THE JEPSON GLOBE

A Newsletter from the *Friends of The Jepson Herbarium*

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The XIX International Botanical Congress in Shenzhen, China

By Brent D. Mishler

The just-completed XIX International Botanical Congress in Shenzhen, China, July 23-30, 2017, was a botanical extravaganza. Over 7,000 people attended, and the scientific program ranged across the study of plants from the cell and molecular level to ecology, systematics, and evolution. Details about the meeting and program can be found at *www.ibc2017.cn*—this is only a personalized summary from my perspective.

The many concurrent sessions made it daunting to try to see all the talks you wanted to, or meet other people you knew were attending. But the excellent evening gala held in the middle of the week, featuring traditional Chinese music and food, was a good chance to mingle. Also, there were many satellite meetings and informal gatherings of research groups or specialists on particular topics.

I gave three talks on spatial phylogenetics (see *Jepson Globe* issues 22(1), 2012 and 24(1), 2014, for more details about this approach) in two symposia: "New insights on the assembly and biodiversity of the flora of North America" and "Spatial phylogenetics as applied to floras around the world" (the latter symposium I co-organized). UC/JEPS faculty curator Carl Rothfels was there and gave an excellent, well-attended talk on "Nuclear phylogenetics of ferns and its implications for taxonomy." Mo-Mei Chen organized a symposium on

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New endowment will support fern research and curation

Alan Smith and his wife Joan have established an endowment fund that will support research in fern and lycophyte systematics and evolution. This research may include monography, phylogenetics, phylogeography, floristics, curation, field work, and ensuing publication. This gift was motivated by their desire to provide support for the institution and collection where Alan worked from 1969 until he retired in 2007.

Alan's interest in plants began early as a young boy in Kansas, tending his family's vegetable and flower garden and working summers on a produce farm. A high school botany course confirmed his interest in this field. Alan earned his bachelor's degree from Kansas State University. His senior year,

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Donation of *Banks' Florilegium*, an amazing set of botanical prints

By Staci Markos

In July, Vernon and Lida Simmons made an incredible donation to the Herbaria, 732 plates from *Banks' Florilegium*, an amazing collection of plates, printed from copper engravings, that document the plants collected by Sir Joseph Banks and Dr. Daniel Solander from 1768-1771 during Captain James Cook's first voyage to the south Pacific Ocean. The voyage, commissioned by King George III, was a combined Royal Navy and Royal Society expedition.

Joseph Banks, (a Royal Society Member and later President for 41 years) was appointed as the official botanist on the HMS Endeavor and hired seven others to join him. Solander, a Swedish naturalist, Apostle of Linnaeus, and a Fellow of the Royal Society of London, was Banks' main collaborator on the voyage.

The stated intention of the expedition was to observe the Transit of Venus (when Venus can be seen

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Cover photo: Alan Smith. Photo by Joan Smith.

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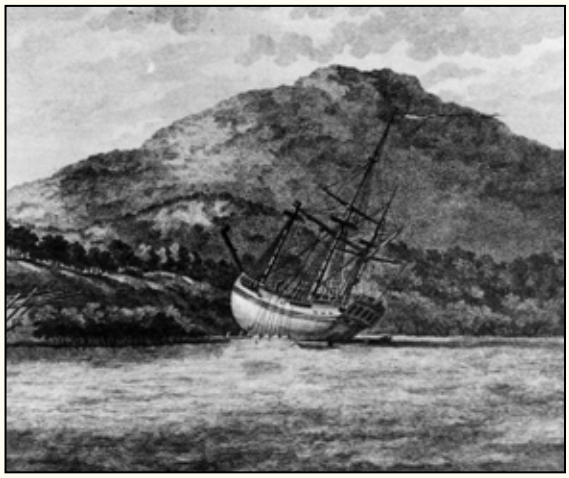
from Earth as a small black disk moving across the face of the Sun). There was also a more secretive aspect to the voyage—to find "unknown southern lands" and, if discovered, claim them for England before any other rival European power.

The voyage crossed the Atlantic, rounded Cape Horn, and reached Tahiti in time to observe the transit of Venus. Once the observations were completed, Cook opened the sealed orders for the second part of his voyage: to search the south Pacific for signs of the postulated rich southern continent of Terra Australis, a hypothetical continent first posited in antiquity and which appeared on maps between the 15th and 18th centuries.

From Tahiti, with the help of a Tahitian named Tupaia, who had extensive knowledge of Pacific geography, Cook set sail into the largely uncharted ocean, stopping at the Pacific islands of Huahine, Bora Bora, and Raiatea to claim them for Great Britain. The expedition reached New Zealand on 6 October 1769, becoming only the second group of Europeans to do so. Cook and his crew spent the following six months circumnavigating New Zealand, charting its coast, and taking formal possession for England before resuming their voyage westward across open sea.

On 20 April 1770, Leuit Hickes sighted a point along the southeastern coastline of Australia and Cook named it Point Hicks. Sailing north, Cook landed at Botany Bay, an extensive, shallow inlet. James Cook and crew went ashore briefly and in Cook's journal he wrote, " The great quantity of plants Mr. Banks and Dr. Solander found in this place occasioned my giving it the name of Botany Bay." This represented the first European contact on Australia's eastern coastline. Cook then continued northwards, charting along the coastline. He stopped at Bustard Head on 24 May 1770, where he and others went ashore. A mishap occurred when Endeavour ran aground on a shoal of the Great Barrier Reef, on 11 June 1770. The ship was seriously damaged and the voyage was delayed almost seven weeks while repairs were carried out on the beach near the docks of modern day Cooktown, at the mouth of the Endeavour River. While there, Joseph Banks, Herman Spöring, and Daniel Solander made the first major collections of Australian flora and these collections formed the basis of *Banks' Florilegium*. Before they left the area to return to England, the expedition had charted 5,000 miles of Australian coastline with great accuracy and Cook took formal possession of New South Wales for England. The voyage lasted almost three years.



Detail of drawing by ship's artist Sydney Parkinson, made in June 1770, showing James Cook's Endeavour *being careened on the beach at the mouth of the Endeavour River in Far North Queensland, Australia, in order to repair damages after having hit the Endeavour Reef (part of the Great Barrier Reef) on 11 June 1770. Item is held by John Oxley Library, State Library of Queensland. Public domain, Wikimedia commons.*

The making of *Banks' Florilegium*

Joseph Banks hired Sydney Parkinson to illustrate the plants and animals collected by Banks and Solander on the voyage of the Endeavour. The focus was to be on plants but Parkinson did make some other remarkable illustrations as he was the first European to observe and draw a kangaroo, the Australian landscape, and

Portrait of Sir Joseph Banks. From the Willis Jepson Papers, University and Jepson Herbaria Archives, University of California, Berkeley.

Australian Aborigines. He lived and worked on board the Endeavor in a small cabin surrounded by specimens. He finished 280 botanical paintings and produced over 900 sketches and drawings. Sadly, on the return trip, Parkinson became ill and died at Princes Island on the way to Cape Town. He was buried at sea. When the ship returned to London, Banks hired five artists to create watercolors of all of Parkinson's drawings. Banks then hired 18 engravers to create copperplate line engravings from the 743 completed watercolors. Banks died in 1820 and the *Florilegium* was not printed during his life. Banks bequeathed the plates to the British Museum and the first complete full-color edition of the *Florilegium* was published between 1980 and 1990 in 34 parts by Alecto Historical Editions and the British Museum (Natural History). Only 100 sets were made available for sale. Each plate took from one week to two months to proof as color accuracy was checked against Parkinson's notes.

Banks' Florilegium represents a record of the plants collected by Banks and Solander in Madeira, Brazil, Tierra del Fuego, the Society Islands, New Zealand, Australia, and Java. It is the world's largest 20th-century fine art printing project and has been exhibited

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(Banks, continued from page 2)

all over the world.

As graduates of the University of California (Lida received her undergraduate degree from UCLA and a masters degree from San Diego State University and Vernon received his PhD from the UC San Diego, Scripps Institution of Oceanography), they wanted to give back to the university community and selected the University and Jepson Herbaria to receive their gift.

The collection will be stored at UC Berkeley in the Marian Koshland Bioscience & Natural Resources Library in the Valley Life Sciences Building in the climate-controlled and secure rare book room. Displays of the material are being planned and when the time comes, we will share the details with our *Friends*.

Sources: Wikipedia and BotanicalArt andArtists.com, July 2017.

Above left: Hibbertia banksii *(Dilleniaceae). Line engraving by Daniel MacKenzie, after Sydney Parkinson (1770) and Frederick Polydore Nodder (1778). Plate 2. Above right:* Banksia dentata *(Proteaceae). Line engraving by Daniel MacKenzie, after Sydney Parkinson (1770) and James Miller. Plate 286.*

Herbaria Alumni

This August, the Herbaria hosted a picnic for our alumni and new graduate students. Many of our former students hold distinguished positions in industry, academics, and public agencies. We hope to share their stories in future issues of the *Globe*.

Roberts Regional Recreation Area, Oakland, California, August 27, 2017. Left to right: Back row: Bianca Knoll with son, Erik; Lisa Schultheis with daughter, Gabrielle; Staci Markos with son, Nate; Will Freeman with his wife, Sophia, and daughter Aliya; Mike Park, Andy Murdock with his daughter Cleo; Bruce Baldwin; Dean Kelch; Brent Mishler; Eric Harris with son, Henry. Front row: Javier Jauregui with his wife, Dominique, son Pascal and daughter Marai; Ben Carter with his wife, Tracy, daughter Cayenne and son Lindon (not pictured); Anna Larsen with son, Elliott; and Betsabe Castro Escobar. Photo by Craig Norvell.

Baja California Flora website now available

By Judy Gibson

The San Diego Natural History Museum's (SDNHM) website, the Flora of Baja California (*bajaflora.org*), was developed as a research tool to collect all available information about the plants of the peninsula and its adjacent islands. Its ultimate purpose was to serve as an online supplement for the proposed *Annotated Checklist of the Vascular Plants of Baja California, Mexico.* Along the way it accumulated many additional useful and sometimes entertaining features. With the publication in 2016 of the *Checklist*, the entire website was opened to the public as an online supplement. And now, the *Checklist* itself is available on the website as a PDF.

The primary source of knowledge is herbarium specimens, some dating back as far back as the 1880s. Inspired by the example of the Consortium of California Herbaria (CCH), SDNHM Curator of Botany Jon Rebman and the curators of six other herbaria with significant collections from the peninsula came together to form the Baja California Botanical Consortium (BCBC).

One of the many rare and unusual plants of peninsula, the succulent Coulterella capitata *(Asteraceae) is an endemic to the Gulf coast of Baja California Sur. Photo by Reid Moran.*

The University and Jepson Herbaria and other members of the CCH have also contributed records of specimens collected in this part of Mexico. These records are already available via the CCH and will soon be added to the BCBC database and served through bajaflora.org.

The combined records from these herbaria can be searched in many different ways. Search results can be downloaded as Excel files, and may be mapped on different base maps. The specimen records are supplemented by a digital scan of one voucher specimen for each taxon, as well as field photos for most of them.

Additional tools of interest to botanists include a lookup table for synonyms that is very helpful for those dealing with old database names and shifting families because the synonym lookup specifically references the synonyms used by Wiggins in his classic *Flora of Baja California*, as well as names used in other widely referenced sources.

Many of the other features available on the website may be of interest to people beyond the botanical community.

For example, someone researching old reports and narratives of travel in the peninsula might want to use the website's database of historic place names, or look at scans of old maps, which can be superimposed as transparencies on satellite images of the terrain. Fans of old style travel in the peninsula might peruse the field notes of SDNHM former curator Reid Moran, who took great care to record his travel arrangements, adventures, and travails, and noted the people who accompanied him and who helped him along the way.

Access to interesting plants is not always easy! Historic photo by Reid Moran, who joined a Scripps Institution trip, shows biologists landing on Islote Negro, an islet off of Guadalupe Island, in April 1970.

Our collection of over 50,000 scanned slides and more recent digital photographs naturally consists mostly of field photos of plants. However, it also includes pictures of landscapes, people, buildings, and wildlife, sorted by region and available to view as individual pictures or as a slide show. For example, there are over 700 photos of one of SDNHM's areas of specialty, Guadalupe Island.

Map of the 1905-6 expedition by Nelson and Goldman. In his report, Goldman states that the flora of the northern part of the peninsula is identical to that of southern California. Image credit: "Plant Records of an Expedition to Lower California," Contr. U.S. Natl. Herb. 16, part 14.

Lifetime Member's Annual Event

On April 30, 2017, we held our fourth annual gathering of Lifetime and Sustaining Members. We met in the morning at the Jepson Prairie Preserve, near Dixon, California, where Kate Mawdsley gave a guided tour of the plants and animals of the reserve. One highlight was seeing four species of *Downingia* in bloom: *D. insignis*, *D. pusilla*, *D. concolor*, and *D. bella*. The group then went to Vacaville for an Italian lunch where Director Brent Mishler discussed current projects and future ideas — it was a great discussion!

Left: Kate Mawdsley showing specimens from the vernal pools of the Jepson Prairie Preserve. Photo by Staci Markos. Above, left to right: Cupped Downingia (D. insignis)*, Fringed Downingia* (D. concolor), *Hoover's Downingia (*D. bella*), Dwarf Downingia* (D. pusilla)*. Photos by Gerald Corsi.*

Dr. Adam Schneider

Globe readers may remember a few years ago when we introduced Adam Schneider as a new graduate student in Bruce Baldwin's lab. Over the past five years, Adam has pursued studies in New World *Orobanche* (now *Aphyllon*), to understand the role of host-specificity as a driver of diversity in holoparasites. Using molecular phylogenetics, he identified numerous host-specific lineages previously unrecognized due to their reduced morphology. Two of these lineages were described in the most recent issue of *Madroño*. Adam also studied the diversification of the western flax genus *Hesperolinon*, a recently evolved genus of mostly California endemics, and the effects of serpentine soil adaptation on the flowering phenology of the California flora.

Adam received three awards from the Lawrence R. Heckard Fund of the Jepson Herbarium, an endowment fund that was established to support systematic research on vascular plants (tracheophytes) of California and their close relatives in North America. He also received a prestigious Doctoral Dissertation Improvement Grant from the National Science Foundation.

Adam Schneider and Bruce Baldwin. Photo by Lucas Schneider.

This past May, Adam completed his dissertation "Evolutionary Shifts Associated with Substrate Endemism in the Western American Flora" and received his Ph.D. In September, Adam began his new position as a Postdoctoral Fellow working with Saša Stefanović at the University of Toronto studying *Cuscuta* transcriptomics and phylogenomics. Congratulations Adam!

Lifetime Members provide significant support for the Herbarium and its programs. We are grateful for their commitment!

(Director's column, continued from page 1)

the redwoods of China and California. Given the number of our alumni and collaborators present, UC/JEPS was well represented, even though the expense was unfortunately prohibitive for our current students (a wonderful target for future giving is travel and research support for students!).

The Congress was a major opportunity for raising public awareness of plants and their importance and conservation, starting with the stirring opening plenary address by UC Berkeley alum Peter Raven, and the spectacular opening ceremony featuring top ballet, singing, and acrobatic groups from across China. There were plenary talks for public consumption every day, and extensive media coverage. The city of Shenzhen itself was extremely proud of the meeting, reportedly pitching in millions of dollars in support, creating attractive displays about the importance of plants in many public squares, and placing IBC banners all across this major city (population 12 million, the fifth largest city in China).

Clockwise from top left: 1) Satellite meeting of the International Association of Bryologists; I am in the center of the front row, and UC/JEPS Research Associate Jim Shevock is at far right in the second row. 2) A wonderful art exhibit called "The Magic and Enchantment of Bryophytes" that was two years in the making and featured watercolor paintings, photographs, and models produced by the Fairy Lake Botanical Garden in Shenzhen. 3) Some participants in the symposium I organized on "Spatial phylogenetics as applied to floras around the world," continuing our discussions over dinner afterwards (L to R: Julie Allen, Shawn Laffan, Rosita Scherson, Dan Murphy). 4) One of several large living walls created around the Congress venue; displays were located all across the city of Shenzhen as well.

Herbaria videos, now available online

As part of our Education and Outreach program, the herbaria have been involved in the production of several videos describing a wide range of botanical subjects. Links to the videos are provided below and on our website under the "Education & Outreach" tab.

Preserving the forest of the sea
By Sheraz Sadiq, Quest, KQED Science on the Spot, featuring Kathy Ann Miller, Curator of Algae.
ww2.kqed.org/quest/2013/02/05/science-on-the-spot-preserving-the-forest-of-the-sea/

Biologist Caleb Caswell-Levy uses a hand lens to identify tiny mosses on a tree in Berkeley, California. (Gabriela Quirós/ KQED Science).

The sex lives of Christmas trees
By Joshua Cassidy, KQED Science, Deep Look, with special thanks given to Bruce Baldwin and Andrew Doran.
ww2.kqed.org/science/2015/11/24/the-sex-lives-of-christmas-trees/

Plant collecting and herbarium research, part 1
By Science IRL (In Real Life) host Molly Edwards, featuring UC Berkeley Ph.D. students Joyce Chery and Carrie Tribble.
www.youtube.com/watch?v=Y4OzLI1qYh8&feature=youtu.be

Plant collecting and herbarium research, part 2
By Science IRL (In Real Life) host Molly Edwards, featuring UC Berkeley Ph.D. students Joyce Chery and Carrie Tribble.
www.youtube.com/watch?v=eKEZfzlYWEo

Calscape
By Tim Didion, ABC 7 News, featuring Andrew Doran and Staci Markos. *abc7news.com/hobbies/new-website-helps-gardeners-go-native/1410352/*

These 'Resurrection Plants' Spring Back to Life in Seconds
By Gabriela Quirós, KQED Science, Deep Look, with special thanks given to Brent Mishler, Caleb Caswell-Levy, and the University and Jepson Herbaria (see photo, left).
ww2.kqed.org/science/2015/06/25/these-resurrection-plants-spring-back-to-life-in-seconds/

What will your legacy be?

In this issue of the *Jepson Globe*, readers may have been inspired by the generosity and forward thinking of the donors who have established endowment funds at the Herbaria to support the core collections in perpetuity. As state funding declines and private giving becomes an increasingly larger portion of the Herbaria's budget, endowment support will help sustain the collections and programs of the herbaria. At present, the annual return from endowment funds comprises approximately 25% of the Herbaria's annual budget.

We encourage all of our *Friends* to consider making a gift that will help sustain the Herbaria and the activities and projects that we value.

There are many ways to give:

- Outright gift of cash or securities.
- Include the Herbaria in your will or trust. An estate plan ensures that your assets will be managed and distributed as you wish after your passing. In addition to supporting your loved ones, an estate plan can also include charitable gifts to causes you believe in.
- List the herbaria as a beneficiary on your retirement account, investment accounts, or life insurance policies.
- Give directly from your IRA, a tax-free way to direct your distributions.

Endowment gifts designated for the Herbaria will be managed by the UC Berkeley Foundation (Tax ID number 94-6090626).

For more information on any of these options, including sample bequest language or how to name the Herbaria as a beneficiary, please contact Staci Markos (*smarkos@berkeley.edu*; 510-643-7008) or the Office of Planned Giving (*ogp@berkeley.edu*; 510-642-6300).

Support the Jepson Herbarium

Name(s) _____ Amount $_____ Visa __ Mastercard __

Address _____ Card # _____

City, State Zip _____ Signature _____

Telephone/ Email _____ Exp. Date _____ U0840

☐ **Basic Membership ($45 individual, $60 family)**
Basic members receive *The Jepson Globe* and discounts on Weekend Workshops.

☐ **Sustaining Membership ($200)**
Receive basic membership benefits plus acknowledgment in the *Jepson eFlora*.

☐ **Lifetime Membership ($5,000 total, or pledge a minimum of $250/year)**
Demonstrate your dedication and commitment to the Jepson Herbarium with a lifetime membership. Gain recognition for your support in *The Jepson Globe* and the *Jepson eFlora*. Share your ideas with the Director and Curator at special, invitation-only events.

☐ I prefer to receive my copy of *The Jepson Globe* electronically (no paper copy).
☐ This gift is ___ in honor of / ___ in memory of _____
☐ My or my spouse's employer will match this gift. (Please enclose company form.)
☐ Please send me information about including the Herbarium in my will or estate plan.

*Please make your check payable to the **UC Regents**, charge your gift, or give online at:*
give.berkeley.edu/fund/?f=FU0840000

Jepson Herbarium, 1001 Valley Life Sciences Building #2465, University of California, Berkeley, CA 94720-2465

Thank you for supporting the Herbarium and its programs!

Larry Heckard Endowment Fund

With a gift from his estate, Larry Heckard, Curator of the Jepson Herbarium (1968-1991) established an endowment fund. The annual return from the fund has supported research in the systematics of the vascular plants of California and their close relatives in North America. Many students rely on this support as they begin their dissertation projects. They use the funding to gather preliminary data and then leverage those data to obtain additional funding from outside agencies. Over the years, the Heckard Fund also supported the second edition of *The Jepson Manual* and the Jepson Flora Project.

As private giving has become an increasingly large part of our annual budget, philanthropic gifts such as the one provided by Larry Heckard are crucial to the continued success of our programs. If you are interested in establishing an endowment fund or making a gift for current use, please contact Staci Markos (*smarkos@berkeley.edu*) or the Office of Planned Giving (*opg@berkeley.edu*).

2017 Larry Heckard Award Recipients

Forrest Freund, Graduate student in Carl Rothfels' lab.
California *Isoëtes* systematics:
This project will address questions of taxonomy in the *Isoëtes* of the west coast, including how many species are present in the region, the connectivity of their populations, and the geographic history of the plants in this region of North America.

Isoëtes nuttallii. *Photo by Forrest Freund.*

Isaac Marck, Graduate student in Bruce Baldwin's lab.
Perityle systematics: The rock daisy tribe (Perityleae, Asteraceae) is a diverse group of arid adapted herbs and subshrubs found mostly in the Southwest U.S. and Mexico. As part of our study, we are using next generation sequencing techniques to build the first densely sampled molecular phylogeny of this fascinating group. For our study, we sampled leaf tissue from herbarium specimens and used genome skimming to get high quality data from specimens more than 100 years old! Rock daisies comprise a classic example of geographic speciation across southwest desert mountains because most species in this group have a narrow geographic distribution and specialize on particular rock substrates.

Right: Emory's rock daisy (Perityle emoryi) *is an important component of the ephemeral wildflower bloom in the Colorado desert. It is the most common* Perityle *in California. Photo by Isaac Marck. Far right: Isaac with a specimen of* Perityle vitreomontana *made by A. Michael Powell of Sul Ross State University in Alpine, Texas. Photo by Will Freyman.*

Michael Song, Graduate student in Carl Rothfels' lab.
California *Azolla* systematics/cyanobacterial symbiont evolution: *Azolla* (Salviniaceae) is the only pteridophyte genus of major economic importance, due to its agricultural role as a nitrogen fixer by means of symbiosis with cyanobacteria. While *Azolla* is being developed as a model organism and is the first fern to have a fully sequenced genome, many aspects of its evolutionary history and basic taxonomy are still understudied. There is no consensus on how many species there are within the genus, nor is there consensus on their nomenclature. This problem is acute in California, where two or three described "species" of *Azolla* are thought to be native—*A. filiculoides*, *A. microphylla*, and *A. mexicana*—as well as an undescribed putative new species. This project aims to describe and characterize the taxonomic variation in this understudied genus in California to resolve the taxonomy and nomenclature of *Azolla* and its cyanobionts, as well as to provide an evolutionary foundation upon which applications of this new model organism can be based.

Azolla *has highly reduced morphological characters for a fern, which makes identification difficult. Photo by Michael Song.*

(Alan Smith, continued from page 1)

he took a systematics course taught by Ted Barkley and was inspired to pursue taxonomy in a Ph.D. program at Iowa State University. There he was fortunate to study with several outstanding botanists, including his mentor and fern expert, John Mickel, now retired from the New York Botanical Garden. After taking an O. T. S. (Organization for Tropical Studies) course in Costa Rica in the summer of 1967, Alan was hooked on ferns.

Reflecting on his career, one of Alan's proudest accomplishments is the addition of more than 100,000 specimens of ferns and lycophytes to the herbaria. The majority of these specimens came as gifts-for-determination—collectors and other herbaria sending duplicate specimens to Alan in return for identifications.

The fern collection at the University Herbarium is now the most important and best curated collection at a public university in this country. Alan often hosts international scholars who come to the herbaria to work with specimens from some of the most botanically diverse places on earth, mostly tropical/subtropical areas rich in ferns — Venezuela, Peru, Ecuador, Bolivia, Mexico, southern China, Bhutan, Vietnam, Myanmar, New Guinea, Philippines, New Caledonia, Madagascar, and Polynesia, among others.

Alan's publication record is as impressive as the collection. His work includes over 185 peer-reviewed papers, and he continues publishing in retirement. One article and one book stand out from the others: a paper in *Taxon*, "A classification for extant ferns", has been cited more than 1,400 times and was recognized by Google Scholar as one of the top ten "classic" papers in Botany; and "*The Pteridophytes of Mexico*", a book Alan co-authored with John Mickel in 2006, was awarded the International Association of Plant Taxonomists' highly competitive Engler Medal in Silver for an outstanding publication in monographic or floristic plant systematics.

Alan has received many awards but perhaps the most meaningful was the Asa Gray Award, in 2014, for lifetime achievement in plant systematics from the America Society of Plant Taxonomists. He felt that award was a distinct honor because he was chosen to receive it based on nomination letters submitted by his peers.

Since his retirement, Alan continues curatorial activities and research three days per week. New specimens continue to arrive and require his attention and expertise.

Alan is hopeful for the future of Pteridology at UC/JEPS, especially with the recent arrival of Dr. Carl Rothfels, also a fern specialist, in the Department of Integrative Biology; fortuitously, they have adjacent offices. *The Alan R. Smith Fern Research and Curation Fund* was established as an endowment fund and will provide core support for ferns and lycophytes, in perpetuity.

Additional gifts to the fund are welcomed and encouraged and can be made with a check payable to the UC Berkeley Foundation.

Make a difference in the life of a student

In the past year, ***Letters to a Pre-Scientist*** connected scientist pen pals with nearly 500 students grades 5-9 in seven schools around the US. The program is currently recruiting volunteers for the 2017-2018 school year.

Two ways to get involved:

- Scientists can request to be matched with a pen pal.
- Teachers can apply to have their classroom participate.

www.prescientist.org/

Jepson Herbarium Resources & Projects related to the California flora

Approximately 400,000 plant specimens from California

Director: Brent D. Mishler
California Phylodiversity Project
Systematics and ecology of *Syntrichia*

Jepson Curator: Bruce G. Baldwin
Jepson eFlora
Systematics and evolution of Calif. tarweeds and relatives (tribe Madieae, Compositae), *Chaenactis* (Chaenactidieae, Compositae), and *Collinsia* (Plantaginaceae).

Curator of Ecology: David Ackerly
Ecology and evolution of California flora
Climate change impacts and conservation strategies

Curator of Ferns and Lycophytes: Carl Rothfels
Divergence and hybridization in Californian ferns and lycophytes (especially *Notholaena*, *Cystopteris*, *Isoëtes*).

Curator of W. N. Am. Botany: Barbara Ertter, *Flora of Mount Diablo* and flora of the East Bay,
North American Potentilleae

Asst. Director for Collections and Curator of Cultivated plants: Andrew Doran

Asst. Director for Development & Outreach: Staci Markos, *Jepson eFlora*, CCH & *Globe* editor

Biodiversity Informatics Manager: Jason Alexander

Collections Staff & Plant Identification: Kim Kersh, Ana Penny, and Margriet Wetherwax

Archivist and Librarian: Amy Kasameyer

Public Programs: Allyson Ayalon

Membership, workshop enrollment, and *Globe* design: Edith Summers

Staff Research Associate: Bridget Wessa

Trustees:
Vice Chancellor Emeritus Beth Burnside; Professor Emeritus Russell Jones; Professor Emeritus Paul Licht; Professors John Taylor and Brent D. Mishler (ex officio)

Constancea: UC Publications in Botany (online)

The Bryophyte Curation Fund of the University Herbarium

The bryophyte collections at the University Herbarium (UC) are a world-renowned collection of approximately 200,000 specimens. Approximately half of them are searchable in the online specimen portal of UC/JEPS and also in the Consortium of North American Bryophyte Herbaria.

The California specimens housed in UC were instrumental in developing three fundamental publications on California mosses: (1) Contributions toward a bryoflora of California: I. A specimen-based catalogue of mosses, Norris DH, Shevock JR. 2004. *Madroño* 51: 1-131; (2) Contributions toward a bryoflora of California: II. A key to the mosses, Norris DH, Shevock JR. 2004. *Madroño* 51: 133-269; and (3) *California Mosses*, Malcolm B, Malcolm N, Shevock J, Norris D. 2009. Since those publications, the study of the California bryophyte flora has continued and results are included in the *California Moss eFlora* (*ucjeps.berkeley.edu/CA_moss_eflora/).*

A newly established endowment fund, the Bryophyte Curation Fund, will support the core activities required to maintain the collection (acquisition, housing, maintenance, and databasing). If curation needs are met, the fund may support research on bryophytes by UC Berkeley students, staff, or faculty.

The Fund was established with gifts from dedicated bryologists who recognize that as state funding decreases for UC Berkeley and its departments, including the herbaria, endowment funds have become an increasingly important part of the annual operating budget. By providing support in perpetuity, endowment funds are reliable sources of income that is not affected by the state budget cuts that impact the herbaria.

We thank William Doyle, David Lennette, Brent Mishler, Jim Shevock, Jake Sigg, and Paul Wilson for their support.

Right: Homalothecium arenarium*, collected from San Clemente Island by Ben Carter, former UC/JEPS graduate student.*

Fungal collections at UC have been consolidated and rehoused

By Andrew Doran

The fungi are critical components of all terrestrial ecosystems, where they play important roles as mutualists, parasites, and commensals in both plants and animals. Most of the world's important plant pathogens, such as chestnut blight, Dutch elm disease, oak wilt, and white pine blister rust are fungi. In addition, fungi are the primary decomposers responsible for recycling organic matter such as fallen leaves and downed trees. In this latter role, they directly impact the global carbon cycle even on a geological time scale.

Fig. 1. Once the space was vacated, carriages were laid down in the existing tracks that were set in concrete when the building was reconfigured in 1993. New and existing cabinets were then installed on the carriages. These compactors conform to all seismic requirements.

To meet the demands for better understanding of fungi in California and across North America, the University Herbarium has been expanding its mycological collections and now, with support from the Collections in Support of Biological Research program of the National Science Foundation, previously scattered specimens and 34 cases of polypore fungi from the Los Angeles County Museum that were stored off campus have been moved into 125 new herbarium cases in the center of the herbaria.

During the move of the fungi we decided to have a major reorganization of some other major taxa, namely the pteridophytes, Compositae, and lichens (Fig. 2). In addition, the Leguminosae, algae, and bryophytes gained much needed expansion space. Approximately one third of the entire collection was moved and reorganized as a result of this project.

In addition to supporting active research, the newly housed fungal specimens will support local citizen science groups who supply the manpower for "mycoblitzes" and need taxonomic expertise for collecting and identifying material. They will also be used in our public workshops.

Fig. 2. The move and expansion of the fungal collections resulted in reorganization of the lichens, pteridophytes, and Compositae. This resulted in expansion space and reorganization of about one third of the whole museum.

2017 Workshop Year in Review

This year's highlights included (above): the vastness of the Yolla Bolly Wilderness; and (below, clockwise from the top left): enthusiastic Seaweed students organizing the day's collections; workshop participants surrounded by the desert superbloom at Anza Borrego State Park; North Coast workshop participants enjoying a lichen-shrouded forest; the liverwort Fossombronia sp.; Lathyrus littoralis *at Lanphere Dunes (photo by John Game); a great year for the rare* Pentachaeta lyonii *in the Santa Monica Mountains; and (center picture) the lady slipper orchid,* Cypripedium californicum, *spotted in Stony Creek. Photos by Allyson Ayalon, except where indicated.*

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Did you know the Jepson Herbarium Workshop program offers courses in the fall, even after the season's flora has come and gone?

This year's fall courses are still open for enrollment:

September 23:
"Climate Change in California: Past, Present and Future"
Instructors: David Ackerly, Cynthia Looy, & Ivo Duijnstee

December 8-9:
"Mushrooms of the Bay Area"
Instructor: Else Vellinga

Ramaria araiospora, *Red Coral Mushroom. Photo by Gerald and Buff Corsi © California Academy of Sciences.*

Don't forget to renew your membership this fall before the new workshop season is announced, and you will receive one week priority registration.

Some of our workshops fill up in the first couple weeks, so this means that you, as a member, will have a chance to get into the workshops you want before they fill!

Your membership expiration date is noted above your name on the mail label.

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