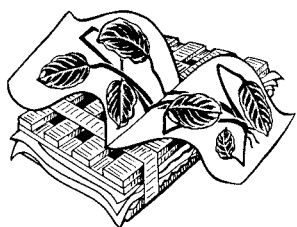


Special Symposium Issue continues on page 14



The Plant Press



Smithsonian
National Museum of Natural History

New Series - Vol. 20 - No. 3

July-September 2017

Botany Profile

Plant Expeditions: History Has Its Eyes On You

By Gary A. Krupnick

The 15th Smithsonian Botanical Symposium was held at the National Museum of Natural History (NMNH) and the U.S. Botanic Garden (USBG) on May 19, 2017. The symposium, titled “Exploring the Natural World: Plants, People and Places,”

focused on the history of plant expeditions. Over 200 participants gathered to hear stories and learn about what motivated botanical explorers of the Western Hemisphere in the 18th, 19th, and 20th centuries. Eight speakers presented talks that took the audience on a trip across the Americas, from Canada in the north to Brazil in the south, and the islands of the Caribbean and the Galápagos.

A day before the talks, several attendees joined behind-the-scenes tours of the Smithsonian Libraries’ Joseph F. Cullman 3rd Library of Natural History at NMNH. For the Symposium guests, the library displayed a wide selection of publications produced by scientific voyages of exploration. From early Renaissance travels (Belon, Tournefort, and others), through the great age of exploration (Cook, Dumont d’Urville, von Humboldt, Darwin, et al.), to the government-sponsored expeditions across the North American West in the mid- and late 1800s, these books are held for study and research. In addition, there were a few examples of “directions for collecting” that reveal how plants were gathered, prepared, preserved, documented, and transported

as specimens (living or dried) in centuries past.

The symposium began with Laurence Dorr (Chair of Botany, NMNH) giving opening remarks. Since the lectures were taking place in Baird Auditorium, Dorr took the opportunity to talk about the theater’s namesake, Spencer Baird. A naturalist, ornithologist, ichthyologist, and

dedicated collector, Baird was the first curator to be named at the Smithsonian Institution

and eventually served as Secretary of the Smithsonian from 1878 to 1887. Among his successes, Baird dramatically expanded the Smithsonian’s natural history collections by obtaining specimens from the many U.S. exploring expeditions.

Kenneth Wurdack (NMNH Botany Curator and Chair of the Cuatrecasas Medal Committee) presented the 15th José Cuatrecasas Medal for Excellence in Tropical Botany to Robin Foster (see related story on page 14). This prestigious award is presented annually to a scholar who has contributed significantly to advancing the field of tropical botany. Foster, a Senior Conservation Ecologist at the Field Museum, was commended for his innovative efforts in cataloging the flora of Barro Colorado Island in Panama. Wurdack also spoke of Foster’s explorations of remote regions of Ecuador and Peru. In his acceptance speech Foster expressed his gratitude and thanked numerous mentors, collaborators, support staff, and his rapid assessment teams. He also encouraged

field explorers to continue what they are doing.

The morning session began with a series of talks focusing on the 18th century explorations of Canada and the United States. Jacques Cayouette (Agriculture and Agri-Food Canada) presented the first talk, “Moravian Missionaries as Pioneers of Botanical Exploration in Labrador (1765-1954).” He explained that missionaries of the Moravian Church, one of the oldest Protestant denominations, established missions along coastal Labrador in Canada in the late 1700s. The first mission was established in Nain in 1771. Within two years the first plant list, including 37 vascular plant species, was written, most likely by the missionary Christoph Brasen.

Cayouette spoke about the Kohlmeister period (1790-1824), named for Benjamin Gottlieb Kohlmeister who collected medicinal plants while traveling along the coast from Okak to the Ungava Bay with a vision of evangelizing the Inuit. During that period, J.C.D. von Schreber and Franz von Paula von Schranck published the first flora of Labrador (1818) which included 12 new species among the 93 vascular plants listed. Cayouette also discussed the “golden era of Moravian botanists” (1824-1880), the most productive period which produced 16 plant collectors, and the Moravian missionaries of the 20th century (1880-1954), which produced 9 collectors. He spoke of Brigitte Schloss, a scholar, university teacher, Moravian Bishop, and the last Moravian plant collector in

Continued on page 17



Pedro Acevedo traveled to Puerto Rico (4/19 – 4/21) to present a talk on the work of Dr. Agustin Stahl, a 19th century scientist and conservationist, at the First Symposium of Environmental History in Puerto Rico; and to the Bronx, New York (6/9 – 6/10) to view collections of the New York Botanical Garden.

Walter Adey traveled to Boothbay Harbor, Maine (6/26 – 9/15) to collect algae.

Gabriel Arellano traveled to Malaysia, Taiwan, and Thailand (5/1 – 6/30) to conduct tree mortality surveys in three permanent plots of the Center for Tropical Forest Science network (Pasoh Forest Reserve, Fushan Forest Reserve, and Huai Kha Khaeng Sanctuary), as part of the Next Generation Ecosystem Experiment - Tropics (NGEE-Tropics) project.

Barrett Brooks traveled to Coconut Island, Kane'ohe, Hawaii (5/20 – 6/6) to collect algae as part of a MarineGEO project at the Hawai'i Institute of Marine Biology; and to Denver, Colorado (6/18 – 6/25) to attend the annual meeting of the Society for the Preservation of Natural History Collections (SPNHC).

Bort Edwards traveled to Fort Collins, Colorado (5/21 – 5/29) to attend a GeoEcoEvo project working-group meeting at the U.S. Geological Survey Powell Center; and to Philadelphia, Pennsylvania (6/6 – 6/9) to visit colleagues at Temple University.

Ashley Egan traveled to Utah, Wyoming, and South Dakota (5/19 – 6/2) to collect *Astragalus* and other legumes for genetic work; to Thurmond, West Virginia (6/9 – 6/13) to collect and remove invasive kudzu vines; and with **Mohammad Vatanparast** and **Matthew Haynsen** to Fort Worth, Texas (6/25 – 6/29) where they each presented at the Botany 2017 meeting.

Christian Feullet traveled to northern Oregon (5/17 – 5/20) to improve the local plant checklists of Gilliam and Sherman counties; and to eastern Oregon (6/1 – 6/6) to collect rare Boraginaceae in the deserts and mountains of Malheur and Wallawa counties.

Vicki Funk traveled to Fort Collins, Colorado (5/21 – 5/27) to attend a GeoEcoEvo project working-group meeting at the U.S. Geological Survey Powell Center; to Syracuse, New York (6/14 – 6/16) to participate in an Environmental Sciences and Forestry working group on the Half Earth Project sponsored by the E.O. Wilson Foundation; and to Fort Worth, Texas (6/26 – 6/28) to attend the Botany 2017 meeting.

Erika Gardner traveled to Denver, Colorado (6/18 – 6/24) to attend the annual meeting of the Society for the Preservation of Natural History Collections (SPNHC).

Karen Golinski traveled to Port Edward, British Columbia (4/27 – 5/8) to teach a field course in bryology for the University of Northern British Columbia; and to Halifax, Nova Scotia (6/21 – 6/25) to participate in the annual meeting of the Mosses and Lichens subcommittee of COSEWIC (Committee on the Status of Endangered Wildlife in Canada).

Morgan Gostel traveled to Geneva, Switzerland (6/25 – 7/2) to participate in the 6th Global Botanic Gardens Congress and host a round table discussion for the Global Genome Initiative for Gardens.

AJ Harris traveled throughout Costa Rica (4/6 – 4/22) to conduct fieldwork and

collect *Billia* (Sapindaceae); and to Ann Arbor, Michigan (5/12 – 5/13) to give a talk on a Cretaceous fossil of *Acer* at the 34th annual Mid-Continent Paleobotanical Colloquium at the University of Michigan in Ann Arbor.

Gabriel Johnson traveled to Memphis, Tennessee (3/13 – 4/13) to visit the laboratory of Jennifer Mandel at the University of Memphis to learn the preparation of DNA libraries for Illumina HiSeq DNA sequencing as well as a hybridization capture technique to enrich those libraries for a set of ~1000 conserved orthologous loci.

Carol Kelloff traveled to Denver, Colorado (6/19 – 6/25) to attend the annual meeting of the Society for the Preservation of Natural History Collections (SPNHC) and to participate in the Council Meeting and workshop as the new Archive Chair.

Nancy Khan traveled to Denver, Colorado (6/20 – 6/23) to attend the annual meeting of the Society for the Preservation of Natural History Collections (SPNHC).

W. John Kress traveled to Shenzhen, China (4/17 – 4/22) to participate in a planning meeting for the XIX International Botanical Congress, in particular the drafting of the *Shenzhen Declaration on Plant Sciences* and developing the *Shenzhen International Award in Plant Sciences*, and to visit the newly opened China National Gene Bank.

Sylvia Orli traveled to Denver, Colorado (6/18 – 6/24) to attend the annual meeting of the Society for the Preservation of Natural History Collections (SPNHC).

Marcelo Pace traveled to Ogden, Utah (6/5 – 6/8) to teach plant anatomy at a microscopy workshop at Weber University; and to Vancouver, Canada (6/12 – 6/16) to give a presentation at the 2017 IUFRO All Division 5, "Forest Sector Innovations for a Greener Future."

Melinda Peters traveled to Panama City and Bocas del Toro, Panama (5/1 – 5/12) to participate in the Smithsonian Scientific Diving Course; and to Coconut Island, Kane'ohe, Hawaii (5/20 – 6/3) to collect algae as part of a MarineGEO project at the Hawai'i Institute of Marine Biology.

Peter Schafran traveled throughout the eastern United States (6/19 – 10/1) to collect specimens of Isoetes for ongoing phylogenetic research.



The Plant Press

NEW SERIES - Vol. 20 - No. 3

Chair of Botany

Laurence J. Dorr
(dorr1@si.edu)

EDITORIAL STAFF

Editor

Gary Krupnick
(krupnickg@si.edu)

Copy Editors

Robin Everly, Bernadette Gibbons, and
Rose Gullledge

The Plant Press is a quarterly publication provided free of charge. To receive notification of when new pdf issues are posted to the web, please subscribe to the listserve by sending a message to listserv@si-listserv.si.edu containing only the following in the body of the text: SUBSCRIBE PLANTPRESS-NEWS Firstname Lastname. Replace "Firstname Lastname" with your name.

If you would like to be added to the hard-copy mailing list, please contact Dr. Gary Krupnick at: Department of Botany, Smithsonian Institution, PO Box 37012, NMNH MRC-166, Washington, DC 20013-7012, or by E-mail: krupnickg@si.edu.

Web site: <http://botany.si.edu/>

Continued on page 4

XIX International Botanical Congress

A good number of our research staff, research associates, and graduate students attended the recent International Botanical Congress held from 23 – 29 July 2017 in Shenzhen, China. It was deeply satisfying to see the department play a prominent role in all aspects of this international gathering. Certainly, the most prominent of our many departmental participants was **Jun Wen** who was one of the deputy presidents of the organizing committee as well as one of the scientific program committee members. She deserves congratulations and thanks for taking on these important duties. Not content merely to assist in organizing a conference of 7000 participants she also presented a keynote lecture (“Developing integrative systematics in the informatics and genomic era”), helped organize two scientific sessions, co-authored seven papers, and co-authored ten posters presented during the congress. In addition, as co-editor in chief of the *Journal of Systematics and Evolution* she managed to release days before the congress began an “IBC 2017 special issue: Frontiers in plant systematics and evolution”.

John Kress also gave one of the keynote lectures (“Tropical plant-animal interactions: Coevolution in the Anthropocene”) and co-organized two sessions on DNA barcoding. **Vicki Funk** likewise co-organized two sessions: one on Compositae and the other on “Systematic Agenda 2050”. **Paul Peterson** co-organized a single session entitled “Poaceae: Systematics and phylogeny of major lineages” and **Warren Wagner**, who was unable to attend the congress, organized a session with Marc Applehans, a former postdoctoral student, on “Biogeographic patterns and adaptive radiations in the Pacific”. **A.J. Harris**, a Buck Fellow in the Department of Botany, organized two sessions with Research Associate **Stefanie Ickert-Bond** on “New insights on the assembly and biodiversity of the flora of North America”. Curators **Ashley Egan**, **Eric Schuettpelz**, and **Elizabeth Zimmer** presented papers in one or more of the hundreds of sessions offered during the congress. Similarly, resident Research Associates **Konstantin Romaschenko**, **Robert Soreng**, and **Carl Taylor** also presented papers, as did current postdoctoral fellows **Morgan Gostel** and **Marcelo Pace**. Graduate student **Matthew Haynsen** collaborated with other departmental colleagues on a poster.

International botanical congresses and the ICN (*International Code of Nomenclature for Algae, Fungi,*

and Plants), formerly the ICBN (*International Code of Botanical Nomenclature*), are intimately associated. This congress was no exception. The Shenzhen Nomenclature Section preceded the congress proper and was held from 17 – 21 July 2017 at the Peking University HSBC Business School (PHBS), University Town, Shenzhen. Smithsonian representation at the Nomenclature Section

has always been strong and this year was no exception. Four curators (**Laurence Dorr**, **Vicki Funk**, **Paul Peterson**, and **Eric Schuettpelz**), two resident Research Associates (**Konstantin Romaschenko** and **Robert Soreng**), and one non-resident Research Associate (**Alina Freire-Fierro**) participated in the discussions, debates, and votes. There were no especially contentious issues debated at the sessions of this nomenclature

section. Perhaps the most radical change to the *ICN* was a revision of Division III of the Melbourne Code and the codification of a number of procedures that previous nomenclature sessions adopted by tradition. The Nomenclature Section continues to be ambivalent with respect to registration of names and nomenclatural acts. Registration is required for fungi, but the Shenzhen section created a special committee to report to the next congress on registration for algae and plants.

One of the less easily quantified aspects of participation at a congress of this magnitude is the facility each participant has to meet colleagues and collaborators scattered across the globe while simultaneously meeting new people and hearing or reading about new ideas. It was well worth the effort to send as many staff, associates, and students as we did. It is a wonderful investment in the future.



IBC 2017
XIX International Botanical Congress
Shenzhen China

Chair

With

A

View

—

L.J.
Dorr



Staff Research & Activities

Manuela Dal Forno presented talks about lichen biology and then led nature hikes at the Jug Bay Wetlands Sanctuary in Lothian, Maryland, and for the Northern Neck Chapter of the Virginia Native Plant Society in Wicomico Church, Virginia. She also gave talks about her collections-based research on lichens at the April meeting of the Botanical Society of Washington, at the National Museum of Natural History's "Expert Is In" series, and during a NMNH Senate of Scientists Lighting Talk.

Ashley Egan and the New River Gorge National Park Service hosted an ecovoluntourism event over four days (June 10-13) to help remove and manage an invasion of kudzu at Thurmond, West Virginia, a historical site managed by the National Park Service. The group of volunteers pulled kudzu, received personal tours, and listened to educational lectures on invasive species and the introduction of kudzu, and the history and prominence of Thurmond. In gratitude to the volunteers, NPS sponsored two days of guided activities within the area, including guided hikes, nature walks, and a full day float trip down the New River.

AJ Harris, a Peter Buck Postdoctoral Fellow in Botany, visited Costa Rica (April 6 - 22) to work with Barry Hammel of Missouri Botanical Garden to investigate *Billia* (Sapindaceae) in the field and collect representative specimens. *Billia* is a neotropical relative of buckeyes and maples and possesses two species, *B. hippocastanum* and *B. rosea*, which occur from Mexico to northern Panama and Costa Rica to Columbia and Venezuela, respectively. Where the two species have overlapping geographic ranges in Costa Rica and northern Panama, they exhibit intergrading morphology. Harris was funded by the Society for Systematic Biologists to observe and collect *Billia* in Costa Rica as part of her ongoing effort to resolve species boundaries in the genus. She collected from high and low elevation populations on the Pacific slope in Costa Rica, and her travel resulted in 15 collections of *Billia* representing red and white

flowered morphs, which are considered separate species. She deposited specimens at the U.S. National Herbarium (US) and the National Herbarium of Costa Rica (CR). Harris gave an oral presentation on her collection trip at the May meeting of the Botanical Society of Washington.

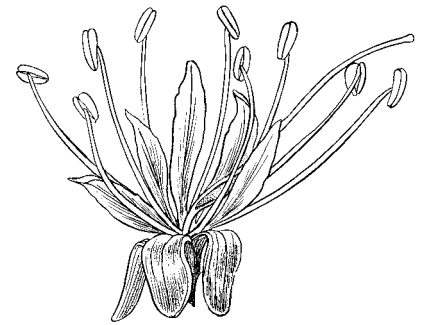
Marcelo Pace presented his research on plant anatomy at a session entitled, "Wood Diversity and Stories Inside Trees," at a Q?rius camp on June 22 and June 29. He showed some curiosities such as the wood of the odd gymnosperm *Welwitschia mirabilis*, some of the heaviest and lightest woods known in the world (*Lignum vitae*, *Guaiacum officinale*, Zygophyllaceae; and Balsa wood, *Ochroma pyramidale*, Malvaceae), woods with very distinctive colors, such as ebony (*Diospyrus*, Ebenaceae), purple heart (*Peltogyne*, Leguminosae), among others. He showed the visitors how to use simple dichotomous keys using anatomical features easily seen with the aid of a 10x magnification lens to identify different economically important timbers. He demonstrated how to smell fresh portions of the woods to identify them by their odor, such as the aromatic wood of *Cinnamomum camphora* (Lauraceae), which contains oleiferous cells. Also on display were the remarkable diversity of the liana stems, demonstrating how stem architectures can be diagnostic of plant families and how lianas represent a strategy that plants have evolved to become more flexible and to climb towards the forest canopy.

Alice Tangerini and Botany volunteer, **Mary Monsma**, attended the Guild of Natural Science Illustrators Annual Meeting and Conference (GNSI 2017) held at Warren Wilson College in Asheville, North Carolina (June 25 - 30). The meeting began with a portfolio sharing with members displaying their artwork in traditional format or on laptops and iPads. The following days commenced with talks by Keynote speakers showing a variety of projects in scientific illustration from salamanders to space art. Afternoons ensued with a series of lectures and short workshop demos. The last two days provided a chance to take half or whole day workshops with small classes of participants learning specific drawing techniques and participate in field trips to the surrounding Black Mountain area. Tangerini and Monsma enrolled in a color pencil class

learning new ways to make a fruit look photographically real.

Awards & Grants

Warren Wagner received a "distinguished service" award at the annual American Society of Plant Taxonomists (ASPT) banquet in June. The award recognizes Wagner's service in overseeing the ASPT endowment for more than a decade and improving it to more than \$1 million.



Travel

Continued from page 2

Eric Schuettpelz travelled to Fort Worth, Texas (6/24 - 6/28) to attend the Botany 2017 meeting.

Alice Tangerini traveled to Asheville, North Carolina (6/25 - 6/30) to attend the Guild of Natural Science Illustrators Annual Meeting and Conference (GNSI 2017) held at Warren Wilson College.

Meghann Toner traveled to Denver, Colorado (6/19 - 6/23) to give a presentation about herbarium cases at the annual meeting of the Society for the Preservation of Natural History Collections (SPNHC).

Warren Wagner travelled to Fort Worth, Texas (6/24 - 6/28) to participate in the Botany 2017 meeting and, as one of the officers, attend the American Society of Plant Taxonomists council meeting.

Jun Wen traveled to Shenzhen, China (4/10 - 4/30) to help plan the XIX International Botanical Congress and to collect plant specimens.

Juannan Zhou traveled to Portland Oregon (6/22 - 6/28) to attend the Evolution 2017 meeting.

Elizabeth Zimmer traveled to New York, New York (4/4) to meet with colleagues at the American Museum of Natural History and the New York Botanical Garden.

Visitors

Morgan Gestel, George Mason University; Compositae and GGI-Gardens Program (9/1/15-8/31/17).

Afzal Shah, Quaid-i-Azam University, Pakistan; Tylophorinae (Apocynaceae) (12/29/16-6/1/17).

Yousheng Chen, Chinese Academy of Sciences, China; Pan-Himalayan Cardueae and Gnaphalieae (Asteraceae) (12/31/16-12/30/17).

Xu Su, Qinghai University, China; Triticeae (Poaceae) (12/31/16-3/1/18).

Amanda Williams, Eastern Mennonite University; Collections management internship (1/17-4/28).

Jacob Suissa, Harvard University; Isoëtes and Asteraceae internship (2/2-8/1).

Maria Alves, Universidade Federal de Feira de Santana, Brazil; Brazilian Heliantheae (Asteraceae) (2/27-4/15).

Yuan Xu, South China Botanic Garden; *Androsace* (Primulaceae) (4/1/17-3/31/18).

Jasmijn Ruijgrok, Naturalis Biodiversity Center, Netherlands; Commelinaceae of the Guianas (4/4-4/18).

Barbara Kreutzer, Marymount University; Herbarium tour (4/5).

Matthew Schreiber, University of Colorado Boulder; Ruellieae (Acanthaceae) (4/5-4/7).

Lisa Campbell, New York Botanical Garden; Xyridaceae (4/10-4/14).

Raymund Chan, Independent researcher, Singapore; Compositae (4/10-4/15).

Paulo Windisch, Universidade do Vale do Rio dos Sinos, Brazil; Brazilian ferns (4/10-4/11).

Michael Urban, University of Illinois at Urbana Champaign; Fabaceae pollen (4/17-4/23).

Ulla Dixon, Independent researcher, Virginia; Flora of Sweden (4/24).

Hank Oppenheimer, Plant Extinction Prevention Program, Hawaii; Endangered Plants of Hawaii (4/24).

Christopher Tyrrell, Milwaukee Public

Museum; West Indian *Arthrotylidium* and *Rhipidocladum* (Poaceae) (4/24-4/28).

Tom Lovejoy and 15 students, George Mason University; Plant conservation and herbarium tour (5/1).

Sasha Bishop, University of Michigan; Zingiberales (5/3-5/5).

Michael Windham, Duke University; US pteridophyte collection (5/10).

Cady Lancaster, World Resources Institute and U.S. Fish and Wildlife Forensics Lab; Wood Collection (5/15-5/26).

Javier Francisco-Ortega, Florida International University; Arecaceae (5/17-5/19).

Megan Raby, University of Texas; Study collections (5/17-5/19).

Harlan Svoboda, Ohio University; *Pas-siflora* (Passifloraceae) (5/17-5/19).

Karl Fetter, University of Vermont; Medicinal plants (5/18-5/19).

Daniel Sanchez-Mata, Complutense University of Madrid, Spain; Chenopodiaceae (Amaranthaceae) (5/18-5/19).

Donna Ford-Wentz, West Virginia University; *Helianthus strumosus* (Asteraceae) (5/19).

Robin Foster, The Field Museum; *Tachigali* (Fabaceae) (5/22).

Molly Megan, Smith College; Digitization internship (5/22-8/18).

Tag Hauschild, Ohio University; Botanical illustration techniques (5/23 - 8/23).

Merit Hondelink, University of Groningen, Denmark; Archaeobotany (5/24).

Margaret and Michael Dix, Universidad del Valle de Guatemala; Guatemalan Bromeliaceae and Orchidaceae (5/25-6/1).

Elizabeth Bui, Australian National Herbarium; Study collections (5/30-6/3).

Henry Scheffer, Field Museum; Isoëtes (5/30-8/15).

Fred Barrie, Missouri Botanical Garden; Gesneriaceae (5/31-6/16).

Jun Lim, University of California, Berkeley; Hawaiian *Peperomia* (Piperaceae)

(6/2-8/15).

Shae-lyn Briggs, Wilkes University; DNA barcoding internship (6/5-7/28).

Renee Klann, Smith College; DNA barcoding internship (6/5-7/28).

Joyce Chery, University of California, Berkeley; Paullinieae (Sapindaceae) (6/8-9/22).

Paul and Hiltje Maas, Naturalis Biodiversity Center, Netherlands; Neotropical Annonaceae and Costaceae (6/10-6/20).

Larry Bird, National Museum of American History; *Carnegiea gigantea* (Cactaceae) (6/12).

Sylvia Kinoshian, Utah State University; *Ceratopteris* (Pteridaceae) (6/12-6/13).

Megan Proska, Dallas Arboretum; Herbarium tour (6/12).

Luciana Solomon, Instituto de Botánica Darwinion, Argentina; *Senecio* (Asteraceae) (6/15-6/28).

Greta Reinhart, Edgewater, Maryland; Botanical Art Collection internship (6/19 - 7/19).

Natalie Howe, U.S. Department of Agriculture; Lichen collection (6/26).

Melissa Chung, Wisconsin Department of Natural Resources; Cameroonian Commelinaceae (6/30).



The Buzz About Pollinator Week

The National Museum of Natural History (NMNH) celebrated National Pollinator Week 2017 in June in an effort to raise awareness of the decline of important pollinator populations. On June 8, **Gary Krupnick** and Catherine Werner, sustainability director for the City of St. Louis, joined moderator Timothy Beatley, professor at the University of Virginia and founder of the Biophilic Cities Network, for a discussion about projects that are benefiting both people and pollinators in urban environments. The event, “Wild Cities: Connecting People and Nature - The Buzz About Urban Pollinators,” was held in the Q?rius Theater in NMNH, and focused on government and grassroots recommendations for sustaining healthy pollinator populations. A live feed of the event was made available and is archived on Smithsonian Magazine’s Facebook page. The program was part of NMNH’s “Anthropocene: Life in the Age of Humans,” a series of discussions exploring human impact on the environment with scholars, artists, and others in an intimate conversational setting.

Krupnick also served as a scientific advisor on the 2017 Pollinator Week poster, “The Monarch Highway.” The



“The Monarch Highway” is the focus of the Pollinator Week poster for 2017.

poster, designed by Oakland-based artist Stephanie Law, features several native plant species that helps sustain monarch butterfly populations as they migrate from Mexico to Canada and back again. The poster’s website <<http://pollinator.org/poster2017.html>> has information about 13 plant species that provide an important

food source for the butterfly migration.

Each year the Pollinator Partnership, along with a wide range of partners (including federal agencies, non-profits, and for-profits), design and distribute the educational pollinator posters to promote Pollinator Week, a time to celebrate pollinators and native plants and to spread the word about what you can do to protect them. The posters are one of the most popular outreach material items offered.

Bees & Bouquets Featured at 2017 Annual Smithsonian Weekend

On Saturday, May 13, 2017, botanical illustrator **Alice Tangerini**, Barbara Ferry and **Robin Everly** (Smithsonian Libraries), Cindy Brown (Smithsonian Gardens), and Sean Brady (Department of Entomology) participated in a “Bees & Bouquets” tour for participants of the 2017 Annual Smithsonian Weekend, an event of the James Smithson Society. About 120 members of the society participated.

For the tour, Tangerini brought a selection of her work in different media and historical work from the Botanical Art Collection along with the published illustrations in books. Giving a short 20 minute presentation, Tangerini pointed out the value of keeping historic work not only for its place in the history of botanical exploration, but for the beauty of the work itself using the techniques and materials which are often lost in technological advancement. Tangerini displayed specific pencils that had ceased being produced since the 1980s and found that several in her audience said they knew of those tools and now were prompted to look for them. Questions for Tangerini ranged from her training in botanical illustration to determining what to show in an illustration for the scientist.

Everly and Ferry focused on gardening and their tour featured several books from the Botany and Horticulture Library. Everly spoke about how the horticulture collection came to Smithsonian Libraries, and then moved on to talk about the importance of gardening for biodiversity. She spoke of some of her favorite books published on this theme. Ferry discussed the Biodiversity Heritage Library (BHL)



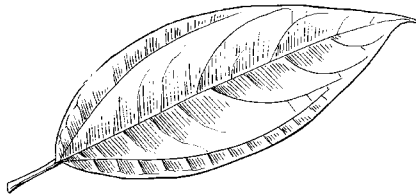
Gary Krupnick, Catherine Werner, and Timothy Beatley discuss “The Buzz About Urban Pollinators” at a June 2017 program at the National Museum of Natural History. (photo by Barbara Stauffer)



Robin Everly speaks to members of the James Smithson Society about the Smithsonian Libraries' horticulture collection. (photo by Barbara Ferry)

and other projects involving biodiversity at the Libraries.

The Smithson members were enthusiastic and engaged. There always seemed to be more to discuss than time allowed and it was a great way to do outreach for the Department of Botany and the Libraries.



Saving Endangered Species Youth Art Contest Recipient Visits Smithsonian

On May 24, **Alice Tangerini** hosted a workshop for the winner of the "Saving Endangered Species Youth Art Contest." Tangerini, along with eight other artists, photographers and wildlife naturalists, were the judges for the national contest, which included all ages in the grades kindergarten through high school and required sifting through the artwork of 60 semifinalists by an online review. A conference call with all nine judges decided

the winners in the four grade categories and the top grand prize went to a local Washington, DC native, seven-year-old Sanah Hutchins. Her winning entry, the Rusty Patched Bumble Bee, a species that had just retained status in the endangered species category shortly before the contest deadline. The prize for Sanah was a visit



Alice Tangerini gives painting tips to youth art winner, Sanah Hutchins. (photo by Nabeeha Kazi)

to Tangerini's office and a private drawing lesson with Tangerini. Sanah, her parents, and grandparents in attendance, walked through the fifth floor hallway, encountering **Greg McKee** who gave a short and informed talk on botany and collecting.

For the lesson, Tangerini supplied photos of bees pollinating, a collection of pinned bees provided by Sean Brady of the Department of Entomology and a sample painting on drafting film of a bee on *Echinacea*. Sanah, a disciplined young artist, followed directions making her own painting from the photos and even doing some back painting on the film. The family took many photos and posted them on social media sites, and the contest and event even had a feature in a local D.C. newspaper, *The Northwest Current*. A ceremony and reception took place in the evening at the U.S. House of Representatives Rayburn House Office Building where Sanah received a plaque and many accolades for her artwork.

Team *Limu* Participates in MarineGEO Hawaii Bio-Assessment 2017

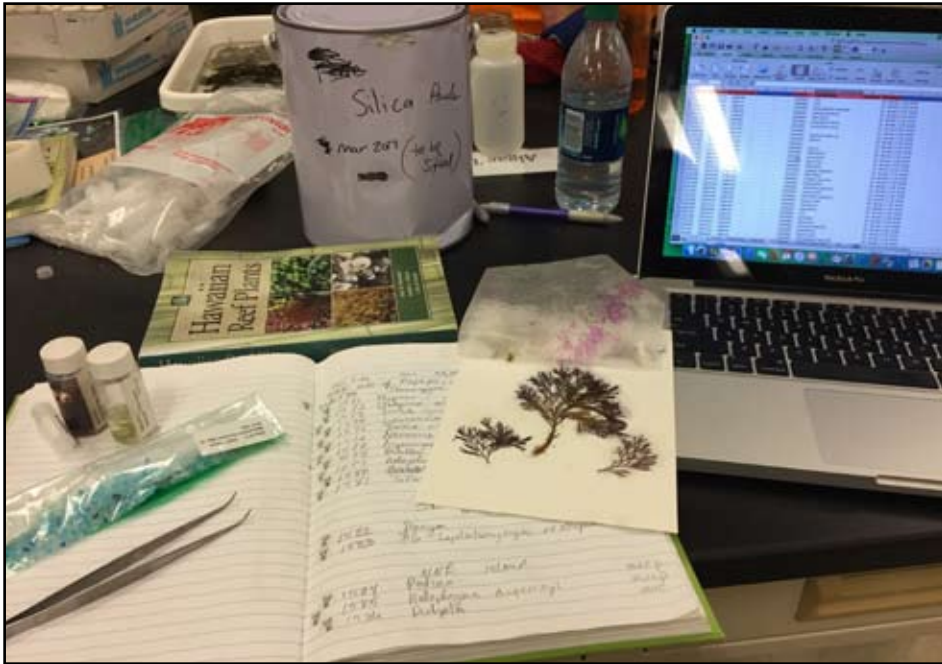
The Smithsonian's Marine Global Earth Observatory (MarineGEO) hosted a two-week bioblitz in Kane'ohē Bay, Oahu, Hawai'i, at the end of May. This was a large-scale inventory including researchers, students, and volunteers working to collect and observe all algae, micro- and macro-fauna, fish and samples from Autonomous Reef Monitoring Structures (ARMS). During the bioblitz all participants lived and worked on Coconut Island, a 28-acre island in the bay, a quarter mile off the windward side of Oahu.

Barrett Brooks and **Melinda Peters** were part of the *limu* (the Hawaiian word for seaweed) team and the goal was to collect and record the algae found in the bay. They were joined by Celia Smith (University of Hawai'i at Mānoa), who specializes in reef algae systems, and an amazing group of students—Laurie Penland, Emily Frost, Sarah Vasconcellos, Scott Chulakote, Nicole Yamase, Seaenna Correa-Garcia, Laica Arcibal, Eileen Nalley, Lindsay Tanabe, Megan Onuma, and Cory Pittman (KANI). The students helped collect and process samples each day.

To understand the diversity of species and abundance levels, the group collected some 440 samples from across the bay. The collecting methods employed the use of digging tools and standard bags. Samples were then sorted, documented, pickled in vials, and tissue samples stored in silica gel and liquid nitrogen. Pressed



Participants of the Bioblitz Team
***Limu*:** (top picture, left to right)
Barrett Brooks, Seaenna Correa-Garcia, Melinda Peters, Claire Lager, Celia Smith, and Scott Chulakote.
(photo by Laurie Penland); (middle picture, clockwise from bottom left):
Laica Arcibal, Sarah Vasconcellos, Barrett Brooks, and Seaenna Correa-Garcia. (photo by Emily Frost).
The bottom photo shows a sample of collected algae specimens during the Kane'ohē Bay Bioblitz. (photo by Barrett Brooks)



Processing algae specimens during the Kane‘ohe Bay Bioblitz. (photo by Melinda Peters)

vouchers were made when possible. About 33 percent of the samples were identified to genus or species. Molecular data will help determine the identifications of the remaining samples.

On the last day of collecting at the northern point of the bay, the team found the invasive, *Avrainvillea amadelpha*. The species has been found in other parts of Oah‘u, but had not been previously documented in this bay. It establishes itself in tight clusters and out-competes native species such as the seagrasses (*Halophila hawaiiiana*). This was a disappointing find, but also a positive example of why assessments like this are so important.



“Cultivating America’s Gardens,” Opens at National Museum of American History

A new exhibit on the history of American Gardening opened May 4, 2017, at the Smithsonian Libraries Exhibit Gallery of the National Museum of American History (NMAH) entitled “Cultivating America’s Gardens.” Items from the U.S. National Herbarium and the Botany-Horticulture Library are part of this exciting new exhibit.

In the “Gardening for Science” exhibit case is a herbarium specimen of *Clarkia pulchella* (Onagraceae) collected in Oregon. This part of the exhibit highlights plant exploration in the New World and a time when European plant collectors were eager to obtain “exotic” American plants for their gardens back in Europe. Other parts of the exhibit tell the story of the rise of the lawn, gardens of the Gilded Age (1870-1900), World’s Fair gardens, World War II Victory and school gardens, the preservation and documentation of historic gardens, the seed industry, and plant breeding and sustainable gardens of today.

Prominently featured in the exhibit are books and journals from many of the branch libraries of Smithsonian Libraries

and objects and graphics from Smithsonian Gardens’ Archives of American Gardens. Books by prominent botanists from the Botany-Horticulture Library include Asa Gray’s *Botany for Young People and Common Schools* (1858) and Charles S. Sargent’s 10 volume journal *Garden and Forest: A Journal of Horticulture, Landscape Art and Forestry* (1888). Also featured is the World War I classic Charles Lathrop Pack’s *The War Garden Victorious* (1919), which features patriotic illustrations and where the phrase “victory garden” was coined. Contemporary books highlighting new gardening trends include Rick Darke and Douglas W. Tallamy’s *The Living Landscape: Designing for Beauty and Biodiversity in the Home Garden* (2014).

The mobile Leafsnap app, the electronic field guide developed by botanists at the Smithsonian, Columbia University, and the University of Maryland, is mentioned in a section entitled, “Digging in at the Smithsonian.”

Smithsonian Libraries provides more information about Cultivating America’s Gardens on the exhibit website at <<http://library.si.edu/exhibition/cultivating-america-gardens>>. The exhibition runs through August 2018.



Included in the exhibition, *Cultivating America’s Gardens*, is a specimen of *Clarkia pulchella* (Onagraceae) collected by Bassett Maguire and Arthur Holmgren east of Frenchglen, Oregon in 1946.



Earth Optimism Summit Celebrates Conservation Success Stories

The Smithsonian Institution's inaugural Earth Optimism Summit took place over Earth Day weekend at the Ronald Reagan Building and International Trade Center in Washington, DC, on April 21-23, 2017. Earth Optimism is a global initiative that celebrates a change in focus from problem to solution, from a sense of loss to one of hope, in the dialogue about conservation and sustainability. More than 1,480 registrants, including thought leaders, scientists, environmentalists, artists, civic leaders and international media, attended the summit, while hundreds more walked through the Innovation Commons public space and enjoyed 20 interactive exhibits. Department of Botany's **John Kress** and **Gary Krupnick** were among the 237 presenters that spoke in 7 plenaries and 35 "deep dives." Beyond the conference, via live stream and social media, the Summit reached and inspired hundreds of thousands of people online.

Featured content at the Summit included species survival, solutions for pollution, success in the city, people and communities for change, food, working land and seascapes, saving wild spaces, and energy innovation. Kress moderated the deep dive session "Apps for the Planet" and Krupnick moderated the session "At Home with Conservation."

Beyond the summit, 19 Earth Optimism events were held in museums and galleries of the Smithsonian in Washington, New York, Anacostia and Panama City, Panama. In 10 countries around the world – from Colombia to New Zealand

– sister organizations hosted 26 events celebrating their own success stories and inspiring hope for the planet.

Videos of all plenary sessions along with the deep dive sessions that were held in the Center's amphitheater were captured via Facebook Live and are archived and available for viewing at <https://earth-optimism.si.edu/live-stream/>. All other sessions were recorded and will be added to the website in the coming weeks.

Earth Optimism is one of four strategic conservation areas of the Smithsonian Conservation Commons, a new initiative to unite scientists from the Smithsonian Conservation Biology Institute, the National Museum of Natural History, the Smithsonian Tropical Research Institute, and the Smithsonian Environmental Research Center, as well as the Smithsonian's rich cultural and public-facing assets and long-standing partnerships, to tackle complex conservation problems on a global scale.

New Insights into Plant Species that Invade the West Indies

In the July 2017 issue of *Ecology and Evolution*, **Julissa Rojas-Sandoval**, **Pedro Acevedo** and colleagues analyze

the distribution and spread of invasive species across nine islands in the West Indies, and found that anthropogenic disturbance and economic development seem to be the major drivers facilitating the spread and predominance of invasive species over native species. They found a total of 516 alien plant species are invasive on at least one of the nine islands, with between 24 to 306 invasive species per island. The most widely distributed alien plant species is *Leucaena leucocephala* (Fabaceae), occurring on all nine of the examined islands.

Their database of invasive species compiled by published literature covered the islands of Bahamas, Cuba, Dominican Republic, Jamaica, Puerto Rico, Virgin Islands, St. Lucia, St. Martin, and Trinidad and Tobago. Cuba has the highest number of invasive species, and St. Martin has the highest density of invasive species. They found low similarity in invasive species diversity between islands. The largest fraction of invasive species come from Asia, followed by continental America and Africa. They found that 75 percent of all invasive plants are species that have escaped from cultivation, most commonly due to ornamental use.

Island area and economic development are strong drivers of invasive species diversity. Their data suggests that gross domestic product per capita and the kilometers of paved roadways are favoring the establishment of invaders of native spe-



Leucaena leucocephala (Fabaceae) on the island of St. John, U.S. Virgin Islands. Compared to other plant families, Fabaceae has the largest number of invasive species on nine islands in the West Indies, and *L. leucocephala* is the most widely distributed. (photo by Pedro Acevedo)



Ulla Dixon with her husband William displaying a donation to the U.S. National Herbarium of 178 pressed specimens collected throughout Sweden during her childhood. (photo by Erika Gardner)

cies. The authors suggest that their dataset can be used as a blacklist of unwanted species to help manage the spread of invasive plant species among the islands of the West Indies.

Herbarium Receives Personal Gift of Swedish Specimens

This spring the U.S. National Herbarium was offered a small but deeply meaningful collection of Swedish wildflowers by a private donor. On April 24, 2017, Ulla Smedberg Dixon and her husband William made a special trip to Washington D.C. They hand-delivered 178 vascular plant taxa from 54 families collected from 1948 to 1950. As a child, Dixon was inspired by her Aunt Edith to learn about botany. She grew a deep appreciation for the flora of her hometown in Sweden and began pressing specimens for her personal collection. Dixon collected these specimens during her teenage years from various locations throughout Sweden and kept them in a leather bound herbarium which was decorated by her sister with a hand painted illustration of *Anemone nemorosa*. In 1951 the Smedberg family emigrated to the United States. She recalled having to get special permission from her mother in

order to transport her special specimens to their new home in New York State. Dixon decided to donate her personal herbarium to the Smithsonian Institution where their historical and botanical significance will long be valued.

Are Pressed Plants Windows into World History?

By Gary Krupnick

The following article appeared on the web blog, Smithsonian Voices, on May 19, 2017. Smithsonian Voices provides a sampling of the unique voices of scholars, researchers, and curators that make up the chorus of ideas at the Institution <<http://www.smithsonianmag.com/blogs/natural-museum-of-natural-history/2017/05/19/are-pressed-plants-windows-world-history/>>.

The botanical specimens housed in the U.S. National Herbarium (USNH) at the National Museum of Natural History have been assembled over the course of several centuries and the collection continues to grow today. Currently, the herbarium contains over 5 million plant specimens and serves as an encyclopedia of the Earth's

flora. These specimens are irreplaceable sources of information regarding the diversity of species and the habitats they come from. They play a critical role in taxonomy, systematics, anatomy, morphology, ethnobiology, paleobiology, and conservation biology. The specimens can be used to discover and confirm the identity of a species new to science. They provide locality data for conservation assessments. They can document the effects of climate change on flowering phenology. They also provide material for DNA analysis and conservation genetics.

For world history buffs, these specimens provide a peek into the past, not only into the expeditions in which the plant was collected, but every so often they document major social events. The clues are usually found on annotation labels attached to the herbarium sheet. Most often these annotation labels tell us of the changing understanding of which species you're holding. But every now and then you get a glimpse into history.

Take for instance USNH specimen 2318036 pictured on the next page (page 12). The preserved plant attached to the sheet is a species in the bellflower family (Campanulaceae) named *Cyananthus spathulifolius* (which has now been renamed *Cyananthus macrocalyx* subspecies *spathulifolius*). The collection label, which details the collection event, tells us that it was collected on July 27, 1936, from the rocky hillslopes of Tibet at 14,000 feet by the English/Scottish team of explorers, Frank Ludlow and George Sherriff. The sheet has a stamp telling us that it currently resides in the U.S. National Herbarium. The collection label indicates that it was previously held in the herbarium of the British Museum ("Ex Herbario Musei Britannici").

The annotation label on this sheet makes this specimen unique. Annotation labels are attached to specimens at a later date with new or additional information about the specimen. The label on this specimen reads "Sheet damaged by enemy action at British Museum (Natural History) on 10 September 1940." During World War II, German forces targeted London, and London's Natural History Museum was badly damaged when 28 bombs landed on or near the museum during the month of September 1940. British scientists did their best to prepare for war

Continued on page 12

World History

Continued from page 11

by protecting the museum's specimens. Earlier, after war was declared, collections from a number of research departments such as geology and entomology were removed from the museum and sent to private homes in the countryside. Sadly, many botanical specimens and books that hadn't been moved yet were either harmed or destroyed when two bombs went through the roof of the botany department.

The bellflower specimen collected by Ludlow & Sherriff was damaged but survived. In 1954, the specimen was sent to the U.S. National Herbarium as part of an exchange of specimens with the Natural History Museum of London. Museums and herbaria around the world are steeped in a history of sharing and collaboration, and they have a long history of collection exchange. By moving specimens around the world, exchanges allow herbaria to expand the geographic and taxonomic ranges of their collections. Duplicate specimens, those collected from the same plant or population by the same collector at the same time, are often used in exchanges. By sending duplicates to a number of herbaria, the specimen and the valuable data associated with it are insured against loss or damage that may occur at one particular location.

The Natural History Museum of London wasn't the only institution to suffer greatly during World War II. The herbarium of the Botanical Museum Berlin-Dahlem in Germany, which at the time housed 4 million specimens, was destroyed in a bombing raid in March 1943. While approximately 500,000 specimens were saved (the collections of German botanist Carl Willdenow were safe-guarded in a bank vault), the majority perished. A similar fate befell the herbarium of the Philippine National Museum in Manila, which was burned down a day before the liberation of Manila in 1946. Fortunately, before the war began, duplicates of historic Philippine plant specimens had been sent on exchange to the U.S. National Herbarium and other American herbaria.

More recent examples of museum damage and the loss of specimens and artifacts include the destruction and looting of museums in the Middle East after the political uprisings of 2010 and the



Before its residence at the Smithsonian's National Museum of Natural History, this pressed plant (*Cyananthus macrocalyx* subspecies *spathulifolius*) was housed at London's Natural History Museum where it survived a bombing during World War II. (photo by Ingrid P. Lin)

destruction of Gabon's National Herbarium by arsonists during post-election riots in 2016. Natural disasters have destroyed natural history collections as well, such as the devastating San Francisco earthquake on the California Academy of Sciences in 1906 and Hurricane Katrina's flooding of the herbarium of the Gulf Coast Research Laboratory in Ocean Springs, Mississippi in 2005.

Man-made and natural disasters aren't the only way specimens might meet an unfortunate fate. While the exchange and loan of botanical specimens may be considered a safe-guard, sending material through the mail carries an inherent risk. During transport, fragile specimens may get lost or suffer damage. A worst case scenario took place recently when type specimens dating back to the mid-1800s were destroyed while in transit from the French National Museum of Natural His-

tory in Paris to Queensland's herbarium in Brisbane, Australia.

As a conservation biologist, I value specimens for the data written on the labels. I use the data to assess the conservation status of the world's flora. Irreplaceable plant specimens may represent the last bit of evidence that a species now extinct had existed on Earth. For example, my colleagues and I recently completed a conservation assessment of 263 endemic plant species from the Lesser Antilles. Two montane species that we assessed, a false pimpernel (*Lindernia brucei*) and a brushholly (*Xylosma serrata*) are both known only from single volcanic sites on the islands of St Vincent and Montserrat, respectively. Neither species has been recollected since the most recent volcanic eruptions of 1979 and 1995 on these islands. With the only known populations of these two species destroyed by volca-

nic flow, both the false pimpernel and the brushholly may now be extinct. What little we know about these plants is preserved on a few herbarium sheets.

The U.S. National Herbarium is preserving its rich specimen data by digitizing its entire collections. Working its way through 5 million specimens, the digitizing team has recently imaged and databased its one millionth specimen. Digitization benefits museum scientists by creating a detailed inventory of plants and records at each herbarium. Researchers can access specimens from all over the world right from their desks without the underlying risk of mailing specimens.

While digitized records of specimens are a great way to preserve data, the specimens themselves are still necessary to researchers. Only the specimen, and not a digitized photograph, provides material for DNA analysis, pollen for taxonomic and pollination studies, and leaves for chemical analysis. Moreover, online data may not be permanent, as online servers are vulnerable to computer viruses or hacking and data could be intentionally or accidentally removed or deleted. Digitizing the records of our herbarium specimens is important for expanding our scientific reach, but safely securing museum specimens is essential for current and future botanical research.

Publications

- Acevedo-Rodríguez, P., K.J. Wurdack, M.S. Ferrucci, G. Johnson, P. Dias, R.G. Coelho, G.V. Somner, V.W. Steinmann, E.A. Zimmer and M.T. Strong.** 2017. Generic relationships and classification of tribe Paullinieae (Sapindaceae) with a new concept of supertribe Paullinioidae. *Syst. Bot.* 42(1): 96-114. <http://dx.doi.org/10.1600/036364417X694926>
- Carrington, C.M.S., **G.A. Krupnick** and **P. Acevedo-Rodríguez.** 2017. Herbarium-based preliminary conservation assessments of Lesser Antillean endemic seed plants reveal a flora at risk. *Bot. Rev.* 83(2): 107-151. <http://dx.doi.org/10.1007/s12229-017-9182-5>
- Dal Forno, M., F. Bungartz, A. Yáñez-Ayabaca, R. Lücking and J.D. Lawrey.** 2017. High levels of endemism among Galapagos basidiolichens. *Fungal Divers.* <http://dx.doi.org/10.1007/s13225-017-0380-6>
- Funk, V.A., M. Gostel, A. Devine, C.L. Kelloff, K. Wurdack, C. Tuccinardi, A. Radosavljevic, M. Peters** and J. Coddington. 2017. Guidelines for collecting vouchers and tissues intended for genomic work (Smithsonian Institution): Botany Best Practices. *Biodivers. Data J.* 5: e11625. <http://dx.doi.org/10.3897/BDJ.5.e11625>
- Funk, V.A. and H.E. Robinson.** 2017. Nine species from Madagascar are moved from *Vernonia* to *Distephanus* (Compositae, Vernoniaeae). *PhytoKeys* 77: 89-92. <http://dx.doi.org/10.3897/phytokeys.77.11727>
- Gostel, M.R., G.M. Plunkett** and P.P. Lowry II. 2017. Straddling the Mozambique Channel: molecular evidence for two major clades of Afro-Malagasy *Schefflera* (Araliaceae) co-occurring in Africa and Madagascar. *Plant Ecol. Evol.* 150(1): 87-108. <http://dx.doi.org/10.5091/pleveo.2017.1193>
- Kangas, P., W. Mulbry, P. Klavon, H.D. Laughinghouse and **W. Adey.** 2017. High diversity within the periphyton community of an algal turf scrubber on the Susquehanna River. *Ecol. Eng.* <http://dx.doi.org/10.1016/j.ecoleng.2017.05.010>
- Kress, W.J.** 2017. Plant DNA barcodes: Applications today and in the future. *J. Syst. Evol.* <http://dx.doi.org/10.1111/jse.12254>
- Lowry, P.P., G.M. Plunkett, **M.R. Gostel** and D.G. Frodin. 2017. A synopsis of the Afro-Malagasy species previously included in *Schefflera* (Araliaceae): resurrection of the genera *Astropanax* and *Neocussonia*. *Candollea* 72(2): 265-282. <http://dx.doi.org/10.15553/c2017v722a4>
- Olsen, R.T. and **J.H. Kirkbride, Jr.** 2017. Taxonomic revision of the genus *Catalpa* (Bignoniaceae). *Brittonia*. <http://dx.doi.org/10.1007/s12228-017-9471-7>
- Ren, Z.M. and **J. Wen.** 2017. Complete mitochondrial genome of the North American *Rhus* gall aphid *Melaphis rhois* (Hemiptera: Aphididae: Eriosomatinae). *Mitochondrial DNA B Resour.* 2: 169-170. <http://dx.doi.org/10.1080/23802359.2017.1303345>
- Ren, Z.M., **A.J. Harris, R.B. Dikow, E. Ma, Y. Zhong** and **J. Wen.** 2017. Another look at the phylogenetic relationships and intercontinental biogeography of eastern Asian - North American *Rhus* gall aphids (Hemiptera: Aphididae: Eriosomatinae): Evidence from mitogenome sequences via genome skimming. *Mol. Phylogenet. Evol.* <http://dx.doi.org/10.1016/j.ympev.2017.05.017>
- Rojas-Sandoval, J., R.L. Tremblay, P. Acevedo-Rodríguez** and H. Díaz-Soltero. 2017. Invasive plant species in the West Indies: geographical, ecological, and floristic insights. *Ecol. Evol.* 7(13): 4522-4533. <http://dx.doi.org/10.1002/ece3.2984>
- Sathyanarayana, N., R.K. Pittala, P.K. Tripathi, R. Chopra, H.R. Singh, V. Belamkar, P.K. Bhardwaj, J.J. Doyle and **A.N. Egan.** 2017. Transcriptomic resources for the medicinal legume *Mucuna pruriens*: *de novo* transcriptome assembly, annotation, identification and validation of EST-SSR markers. *BMC Genomics* 18(1): 409. <http://dx.doi.org/10.1186/s12864-017-3780-9>
- Sidlauskas, B.L., C. Ferraris, **V. Funk, L.R. Parenti, M. de Pinna** and G.M. Reid. 2017. In Memoriam: Richard Peter Vari (August 24, 1949-January 15, 2016). *Copeia* 105(1): 147-160. <http://dx.doi.org/10.1643/CI-16-550>
- Zeng, L., **N. Zhang, Q. Zhang, P.K. Endress, J. Huang** and H. Ma. 2017. Resolution of deep eudicot phylogeny and their temporal diversification using nuclear genes from transcriptomic and genomic datasets. *New Phytol.* 214(3): 1338-1354. <http://dx.doi.org/10.1111/nph.14503>
- Zhang, L., X.M. Zhou, D.K. Chen, **E. Schuettpelz, R. Knapp, N. Thi Lu, T. Tam Luong, M. Tri Dang, Y.F. Duan, H. He, X.F. Gao** and L.B. Zhang. 2017. A global phylogeny of the fern genus *Tectaria* (Tectariaceae: Polypodiales) based on plastid and nuclear markers identifies major evolutionary lineages and suggests repeated evolution of free venation from anastomosing venation. *Mol. Phylogenet. Evol.* 114: 295-333. <http://dx.doi.org/10.1016/j.ympev.2017.05.020>
- Zhang, N., D.L. Erickson, P. Ramachandran, A.R. Ottesen, R.E. Timme, **V.A. Funk, Y. Luo** and S.M. Handy. 2017. An analysis of *Echinacea* chloroplast genomes: Implications for future botanical identification. *Sci. Rep.* 7(1): 216. <http://dx.doi.org/10.1038/s41598-017-00321-6>



Smithsonian Botanical Symposium

Foster Receives 15th Cuatrecasas Medal

The Department of Botany and the United States National Herbarium present this award to a botanist and scholar of international stature who has contributed significantly to advancing the field of tropical botany. The José Cuatrecasas Medal for Excellence in Tropical Botany is named in honor of Dr. José Cuatrecasas, a pioneering botanist and taxonomist, who spent nearly a half-century working in the Smithsonian Institution's Department of Botany. Dr. Cuatrecasas devoted his career to plant exploration in tropical South America and this award serves to keep vibrant the accomplishments and memory of this outstanding scientist.

The winner of this prestigious award is selected by a committee made up of four botanists on staff in the Department in consultation with other plant scientists outside of the Smithsonian Institution. Nominations for the Medal are accepted from all scientists in the Botany Department. The award consists of a bronze medal bearing an image of José Cuatrecasas on the front with the recipient's name and date of presentation on the back. Highlights from past presentations to the recipients are available at <http://botany.si.edu/cuatrecasas/cuatrecasasMedal.cfm>.

Robin B. Foster is the 15th recipient of the José Cuatrecasas Medal for Excellence in Tropical Botany. Foster received an A.B. degree from Dartmouth College in 1966 and a Ph.D. from Duke University in 1974 under noted ecologist W.D. Billings. He first joined the faculty of the University of Chicago, and then the Field Museum as a research associate where he has continued his primary affiliation. He has also had appointments in botany and ecology with Conservation International, Marie Selby Botanical Gardens, the Missouri Botanical Garden, and the Smithsonian Tropical

Research Institute. His Ph.D. research relating to the recruitment dynamics (seasonality and seed production) of tropical forest ecosystems in Panama along with early fieldwork in Amazonian Peru set the stage for his continuing research focus on plant communities in those regions. He has published over 120 scholarly articles – garnering over 18,000 citations – along with numerous reports and floristic guides. Additionally, he has been involved in the leadership and boards of several organizations dedicated to tropical biology and, in 2013, was elected an honorary fellow of the Association for Tropical Biology and Conservation (ATBC).

The Cuatrecasas Medal selection committee took special note of Foster's pioneering work on cataloging the flora of Barro Colorado Island (BCI) in Panama and then subsequent development of the first tropical forest dynamics plot there. With its detailed look at forest composition and spatial context, the BCI plot has transformed the study of tropical ecosystems and spurred new approaches and theories to explain their function and high biodiversity. It has led to a network of 50-hectare plots around the world, serving as testimony to the importance and power of this approach. Of special relevance to this year's Smithsonian Botanical Symposium is Foster's botanical exploration of remote regions of Ecuador and Peru, especially as part of Conservation International's "Rapid Assessment Program" (RAP), which does fieldwork in poorly known biodiversity hotspots and promotes their conservation.

The past recipients of the Cuatrecasas Medal are Rogers McVaugh from the University of North Carolina at Chapel Hill (2001); P. Barry Tomlinson from Harvard University (2002); John Beaman from the Royal Botanic Gardens,

Kew (2003); David Mabberley from the University of Leiden, The Netherlands, and the Royal Botanic Gardens, Sydney (2004); Jerzy Rzedowski and Graciela Calderón de Rzedowski from Instituto de Ecología del Bajío, Michoacán, Mexico (2005); Sherwin Carlquist from Rancho Santa Ana Botanic Garden and Pomona College (2006); Mireya D. Correa A. from the University of Panama and Smithsonian Tropical Research Institute (2008); Norris H. Williams from the Florida Museum of Natural History and the University of Florida, Gainesville (2009); Beryl B. Simpson from the University of Texas at Austin (2010); Walter S. Judd from the University of Florida at Gainesville (2012); Ana Maria Giulietti Harley from the Universidade Estadual de Feira de Santana, Brazil (2013); H. Peter Linder from Zurich University (2014); Paulo Günter Windisch from Universidade Federal do Rio Grande do Sul, Brazil (2015); and Kamal Bawa from the University of Massachusetts Boston (2016).



Kenneth Wurdack presents Robin Foster with the 15th José Cuatrecasas Medal in Tropical Botany. (photo by Gary Krupnick)

Abstracts from the Speakers at the 15th Smithsonian Botanical Symposium

The 15th Smithsonian Botanical Symposium, “Exploring the Natural World: Plants, People and Places,” was held 19 May 2017. The invited keynote speakers explored the impact of 18th, 19th, and 20th century botanical explorers on plant science. Below are the abstracts from the papers that were presented by the keynote speakers.

Janet Browne

Harvard University, USA

“Plants, people and places: Charles Darwin’s botanical work”

On the Beagle voyage Charles Darwin collected plants as best he could, hoping that they would provide important information for taxonomists in the UK. He was working in a longstanding tradition of botanical exploration that became a significant aspect of imperial expansion in the 19th century. As his evolutionary views took shape he became a dedicated plant physiologist. This talk looks at Darwin’s plant collecting and botanical work.

Jacques Cayouette

Agriculture and Agri-Food Canada, Canada

“Moravian missionaries as pioneers of botanical exploration in Labrador (1765-1954)”

The Moravian Church, also known as Church of the United Brethren or *Unitas Fratrum*, sent out missionaries to many parts of the world, including Labrador. The Moravian Brothers regarded natural history as an important reflection of God’s presence, and were interested in natural sciences such as meteorology. They collected a wide range of specimens, including vascular plants, in part to supplement their income. Their botanical contributions in Labrador were initiated in 1765, following the early discoveries of Joseph Banks in the region. In 1773, a list of plants collected at Nain was sent to their headquarters in London, probably accompanied by specimens. European botanists used this material to describe new species. Later, the principal Moravian naturalist, Kohlmeis-



Speakers, conveners, and award recipients at the 2017 Smithsonian Botanical Symposium at the National Museum of Natural History (from left): Laurence Dorr, Janet Browne, Eliane Norman, Jacques Cayouette, Pamela Henson, Robin Foster, Megan Raby, Daniel Stone, and Javier Francisco-Ortega. (photo by Ken Wurdack)

ter, made numerous collections and some of these were used to prepare the first flora of Labrador in 1818. North American botanists such as L.D. de Schweinitz were keen to acquire such early North American collections from Kohlmeister, and a genteel rivalry developed between botanists for their acquisition. From 1820 to 1880, at least 16 Moravian missionaries became plant collectors for numerous European clients. Specimens were used to prepare botanical publications, particularly floras, and were preserved in private collections, later incorporated into institutional herbaria. During the 20th century, Moravians in Labrador continued to collect plants, mostly for American botanists. Two Moravian women are known to have collected up until the mid-1950s. There remains much to discover about the Moravian botanists and their important collections.

Javier Francisco-Ortega

Florida International University, USA

“David Fairchild and his expeditions to the Caribbean Islands”

David Fairchild (1869-1954), one of the most influential plant explorers in America’s history, undertook many of his expeditions (between 1925 and 1933) on board the research yacht *Utowana*, a vessel owned by his wealthy businessman friend Allison Armour (1863-1941). The two last plant hunting expeditions that Fairchild carried out on *Utowana* targeted the Caribbean Islands (December 1931-April 1932 and January-April 1933). Based on studies

conducted in the U.S. National Agriculture Library Special Collections, the U.S. National Herbarium, the U.S. National Archives, and Fairchild Tropical Botanic Garden, insights regarding the collecting strategies of David Fairchild are provided; with a focus on his plant hunting expeditions in The Bahamas, Haiti, and Jamaica. Before these expeditions were carried out Fairchild read extensively about the history of these countries and contacted relevant colleagues who facilitated his field work. During these trips he collected herbarium specimens and germplasm material. In addition he took photographs, kept a travelogue, and recorded botanical information in collecting note books, and pocket-books. This presentation highlights how botanical history studies can provide unique avenues to establish solid partnerships among botanists from different countries. Furthermore, this presentation will also show how this study facilitated the engagement of members of the Miami community in archival, library, and botanical history research.

Pamela Henson

Smithsonian Institution Archives, USA

“‘What holds the earth together’: Agnes Chase and Latin American agrostology”

Agrostologist Agnes Chase (1869-1963) devoted her career to the study of grasses, spreading her belief that grass is

Continued on page 16

Abstracts

Continued from page 15

“what holds the earth together.” Entirely self-educated, she became a U.S. Department of Agriculture scientific illustrator and botanist, as well as Honorary Curator stationed at the Smithsonian’s U.S. National Museum. Working with her mentor, Alfred Spear Hitchcock, she became the world’s expert on the systematics of grasses. For their volumes on the grasses of the Americas, Hitchcock and Chase conducted extensive field work in Central and South America. Field work was challenging for women in her era, but Chase persisted, relying often on female networks in such places as rural Brazil and Venezuela. Her field notebooks have recently been digitized and transcribed. Chase devoted her career to the systematics of grasses throughout the Americas, serving as a mentor to generations of Latin American botanists. She also reached a broad audience through her popular *First Book of Grasses: The Structure of Grasses Explained for Beginners*, which was translated into several languages. In her spare time, she was a suffragist, opera buff, and political activist through such groups as the Socialist Party and NAACP. This paper will trace her career, challenges, and expeditions, as well as document her botanical network across the Americas.

Eliane Norman

Stetson University, USA

Charlie Williams

The André Michaux International Society, USA

“André Michaux, intrepid naturalist in America: 1785-1796”

André Michaux arrived in America in 1785 as a royal botanist of Louis XVI and returned to France in 1796 after the French Revolution. His main mission in America was to help in France’s reforestation, and he grew both trees and other useful plants and shipped them to France. Michaux wanted to find new species and publish them, and he kept a succinct diary, *Journal de mon Voyage*, preliminary notes in French with snatches of Latin, which might have been the basis of a book had he lived long enough. He established two nurseries, one near Hoboken, New Jersey, and the other near Charleston, South Carolina. He travelled widely to collect

plants, from Florida to the Appalachians, to the Bahamas, and to northern Québec. Negotiations with Jefferson in 1793 for a journey all the way to the Pacific were aborted by Citizen Genet, the first post-revolutionary French Ambassador, who transformed Michaux into a political agent, transferring funds to General Clark of Kentucky to form a militia to expel the Spaniards from the Mississippi. Michaux’s last American journey, in 1795, was to the Mississippi River, to determine the feasibility of going to the Pacific. His return to France was marred by shipwreck when he almost lost his herbarium. Once in Paris, he began work on two books, *Les Chênes de l’Amérique* and *Flora Boreali-Americana*. We will discuss differences in style and format of these publications, the individuals who were instrumental in his botanical education, and his interactions with Indians and Blacks.

Megan Raby

University of Texas at Austin, USA

“Tropical biology and the history of ‘biodiversity’”

It is no coincidence that tropical biologists were among the key players in the effort to bring “biodiversity” to the public stage in the 1980s. This talk explains how the key scientific concepts and values embedded in the modern biodiversity discourse were developed through U.S. biologists’ fieldwork in the tropical circum-Caribbean during the 20th century. Beginning in the era of the Spanish-American War and the construction of the Panama Canal,

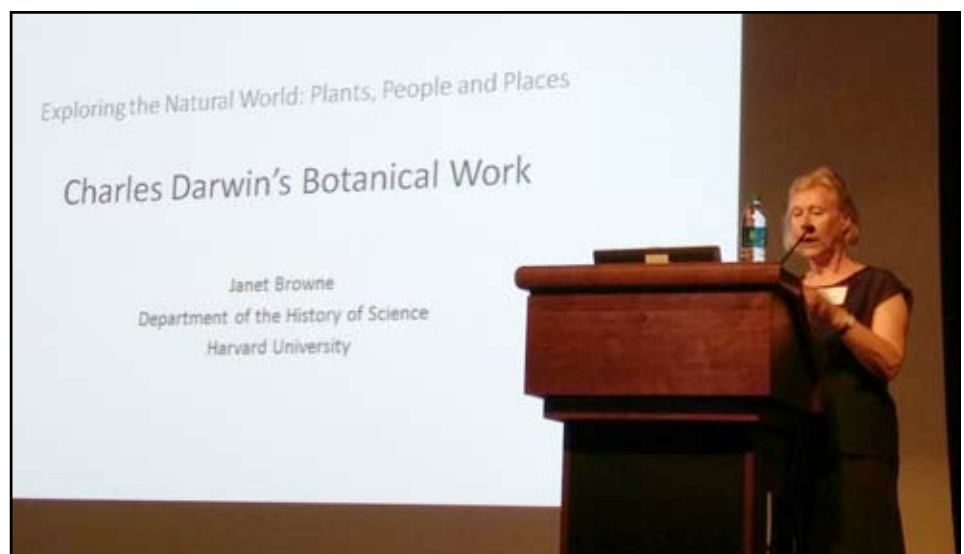
U.S. ecologists took advantage of expanding U.S. landholdings to establish permanent field stations for long-term, basic research in the tropics. Chief among these was the station at Barro Colorado Island, Panama, now part of the Smithsonian Tropical Research Institute. Facilitating the study of living organisms *in situ*, tropical stations encouraged studies of ecology, physiology, and behavior in places where specimen-based research had previously dominated. At the same time, stations also encouraged intensive and increasingly fine scale taxonomic and distribution studies. Indeed, it seemed that the closer tropical biologists looked, the more species they found. Although long fascinated by the great numbers and variety of species in the tropics, by mid-century biologists developed practices for measuring “species diversity” and investigating its ecological and evolutionary causes. Seeking financial support and institutional stability, tropical biologists began to argue that the diversity of tropical life itself was an economic resource that should be better studied, used, and conserved. In doing so, they laid the foundations of the modern biodiversity discourse.

Daniel Stone

National Geographic Magazine, USA

“The botanical adventures we live every day”

From 1894 to 1904, plant hunter David Fairchild circled the world in search of plants that would enrich American farmers and delight American eaters. Fairchild



Janet Browne (Harvard University) speaking on expeditions and botanical studies of Charles Darwin. (photo by Gary Krupnick)



Daniel Stone (National Geographic Magazine) discussing the botanical adventures of David Fairchild. (photo by Ken Wurdack)

wasn't the first to do this work. The birth of countries had long coincided with a botanical scramble for exotic plants. But Fairchild was the most creative, harnessing the United States' growing appetite in the late 19th and early 20th century to go further and act more boldly to acquire a stunning array of plants, including avocados, dates, mangoes, and Egyptian cotton, that would help transform the United States into an agricultural and economic superpower. *National Geographic* editor and author Daniel Stone will discuss this era of plant exploration—including Fairchild and the explorers who came before and after—to argue that America's botanical and culinary diversity are the result of decades of savvy diplomacy, secret theft, and, at times, dark espionage. The talk will include stories from Stone's book, *The Food Explorer*, on the life and adventures of David Fairchild, forthcoming from Penguin Random House in 2018.

Sponsors of the 15th Smithsonian Botanical Symposium

- National Museum of Natural History
 - Department of Botany
 - Office of the Associate Director for Science
- United States Botanic Garden

Symposium

Continued from page 1

Labrador. Overall, Moravian missionaries wrote nine floras of Labrador, with a peak of 325 plant species (written by Eduard Wenk in ca. 1835-1873).

The next set of talks focused on another naturalist who explored North America during the late 18th century. In 1785 André Michaux, a royal botanist appointed by King Louis XVI, was sent to the U.S. to bring trees back to France to replenish forests that were stripped bare because of shipbuilding. Eliane Norman (Stetson University) and Charles Williams (The André Michaux International Society) discussed these expeditions in their co-authored talk, "André Michaux, Intrepid Naturalist in America: 1785-1796." Norman first focused on the history of Michaux's 11 years in America. Upon arriving in North America, Michaux first set up a 29-acre nursery in New Jersey. Norman noted several significant people Michaux interacted with, such as Benjamin Franklin, who wrote letters of introduction on Michaux's behalf, and George Washington, who gave seeds to Michaux. Michaux met with Thomas Jefferson who was interested in sending him on an expedition out west to the Pacific. Edmond Genet, however, wanted him to go to Kentucky instead as a political agent to help form a militia to rid Mississippi of Spaniards. Norman also discussed how a

visit with Carl Wadstrom, a Swedish abolitionist, impressed upon Michaux that he then began tutoring a young African boy how to press plants, stuff animals, and pin insects. After Michaux returned to France, he published two major contributions: *Histoire des Chênes*, a monograph of 20 oak species (written in French), and *Flora Boreali-Americana*, the first treatment of the plants of North America, including Latin descriptions and localities of each species.

Charles Williams talk narrowed in on 10 noteworthy journeys of Michaux. Each journey departed from Charleston, South Carolina, and took him to 10 of the original 13 U.S. states, Kentucky, Tennessee, territories that would later become Illinois, Indiana, and Ohio, Spanish Florida, Quebec, and the Bahamas. Williams examined Michaux's first wilderness journal written in 1787 in Georgia and the headwaters of the Savannah River, where he recorded 108 species of plants. Michaux encountered many plants unknown to science, including *Shortia galacifolia*, a species later described by Asa Gray after Gray found a specimen in Michaux's collection in France. In 1789, with fear of being sent back to France, Michaux took three journeys—to the Bahamas, on horseback to Philadelphia and New York City, and to the mountains of northwestern North Carolina, where he discovered *Magnolia macrophylla*. His last big 360-day journey, in 1795-1796, took him to the Mississippi river, where he discovered the oak, *Quercus macrocarpa*, and a new tree with commercial potential, yellowwood (*Cladrastis kentuckea*). Michaux's discovery of the yellowwood tree later led to the designation of the tree as Tennessee's Bicentennial tree in 1991, and a tree with a historical marker sits on a square in Gainesboro, Tennessee.

Pamela Henson, Smithsonian Institution Archives, next spoke about expeditions farther south during her talk, "What Holds the Earth Together": Agnes Chase and Latin American Agrostology." Henson explained that as Agnes Chase began local botanizing trips in her home state of Illinois, Chase grew an interest in grasses, a plant that "holds the earth together." Henson traced Chase's career from illustrating plants at the Field Museum to securing a job at the U.S. Department of Agriculture's Bureau of Plant Industry first as a

Continued on page 18

Symposium

Continued from page 17

botanical illustrator and then as a scientific assistant under Alfred Hitchcock (1906), assistant botanist (1909), associate botanist (1925), and, after Hitchcock's death, senior botanist (1936). Even though she was an employee of USDA, her office was located in the Smithsonian Castle where she was an unpaid custodian of grasses and honorary curator in the National Herbarium. After retirement in 1939, she continued working in the herbarium until her death in 1963.

Henson explained that women at that time found it difficult to secure financial support for fieldwork, and thus Chase had to fund her own expeditions. Henson discussed Chase's field trips throughout the northeast and southeast of the U.S., Puerto Rico, Mexico, Panama, and later Brazil and Venezuela. Chase met resistance from the Smithsonian, where officials were reluctant to send a woman on field trips of these kind. Henson explained that without institutional support for field work, Chase pursued alternative pathways and built relationships with Latin American botanists. On her trip to Brazil,

for instance, she turned to a network of missionary woman for support to facilitate her research, including transportation, housing, and moral support. Henson talked about many of the Latin American students and collaborators who flourished under Chase's training and guidance, each receiving advice on collecting techniques, collections management, note-taking, and manuscript writing.

The afternoon sessions began with Megan Raby, University of Texas at Austin, continuing the discussion of tropical explorations with her talk "Tropical Biology and the History of 'Biodiversity'." She opened her talk by discussing the 1986 National Forum on Biodiversity, a televised meeting that introduced the concept of biological diversity to the policy world. She was struck by how each of the conference participants developed their own understanding of biodiversity through their individual research programs in the tropics. The modern concepts of biodiversity and conservation have their foundation in both taxonomic and ecological approaches to tropical field work. Raby focused her talk on three case studies—three important field sites for early-20th century botanists in North America: Cinchona in Jamaica, Soledad in Cuba, and Barro Colorado Island (BCI) in Panama.

Raby explained that Cinchona was initially important because of three key features: it was an English-speaking locality, frequent steamships for the fruit trade traveled from Boston and New York to Jamaica, and the flora was relatively well known. At the turn of the century, a field station was initially set up for basic research in ecology since plants must be studied in the field to fully understand their physiology and ecological relationships. The research coming from the site began to challenge assumptions of tropical environments. In contrast, the Harvard Station in Soledad began as a sugar experiment station. While it attracted many agricultural breeders, the Harvard Station grew important as a botanic garden and arboretum. It soon became a good training ground for North American biologists. The only station more important in introducing tropical biology in the first half of the century was BCI. Unlike the agricultural research at Soledad, basic research thrived at BCI due to the unmodified landscape, concentrated research due to isolation, and a focal point for long-term studies. There

was a desire for a complete inventory of the fauna and flora, and the flora of the island was published in 1927. By the end of the century, a 50-hectare permanent tree plot was established to census every tree. Raby argued that tropical biologists at each of these three field sites laid the foundations of biodiversity research.

Daniel Stone, National Geographic Magazine, presented the first of two talks focusing on the explorations of David Fairchild with his presentation, "The Botanical Adventures We Live Every Day." Stone explained that as plant viruses and pathogens took a toll on the U.S. economy in the late-19th and early-20th century, the goal of many explorations was to bring back new crops to liven the economy through agriculture and botany. Stone's talk focused his talk on the origins of several domesticated crops and the influence of Fairchild's journeys from 1900 to 1917. Some significant Fairchild discoveries that Stone spoke of include the avocado from the Caribbean, new varieties of wheat and garlic from Italy, new cotton from Egypt, and cherry trees from Japan.

Stone spoke at length about Fairchild's close relationship with his travel colleague, Charles Marlatt. He explained that the friendship became fractured after Fairchild brought Japanese cherry trees to Washington, DC. Marlatt objected to the trees because of risks in importing invasive insects and diseases. Their escalating battle was written out in the pages of *National Geographic* in 1911, where Marlatt published an article about "Pests and Parasites" while Fairchild published an article later that year about exciting "New Plant Immigrants." Marlatt was able to claim victory in their feud when U.S. Congress enacted plant quarantine regulations. Stone concluded his talk by talking about the frontiers in food crop discoveries that remain. He highlighted Fairchild's favorite fruit, the mangosteen (*Garcinia mangostana*), a crop Fairchild failed to successfully import into the U.S.—a tropical fruit with a rind too thick, which bruises too easily, and ripens too quickly.

Javier Francisco-Ortega, Florida International University, gave the second Fairchild talk with "David Fairchild and His Expeditions to the Caribbean Islands." Funded by two wealthy businessmen, Barbour Lathrop and Allison Armour, Fairchild traveled to the West Indies first in 1931-1932 and on a second trip in 1933.

Acknowledgements

The success of the Symposium was due to the significant time and efforts of the following people:

Organizers

- Laurence J. Dorr
- Kenneth Wurdack
- W. John Kress
- Gary Krupnick
- Sue Lutz
- Ari Novy
- Sylvia Orli
- Susan Pell
- Eric Schuettelpelz
- Elizabeth Zimmer

Support

- Mary Ann Apicelli
- Carol Youmans

Photographers

- Gary Krupnick
- Kenneth Wurdack

And many others who had helped in a myriad number of ways.



Guests interact at the closing reception and poster session of the 2017 Smithsonian Botanical Symposium. (photo by Ken Wurdack)

Francisco-Ortega explained that Fairchild's expeditions consisted of meticulous plant recordings, detailed in his pocket-books, collection books, and travelogues. Fairchild's collecting team included Armour, Leonard Toy, and Fairchild's wife Marian and daughter Nancy. Other noted collectors on his expeditions include ornithologist James Greenway, herpetologist Thomas Barbour, and botanist Harold Loomis. One notable in-country collaborator is Brother León of Havana, Cuba.

Francisco-Ortega explained that Fairchild's expeditions had very clear objectives. For instance, in his 1933 expedition to Jamaica, Fairchild traveled to three botanical gardens on the island in search of early collection germplasms introduced to the West, including breadfruit (*Artocarpus altilis*) and fish poison tree (*Barringtonia asiatica*) that Vice Admiral William Bligh introduced from the Pacific in the late 1700s. Francisco-Ortega discussed Fairchild's rich collection of photographs, herbarium specimens, and germplasm accessions, and its impact on botany. For instance, he recounted the 1966 story of how Robert Read, a Curator of Botany at Smithsonian, was able to describe a new species of palm, *Coccothrinax inaguensis*, based on material originally collected by Fairchild in the Bahamas in 1932 and planted near Miami, Florida.

Janet Browne, Harvard University, closed the afternoon lectures with her presentation, "Plants, People and Places: Charles Darwin's Botanical Work."

Browne began by asserting that during the voyage of HMS *Beagle* in 1831, Darwin considered himself a novice in the field of botany. He sent his collected plant specimens to his mentor John Stevens Henslow for identification, and in Darwin's correspondences with Henslow, he urged him to hurry along with the plant identifications. He also asked Henslow for advice on how to properly preserve pressed leaves. Browne explained how Darwin's later correspondences reveal that he often sought out specialists and recruited knowledgeable people.

Browne discussed several of Darwin's numerous botanical collections from the Galapagos Archipelago that now reside in Cambridge University Herbarium. All plants that he collected were in flower, but Browne explained that Darwin was not impressed by "wretched weeds." Even though he perceived himself as a collector, his frame of mind began to shift into seriously exploring the causes of variation within species. His shift was triggered by finches and tortoises; plants were not part of that shift mainly due to the lack of expert plant identification. After the voyage, Darwin became a dedicated botanist. He built a greenhouse and had many correspondences with other botanists, such as Asa Gray, Joseph Hooker, and George Bentham. His work later in life focused on experiments and observations in his greenhouse, and he became an astute plant physiologist. He published significant works on orchids, insect pollination, insectivorous plants, climbing plants, hybrid-

ization, and tropisms. Browne feels that Darwin's love and interest in plants was developed though the *Beagle* voyage.

The Symposium ended with a closing reception and poster session in the Conservatory of the U.S. Botanic Garden. Next year's 16th Smithsonian Botanical Symposium is scheduled to take place on Friday, May 18, 2018, with a theme yet to be determined. Be sure to check the symposium website at <<http://botany.si.edu/sbs>> for updates.

Supplementary Symposium Links on Web

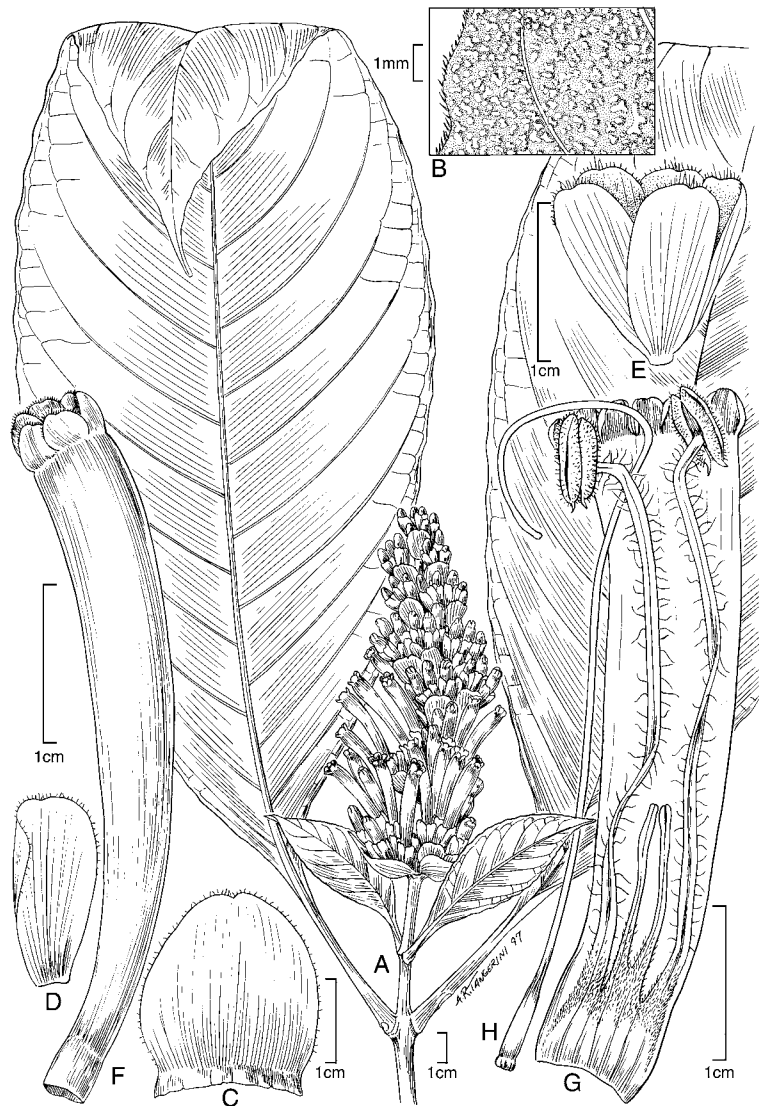
The website to the 15th Smithsonian Botanical Symposium <<http://botany.si.edu/events/sbsarchives/sbs2017/>> has many links and documents related to the conference. Included on the website is the full program, abstracts of the talks, links related to the speaker's presentations, and selected images from the various events. Additional items related to the Symposium can be added to the list of links and documents by sending an e-mail to sbs@si.edu.

The Symposium archive page <<http://botany.si.edu/events/sbsarchives/>> also includes programs, abstracts and images from the past 14 symposia: "Linnaean Taxonomy in the 21st Century" (2001); "The Convention on Biological Diversity" (2002); "Botanical Frontiers in Southeast Asia" (2003); "Botanical Progress, Horticultural Innovations, and Cultural Changes" (2004); "The Future of Floras: New Frameworks, New Technologies, New Uses" (2005); "Island Archipelagos: Cauldrons of Evolution" (2006); "Partners in Evolution: Interactions, Adaptations, and Speciation" (2008); "Genes, Genomics and Genome Evolution in Plants" (2009); "Food for Thought: 21st Century Perspectives on Ethnobotany" (2010); "Transforming 21st Century Comparative Biology using Evolutionary Trees" (2012); "Avoiding Extinction: Contemporary Approaches to Conservation Science" (2013); "Location, Location, Location... New Advances in the Science of Biogeography" (2014); "Next Generation Pteridology: An International Conference on Lycophte & Fern Research" (2015); and "Bats, Bees, Birds, Butterflies and Bouquets: New Research in Pollination Biology" (2016).

Art by Alice Tangerini

***Sanchezia fosteri* Wassh.**

Robin Foster, the 15th recipient of the José Cuatrecasas Medal for Excellence in Tropical Botany, collected the type specimen of *Sanchezia fosteri* (Acanthaceae) in Peru, east of Puerto Inca, Huánuco, on September 11, 1982. Dieter Wasshausen described this species in 2007 (*Ann. Naturhist. Mus. Wien, B* 108: 180–182), and dedicated the name of the plant in honor of Foster "for his outstanding tireless fieldwork contributing to our knowledge of taxonomic botany." Alice Tangerini prepared the illustrations of *S. fosteri* and eight other new species of Peruvian Acanthaceae collected from the Cerros del Sira for Wasshausen's publication.



Smithsonian
National Museum of Natural History

Department of Botany
PO Box 37012
NMNH, MRC-166
Washington DC 20013-7012

Official Business
Penalty for Private Use \$300