

The Plant Press



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National Museum of Natural History

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A Curator's Perspective

The Erosion of Collections-Based Science: Alarming Trend or Coincidence?

By Vicki A. Funk*

Over the last few years many visitors have passed through the doors of the U.S. National Herbarium (Herbarium Code: US) bringing depressing news about some of our fellow botanical institutions and research centers. Institutions, which house historic and otherwise important botanical specimens, have been closed. The scientists who study, preserve, and curate them, have been fired, downsized, forced into retirement, or had their focus directed away from taxonomy and systematics. When reasons are given they usually involve budget shortfalls; unfortunately, collections and research are easy targets. But when I mentioned this to one former museum director who was visiting, his reply was, "When I was a director and had a budget shortfall I went out and raised more money, I did not fire my staff!"

Is this a trend or a coincidence? Perhaps a more detailed examination of events will provide an answer and so we begin with the Milwaukee Public Museum and continue up to the ongoing recent troubles at the Royal Botanic Gardens, Kew.

In 2005 *Milwaukee Public Museum* (MIL; established in 1882; 250,000 specimens) eliminated science and fired most of its staff. If you check the museum's website it seems they no lon-

ger have much of a science presence, just a few collections managers, emeritus curators and adjunct curators who have jobs elsewhere. At the time, most of us thought this was a unique event. How could an institution with 4.5 million objects and specimens, spread over a broad array of departments go out of the research business? How did they think they would keep their collections, exhibits and education programs up to date? But in the nearly 10 years since that event, additional examples of this type of nearsighted administrative behavior has become more frequent as research program after research program has taken the brunt of budget shortfalls; we have become increasingly more alarmed.

Fairchild Tropical Botanic Garden (FTG; established in 1936; 165,000 specimens)

Fairchild has long been active in systematic research. The board and administration decided to move to a different model where they would no longer pay the salaries of research staff but rather have Florida International University faculty work out of Fairchild. They currently have only one research scientist working there. Over a period from 2007 to 2009, the emphasis for research seems to have shifted from tropical systematics to ecology and conservation. In fact, you cannot even find the herbarium on the Fairchild website. If you search for it on Google all you can find is the FTG Virtual Herbarium which contains only about half the collec-

New York State Museum, Albany (NYS; established in 1836; 279,000 specimens)

Most of the research staff was let go a few years ago, including all of the botanists. According to the staff directory, there are four curators, all zoologists, one of which appears to be a state employee. They do have collection managers listed for most collections, including botany, but the herbarium does not appear to have an active research program.

Brooklyn Botanical Garden (BKL; established in 1910; 300,000 specimens)

In August 2013, Brooklyn Botanic Garden suspended its research program and shuttered its herbarium. All members of the Garden's Science Department were laid off, except for one herbarium assistant who was transferred elsewhere and a part-time plant mounter. The Science Department's director was on sabbatical at NSF and she has since left the Garden for a position elsewhere. The Director of Living Collections was made the Director of Collections with the additional responsibility of managing the herbarium. The staff laid off had 60 years of combined experience with BKL. Currently no scientific research is being conducted at Brooklyn Botanic Garden. The herbarium, once widely used by scientists especially those doing research in New York City and Long Island, remains essentially inaccessible to the public.

* With contributions by many individuals in the botanical community.

Pedro Acevedo traveled to Puerto Rico (8/26 – 9/17) to conduct a floristic inventory of a military installation in Aguadilla, to use the rare book library at the University of Puerto Rico in San Juan, to visit the museum home of Agustin Stahl in Bayamón, to present a talk on the work of Stahl in Humacao, and to collect field data on invasive plants of Puerto Rico.

Walter Adey traveled to St. John's, Canada (8/29 – 9/23) to carry out experimental research on *Clathromorphum* climate archive at the Logy Bay Marine Lab at Memorial University.

Ashley Egan traveled to Boise, Idaho (7/26 – 7/30) to participate in the American Society of Plant Taxonomists council meeting and to present a talk at the Botany 2014 annual meeting; and to Leiden, Netherlands, Copenhagen & Aarhus, Denmark, and London, England (8/14 – 9/15) to conduct herbarium research and to present a talk at the Flora of Thailand meeting held at Royal Botanic Gardens, Kew.

Robert Faden traveled to London,

England (7/12 – 9/26) to conduct research on Commelinaceae for Flora Zambesiaca at the Royal Botanic Gardens, Kew.

Vicki Funk traveled to Honolulu, Hawaii (7/4 – 7/16) to study Compositae and to present a talk at the Island Biology 2014 meeting at the University of Hawaii at Manoa; to Boise, Idaho (7/25 – 8/3) to attend the Botany 2014 conference; and to Oaxaca, Mexico (8/27 – 9/7) to conduct field work on Compositae and participate in a Ethnobotany project funded by a Consortium Level II grant.

Amanda Grusz traveled to San Jose, Costa Rica (6/5 – 7/15) to lead the Organization for Tropical Studies (OTS) Tropical Plant Systematics graduate field course; and to Boise, Idaho (7/26 – 7/31) to present a talk at the Botany 2014 conference.

Carol Kelloff traveled to Ithaca, New York (9/10 – 9/14) to present a poster at the Plant Biology Retreat and to work on the T.F. Lucy collection in the Bailey Hortorium.

W. John Kress traveled to Cairns, Australia (7/18 – 8/9) to present an invited symposium at the annual conference of the Association for Tropical Biology and Conservation and to meet with colleagues at the Royal Botanic Gardens in Sydney.

Gary Krupnick traveled to Honolulu, Hawaii (7/6 – 7/12) to present a poster at the Island Biology 2014 meeting at the University of Hawaii at Manoa.

Sylvia Orli traveled to Panama City, Panama (9/22 – 9/26) to attend the 7th Annual Meeting of the Global Plants Initiative.

Paul Peterson traveled to Boise, Idaho (7/24 – 8/13) to present two talks at the Botany 2014 conference and to collect grasses in the surrounding area.

Eric Schuettpelz traveled to Boise, Idaho (7/26 – 7/31) to present a talk at the Botany 2014 conference; and to Berkeley, California (9/30 – 10/4) to study fern collections at the University Herbaria of the University of California at Berkeley.

Rusty Russell traveled to Panama City, Panama (9/22 – 9/26) to present a talk "Revisiting Type Fragments" at the 7th Annual Meeting of the Global Plants Initiative.

Robert Soreng traveled to Florence, Italy (7/2 – 7/4) to work with species and type specimens at Herbarium Universitatis

Florentinae; and to Turkey (7/17 – 8/20) to collect for a revision of *Poa* in Turkey (Taurus Mts., Pontic Mts., and Mt. Ararat) with Evren Cabi (Namık Kemal University, Tekirdağ) and to present a talk on phylogenetics and geography of *Poa* at NKU.

Alice Tangerini traveled to Boulder, Colorado (7/13 – 7/19) to present a portfolio and a lecture at the annual meeting of the Guild of Natural Science Illustrators; and to Boise, Idaho (7/26 – 7/30) to present a workshop at the Botany 2014 conference.

Alain Touwaide and Emanuela Appetiti traveled to Tbilisi, Georgia (9/7 – 9/15) to attend the Conference of the International Society for the History of Medicine, where they organized a thematic session on "The Silk Road and the circulation of materia medica, remedies, and therapeutics. Methods and practices from China to the Mediterranean."

Warren Wagner traveled to Boise, Idaho (7/18 – 7/31) to present a talk at the Botany 2014 conference, to participate in the American Society of Plant Taxonomists council meeting, and to collect Onagraceae DNA samples in Colorado and Utah.

Jun Wen traveled throughout California (8/1 – 8/8) to conduct field work for the Vitaceae treatment of the Flora of North America; and throughout the south-east U.S. (8/10 – 8/18) to conduct further Vitaceae field work.

Kenneth Wurdack traveled to Bronx, New York (8/27 – 8/28) to attend a Ph.D. defense and examination as an external graduate committee member.

Ning Zhang traveled to Durham, North Carolina (7/14 – 7/20) to attend a workshop on next-generation sequencing data for phylogenetics and phylogeography at Duke University.



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Global Plants, New Beginnings

In September 2014, **Sylvia Orli** and **Rusty Russell** attended the 7th annual meeting of the Global Plants Initiative (GPI) in Panama City, Panama. GPI is an international partnership of more than 330 herbaria in 75 countries with the goal to digitize, unite, and provide access to type specimens of plants, fungi, and algae. These specimens are available through JSTOR Global Plants (<http://plants.jstor.org>), and as of September 2014, 2 million digital objects can be found in the Global Plants Database, by far the largest online repository of biological type specimen data. In addition to over 110,000 type specimens, the U.S. National Herbarium has provided micro-imaging of the lichen type specimens and an inventory of the type fragment collection. We have also provided almost 25,000 images of specimens collected on various 19th century expeditions to the western United States.

Editor's Note

Some of the topics discussed at the conference included addressing the data gaps in the Global Plants database, minimizing errors in the metadata, and recruiting new herbaria to the GPI. In addition, suggestions for improvements or additional functionality for the JSTOR Global Plants website and database were discussed. Partnerships, priorities and communication strategy discussions for the GPI were particularly important as 2014 was the end of funding from the Mellon Foundation. The U.S. National Herbarium will continue to provide additions and updates to the type data in Global Plants as part of the important global effort to aggregate type materials and make them accessible through one online portal.

Visitors

Carlos García-Robledo, Smithsonian Fellow; Plant-herbivore interaction (7/20/10-7/17/14).

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

Yongli Fan, Xishuangbana Tropical Botanical Garden, China; Pollination studies (1/13/14-1/12/15).

Nancai Pei, Research Institute of Tropical Forestry, China; Plant reproductive traits (3/1-9/1).

Ramya Prasad, Georgetown University; Medicinal uses of plants in Ayurveda (5/5-7/18).

Hope Watson, Temple University; Medicinal plants of antiquity internship (5/24-8/8).

Sterling Herron, Milligan College; *Vitis* internship (5/27-8/2).

Dennis Zhu, University of Missouri; Kudzu internship (5/27-8/2).

Lola Ramirez, Corcoran College of Art+Design; Botany exhibit internship (6/2-8/29).

Karen Yu, Smith College; Plant DNA barcode project internship (6/9-8/15).

Katharine Wilson, Smith College; Plant DNA barcode project internship (6/16-8/22).

Rebecca Jacobs, Indiana University-Purdue University Fort Wayne; Medicinal plants of antiquity internship (6/30-8/15).

Valentina Cammaroto, University of Messina, Italy; Epidemiology in the Early Roman Empire. (7/1-7/30).

Domenico Pellegrino, University of Messina, Italy; Greek therapeutic plant lore (7/1-7/30).

Kristen Porter-Utley, Keene State College; Ochnaceae (7/1).

Rebecca Richards, University of Adelaide, Australia; Australian Aboriginal plant uses (7/10).

Marc Baker, Arizona State University; *Cylindropuntia*, *Echinocereus* and *Grusonia* (Cactaceae) (7/14-7/18).

Juliet Lindo, North Carolina State University; *Medinilla* (Melastomataceae) (7/14-7/15).

Edgar Rosas-Alquicira, Universidad Del Mar, Mexico; *Amphiroa* (7/14-7/15).

Hong Xin, Anhui Normal University, China; Gesneriaceae (7/14-7/19).

Mary McKenna, and 13 students, University of Virginia Blandy Field Station; Herbarium tour, plant conservation (7/18).

Eduardo Estrada, Universidad Autónoma de Nuevo León, Mexico; *Astragalus* and *Dalea* (Fabaceae) (7/20-7/27).

Michael Elgey, Royal Botanic Gardens, Sydney, Australia; Herbarium tour, disaster preparedness (7/21).

Tyler Kartzin, Princeton University; Plant DNA barcode project (6/16-6/17; 7/21-7/23).

Paulo Windisch, Univ. Vale do Rio dos

Sinos, Sao Leopoldo, Brazil; Brazilian ferns (7/24-8/7).

Eleanor Wagner, George Marshall High School, Virginia; Pacific Island flora (8/1-8/29).

Thomas Smith, Great Bridge Opportunities, Virginia, and **Calvin Stone**, Integrated Federal Solutions, Virginia; Mediterranean medicinal plants. (8/7).

Divya Kumar-Dumas, University of Pennsylvania; South Asian botanical tradition (8/11).

Catherine Webb, University of Oklahoma; Medicinal plants (8/13).

Francismeire Bonadeu da Silva, Botanical Garden of Rio de Janeiro, Brazil; Fabaceae (8/14-8/16).

Ana Kelly Koch, Institute of Botany of São Paulo, Brazil; Orchidaceae (8/14-8/16).

Mark Tebbitt, California University of Pennsylvania; Andean *Begonia* (Begoniaceae) (8/14-8/15).

Margaret, Michael, and William Dix, Univ. del Valle de Guatemala, Guatemala; Central American Bromeliaceae and Orchidaceae (8/18-8/29).

Eduardo Pasini, Universidade Federal do Rio Grande do Sul, Porto Alegre - RS, Brazil; Compositae (8/18/2014-4/30/2015).

Fabio Andres Avila Castillo, Universidad Nacional de Colombia, Colombia; Cuatrecasas Project (8/19-8/28).

Continued on page 5

Staff Research & Activities

Bob Faden spent 11 weeks (12 July – 26 September) at the Royal Botanic Gardens, Kew working on Commelinaceae for Flora Zambesiaca, the Kew flora covering the African countries of Mozambique, Malawi, Zambia, Zimbabwe and Botswana. The flora contains at least 87 species of Commelinaceae, including the endemic genus *Triceratella*, collected for the first time in 1958 in southern Zimbabwe, described in 1961 by J. P. M. Brenan, and only recollected once. It is believed to be most closely related to the Australian genus *Cartonema*. At Kew, Faden concentrated on the most complex genus, *Commelina*, which comprises nearly half the species in the flora. It is particularly diverse in Zambia, especially near the long border that it shares with the Democratic Republic of Congo. Faden plans to work on the second largest genus in the flora, *Aneilema*, back at the Smithsonian Institution. At Kew, he also attended parts of the Flora of Thailand meeting, which was held on September 7-12, 2014.

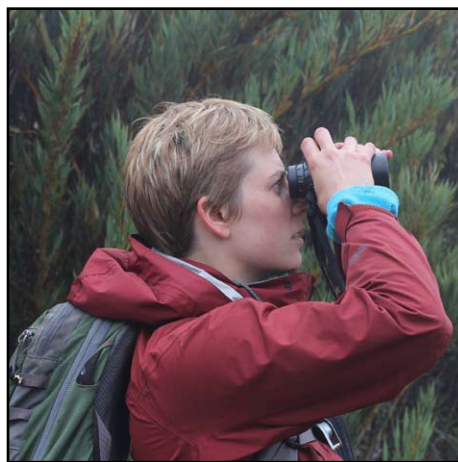
Messaggeri della Conoscenza (*Messengers of Knowledge*) is a new program launched by the Italian Ministry of Education, University and Research (MIUR) to promote academic activities and research between foreign scholars and universities based in Southern Italy (Campania, Calabria, Puglie, and Sicilia). As part of the program, **Alain Touwaide** delivered in March a one-month intensive course on Classical science and tradition at the



Domenico Pellegrino (left) and Valentina Cammaroto (right) with Alain Touwaide. (photo by Emanuela Appetiti)

University of Messina, Sicily. At the end of Touwaide's classes two students, **Valentina Cammaroto** and **Domenico Pellegrino**, were selected to study with him for the month of July at the Smithsonian Institution. During their internship, Valentina worked on "Reconstructing Epidemiology in the Early Roman Empire," while Domenico researched the "Greek Therapeutic Plant Lore." The research will lead to a publication of an article in English in *Technai*, an international peer-reviewed journal in ancient science and technology.

New Faces



Amanda Grusz

Amanda Grusz joined the Botany Department as a postdoctoral fellow in May 2014, working with **Eric Schuettpeiz**. Grusz received her undergraduate degree in Biology at the University of North Carolina Wilmington and she recently completed her Ph.D. in Biology and Genetics at Duke University. Her dissertation research focused on the evolution and systematics of the desert-adapted fern genus *Myriopteris* (Pteridaceae). Specifically, she explored how hybridization, polyploidy, and apomixis influence the evolution and diversification of this ecologically extreme lineage. Following the completion of her degree, Grusz coordinated the 2014 Tropical Plant Systematics Course offered by the Organization for Tropical Studies (San Jose, Costa Rica), alongside Mauricio Bonifacino (previously of the NMNH Botany Department). Now, as a Smithsonian postdoctoral fellow, Grusz is working to develop phylogenomic resources with which to explore the evolution of extreme rates of molecular substitution exhibited by the vittarioid ferns, a lineage of tropical epiphytes in the Pteridaceae.

Kuang-chi Hung, a Smithsonian Fellow in the History of Science and Technology, was in Washington through August 2014. He was exploring the role that the Smithsonian Institution played in advancing research in biogeography and allied fields (e.g., paleontology and archaeology) in Asia during the first half of the 20th century. Although much of his research was in the Smithsonian Institution Archives and the Freer and Sackler Gallery Archives, he was no stranger to the Department of Botany. Hung recently received his Ph.D. from Harvard University with a thesis entitled "Finding Patterns in Nature: Asa Gray's Plant Geography and Collecting Networks (1830s-1860s)." Janet Browne in the Department of the History of Science was his major advisor. **Laurence J. Dorr** (Botany) and **Pamela Henson** (Smithsonian Institution Archives) served as Hung's hosts. He has since taken a professorship in Taiwan.

Sonja Walch, currently a Postdoctoral Research Fellow in the Department of Contemporary History, University of Vienna, Austria was awarded a Smithsonian fellowship from the History of Science and Technology pool and is in residence in Washington from August through November 2014. She is interested in the history of post WWII botany (and science) in the Pacific and the interactions of American and exiled European botanists whose careers intersected in the Philippines. She will continue to research the activities of the Austrian botanist Mona Lisa Steiner who lived in the Philippines in exile from 1938 onward and Steiner's interactions with the late F. Raymond Fosberg among others. **Laurence J. Dorr** (Botany) and **Pamela Henson** (Smithsonian Institution Archives) are Walch's hosts.



Departures

In October, **Andrew Clark**, a member of the Core Collections Management team, left the Department to take a new job at the U.S. Department of Agriculture's National Institute of Food and Agriculture. A member of the CCM team since



Andrew Clark

2008, Clark's responsibilities included all aspects of collection management, with his primary responsibilities being Loan Officer for the Department. Clark was instrumental in negotiating and establishing Museum Transfer Agreements (MTA) between the Smithsonian Institution and over 40 Brazilian institutions. This allowed the processing and acquisition of roughly a decade's worth of exchange and gifts sent to the Department of Botany that had been suspended due to the lack of an MTA. Other accomplishments included working closely with the Seeds of Success program under the Bureau of Land Management (BLM). A protocol was constructed for the collection, pressing, labeling, and shipping of vouchers by various BLM outposts so that all collections are made in a standardized manner and arrive at the herbarium safely and well documented.

Awards & Grants

In 1963, the Council of the Association for Tropical Biology and Conservation (earlier known as ATB) established the election of Honorary Fellows as "persons of long distinguished service to tropical biology." This is the highest award given by the Association. To date more than 80 Honorary Fellows from over 15 countries have been elected by the Council. In July 2014, at the ATBC annual meeting in Cairns, Australia, **W. John Kress** received

the ATBC Honorary Fellows Award for his past contributions to the Association.

Alain Touwaide and **Emanuela Appetiti** were awarded the "Golden Fleece of Medicine" for their contribution to the History of Medicine, conferred during the closing ceremony of the 44th Congress of the International Society for the History of Medicine, in Tbilisi, Georgia, on September 14, 2014.

Linder Receives Cuatrecasas Medal

At an October 2014 seminar, H. Peter Linder from the University of Zurich was presented with the 2014 José Cuatrecasas Medal for Excellence in Tropical Botany. The Cuatrecasas Medal is typically given during the Smithsonian Botanical Symposium, but Linder was unable to attend the Symposium in April 2014. At his October seminar he spoke about "The Evolution of African Plant Diversity." In receiving the award, Linder was recognized for his valuable contributions to identifying biogeographical patterns in the Southern Hemisphere and especially in Africa.



H. Peter Linder accepts the 2014 José Cuatrecasas Medal for Excellence in Tropical Botany from **Laurence Dorr**, Chair of the Cuatrecasas Medal selection committee. (photo by Ken Wurdack)

Visitors

Continued from page 3

Ari Novy, US Botanic Garden; Medicinal plants in Antiquity (8/19).

Carolina Diller, University of Maryland, College Park; Angiosperm pollination (9/2/2014-1/31/2015).

Philip Wexler, National Library of Medicine; Poisonous plants (9/2).

Christian da Silva, Univ. Estadual de Freire de Santana, Freire de Santana, Brazil; *Ichnanthus* and *Echinolaena* (Poaceae) (9/9-9/18).

Cristiane Snak, Univ. Estadual de Freire de Santana, Freire de Santana, Brazil; *Canavalia* and other Phaseoleae (Fabaceae) (9/9-9/18).

Thomas F. Daniel, California Academy of Sciences; Acanthaceae (9/16-9/17).

Ainsley Calladine and **Michelle Waycott**, State Herbarium of South Australia, Australia; Seagrasses (9/29-9/30).

John Clark, National Tropical Botanical Garden; Pacific *Cyrtandra* (9/29-10/10).

NEXT GENERATION PTERIDOLOGY

AN INTERNATIONAL CONFERENCE ON LYCOPHYTE & FERN RESEARCH



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ORGANIZATION OF PLANT BIOSYSTEMATISTS

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International Association for Plant Taxonomy

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2015 Smithsonian Botanical Symposium, 1-5 June, to Explore Lycophyte and Fern Research

The United States Botanic Garden and the Smithsonian Institution Department of Botany will convene the 13th Smithsonian Botanical Symposium, “**Next Generation Pteridology: An International Conference on Lycophyte & Fern Research**,” to be held at the National Museum of Natural History in Washington, D.C., on 1-5 June 2015. This meeting will also mark the 12th Symposium of the International Organization of Plant Biosystematists.

The past decade has seen remarkable advances in our understanding of fern and lycophyte biology. New sources of data have emerged and novel methods for analyzing these data are being developed. At the same time, many traditional approaches have been revitalized as their unique and specific contributions are more fully realized. With a recent influx of students and early career researchers, the international pteridological community continues to grow. Through more widespread and far-reaching collaborations, the pace of scientific discovery is accelerating, new parts of the globe are being included, and the conservation of these important species in a rapidly changing world is being investigated. This conference aims to bring together the world’s pteridologists to celebrate the progress to date and to forecast developments still on the horizon.

The conference will feature an opening symposium on 1 June, plus three additional days of focused scientific talks, workshops, a poster session, a reception, and a conference dinner. A local field trip is also being organized.

Additionally, the 13th 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 talks and posters can be submitted online at botany.si.edu/sbs/ beginning in early February. The deadline for abstract submission will be 1 April.

Sponsors of the conference are the United States Botanic Garden, the Smithsonian Institution Department of Botany, the National Museum of Natural History, the Journal of Systematics and Evolution, the International Organization of Plant Biosystematists, the International Association of Plant Taxonomy, and the Cuatrecasas Family Foundation.

Attending the opening symposium on 1 June will be free, but attendees must register online at botany.si.edu/sbs/. To participate in the full program, a modest registration fee will be required. Registration will open in early February. Visit the website, call 202-633-0920, or email sbs@si.edu for more information.

New Herbarium Cases: Protecting the Collections for Future Generations

By Meghann Toner

The first line of defense in protecting the U.S. National Herbarium collections from the agents of deterioration is the cases that house them. In the past, these cases were handmade in the Smithsonian craft shops from wood and glass. In the 1940s these cases cost \$29.00 to create.

Today metal cases cost considerably more. The wood and glass half cases first used in the Smithsonian Castle were transferred to the Natural History Building in 1965. In 1968, metal cases were purchased to replace the wooden cases a little at a time. As conservation technologies have improved, so has the housing around our collections.

Over the decades a greater percentage of our wooden cases have been replaced. This massive effort to replace all the wooden cabinets has required funds that have ebbed and flowed over the years. This year, with the generous help of the Collections Care and Preservation Fund (CCPF), we are able to purchase 160 new herbarium cases from Viking Metal Cabinet Company. These new cases will replace 138 wooden cases.

As a result of this new configuration, there will be additional space. For every new metal case, we gain at least two pigeon holes of space. We will be gaining 848 pigeon holes or 32 cases. Unfortunately, this also means the loss of counter space which is partially offset by the fact that each new case has two pull out shelves.

All these cases are planned to be delivered during the fall of 2014. The tasks of installation of cases will require the assistance of, not only the Botany Department’s staff, but also the Museum’s craft shops and labor force. This will be a team effort and one that will make it possible to improve and protect our collections into the future.



The Labor Force team of the National Museum of Natural History move the new herbarium cases into position. (photo by Ken Wurdack)



Attendees of the Island Biology 2014 meeting, held at the University of Hawaii at Manoa, Hawaii.

Meeting Spotlight

By Vicki A. Funk

The Island Biology 2014 meeting, an international conference on island evolution, ecology, and conservation, was held at the University of Hawaii at Manoa from 7 – 11 July 2014. The meeting was organized by Don Drake, Jose Maria Fernandez-Palacios, and Christoph Kueffer. It was attended by nearly 400 people most of whom presented talks or posters. **Gary Krupnick** and I represented the Smithsonian's Department of Botany.

The first day of the meeting was dedicated to invited speakers. The remaining four days were full of contributed papers and posters, covering topics as diverse as plant functional traits, predation, vertebrate evolution, plant evolution, biogeography, birds, arthropods, nutrient cycling, and conservation. At the conclusion of the meeting, a group discussion led to the decision to have another meeting in 2-4 years and three potential places were discussed. The organizers of the meeting published a report about the meeting, discussing current developments and future perspectives for island biology, in the journal *Biology Letters* (10: 20140719; 2014).

There are too many people in the photo above to identify, but a few individuals with ties to the Department of Botany can be pointed out. I am on the far right about four rows back. To my right is Robert Whittaker (editor of the *Journal of Biogeography*), and on his right is Cliff Morden (Hawaiian botanist, UH faculty). On my left is Michael Kiehn (Director of the Vienna Botanical Garden). In the front row fifth from the right is **Marian Chau**, former postdoctoral fellow of mine while I was on sabbatical at UH. The third person to her right is **Haldre Rogers**, former

intern of mine and now a postdoctoral fellow at Rice University doing field work in Guam. In the middle wearing a red shirt is **Jonathan Price**, former postdoctoral fellow of **Warren Wagner** and now an Associate Professor at UH, Hilo. Seated on the steps and holding bags are Peter and Rosemary Grant, well-known Pacific biologists who have visited here and published extensively on Darwin's finches. In the middle at the back, taller than the others and in a light blue shirt, is Robert Ricklefs, well-known phylogeographer and husband of former Smithsonian postdoctoral fellow Susanne Renner. In the front wearing a lei is Don Drake, the local organizer, UH faculty member, and colleague of several Smithsonian staff. Behind Drake's left shoulder is Jose Maria Fernandez-Palacios, the organizer from the Canary Islands. If you look closely you may find others that have passed through the Smithsonian doors.

Six Questions with a Student Intern

Every summer the National Museum of Natural History is invaded by a golden horde of interns and visiting students. The Department of Botany is no exception, with over 25 students passing through its doors this past season. **Vicki Funk** and **Aleksandar Radosavljevic** shared in supervising one of these exceptional interns, **Philip Waissen**, a master's student from the University of Hawaii-Manoa. Before he returned to the university, Radosavljevic sat down with Waissen and asked him a few questions about his research and home country of Papua New Guinea.

AR: So, Philip, what brought you to the Department of Botany?

PW: Well, my master's degree is being

funded through an East-West Center Graduate Degree Fellowship and one of the requirements is that we complete two internships—one in our home country and one at an institution of our choosing. For my first internship I went back to Papua New Guinea and my alma mater, the University of Technology-Papua New Guinea, to study the effects of soil sterilization (through burning) on nematode load in the roots of banana and plantain crops. And, as you know, my second internship was here in the Department of Botany.

AR: Nematodes...I take you are not a botanist in the traditional sense?

PW: No, not really. I guess you would call me a nematologist. Or maybe a plant pathologist...My master's work is focused on the use of the insecticide Movento to control the reniform nematode *Rotylenchulus reniformis*, which is causing major damage to Pineapple crops in PNG. The farmers are already using Movento to control aphid infestations, so we are trying to determine what effect, if any, it has on other sucking parasites and if there are ways to improve application techniques to target several parasites at once. Farmers in PNG don't have much money to invest in costly pesticides, so if we can kill two birds, er bugs, with the same stone it would be a real benefit to small scale farmers.

AR: What have you discovered so far?

PW: Ask me in about two months! I still have some data to analyze, but it looks like it does reduce the number of nematodes found growing in the roots. We just aren't sure yet that reduction has any effect of the overall health of the indi-



Philip Waissen

vidual plant.

AR: Why nematodes?

PW: I grew up in a town in the highlands of PNG called Kainantu. Most of the families grow coffee as a cash crop, but rely on their plantings of things like sweet potato, taro, and plantain to produce most of the food they eat. In 2003 there was a major outbreak of blight that wiped out most of the potato crop. My parents grow quite a bit more coffee than a lot of their neighbors so we were mostly insulated from the shock—but seeing how quickly and severely some of our neighbors were affected inspired me to study plant pathology when I left for the university the following year. I am not exactly sure how I ended up deciding to work nematodes for my senior capstone project, but I did...and I was hooked.

AR: So, I have to ask...how was your experience here in Botany?

PW: Great! At first I was a bit nervous, because I didn't really know much about botany outside of what we covered in an introductory course during my undergraduate studies. But in the end, this lack of knowledge ended up being a great reason to come here. I was exposed to things I never would have learned as part of my normal training. I got the chance to learn plant morphology and a bit of taxonomy, made plant collections with Carol Kelloff, learned some techniques like DNA extraction and PCR, and learned how a herbarium functions on a day to day basis and how the collections here can improve my own research.

AR: And, last question...what's next?

PW: A break! Just kidding...once I complete my degree I will have to return to PNG for a few years as a condition of my J1 visa. After that, however, I would like to continue my education and perhaps pursue a PhD studying the molecular interactions between plants and their parasites.

ABC Interviews "Her Deepness" in the Depths of the Herbarium

Sylvia A. Earle, National Geographic Explorer-in-Residence and the founder of Mission Blue, visited the U.S. National Herbarium on August 6, 2014, for an interview with ABC's Power Players



Sylvia Earle displays a specimen during an interview at the U.S. National Herbarium. Photos Courtesy of the Smithsonian Office of Public Affairs

Susan Saulny. Earle, currently in the midst of a press tour for the release of her new documentary "Mission Blue", discussed ocean conservation, as highlighted in her upcoming film.

A multitude of current issues were discussed including sustainable fisheries: from ocean to table, the long-term impacts of the BP Deepwater Horizon Oil Spill on the Gulf Region, and the future outlook for the world's oceans. The interview was conducted in the exact location in the herbarium where a segment of "Mission Blue" was also filmed. Both segments helped to highlight the extensive collection of algal specimens which Earle generously donated to the Smithsonian Institution in 1999.

The Earle collection adds to an already vast record of marine botanical species across many decades, thereby permanently preserving these species during a time where the oceans are undergoing dramatic shifts. Emphasizing these shifts,

Earle ended the interview with her mantra of choice "no water, no life; no blue, no green". The documentary "Mission Blue" was recently released by Netflix.

Guide to Guyana Plant Collection is Published

Sara Alexander, Bruce Hoffman, Carol Kelloff, and Vicki Funk have published "Smithsonian Plant Collections, the Guianas: 1991 – 1993, and 1995-2000, Bruce Hoffman," (2014, Smithsonian Institution, *Smithsonian Contributions to Botany*). With narrative from Bruce Hoffman and full-color and black-and-white photographs, the publication details Bruce Hoffman's botanical collecting trips for the Biological Diversity of the Guiana Shield Program. Part I contains trip narratives by Hoffman and maps of his teams' routes; part II lists collection localities, with collection number ranges, habitat descriptions, geographic coordinates, and assisting collectors; part III lists collections in numerical order with identifications; and part IV lists collections ordered by determined taxonomic name. This volume is intended as a reference for herbaria holding collections made by Hoffman and as an aid to botanists interested in the region. The information in the volume is also available, along with additional photographs and information about other collectors and expeditions with the BDG Program, at <http://botany.si.edu/bdg/expeditions.cfm>.



Approaching Ayanganna Mtn. summit, Bruce Hoffman (left) and local guides from Chinoweing village, Harkinson Roland (center) and Teddy Roland (right). (photo by Terry Henkel)

The Biodiversity Heritage Library: It's More Than Legacy Literature

By Robin Everly

As a reference librarian in the Botany and Horticulture library, I try to keep up with the overgrowing amount of online botanical literature. When a library user asks for a botanical publication published before 1923, not only do I check the physical stacks, but automatically check if the title is available online. I usually start with the Biodiversity Heritage Library (BHL) website and then check others such as Google Books. BHL currently has 21 Institution Members and Affiliates, including Smithsonian Libraries and its Botany and Horticulture Branch, digitizing the works found in their libraries. As of September 2014, BHL has scanned over 44 million pages and continues to provide worldwide freely available access to over 151,000 volumes. Increasingly, there is the likelihood a relevant title will be found in the online database. However, what you might not know is BHL is also now scanning post-1922 literature.

Post-1922 titles are available on BHL because (1) it's a U.S. federal government publication, (2) its copyright has expired (relevant to the murky 1923-1963 time period of copyright renewal), (3) it's available via the Internet Archive, or (4)

the BHL has obtained permission from a third-party publisher to digitize the title. Also, some BHL Institution Members and Affiliates have given permission to have titles published by their institutions digitized and made available to BHL. When viewing a post-1922 title or journal, some might include a cutoff date; e.g., only pre-2004 volumes are digitized and more recent will still be found in print or through a subscription database.

Here are just a few examples of post-1922 titles available through BHL. Feel free to explore at <http://www.biodiversitylibrary.org>. To learn more how BHL handles post-1922 publications' permissions, visit <http://biodivlib.wikispaces.com/Permissions>, and for copyright and licenses, go to <http://biodivlib.wikispaces.com/Licensing+and+Copyright>.

An ecologically annotated checklist of the vascular flora at the Chesapeake Bay Center for Field Biology, with keys; by Daniel Higman. <<http://www.biodiversitylibrary.org/bibliography/63158#/summary>>

This is an U.S. federal government publication from the Smithsonian Institution, so it is not in copyright. Also, according to a library catalog database (WORLDCAT) which can show how many libraries own a title, only three libraries in the U.S. hold this title. Therefore, by digitizing it, Smithsonian Libraries and BHL have made it available to anybody interested in studying the flora of the Chesapeake Bay region in Maryland.

Flora of Japan : in English : combined, much revised and extended translation / by the author of his Flora of Japan (1953) and Flora of Japan, Pteridophyta (1957) ; edited by Frederick G. Meyer and Egbert H. Walker. <<http://www.biodiversitylibrary.org/bibliography/43786#/summary>>

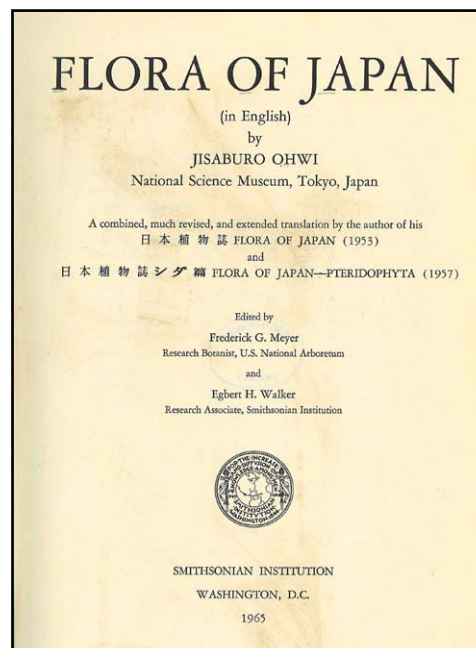
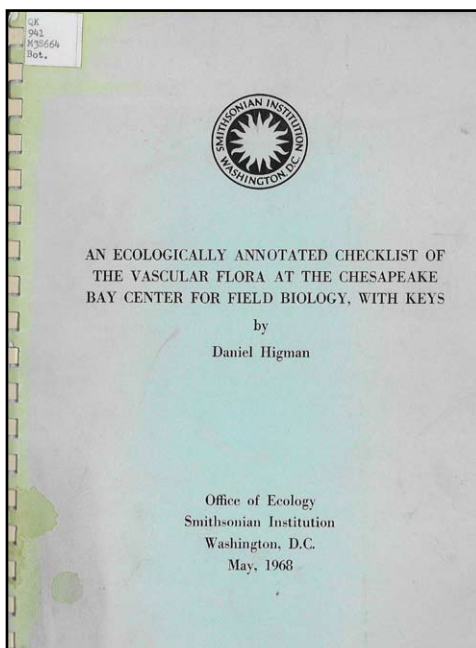
This is a title I became familiar with when I was the librarian at the U.S. National Arboretum. The Arboretum has many Japanese plants in their gardens and a rich history of researchers collecting plant material in the country. In addition to Egbert H. Walker, many other Smithsonian scientists offered their expertise to this English translation.

Annals of the Missouri Botanical Garden (Missouri Botanical Garden) <<http://www.biodiversitylibrary.org/bibliography/702#/summary>>

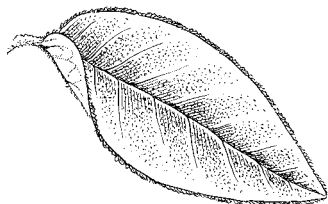
This journal is an important publication on systematic botany and has been published since 1914. Missouri Botanical Garden (MBG) has given permission for this journal to appear in BHL currently up to Volume 106 (2010). The Peter H. Raven library at MBG, which is also a BHL Member Institution and incidentally provided most of BHL's early botanical content through the website, Botanicus.org, performed the scanning of the issues.

Compositae Newsletter (The Swedish Museum of Natural History) <<http://www.biodiversitylibrary.org/bibliography/12561#/summary>>

This is an example of an international



organization giving permission to have its entire journal run scanned into BHL. The publication began in 1975 and is useful to anyone with a taxonomic interest in the family Asteraceae, commonly known as the daisy or sunflower family. A nice history of the publication can be found in Volume 50. Providing it electronically through BHL, allows for more researchers and libraries to learn about the publication and have access.



Flora of Guaramacal

By Laurence J. Dorr

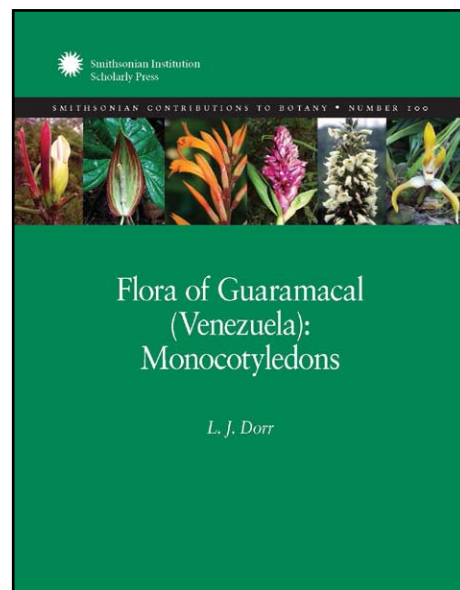
The first volume of a multi-volume Flora of Guaramacal (Venezuela) was published electronically on 30 September 2014 (<http://dx.doi.org/10.5479/si.19382812.100>). Hard copy will be available mid-November. The flora is an attempt to describe the ca. 1300-1500 species of vascular plants that occur within the boundaries of a 225 km² national park in the Andes of Venezuela. The area is roughly equal to that of the District of Columbia (177 km²), but the relief, habitats, species diversity, and species composition are vastly different. The present volume treats the monocotyledons: 25 families, 135 genera, and 315 species (316 taxa). Almost half of the species treated are orchids, many of them epiphytes.

I first began collecting plants in the Andes of Venezuela in April 1988 before I joined the Smithsonian. My principal collaborators were and have always been the botany professors and staff of UNELLEZ, which is a small university in the *llanos* (plains) near Guanare, Portuguesa state, and in the foothills of the mountains. Initially we began exploring the east-facing slopes of the Sierra Nevada de Mérida, which was challenging because there are no roads apart from the paved road that connects Barinas and Mérida and access to the mountains involved hiring horses and mules and organizing small expeditions. Eventually we were introduced to Guaramacal because it was one of the few places in the Venezuelan Andes close to Guanare that had vehicular access although we have continued to use pack animals. In the

late 1960s a dirt road had been constructed from Boconó to the summit of Guaramacal so that television towers could be situated there. When the road was extended to the small and remote village of Guaramacal, it effectively bisected the Ramal de Guaramacal, the northernmost extension of the wet Andes in Venezuela. Of course, the road was almost immediately discovered by plant collectors notably the Venezuelan orchid specialist G.C.K. ("Stalky") Dunsterville.

I do not remember when the botanists at UNELLEZ and I conceived of organizing a project to write a flora of Guaramacal. If I did I would probably rue that day. While I am very pleased with what we have been able to accomplish, I was very naïve about what writing a flora would entail, especially in a region that had not previously been treated floristically. Our blank slate meant that we had to raise money for field work, assemble an herbarium collection large enough to proceed, discover who else had made herbarium collections in Guaramacal and where they were deposited, identify the material, verify the nomenclature and sort out synonymies, draft descriptions of families and genera while taxonomic concepts were constantly shifting as molecular phylogenies were being published, map distributions, illustrate selected taxa, etc.

It is impossible to acknowledge all who helped get us to this point but several contributors deserve special notice. Germán Carnevali and Ivón Rodríguez (both CICY) conceptualized and drafted the treatment of the orchids; Mark Strong



(US) and Tony Reznicek (MICH) prepared a treatment of the sedges; and Basil Stergios and Miguel Niño (both PORT) assisted in researching and writing all of the other treatments. Rose Gullledge (US) did almost everything else necessary to complete the flora apart from field work. Also, what has made working in Guaramacal infinitely easier than it might otherwise have been is the support we received from the superintendent of the park, Amilcar Bencomo, and two of the park guards in particular, Ramón Caracas and the late Luis Zambrano.

The gestation period for this first volume of the Flora of Guaramacal was exceedingly long, but now that we have a model for the additional volumes we hope that they can be completed more expeditiously.



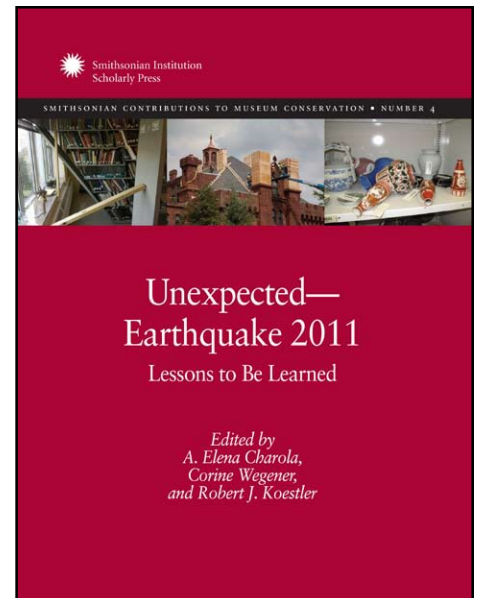
Collecting epiphytes in a cloud forest in Quebrada Honda, Venezuela.

Unexpected— Earthquake 2011: Lessons to Be Learned

The volume “Unexpected—Earthquake 2011: Lessons to Be Learned” (*Smithsonian Contributions to Museum Conservation* 4: 1-105. Edited by A.E. Charola, C. Wegener and R.J. Koestler. 2014) brings together nine reports and six short communications that describe damage and other problems caused for the Smithsonian Institution by the earthquake that occurred in the Washington, D.C., area on 23 August 2011. The first chapter is a summary of the presentation by Secretary G. Wayne Clough to the Smithsonian community nearly a month after the event, and the second gives an overview of the impact that the earthquake had on buildings and collections. The third chapter describes in

detail both damages to and post-seismic stabilization of the Hempstead House, listed as a historic site on Smithsonian property in Maryland. The fourth chapter describes some of the damage to and subsequent conservation of fossils in the National Museum of Natural History; the next two chapters describe damages suffered by the **Botany–Horticulture Library** and the fluid collection located in this same building. The short communications report whether damage was suffered in six other Smithsonian museums. Chapter eight deals with the Smithsonian’s Museum Support Center, describing damage suffered by collections in the pods of this center as well as the structure overall and, in particular, its roof, in which many previously undiscovered leaks were subsequently exposed (over offices and laboratories) by Hurricane Irene. The final chapter brings together recommendations for measures to be implemented based on the experience gained. An epilogue on

the need for preparedness for unexpected emergencies and a bibliography close the volume. Download it from <http://opensi.si.edu/index.php/smithsonian/catalog/book/47>.



Botany in Pictures



Smithsonian botanist **Mark Strong**, following in the footsteps of early generations of D.C. and vicinity botanists, examines Scarlet Ammannia (*Ammannia coccinea*) and associated plants along the floor of the historic Alexandria Reservoir below the Masonic Temple in the City of Alexandria, Virginia, in August 2014. The reservoir was built in the 1850s and is one of the oldest public water reservoirs in the



nation. Local botanist Nellie C. Knappen studied this site in the early 1920s and documented Scarlet Ammannia, among many other plants that persist there today. *Ammannia coccinea* is a nonshowy, uncommon, native wetland plant in the Loosetrife family (Lythraceae). Also known as Valley Redstem, it occurs in fresh marshes and on pond margins, and is one of those easily overlooked plants that plays an eco-

logical role not readily apparent to us—it is useful as a source of food for waterfowl. During the fall and winter, the seed capsules are eaten by ducks such as Mallards, Northern Pintails, and Green-winged Teal. Above left is an image of Scarlet Ammannia (photo by G.P. Fleming) and on the right is a picture of Mark Strong examining Scarlett Ammannia in the field (photo by R.H. Simmons).

Profile

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Instituto Nacional de Biodiversidad (INBio) (INB; established in 1989; 183,000 specimens)

In 2011 INBio announced that it was going out of the collections and research business. The herbarium was rapidly moved into another building because the building built specifically for the herbarium, had been sold. Recently, the entire staff was let go. This important collection is completely databased and available on line and together with the herbarium at the Museo Nacional de Costa Rica (CR; 215,000 specimens) they make Costa Rica the best botanically documented country between Mexico City and Bogota. Fortunately, the Museo has agreed to take charge of the herbarium; although, currently, they do not have the space to incorporate the specimens. So far, there is no guarantee that there will be jobs for the staff. Hopefully, there will be a new building constructed so that both collections can be combined and additional trained staff will be hired to manage it.

Field Museum of Natural History (F; established in 1893; 2,700,000 specimens)

Staffing for research and collections at the Field Museum had been on the decline for years. Beginning in 2009, between buyouts and staff leaving for other jobs, science staffing took a steep turn downward. Currently, there are only two curators in Botany and three support staff to study and manage the enormous resource. Fortunately there are three emeriti that continue to work. There are no science departments, just one "Action Science Center." The collections are well maintained because of the dedication of collections staff but there is no real growth. However, the emphasis seems to be on marketable skills and plant taxonomy does not seem to be on the list. There is no announced plan to hire additional staff.

California Academy of Sciences (CAS; established in 1853; 2,000,000 specimens)

Recently the administration of CAS has decided to shift the focus of the museum. Established scientists were pressured into retiring, new people will be hired but they will have a significant focus on outreach using social media. Oddly this comes after the construction of a new building to house the collections.



A good model to follow: Muséum National d'Histoire Naturelle in Paris, which has recently renovated its herbarium, has imaged about 8 million specimens. All of their herbarium specimens are now stored in new compactors, organized by the phylogenetic system.

Royal Botanic Gardens, Kew (K; established in 1759; became a government institution in 1841; 7,000,000 specimens with well over 350,000 types)

For months rumors have been in circulation about the drastic changes that are taking place at Kew. Finally enough people have visited and others have passed through US, that we are getting a better picture of what is happening. Kew, long a premier botanical institution for research and collections, is under serious attack. Reports indicate that the Herbarium, Jodrell Laboratory, and Millennium Seed Bank are to undergo drastic administrative changes and a significant reduction in science staff. The major structural change is that these three administrative units will be replaced by six focal areas: Collections, Identification and Naming, Comparative Plant and Fungal Biology, Conservation, Natural Capital, and Biodiversity Informatics. Nine people have been appointed to guaranteed new positions. Everyone else is being forced to apply for open new positions that are made available.

When this crisis at Kew started 25 people decided to retire and those positions were lost altogether. That left 200 staff members in the three units. The scientific staff is scheduled to be reduced

from 200 to 176 which makes it seem as if only 24 positions will be lost. However this number is misleading—the 176 positions include 12 new positions in Biodiversity Informatics, at least some of which may need to be hired from outside Kew, which would further reduce the number of current Kew staff to be retained. Also, the new positions include 27 'Career Development Fellows,' which are fixed non-renewable term (3-5 years) appointments designed to develop researchers from current Kew staff. These staff members are then apparently expected to seek research positions at Kew, attract independent funding, or simply become redundant and have to leave Kew.

Except for the heads of the new focal areas and a limited number of new slots that are very close to existing ones, everyone else will have to apply for one or more of the positions that have been created in the new structure. Any new positions that are not filled by current Kew staff will be opened to a wider pool of applicants. It appears then that at a minimum, 24 current Kew staff members in science will lose their jobs by December 1 but reason suggests that the number could be significantly higher. Taking all of this into account, the total loss of permanent jobs

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Profile

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in science at Kew will probably be at least 50 or 25 percent of the current permanent science positions. However, if you include the 25 that took retirement the loss of science positions would be 34 percent.

Equally disturbing is the division of the remaining herbarium staff into three areas: Americas, Africa, and Asia. Systematic groups such as the “Legumes” will no longer exist and the leaders and staff of these groups will have to compete for jobs with everyone else. What is striking about this is that most of the world (including Kew scientists) has been moving to synthetic work with a global focus and yet the administration at Kew is choosing to balkanize their research into areas. It is amazing that Muséum National d’Histoire Naturelle in Paris (P) has just worked hard to break down such barriers while Kew is building them. It makes it difficult for specialists in a particular family to view a plant group from a global perspective. Will we no longer have “world experts” at Kew?

In addition, the loss of support staff at Kew will be great and that will mean that curators will have to spend more time doing technical work and less time on science. Those scientists that are able to obtain one of the herbarium positions may very well find themselves overwhelmed with collections work as well as mentoring and teaching and as a result have very little time to do research. Certainly Kew has a budget shortfall but when you balance the budget by gutting research and collections staff you fail to recognize that expertise in a group of plants is built up over many years and cannot be replicated once it is lost.

Biological specimens are critical for the next frontiers of climate change studies: they provide the evidence of past as well as present distributions. A deeper understanding of life on Earth in the past can help us predict and possibly mitigate the worst impacts of climate change in the future. Such information is not readily available but it is becoming more so. For some collections it is now possible to view their data and images online and this allows us to use advanced modeling techniques to predict which species may survive and which may go extinct.

Images alone are not enough. Names



The U.S. National Herbarium will soon begin using a scanner, similar to the one pictured here, to capture images of herbarium specimens. The first project will scan 280,000 fern specimens and 20,000 Onagraceae specimens.

of organisms change frequently and these proposed changes need to be evaluated and either accepted or rejected. More importantly, a specimen is only useful if it has a proper identification. Many specimens are misidentified. Insuring that something is correctly identified requires a detailed examination of the actual specimen, usually under a microscope. As a result, all collections require constant curation to make them useful for climate change studies and other biodiversity studies. Collections that are not studied and maintained, even if they are physically well cared for, can become out-of-date and less useful.

The utility of collections does not stop with climate change. If you search for “Biological Collections” in Google Scholar, you will find a host of references on the use of such specimens ranging from phenological data to populations trends, utility of vouchers, DNA based phylogenies, biodiversity estimates, and trait evolution.

Lastly, the actions of these gardens and museums fail to take into account that to be relevant and useful collections must continue to grow as new discoveries are made. Expeditions to poorly understood areas are critical for filling in holes in our data and for collecting new material in ways that allow the preservation of genome quality tissue for new methods of investigation. It seems that just when the world is beating a path to our door and asking for help and collaboration we are closing our doors and turning them away.

Here at the Smithsonian Institution we

are not immune. Since I was hired in 1981, our scientific staff has shrunk by about 50 percent and our collections staff even more. The Botany staff at the Smithsonian is concerned about our colleagues and the collections they study, at Kew and around the world. It is troubling that there seems to be an alarming trend in museum and garden administrations to devalue collections and the staff who study and care for them. This is a critical point in time to work toward a world-wide effort to stop and reverse this attrition.

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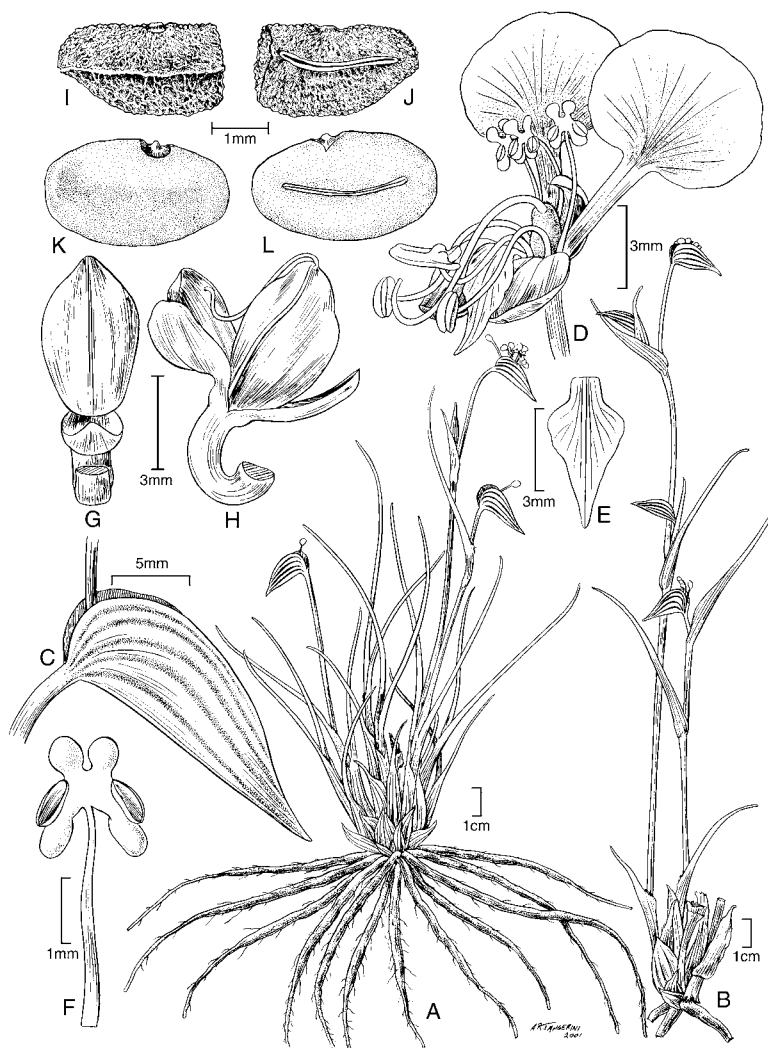
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Commelina milne-redheadii Faden

Among the many collections of *Commelina* (Commelinaceae) in the herbarium of the Royal Botanic Gardens, Kew (see related article on the cover), was a specimen from northwestern Zambia that clearly represented a new species. Unlike most Commelinaceae collections, this specimen, *Milne-Redhead 2824*, had a complete base, mature capsules and seeds, useful descriptive notes on the label and a separate spirit collection of the flowers, enabling the entire plant to be described and illustrated (*Novon 18(4): 469-479; 2008*). The dried and liquid collections were loaned by Kew to the U.S. National Herbarium. The species was named in honor of Kew curator Edgar Milne-Redhead not only because of his excellent collections but also because he inspired other Kew botanists to collect in the same manner.



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