

The Plant Press



Smithsonian
National Museum of Natural History

New Series - Vol. 14 - No. 2

April-June 2011

Botany Profile

Making Sense of the Schomburgk Expeditions

By Sara Alexander

Robert Hermann Schomburgk (1804-1865) was possibly the most important of the early botanical collectors in Guyana, and was the first scientist to explore many of its interior regions. He and his younger brother, Moritz Richard Schomburgk (1811-1891), explored Guyana, and adjacent Brazil and Venezuela, between 1835 and 1844, during which time they discovered many new species and collected many types. The U.S. National Herbarium holds 334 of these type specimens, and information and images for many of these are available through the Botany Department's online Type Specimen Register <botany.si.edu/types>.

The Biological Diversity of the Guiana Shield Program (BDG) recently completed a project to georeference all 3,400 US-held botanical types specimens from the Guiana Shield (Garcia-Milagros and Funk, 2010. *Frontiers of Biogeography* 2(3): 71-77), and produce maps in Google Earth <botany.si.edu/bdg/georeferencing.cfm>. This was not possible for all types: 97 percent of types from the Venezuelan state of Amazonas could be georeferenced, but only 61 percent of types from Guyana. One of the largest sources of these ungeoreferenced type specimens was the type collections made by the Schomburgk brothers. The purpose of this article is to explore and explain the cause of this ambiguity.

Soon after the formation of the colony of British Guiana in 1814, Robert Schomburgk was employed by the Royal Geographical Society of London to survey its interior. Between 1835 and 1839

he made three journeys to inland Guyana and on through Venezuela, tracing the Essequibo River to its source and surveying areas neglected during Alexander von Humboldt's earlier explorations of the upper Orinoco River. Richard Schomburgk accompanied him on four additional expeditions and several shorter excursions between 1841 and 1844. In their quest to survey the boundaries of British Guiana, the brothers traveled thousands of miles through the interior, taking notes, collecting biological specimens, and observing the cultures of local Amerindians (van Dam, 2002).

Expeditions made by the Schomburgk brothers can be outlined as follows:

Robert's solo expeditions:

1. Up the Essequibo from Georgetown to the Rupununi River, and from there to Annai and the Amerindian village of Pirara (21 September 1835 – 28 March 1836).
2. Along the Courantyne and Berbice Rivers (2 September 1836 – March 1837).
3. Up the Essequibo River to its source, and Mount Roraima (12 September 1837 – 9 November 1838).
4. Esmeralda and Fort Sao Joaquim in Brazil, along the Orinoco River and its tributaries, and along the Rio Casiquiare in Venezuela (21 November 1838 – 20 June 1839).

Joint expeditions by both Robert and Richard:

1. Barima and Cuyuni Rivers (19 April 1841 – 30 July 1841).
2. Takutu River source (23 December

1841 – 22 May 1842).

3. Roraima Territory, Brazil (10 September 1842 – 5 December 1842).
4. Upper Courantyne River (15 February 1843 – 12 October 1843).

Richard's solo expeditions:

1. Pomeroon (August – September 1843).
2. Moruca (October 1843).
3. Demerara River (April – June 1844).

Enumerating collections made by the Schomburgk brothers, or sometimes even determining if a specimen was collected by Robert or Richard, is difficult due to multiple numbering series, irregular procedures during collections, and sparse or absent label data.

Multiple numbering series. Over the course of his expeditions Robert Schomburgk made four different series of botanical collections. Each of the four series started at the number one, and so the numbers of the collection series fully overlap and must be distinguished through other label information or reference to literature.

Series one (Rob. Ser. 1) was collected between 1835 and 1839.

Series two (Rob. Ser. 2) was collected between 1841 and 1844. These labels often include a second number in parentheses representing a collection in Richard Schomburgk's series. While many numbers in Richard's collection series correspond to Rob. Ser. 2 collections, many others do not.

Continued on page 9

Pedro Acevedo traveled to San Juan, Puerto Rico (2/3 – 2/12) with **Vinita Gowda** and **Fiona Wilkinson** to present a talk and to mount an exhibit on the botanical paintings of Agustin Stahl; and to Bronx, New York (3/16 – 3/17) to select material at the New York Botanical Garden for Bobbi Angel to illustrate.

Vicki Funk traveled to Crete, Greece (1/5 – 1/11) to attend a meeting of the International Biogeography Society where she stepped down as Past-President; Funk was one of the founding members of the society which was incorporated in 2000 and hosts an international meeting every other year. The next meeting will be hosted by Florida International University in January 2013.

Carlos García-Robledo traveled to La Selva Biological Station, Costa Rica (1/27 – 2/23) to teach the Tropical Ecology and Conservation course for the Organization for Tropical Studies and to conduct fieldwork for his postdoctoral fellowship.

W. John Kress traveled to Panama and Costa Rica (2/19 – 3/2) to attend the Smithsonian Institution Global Earth Observatories (SIGEO) Symposium at the Smithsonian Tropical Research Institute, and to conduct field research on *Heliconia* in Costa Rica; to Hartford, Connecticut (3/4 – 3/5) to give an invited talk at Smith College; and to Puerto Rico and Dominica (3/12 – 3/16) to give an invited lecture to the Heliconia Society of Puerto Rico and to conduct field work in Dominica.

Rusty Russell traveled to Riverside, California (2/24 – 3/6) to conduct fieldwork in the San Jacinto Mountains as part of a study of herbarium records as a reflection of change over time; the work is funded in part by Earthwatch Institute in cooperation with the U.S. Forest Service and the University of California Nature Reserve System.

Laurence Skog traveled to Sarasota, Florida (2/14 – 2/22) to conduct research at the Gesneriad Research Center and herbarium at Marie Selby Botanical Gardens, and met with officers of the Gesneriad

Society, Inc.

Alice Tangerini traveled to Kauai, Hawaii (2/23 – 3/8) to teach a class and participate in a workshop at the National Tropical Botanical Garden (NTBG).

Alain Touwaide and **Emanuela Appetiti** traveled to Victoria, Canada (3/1 – 3/29) to teach a set of classes for the trans-disciplinary program on “Medicine and Society,” and to present several lectures at the University of British Columbia.

Warren Wagner traveled to Kauai, Hawaii (3/26 – 4/15) to participate in a workshop to develop a section of the McBryde Garden at the National Tropical Botanical Garden (NTBG), and to attend the NTBG board meeting as the McBryde Chair.

Kenneth Wurdack traveled to Bronx, New York (3/4) with **Laurence Dorr** to conduct research at the New York Botanical Garden; and to State College, Pennsylvania (3/21 – 3/22) to meet with co-PIs on the Grand Challenge Award regarding next-generation sequencing.



The Plant Press

Reu Series - Vol. 14 - No. 2

Chair of Botany

Warren L. Wagner
(wagnerw@si.edu)

EDITORIAL STAFF

Editor

Gary Krupnick
(krupnickg@si.edu)

Copy Editors

Robin Everly, Bernadette Gibbons, Rose Gullledge, Dail Laughinghouse

News Contacts

MaryAnn Apicelli, Robert Faden, Rusty Russell, Alice Tangerini, and Elizabeth Zimmer

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/>

Visitors

Mike Martin, Johns Hopkins University; *Ambrosia* (Compositae) (1/1/09-6/30/11).

Li-min Lu, Chinese Academy of Sciences; *Parthenocissus* (Vitaceae) (4/1/10-3/31/11).

Zhou Zhuo, Kunming Institute of Botany, China; *Cyanthus* (Campanulaceae) (4/1/10-3/29/11).

Carlos García-Robledo, University of Miami; Plant-herbivore interactions (7/20/10-7/19/11).

Juan Chen, South China Botanical Garden, Guangzhou, China; *Curcuma* (Zingiberaceae) DNA barcodes (8/9/10-2/15/11).

Vinita Gowda, Indian Institute of Science, Bangalore, India; *Alpinia* (Zingiberaceae) (11/15/2010-3/31/2012).

Genise Freire, Universidade Federal Rural do Rio de Janeiro, Brazil; Sapindaceae (12/1/2010-12/31/2011).

Li Pan, University of Wisconsin-Madison; *Smilax* (Smilacaceae) (1/3 - 1/7).

Evelyn Strombom, Swarthmore College; Edward Palmer collections from Mexico (1/4 - 1/21).

Julianne Byrne and **Gerry Fitzgerald**, Boyne Research Institute, Drogheda, Ireland; Birth defects in Antiquity (1/10).

Allen Dawson, University of Maryland, and **Camila Uribe-Holguín García-Reyes**, Pontificia Universidad Javeriana, Bogotá, Colombia; Plant conservation internship (1/10 - 4/15).

Carolina Diller, University of Maryland; Angiosperm phylogeny (1/10 - 1/21).

Marc Chimes, Bremmer & Goris Communications, Virginia; Collaborative research with the Institute for the Preservation of Medical Traditions (1/18).

Dave Gammon and 12 students, Elon University; Plant conservation and herbarium tour (1/19).

Sandra Knapp, Natural History Museum, London; Solanaceae (1/31 - 2/8).

Continued on page 5

XVIII International Botanical Congress

By Laurence J. Dorr

Since 1969, the International Botanical Congress (IBC) has been held every six years. While there are 19th century antecedents, the modern incarnation of this important scientific meeting began in 1900 in Paris and at four to six year intervals subsequent meetings were held mostly in European and North American cities. This summer, or winter depending upon your perspective, the XVIII International Botanical Congress will be held in Melbourne, Australia. The Congress proper, which will occur from 23-30 July 2011 is preceded by the Nomenclature Section, which will convene from 18-22 July 2011. Both are important events and both are of paramount importance to systematic botany.

Our Department plans to have a strong presence at the XVIII International Botanical Congress and this will reflect well on the National Museum of Natural History (NMNH) and the Smithsonian Institution. Participation in the IBC will give us an opportunity to present our ideas on an international stage, and it will give us countless opportunities to acquire new knowledge about research and techniques, give us insight into potential new trends and opportunities that can benefit our research, help us identify strong candidates for graduate and postdoctoral fellowships and other collaborations, and even suggest new funding possibilities. The IBC also will give us a platform to advance NMNH and Smithsonian Institution scientific initiatives, most notably the Encyclopedia of Life, the Biodiversity Heritage Library, and the Global Genome Initiative.

Nine curators (**Pedro Acevedo, Laurence Dorr, Robert Faden, Vicki Funk, W. John Kress, Paul Peterson, Warren Wagner, Jun Wen, and Kenneth Wurdack**) and two resident research associates (**Christian Feuillet and Robert Soreng**) in the Department of Botany, NMNH, as well as the librarian (**Robin Everly**) of the Botany and Horticulture Library, Smithsonian Institution Libraries, plan to attend the XVIII International Botanical Congress and will present a wide range of talks and posters. The Congress anticipates holding up to 150 general symposia, allowing up to 900 oral presentations. In addition, provision has been made for sessions to display the results of research as posters, including ePosters that will be displayed on computer monitors instead of paper. The symposia are organized into seven major themes; Systematics, evolution, biogeography & biodiversity informatics; Ecology, environmental change & conservation; Structure, development & cellular biology; Genetics, genomics & bioinformatics; Physiology & biochemistry; Economic botany including biotechnology, agriculture & plant breeding; and Plants in society. Most of us who attend will be speaking in symposia

falling under the umbrella of either the Systematics or Genetics themes. In addition, W. John Kress will give one of several key note addresses in a session devoted to Plant Taxonomy in the 21st Century. The title of his talk is "Plant DNA barcoding: the future of taxonomy, ecology, and species discovery."

Seven of us (Acevedo, Dorr, Feuillet, Funk, Peterson, Soreng, and Wagner) plan to participate in the Nomenclature Section that precedes the Congress proper. This is the sole venue where the rules and recommendations of the *International Code of Botanical Nomenclature* can be revised or modified and it absolutely requires our participation. A number of far-reaching and controversial proposals are scheduled to be debated next year, including mechanisms for implementing valid electronic publication of botanical names, an idea first put forward by a member of our department at the XV IBC in Tokyo. We have always played a major role in deciding the fate of the rules and this is reflected in the fact that we are one of only eight institutions worldwide that is given the maximum number (seven) of institutional votes allowed. The assignment of institutional votes is based on "taxonomic activity" and participation in the Nomenclature Section is one important indicator of such activity. Also, individual scientists from the Smithsonian who attend the Section are given a single vote, and they can carry proxies for institutions unable to send representatives to the IBC. Thus when one combines our institutional votes, individual votes, and proxies we have a loud voice that can steer the discussions and debates toward resolutions that benefit us (and the botanical community).

A strong presence in the Nomenclature Section is also important for our ongoing collaborations with colleagues in Latin America and Africa as neither region will be sending a large number of delegates to the Congress. While there are no figures yet concerning the number of delegates who plan to attend the Nomenclature Section, preliminary figures (www.ibc2011.com) for the Congress as a whole show, as one would expect, that the greatest number of attendees will be coming from Australia and New Zealand (ca. 400 delegates), followed by Asia (ca. 370), North America (ca. 300), Europe (ca. 270), Latin America (ca. 120), and Africa (ca. 40).

Before, during or after the XVIII International Botanical Congress there will be opportunity to study collections in the National Herbarium of Victoria (MEL), which is situated in the Royal Botanic Gardens, Melbourne, as well as other herbaria in Australia. Admittedly winter is not the best season for finding flowering plants, but a number of us

Continued on page 8

Chair

With

&

View

Warren
L.
Wagner



Staff Research & Activities

On 26 January, **John Kress**, **Gary Krupnick**, and **Alice Tangerini** participated in Smithsonian's "Shout Online Conference Series." Shout invites educators and students to take an active role in global environmental issues. The "Study the Land" event featured interactive lectures with Kress explaining the role of evolution and adaptation in shaping plant and animal communities in island ecosystems, Krupnick discussing issues surrounding herbarium collections and plant conservation, and Tangerini sharing methods of botanical illustration. The event took place live online with a recording archived on the Shout webpage <www.smithsonian-conference.org/shout/conference-study/>.

Alice Tangerini and Wendy Hollender, New York Botanical Garden artist and art instructor, taught a two-week botanical illustration class from 24 February to 6 March 2011, at the National Tropical Botanical Garden in Kauai, Hawaii. Tangerini was asked by Hollender (who had taught the previous year as a solo instructor) to teach the scientific illustration technique of pen and ink on drafting film to complement Hollender's techniques using color pencil and graphite. The 17 students represented a full range of experience—from no previous drawing background to professional artists interested in expanding their knowledge of techniques and botanical subjects. In addition to the class agenda, the NTBG offered two field trips: to Limahuli (NTBG's North Island site), and to "The Cave," where David Burney, NTBG conservationist and paleoecologist, maintains an ecological study site. A half-day excursion was made to the local garden to collect material. Tours of the new facility containing the herbarium, library, and rare book room were provided by NTBG staff members, Dave Lorence, Rick Hanna and Tim Flynn. The amount of work achieved in the eight days of drawing from NTBG's vast living plant collection was impressive and spurred interest in further classes.

On 10 February, **Alain Touwaide** presented a 2-hour illustrated seminar for the

Smithsonian Resident Associates entitled "History of the Book: Papyrus to E-books in Only 4,000 Years."

Awards & Grants

Carlos García-Robledo received a National Geographic / Waitt Institute grant (early career grant) to support his postdoctoral fellowship project "Using DNA barcodes to model tropical plant extinctions and co-extinction cascades of associated insect herbivores under projected climate change."

Search Past Issues of *The Plant Press*

The Plant Press webpage <botany.si.edu/pubs/plantpress> has a new feature—a search toolbar. Viewers can search for articles from all of the past 54 issues (1998 - present) of the newsletter. Keyword search includes names, locations, institutions, taxa, disciplines, and more. The resulting list of articles includes links to the pdfs of past issues. All articles from each issue (excluding "Travel," "Visitors" and "Publications") are included in the search function.

Stahl Exhibition Opens in Puerto Rico

Pedro Acevedo recently curated an exhibition, "Dr. Agustin Stahl: Botanical Watercolors," at the art gallery of the Universidad del Sagrado Corazón, Puerto Rico, featuring 90 reproductions of botanical watercolors made by Agustin Stahl (1842-1917), a Puerto Rican physician and naturalist who published the first flora of Puerto Rico from 1883-88. The original watercolors, in the collections of the University of Puerto Rico in Mayagüez and the Instituto de Cultura Puertorriqueña, were scanned in Puerto Rico and have been available since 2005 through Botany's website <botany.si.edu/Antilles/PRFlora/Stahl/index.cfm>.

In 2010, Acevedo obtained a grant from Smithsonian Latino Center to produce an exhibit highlighting Stahl's botanical artwork. The project, which involved the digital restoration of 90



Stigmaphyllon emarginatum by Agustin Stahl.

images by **Fiona Wilkinson** at NMNH took more than six months to complete. In early 2011, Acevedo, Wilkinson, and **Vinita Gowda** traveled to Puerto Rico to set-up the exhibit. The opening took place on 10 February with a presentation by Acevedo featuring Stahl's scientific accomplishments and the process used to digitally restore Stahl's watercolors. The opening was well attended with more than 200 people from all over the island. The exhibition was on view through 3 March, with several hundred people visiting the exhibit. New venues are being identified to ensure that the exhibition reaches diverse audiences.

Spring Flowering on Facebook

The first-flowering dates for spring-blooming plants for the Washington-Baltimore area have been recorded by more than 100 volunteers in the Department of Botany, NMNH, each year from January 1 to May 31 since 1970. The DC Flora Spring Flowering webpage <botany.si.edu/dcflora/springflowers/> gives information about range of dates that spring flowers have been observed to start blooming within the Washington area over the years 1970-2011, where you can find them, and 100 of the most commonly observed flowers.

The Spring Flowering project has



joined the social network with its own Facebook page, “Spring Flowers of The Washington-Baltimore Area” <www.facebook.com/dc.spring.flowers>. This colorful page has weekly updates of spring flowering plants and images taken from our DC Flora image repository. In addition, members can add their own flower sightings. You must be a Facebook member to access this page.

Maps Catalog

The Smithsonian Institution, since the earliest days, has sent its researchers on expeditions to fulfill the mission of increasing and diffusing knowledge. These researchers usually relied on maps to plan and guide their quests. Efforts have been made recently to organize the maps that have accumulated over the years. The *Maps Catalog* website <botany.si.edu/references/mapsCatalog> is a result of those efforts. Until recently, this information has only been available within the Smithsonian, but may now be viewed by the general public.

The Maps Catalog currently includes about 14,000 distinct maps covering about 11,000 subjects, with nearly 7,000 high

resolution images available for viewing. Viewers can search for details about any of the maps, spread across five different collections (Botany, Amphibians & Reptiles, Mammals, African Art and the Smithsonian Environmental Research Center), using four different methods (subject search, geographic search, coordinate search, and advanced search).

The website is the product of the efforts of volunteer **Jim Harle**, who was recruited by **Rusty Russell** in 1994 to curate the Botany maps, and to organize them into a collection. Each map has as many as 30 different pieces of information entered into the database. Maps that are fragile are put in polyethylene bags. Each map is scanned and the image is cleaned up with Photoshop. Together with over 30 interns, Harle has cataloged over 9,000 of Botany’s approximately 10,000 maps, and has expanded to other collections with Entomology coming soon.

Harle has had several fascinating discoveries while digging through various assortments of maps. One discovery had nothing directly to do with maps. While going through maps stored in Botany’s area of the museum’s basement, he came across a manila envelope labeled “Japa-

nese Balloon Fragment.” Inside was documentation and correspondences related to a Japanese effort during World War II to build balloons to carry bombs across the Pacific to land in the United States. Alas, there was no balloon fragment. A few months later, he was digging through a different case in the basement and located the actual balloon fragment. Two years later, Harle tracked down a curator in the National Air and Space Museum who had another balloon fragment that was not in as good shape and lacked any documentation. The curator was quite pleased with Harle’s discovery.

Visitors

Continued from page 2

Theodore Fleming, University of Miami and University of Arizona; Collaborative publications (2/2 - 2/5).

Melissa Lukow, Cornell University; Fabaceae (2/4 - 3/4).

James Smith, Boise State University; *Columnea* (Gesneriaceae) (2/9 - 2/10).

Mauricio Diazgranados, St. Louis University & Missouri Botanical Garden; Compositae (2/10 - 2/15).

Ekaterini Malliou, U.S. Department of Health and Human Services; *Historia Plantarum* Collection (2/16).

J. Mauricio Bonifacino, Universidad de la República, Montevideo, Uruguay; Compositae (2/21 - 3/8).

Kerry Knudsen, University of California Riverside; Lichens, *Acarospora* (Acarosporaceae) (2/21 - 2/28).

Jane O’Brien, BBC News; Interview on the DNA analysis of ancient medicines (2/22).

Zoe Kosmidou, Greek Embassy; Ancient Greek medicine (2/24).

Alexander Krings, North Carolina State University; Asclepiadaceae (3/8).

Omokafe Ugbogu, Ibadan Herbarium Forestry Research Institute of Nigeria; Plant DNA barcodes (3/14 - 4/22).

John Benedict, Arizona State University; Zingiberales (3/16 - 3/19).

Stephen Stern, University of Utah; *Solanum* (Solanaceae) (3/23 - 3/25).



Detail of Botany Map 7556 (1 of 17 sheets): Manuscript maps of Northwestern China and adjacent Tibet from 1945. These handmade maps by botanist Joseph F. Rock detail his Ch’ing-Hai Upper Yellow River Expedition through western China and the Tibetan area during 1925-27. Various geographic features, Chinese and Tibetan towns and communities, are shown in both Chinese and Tibetan. A handwritten note from Rock is on the reverse side of the first sheet.

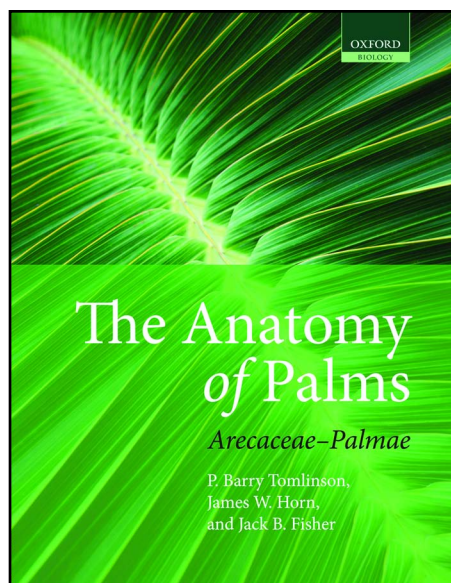
A New Look Inside Palms

By P. Barry Tomlinson, James W. Horn,
and Jack B. Fisher

Palms (family Arecaceae) are recognized as icons of the tropics, in addition to being the source of many economically significant products that globally extend relevance of the group to millions of people daily. This family of about 183 genera and over 2,400 species exhibits striking morphological and ecological variability, despite most members being readily identifiable as palms because of their distinctive habit as monocot trees of stately elegance. The charismatic external form of palms has inspired almost two centuries of research devoted to the family, which has advanced a knowledge of palm biology and systematics beyond that of most other tropical plant families.

Hidden from view, but no less compelling, is the internal structure of palms—an understanding of which is essential for interpreting many of the unique biological aspects of the family. Furthermore, anatomy provides a wealth of comparative information important for discerning relationships among palm genera. Aesthetically, sections of palm tissues, when stained and viewed with a microscope, can rival in beauty even the most horticulturally desirable palms. In the new book, *The Anatomy of Palms* (Oxford University Press; 2011), P. Barry Tomlinson, **James W. Horn**, and Jack B. Fisher provide the definitive, up-to-date reference work on this topic, which showcases both the science and art inside palms.

Part One of *The Anatomy of Palms* provides an overview of the diversity of vegetative structure in palms. Throughout this section, anatomy is placed in the context of the whole organism. Highlights



include chapters on the stem anatomy of arborescent palms, which emphasize the relationship of stem structure and development to their unique method of tree building, in addition to a chapter on climbing palms (e.g., the rattans), which describes how stem structural variation is indicative of the multiple origins of the scandent habit within Arecaceae. The final chapter of Part One consists of an evolutionary analysis of anatomical characters across the entire family. It introduces systematic and evolutionary concepts that are developed in the next section.

Part Two focuses on the systematic anatomy of palms and is a synthesis of extensive and original anatomical observations in the context of the most recent classification of the family. An essay on phylogenetics and anatomical evolution, based on the results of ancestral state reconstructions using the most recent molecular phylogenetic information, intro-

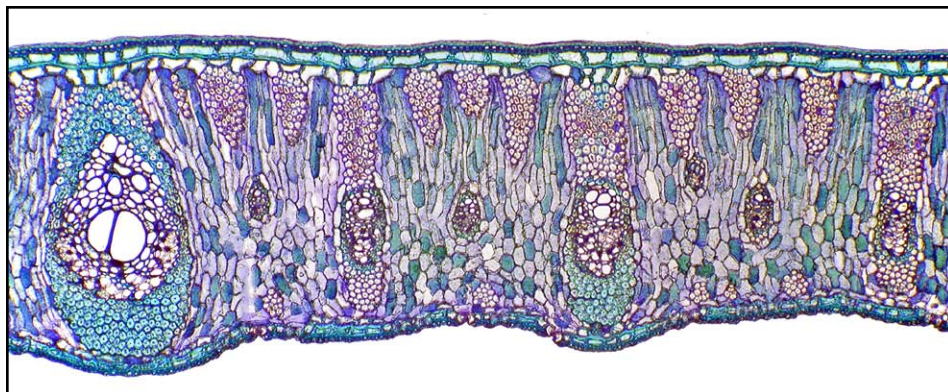
duces each subfamily chapter. Although the anatomy of all vegetative organs is described, emphasis is placed on the comparative anatomy of the leaf lamina, which is further highlighted in a series of keys to most of the genera.

The chief appeal of *The Anatomy of Palms* to a general audience will undoubtedly be the approximately 800 color photographs that document the extent of palm anatomical diversity. To give the preparations a more natural, hydrated appearance, as well as to overcome technical difficulties inherent in making microscope slides of palm tissues, many of the photos were taken from temporary preparations that were custom-made for the shoot.

Palm biologists, plant anatomists, and curious botanists working in other disciplines will find that the book contains abundant new data, new interpretations, and new ideas for future studies. Although the authors cannot foresee all applications of the information included in *The Anatomy of Palms*, the book has potential for initiating a new wave of reinterpretation of palm fossils because of their often excellent anatomical preservation. The book also gives the classical field of comparative anatomy a fresh perspective, which will hopefully inspire others to do similar work.

Systematics and Biogeography of *Aralia* L. (Araliaceae)

The new volume of *Contributions from the United States National Herbarium* (vol. 57: 1-172) is a revision of four sections of *Aralia* L. (Araliaceae, the ginseng family) by **Jun Wen**. It is the third and the last of the *Aralia* monographic series by the author. The first was on *Aralia* sect. *Pentapanax* (Seem.) Wen (19 species, Wen 2002, *Cathaya* 13-14: 1-116); the second was on *Aralia* sect. *Dimorphanthus* (Miq.) Miq. (29 species, Wen 2004, *Cathaya* 15-16: 1-187). This revision treats *Aralia* sects. *Aralia* (14 species), *Humiles* (3 species), *Nanae* (1 species), and *Sciadodendron* (5 species). The morphology, ecology and distribution of each of the 23 species have been carefully documented.



Colpothrinax wrightii, the Cuban belly palm. Leaf lamina in transverse section, stained with aqueous toluidine blue.



Jun Wen collecting *Aralia apioides* in NW Yunnan of China (June 2007, photo by Zelong Nie).

The revision includes illustrations of all the species with line drawings as well as with color plates. A taxonomic key to all sections of *Aralia* is constructed. Species keys are provided for each of the three sections with multiple species. As typified by *Aralia fargesii* Franch., *Aralia* sect. *Anomala* Harms is now formally placed in synonymy of *Aralia* sect. *Aralia*. *Aralia* sect. *Nanae* is the only monotypic section of the genus, consisting of *Aralia nudicaulis* L. Marchal's *Coudenbergia* is merged with *Aralia* sect. *Sciadodendron* in this study. *Aralia bahiana* J. Wen is herein described as new species from Bahia, Brazil. *Aralia* sect. *Sciadodendron* is a new nomenclatural combination with the genus *Sciadodendron* as its basionym.

The phylogeny of *Aralia* is presented based on sequences of the internal transcribed spacer (ITS) regions of nuclear ribosomal DNA and three chloroplast markers including the *ndhF* gene, the *trnL-F* region, and the *atpB-rbcL* spacer. An early biogeographic radiation of *Aralia* is hypothesized. Taxa of *Aralia* sect. *Humiles* do not form a clade with those of the Asian *Aralia* sect. *Pentapanax*. These two sections were once treated as constituting the genus "*Pentapanax*" disjunctly distributed in Asia and the New World and the new phylogenetic evidence suggests

that they are best treated as belonging to two different sections.

It is significant that the New World harbors a relatively high diversity of major lineages of *Aralia* even though it has only 14 of the 71 species of the genus. The New World species belong to five sections, of which three are endemic to the New World (sect. *Humiles*, sect. *Nanae*, and sect. *Sciadodendron*) and two sections disjunct with Asia (sect. *Aralia* and sect. *Dimorphanthus*). The 57 Asian species belong to three sections (sect. *Aralia*, sect. *Dimorphanthus*, and sect. *Pentapanax*) with only sect. *Pentapanax* endemic to Asia. *Aralia* was hypothesized to have originated in the New World and subsequently migrated into Asia. The ancestor of *Aralia* sect. *Aralia*, however then migrated back from Asia into North America. The taxonomy and the phylogenetic framework of *Aralia* set the foundation for future studies on species diversification processes and phylogeography of Asia using *Aralia* as a model.



Smithsonian Sun Shines at National Scientific Meetings as Interns Present Their Research

By Karen Redden, Bertrand Ndzelen and Tseday Tegegn

Over the past year, the Department of Botany has been hosting a number of undergraduates from the University of the District of Columbia (UDC). The University is a member of the Historically Black Universities and College (HBCU) and is an urban land-grant public institution. The students are culturally, economically and ethnically diverse. The UDC interns were supported through the Smithsonian Science, Technology and Engineering Program (STEP), and the UDC Science, Technology, Engineering and Math (STEM) program.

These interns have been involved in a variety of projects including creating Encyclopedia of Life (EoL) pages for members of the Compositae, exploring molecular and morphological phylogenetic relationships within Compositae and Caesalpinioideae, and data-basing collections from the Guiana Shield. The culmination of their research produced a number of poster and oral presentations given at four different venues, disseminating the information to the broader scientific community.

Four interns presented posters at the Flora of the Guiana's annual meeting held in Washington, D.C., in November 2010. Under the direction of **Vicki Funk** and **Karen Redden**, **Hayley Hamilton** and **Tseday Tegegn** presented their research on members of the Compositae, and **Sewalem Mebrate** and **Bertrand Ndzelen** presented their preliminary phylogenies on two genera of the Caesalpinoid legumes: *Dicymbe* and *Eperua*. For all of the interns, this was their first experience in presenting scientific data and their presentations were well received. All abstracts were published in the Flora of the Guianas newsletter.

Ndzelen and Tegegn presented their research at both the Emerging Researchers National Conference in STEM held in Washington, D.C., and the joint

Continued on page 8

Interns

Continued from page 7

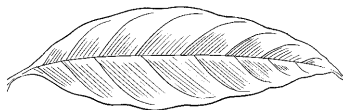
annual National Institute of Science/Beta Kappa Chi meeting in Atlanta, Georgia. The theme of the latter meeting was the effects of environmental pollutants on the biosphere. The oral presentations “Preliminary Diversity and Systematics of the Genus *Eperua*” and “Phylogeny and Biodiversity of *Wulffia* (Compositae: Heliantheae s.s.)” addressed the importance of taxonomic science in conservation and preservation of biodiversity and were unique in these typically biomedical-dominated conferences. One judge commented that “it is refreshing to see molecular phylogenies in the undergraduate sessions when the topic was previously only explored by the graduate competitors.”

On 12 April, at the UDC’s Undergraduate Research Day, Ndzenen and Tegegn presented their research to the faculty and STEM student body. Both gave excellent oral presentations and again were unique in a medically dominated competition. This time their perseverance paid off and Ndzenen was awarded first place in Biology.

Emily Frew, a volunteer intern since September 2010, will be presenting her research on the evolution of Pacific *Bidens*

at the Evolution of Life on Pacific Islands and Reefs meeting, 26-29 May 2011, at the University of Hawaii <botany.si.edu/events/2011_pacific/>.

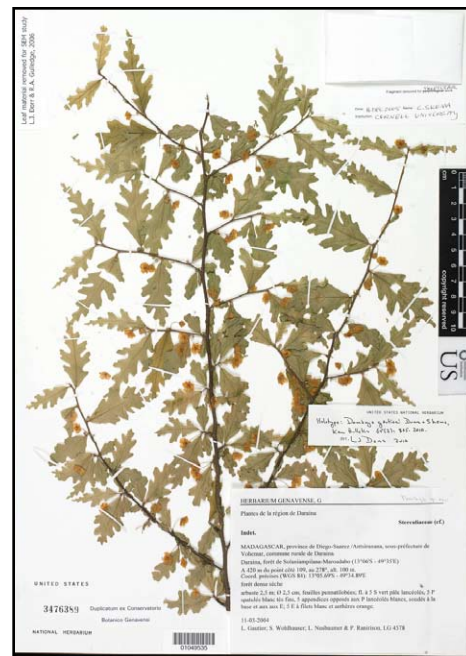
This is just the beginning. The 2011 summer promises to expand the UDC internship opportunities, including both new and continuing opportunities. Both Ndzenen and Tegegn want to continue with their research. The Department is looking forward to all these bright young people bringing a “breath of fresh floral air” back to Natural History this year.



New to Nature

An exceptionally attractive Malagasy flowering plant, *Dombeya gautieri* (Dombeyaceae), described by **Larry Dorr** and Cindy Skema (Massey University, New Zealand) and named in honor of its collector, Laurent Gautier (Conservatoire et Jardin botaniques, Geneva), was featured in a weekly column published in *The Guardian* <www.guardian.co.uk/science/2011/apr/24/new-to-nature-dombeya-gautieri?INTCMP=SRCH> by Quentin Wheeler (International Institute for Species Exploration, Arizona State

University). While the Royal Wedding is certain to attract more attention than this new species, the newspaper article will receive more than its share of attention as *The Guardian* has a print circulation of 280,000 and its on-line readership is second only to that of *The New York Times*. An image of the holotype (shown below) is available at <botany.si.edu/types/show-image.cfm?mypic=01049535.jpg>.



Holotype of *Dombeya gautieri* Dorr & Skema.

Botanical Congress

Continued from page 3

also will stay on after the Congress to participate in field work. Future issues of the *Plant Press* undoubtedly will feature accounts of some of these excursions to various parts of this large, island continent.

We are grateful to **Cristián Samper**, Director of the National Museum of Natural History, and an anonymous donor for financial support that allows us to have a strong presence at this Congress. We are fully aware that the ability of the Department of Botany, including the U.S. National Herbarium, to continue to maintain its stature as one of the pre-eminent botanical research institutions in the world is conditioned not only on excellent staff, rich collections, and facilities, but also on our full engagement with the international scientific community.



Students from the University of the District of Columbia with their mentors (from left: Sewalem Mebrate, Bertrand Ndzenen, Vicki Funk, Tseday Tegegn, Emily Frew, and Karen Redden).

Profile

Continued from page 1

There were also two additional, shorter series that were only distributed to one or two herbaria.

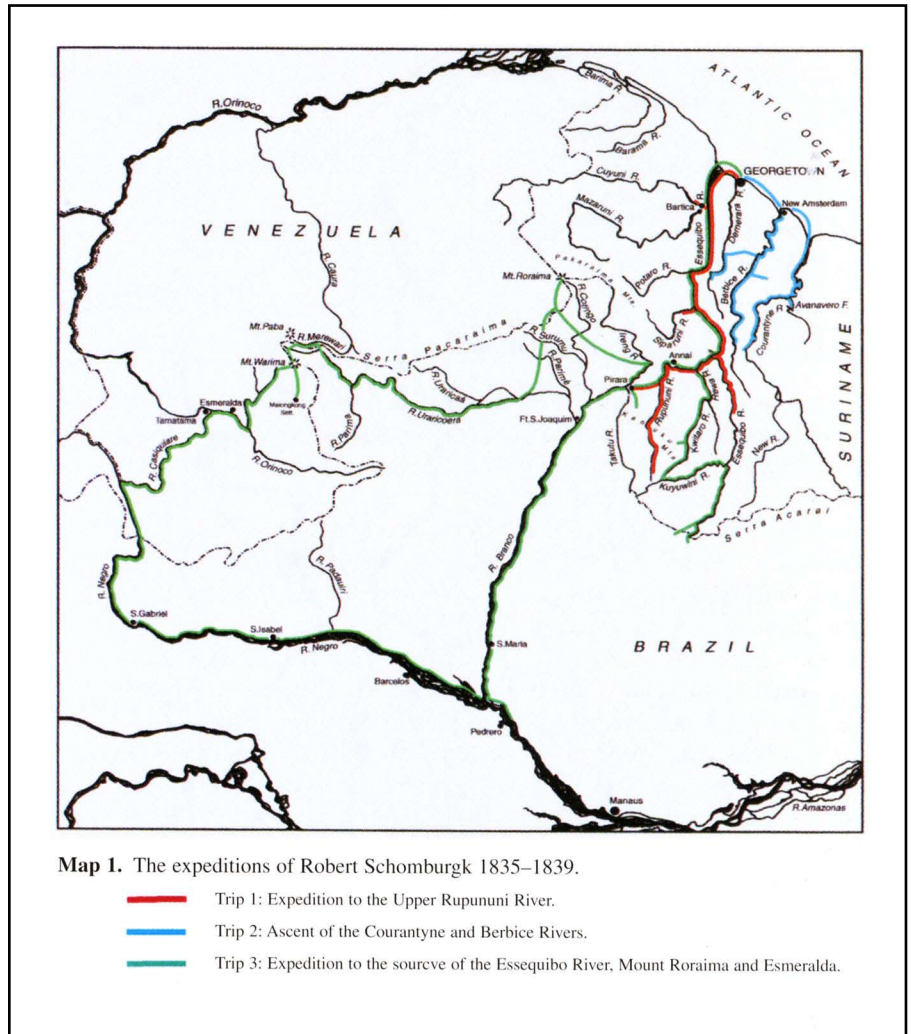
Additional series one (Rob. add. ser. 1) was collected between 1835 and 1839. These are differentiated from the first collection series by a letter “S” following the collection number.

The final series, the Roraima collection series, Robert collected without Richard in Roraima and along the Courantyne River between December 1842 and September 1843.

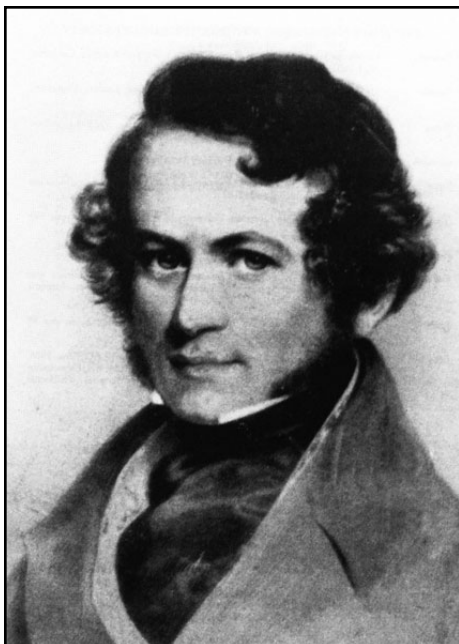
Irregular Procedures. Collection numbers were apparently not assigned in the order the specimens were collected, but instead at convenient points in the journey (van Dam, 2002. In M.J. Jansen-Jacobs, ed. *Flora of the Guianas. Supplementary Series Fascicle 3*. Royal Botanic Gardens, Kew. Richmond, Surrey, U.K.). Labels were often prepared after the specimens had been sent to London or Berlin, and so some labels lack a collection date but instead read “Rec’d 1913 from BM.”

Sparse or Missing Label Data. Many of the labels contain sparse information: some lack collection number, date, or location, and many exclude initials and list the collector simply as “Schomburgk.”

Confusing Label Data. Of the Schomburgk collections that include locality



Map of the expeditions of Robert Schomburgk 1835-1839. Lines appear in color in the online version of *The Plant Press*. (Courtesy van Dam, J.A.C. 2002. *The Guianan plant collections of Robert and Richard Schomburgk*. In Jansen-Jacobs, M.J., ed. *Flora of the Guianas. Supplementary Series Fascicle 3*. Royal Botanic Gardens, Kew. Richmond, Surrey, U.K.)



Robert Hermann Schomburgk (1804-1865)

data, some list multiple locations; for example, R.H. Schomburgk lists “Pirara and Roraima, Rupununi.” Roraima is listed on 54 labels, the Essequibo on 43, Pirara 37, the Rio Negro 32, and the Rupununi 27.

Missing Collections. There are gaps in the collection series where specimens have been lost or destroyed by fire in Berlin during the Second World War.

While some missing information can be filled in thanks to the extensive literature research conducted by van Dam (2002) for his publication on the Schomburgks’ botanical careers, there are still irregularities both within the book and between the book and specimen data. Several collection numbers listed by the book are assigned to two collections; for example:

- 1) *Rob. Ser. 1. 100* is both *Perama hirsuta* Aubl. and *Perama stricta* Benth; the specimen held at US is *Perama stricta*.
- 2) Collection numbers 130 and 139 are listed on a single label for the type of *Eugenia nitida* Benth.
- 3) US holds two sheets of *Rob. Ser. 1. 787*, the type of *Cassia filipes* Benth; while van Dam’s publication says it was collected in August 1838, the label states 1840. Otherwise, the label and publication agree that it was collected in savannas near Fort Sao/St. Joaquin.

The main sets of collections made by the Schomburgk brothers are held at the Botanischer Garten und Botanisches Museum Berlin-Dahlem in Berlin (B), the Natural History Museum in London

Continued on page 10



Moritz Richard Schomburgk (1811-1891)

Profile

Continued from page 9

(BM), the Royal Botanic Gardens at Kew (K), and the Muséum National d'Histoire Naturelle in Paris (P) (Steyermark, Berry and Holst, 1995. *Flora of the Venezuelan Guyana*, vol. 1: Introduction. Missouri Botanical Garden Press. St. Louis, Missouri). The BDG database contains records of 859 Schomburgk collections, of which 705 specimens are held at US. Undoubtedly US holds more Schomburgk collections because the BDG program has not yet made a comprehensive effort to barcode and database specimens from Brazil. The *Index Herbariorum Pt. II: Collectors* (Vegter, 1986; Bohn, Scheltema, and Holkema. Utrecht and Antwerp) provides an estimation of over 4,000 collections made the brothers.

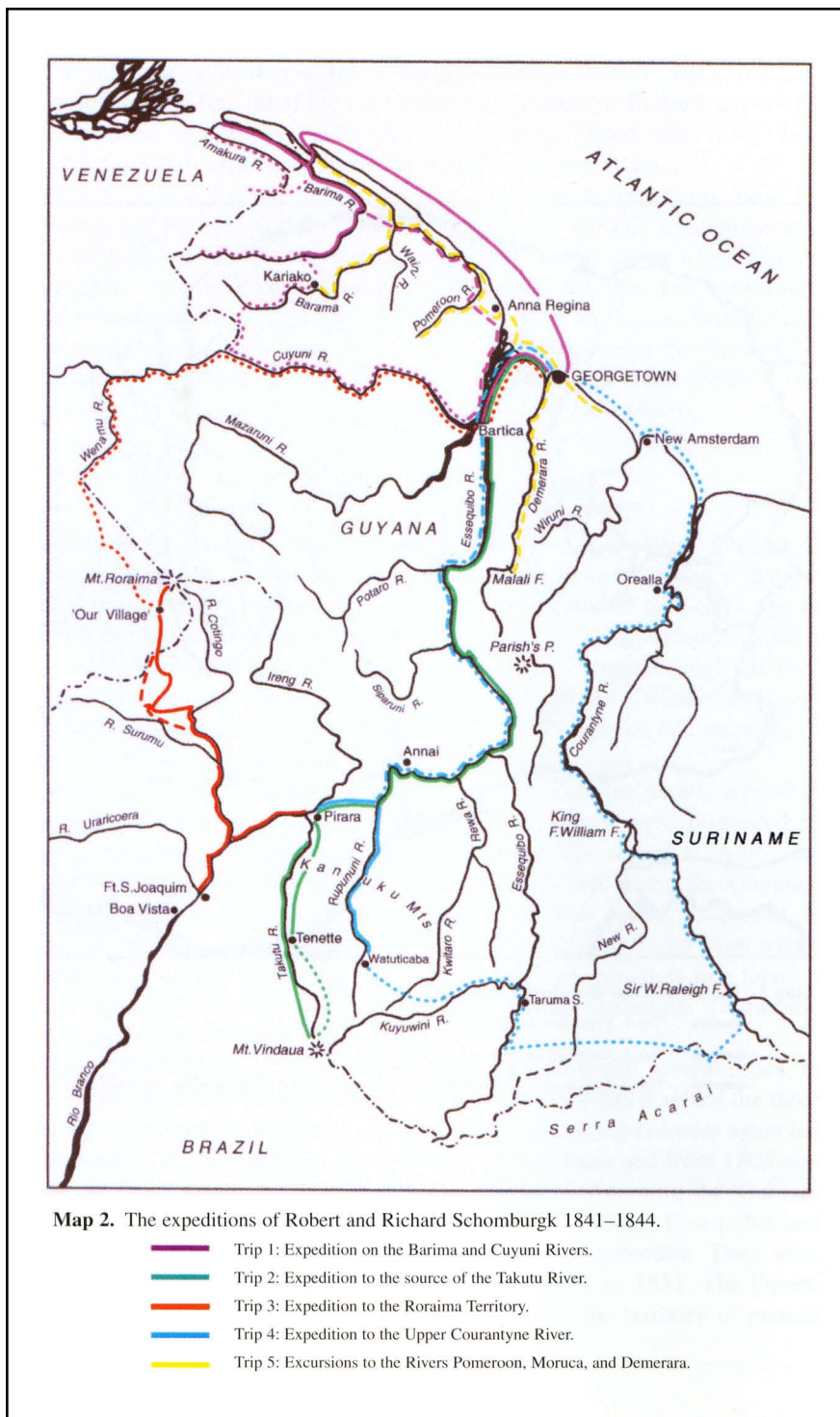
Guianan Schomburgk collections held at US include 306 type or type-related collections. This total includes 57 types or type fragments, 189 isotypes, 34 isosyntypes, 16 isolectotypes, 8 syntypes, one paratype, and one lectotype. Information about these types is available from the Type Specimen Register website <botany.si.edu/types>, most records including photographs of the specimens.

Of the 859 Schomburgk collection records held by the BDG, 474 were collected by Robert (R.H.) Schomburgk, 54 were collected by Richard (M.R.), and 315

note collector as “Schomburgk” or “R. Schomburgk.” Collection dates are absent from 294 of the specimen labels.

Geographically, 829 of the collections listed in the database were made in Guyana, 27 in Brazil and two in Suriname. The Suriname collections were made

as the brothers skirted the border while exploring the Courantyne River in 1843. It should be noted that only one Suriname collection includes a date – 1841 – but that year must be in error as during 1841 the brothers were exploring the Barima and Cuyuni Rivers on the opposite side of

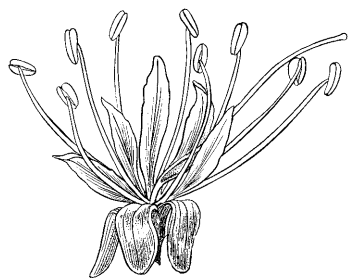


Map of the expeditions of Robert and Richard Schomburgh 1841-1844. Lines appear in color in the online version of *The Plant Press*. (Courtesy van Dam, J.A.C. 2002. The Guyanan plant collections of Robert and Richard Schomburgk. In Jansen-Jacobs, M.J., ed. *Flora of the Guianas. Supplementary Series Fascicle 3*. Royal Botanic Gardens, Kew. Richmond, Surrey, U.K.)

Guyana. The brothers did some collecting on the Brazilian portion of the Guyana Shield, and, although not comprehensive, the BDG database contains 27 records of Schomburgk collections made there.

The majority of Schomburgk collections lack locality information: 71 percent. By comparison, among other historical collections from the Guiana Shield also included in the BDG's database, only 3 percent lack locality data.

Specimens without precise locality information are of limited use for floristic or distribution studies. Despite their great historical and botanical importance, the Schomburgk collections are nearly unusable for these modern applications because of their poor geographical data. Detailed and accurate field notes and labels are essential to ensure collections will continue to be of highest utility into the future.



Publications

Clark, J.L. and **L.E. Skog**. 2011. Novae Gesneriaceae Neotropicarum XVI: *Cremosperma anisophyllum*, a new species of Gesneriaceae from the Chocó region of northern Ecuador and southern Colombia. *Brittonia* 63(1): 133-138.

Dalla Nora, G., T. Pastori, **H.D. Laughinghouse**, T.S. Do Canto-Dorow and S.B. Tedesco. 2010. Antiproliferative and genotoxic effects of *Mikania glomerata* (Asteraceae). *Biocell* 34(3): 95-101.

Dorr, L.J. 2011. Austin Paul Smith: the life of a natural history collector and horticulturist. *Taxon* 60(1): 305.

Dorr, L.J. 2011. *Trichospermum lesser-tianum* comb. n., the correct name for the Cuban species of *Trichospermum* (Malvaceae, Grewioideae) also found in Mexico and Central America. *PhytoKeys* 2: 17-22.

Feuillet, C. 2011. Two new species of *Dilkea* subgenus *Dilkea* (Passifloraceae from Loreto, Peru). *PhytoKeys* 2: 1-8.

Funk, V.A. and M. Koekemoer. 2011. A monograph of the small tribe Platycarphaeae (Compositae: Cichorioideae). *Syst. Bot.* 36(1): 191-208.

Gagnon, P.R., E.M. Bruna, P. Rubim, M.R. Darrigo, R.C. Littell, M. Uriarte and **W.J. Kress**. 2011. Growth of an understory herb is chronically reduced in Amazonian forest fragments. *Biol. Conserv.* 144(2): 830-835.

Gamboa, G., J. Halfar, S. Hetzinger, **W.H. Adey**, T. Zack, B. Kunz and D.E. Jacob. 2010. Mg/Ca ratios in coralline algae record northwest Atlantic temperature variations and North Atlantic Oscillation relationships. *J. Geophys. Res.-Oceans* 115: C12044.

Garcia-Milagros, E. and **V.A. Funk**. 2010. Improving the use of information from museum specimens: Using Google Earth® to georeference Guiana Shield specimens in the US National Herbarium. *Front. Biogeogr.* 2(3): 71-77.

Hetzinger, S., J. Halfar, T. Zack, G. Gamboa, D.E. Jacob, B.E. Kunz, A. Kronz, **W. Adey**, P.A. Lebednik and R.S. Steneck. 2011. High-resolution analysis of trace elements in crustose coralline algae from the North Atlantic and North Pacific by laser ablation ICP-MS. *Palaeogeogr. Palaeoclimatol. Palaeoecol.* 302(1-2): 81-94.

Ireland, R.R., G. Bellolio, J. Larraín and R. Rodríguez. 2010. Studies on the moss flora of the Bio-Bio region of Chile: Part 2. *Trop. Bryol.* 32: 39-44.

Price, J.P. and **W.L. Wagner**. 2011. A phylogenetic basis for species-area relationships among three Pacific Island floras. *Am. J. Bot.* 98(3): 449-459.

Robinson, G.E., J.A. Banks, D.K. Padilla, W.W. Burggren, C.S. Cohen, C.F. Delwiche, **V.A. Funk**, H.E. Hoekstra, E.D. Jarvis, L. Johnson, M.Q. Martindale, C.M. del Rio, M. Medina, D.E. Salt, S. Sinha, C. Specht, K. Strange, J.E. Strassmann, B.J. Swalla and L. Tomanek. 2010. Empowering 21st century biology. *Bioscience* 60(11): 923-930.

Robinson, H.E. 2011. *Ageratina tovarae*, a new species from northern Peru (Asteraceae: Eupatorieae). *Phytologia* 93(1): 94-98.

Robinson, H.E. and **V.A. Funk**. 2011. *Stephanbeckia plumosa* (Liabeae: Compositae): a new genus and species from southern Bolivia. *Brittonia* 63(1): 75-82.

Skema, C. and **L.J. Dorr**. 2011. *Nesogordonia tricarpellata* (Dombeyaceae), a new species from Madagascar that compels modification of the morphological circumscription of the genus. *PhytoKeys* 2: 9-15.

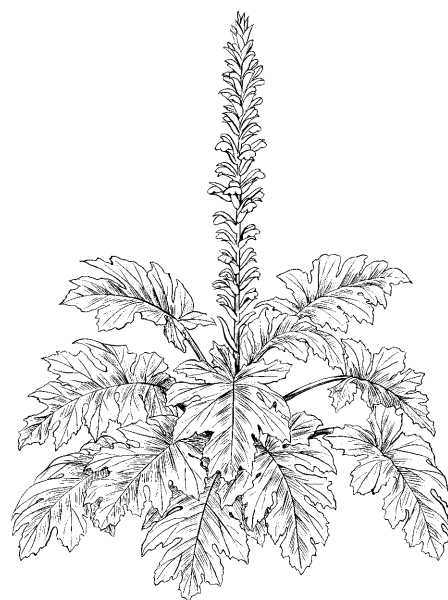
Thiele, K.R., **V.A. Funk**, K. Iwatsuki, P. Morat, C. Peng, P.H. Raven, J. Sarukhan and O. Seberg. 2011. The controversy over the retypification of *Acacia* Mill. with an Australian type: a pragmatic view. *Taxon* 60(1): 194-198.

Tomlinson, P.B., **J.W. Horn** and J.B. Fisher. 2011. *The Anatomy of Palms (Arecaceae-Palmae)*. Oxford University Press, New York. 276 pp.

Wen, J. 2011. Systematics and biogeography of *Aralia* L. (Araliaceae): revision of sections *Aralia*, *Humiles*, *Nanae*, and *Sciadodendron*. *Contrib. U.S. Natl. Herb.* 57: 1-172.

Zhang, J., Z. Nie, **J. Wen** and H. Sun. 2011. Molecular phylogeny and biogeography of three closely related genera, *Soroseris*, *Stebbinsia* and *Syncalathium* (Asteraceae, Cichorioideae), endemic to the Tibetan Plateau, SW China. *Taxon* 60(1): 15-26.

Zuo, Y., Z. Chen, K. Kondo, T. Funamoto, **J. Wen** and S. Zhou. 2011. DNA barcoding of *Panax* species. *Planta Med.* 72(2): 182-187.



Art by Alice Tangerini

***Zephyranthes proctorii* Acev.-Rodr. & M.T. Strong**

Pedro Acevedo recently curated an exhibition in Puerto Rico featuring 90 reproductions of botanical watercolors made by Agustin Stahl (1842-1917) (see page 4). Alice Tangerini has made several illustrations of her own of the Puerto Rican flora, including the endemic *Zephyranthes proctorii* (Amaryllidaceae), featured in Acevedo-Rodríguez and Strong's treatment of the Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands (*Contr. U.S. Natl. Herb.* 52: 1-415; 2005). *Zephyranthes proctorii* is found in dry forest scrub and thickets on limestone. The species is morphologically similar to the widespread *Z. rosea* from which it differs by the much shorter pedicels.



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