



THE JEPSON GLOBE

A Newsletter from the *Friends of The Jepson Herbarium*

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Director's Column: The University and Jepson Herbaria at Botany 2019 in Tucson, Arizona

By Brent D. Mishler

Faculty, staff, and students (both undergraduate and graduate) of the University and Jepson Herbaria played a major role in the recently concluded meeting of US botanical societies called Botany 2019 that was held in Tucson, Arizona. The most exciting news is that three graduate students were recognized for their talks in three different sections: Isaac Marck won the George R. Cooley Award given by Systematics Section/ASPT, Joyce Chery won the Katherine Esau Award given by the Developmental and Structural Section, and Jenna Ekwealor received Honorable Mention for the A.J. Sharp Award given by the Bryological and Lichenological Section/ABLS.

There was a full turnout from the Mishler Lab, because of a concurrent research meeting of participants in the *Syntrichia* Dimensions of Biodiversity grant. This grant is a collaboration among a number of institutions studying all aspects of the diverse moss genus *Syntrichia* from genomics, to population genetics, to systematics, to its role in dryland ecosystems (see *The Jepson Globe* 26(2), 2016 for details). Students and faculty from across the project attended to share results, ideas for analysis, and plans for finishing out the project. You can read more about

(Director's column continued on page 4)



Herbert and Irene Baker observing ants on Salix reticulata on Pennsylvania Mountain, Colorado. Photo Credit: Ed Guerrant

Welcome Home!

A prodigal seed collection returns to the Jepson Herbarium after more than a quarter century away

By Ed Guerrant and David Ackerly

Dr. Herbert G. Baker began his career at UC Berkeley in 1957 and devoted it to teaching and research with a focus on tropical botany, evolutionary ecology, and the chemical constituents of nectar, pollen, and other floral rewards. He and his wife, Irene Baker, played a pivotal role in transforming reproductive biology, especially pollination biology, from a mostly descriptive endeavor to a quantitative science.

During his work at Berkeley, Baker compiled a seed collection comprising some 2,500 native and introduced California plant species, along with voluminous supporting data. The seed samples and data were gathered and

(Baker Seeds continued on page 2)

The UC Botanical Garden's Point Arena Floristic Project

By Holly Forbes, Curator
UC Botanical Garden

The California Coastal National Monument was established in the year 2000 with about 1,000 acres of off-shore rocks and islands located along the coastline of California. It has since been expanded to include nearly 8,000 acres of on-shore parcels, including the Point Arena-Stornetta Unit in Mendocino County. This nearly 1,700 acre property hugs the coast from the charming town of Point Arena northward, almost to Manchester State Beach.

The site includes two marine terraces of Monterey sandstone formation and a variety of habitats, from nearly pristine coastal bluffs to riparian zones to highly invaded grasslands. The site continues to be grazed by cattle. One notable invasive plant includes Monterey cypress (*Hesperocyparis macrocarpa*) that was planted as a windbreak and continues to spread through seedling regeneration.

In 2016, the UC Botanical Garden entered into an agreement with the Bureau of Land Management's Cali-

(Point Arena continued on page 8)

ALSO IN THIS ISSUE

- Bruce G. Baldwin's field work
- New to the *eFlora*
- NSF current grants
- Students digitizing fossil ferns

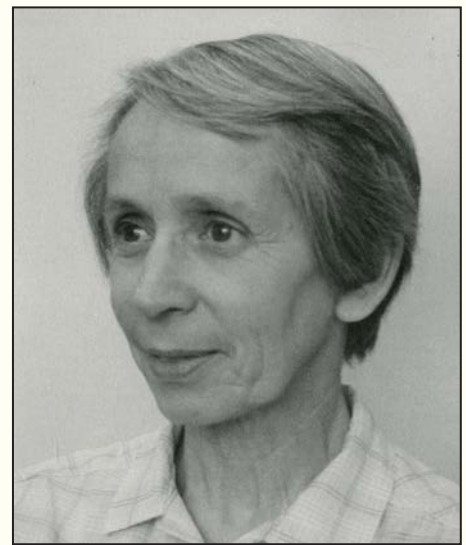
(*Baker Seeds, continued from page 1*)

assembled by Herbert and Irene to serve as the empirical base for Herbert's influential 1972 paper in *Ecology* (53(6):997-1010), "Seed Weight in Relation to Environmental Conditions in California." Encouraging further work with the collection, a note at the end of the paper read: "The carpological and seed collections that have been built up during the study and the data on their cards remain available for further study in the Botany Department at Berkeley."

Ed Guerrant became aware of the Baker's seed collection in the Fall of 1977 when he had the good fortune of having Herbert as his major professor. For two years, Ed had a graduate student appointment in Herbert and Irene's lab, during which time the Baker's research was focused on questions of nectar chemistry and pollination ecology. In the lab, there was a large metal cabinet with many shallow drawers, all full of seed packets, and boxes of cards with associated data. The cabinet and its contents captured Ed's curiosity.

Herbert retired in 1990, around the time that the original Life Sciences Building (LSB) was being renovated, and renamed the Valley Life Sciences Building (VLSB), and the Baker lab had to move to a different building on campus. By that time, Ed had moved to Oregon where he was the Conservation Director at the Berry Botanic Garden, and eventually the Director of the Rae Selling Berry Seed Bank & Plant Conservation Program at Portland State University. When it became clear that the Baker seed collection was in jeopardy of being neglected, Ed received Herbert's permission to move the collection to the Berry Botanic Garden (BBG) where it was referred to as the Baker Seed Herbarium. Upon its arrival in Oregon, the collection was frozen (to eliminate pests) and then, over time, Berry Botanic Garden volunteers repackaged the entire collection in archival poly bags and an outer bag.

In the early 2000s, David Ackerly (IB faculty member, and currently




Photographs of Herbert Baker (dated 1973) and Irene Baker (dated 1976) from the University and Jepson Herbaria Archives.

Dean, College of Natural Resources) was working with post-doc Angela Moles (Macquarie University, Australia) on the first large-scale compilation of global seed weight data. Angela obtained seed weight data from the Seed Information Database at the Royal Botanic Gardens, Kew. Of the 6,000 records in the database, a full third of them were California taxa derived from the Baker seed collection, and the data had been provided by the BBG. Together with data for another 7,000 or so species, Angela published a series of innovative papers in *Science* (2005), *PNAS* (2005), and *Global Ecology and Biogeography* (2007), coupling the trait data with a global angiosperm phylogeny to identify major patterns in seed size evolution and the global pattern of larger seeds in tropical environments.


In addition to the seeds, Herbert and Irene created an intricate file card system, with one card for each species and a set of attributes regarding reproductive biology, phenology, etc. Students in the Ackerly lab digitized all of the data on the cards into an Excel spreadsheet, see page 3. This spreadsheet is available for use, via the herbaria's website; so far these data have not been published.

In the past 10 years, 'trait-based' ecology has emerged as a dynamic

discipline, coupling species trait data with community ecology, biogeography, phylogenetics, and climate change biology. The TRY database emerged in Europe as the most comprehensive repository of trait data (try-db.org/Try-Web/Home.php), allowing scientists to extract compilations of data based on research conducted around the world. Baker's 1972 paper demonstrating patterns in the California flora for more than 2,000 species was decades ahead of its time and a foundational paper that advanced the field of ecology as well as our understanding of the California flora.

The return of the Baker's seed collection brings a wonderful resource back home where it was originally developed. We hope the data continue to be of use to ecologists here and throughout the world and that the card data receive more attention and analysis. For additional information, please feel free to contact Staci Markos at UC/JEPS. To read more about the career and legacy of Herbert Baker, please see the article *In Memoriam: Herbert George Baker, Professor of Integrative Biology, Emeritus Berkeley (1920-2001)* senate.universityofcalifornia.edu/_files/inmemoriam/html/bakerhg.htm. 

A Brief Description of the Data from the Baker Seed Collection

The Baker Seed Collection is comprised of seeds from approximately 2,925 taxa and each seed packet has an associated data card. This image is an annotated version of the data card for *Achyrochaena mollis*. The cards include the following information and traits: taxon name, accession number, habitat type or plant community, plant habit, life form, flower color, when flowering begins and ends, how long flowers last, if a mass flowering event occurred, if flowers were open or closed, if nectar was present or absent, seed weight, seed dispersal system, number of seeds per fruit, number of seeds per plant, if plants were chasmogamous or cleistogamous, if plants reproduce vegetatively, if plants are self compatible, a description of the scent, and notes on pollinators. Data from the cards have been compiled and organized in a spreadsheet that is available on the UC/JEPS website (under databases). 

species name		accession #		page in Munz	
ACHYRACHAENA MOLLIS		BSH-0-1074, 1073		1107	
a b c d e f g h i j k l m n o p q r s t u v w x y z		1 2 3 4		card #	
3.741 8 125 1 102 2		plant habit (annual, perennial, shrub/tree)		seed dispersal (singly or in groups)	
seed weights & seed weight class		uncertain—fruit weight? seeds/plant?		habitats	
SC ← self-compatibility		Raunkiaer life form		seed dispersal system (numerical code)	
← Uncertain meaning		vegetative reproduction		seeds/fruit	
		sociability		seeds/plant?	
		plasticity		seedling (?)	
		months flowering begins?		germination date	

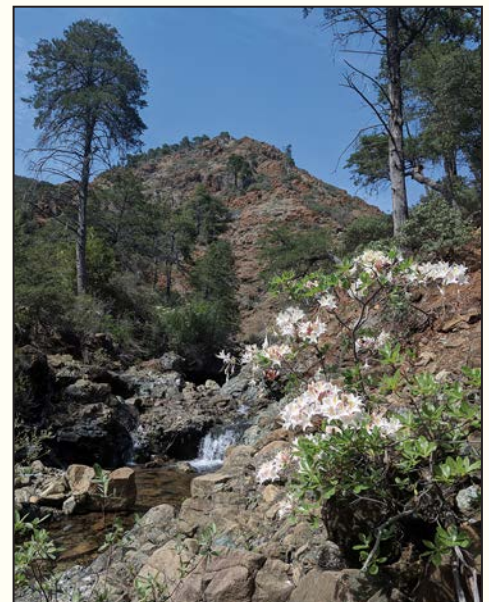
4x6 trait matrix

Lifetime Member's Annual Event

On April 7th, we held our sixth annual gathering of Lifetime and Sustaining Members. We were led on a guided tour through the The Cedars with Roger Raiche who for 23 years was Curator of the California Native Plant Collection at UC Botanical Garden in Berkeley. Roger is also the founder of Planet Horticulture, a design-build landscape firm in Northern California. He shared with us his vast knowledge of The Cedars and as we walked up the canyon, Roger described the plants, the ecology, and the geology in detail. We learned that The Cedars is a little known peridotite and serpentine canyon system that combines rare geology and unusual and unique plants. It is designated an Area of Critical Environmental Concern by the US BLM and we feel fortunate to have had the opportunity to visit.

A special thank you to this year's new Lifetime Members (July 1, 2018 – June 30, 2019): Gerald & Buff Corsi, Sue J. Estey, Lindy Fung, Kori Kody & Steve Jackson, Patricia Litton & Peter Ralston, Nancy R. Morin, Charles & Kati Quibell, Cristian Singer, Delia & John Taylor, and Desi & Karen Zamudio.

Mark your calendar! Our 2020 Lifetime Member event will be at Fort Ord on Saturday, April 25th. 



Rhododendron occidentale
(Photo by Julie Nelson)

(Director's Column, continued from page 1) the research meeting, and the project as a whole, at: 3dmoss.berkeley.edu/2019/08/.

See the accompanying figure for pictures of some of the talks that were presented. In addition to those illustrated, several other UC/JEPS presentations were given as well. From the Rothfels Lab, grad students Mick Song (“Diversification rates across lineages:

how does biological meaning differ across model-based approaches?”) and Carrie Tribble (“Differential gene expression in tuberous vs. non-tuberous roots of the tropical monocotyledonous geophyte *Bomarea multiflora* (Alstroemeriaceae)”) also gave talks, and posters were presented by grad student Maryam Sedaghatpour (“Evolution of the Levant flora”) and undergraduate student Adia Tajima (“Comparative

anatomy of climbing and non-climbing sister genera in Alstroemeriaceae”). Carl gave an additional talk on “Towards a timeline of vascular plant evolution: Inferring the time-calibrated phylogeny of the Marattiales using total-evidence dating under the fossilized birth-death process.” From the Mishler Lab, talks were also given by grad student Caleb Caswell-Levy (“Epiphyte functional traits and phylogenetic diversity in an increasingly invaded Polynesian forest”), and visiting scholar Shuo Shi (“DNA material processing and preservation: new methods”); undergraduate Dean Berkowitz presented a poster (“Spatial phylogenetic diversity of native vascular plants in the Mojave National Preserve”). The whole Mishler Lab presented a poster on: “A global phylogeny for the dryland moss clade *Syntrichia*.” Bruce Baldwin presented a talk in the colloquium on Pacific Biogeography entitled “Revisiting cytonuclear discordance, habitat shifts, and biogeographic patterns in the Hawaiian silversword alliance (Compositae).”

These presentations give a glimpse at the incredible depth and breadth of research topics being pursued at UC/JEPS, and our commitment to cutting-edge education at all levels. We thank our donors for their vital support that makes it all possible! 🕷️



UC/JEPS in action at Botany 2019.

Upper left: Research meeting of the *Syntrichia* Dimensions of Biodiversity grant; UC/JEPS participants in the picture are Sonia Nosratinia and Jenna Ekwealor (left, on couch) and Caleb Caswell-Levy at far right.

Upper right: Javier Jauregui from the Mishler Lab giving his talk on “Phylogenetic systematics of *Syntrichia* Brid. in South America.”

Inset left: Ixchel González from the Mishler Lab presenting her poster on “What do we know about Mexican liverworts?”

Next row, left: Brent Mishler presenting on “Spatial phylogenetics of the North American flora.”

Next row, right: Joyce Chery from the Rothfels Lab giving her award-winning talk on “Evolution of strange wood development in a large group of neotropical lianas, *Paullinia* (Sapindaceae).”

Next row, left: Isaac Marck from the Baldwin Lab giving his award-winning talk on: “Historical biogeography of the rock daisies (tribe Perityleae; Asteraceae) in the sky island archipelagos of the southwest US and northern Mexico.”

Next row, right: Carl Rothfels giving his talk on “The Pteridophyte Collections Consortium: 420 million years in two million specimens.”

Bottom left: Bruce Baldwin giving Jepson news at the informal luncheon held for all attending California botanists.

Bottom right: Jenna Ekwealor from the Mishler Lab giving her talk on “UV tolerance in Mojave Desert biocrust mosses.”

Continuing Studies on Evolution and Diversity of *Chaenactis* and *Hulsea* (Compositae)

By Bruce G. Baldwin

This summer I had the pleasure of conducting additional high montane fieldwork on two fascinating genera of western North American Compositae: *Chaenactis* (pincushions) and *Hulsea* (alpinegolds). I briefly described ongoing studies of *Chaenactis* in the last *Globe* issue, in the tribute to Don Kyhos and his legacy. My lab also has been focused on *Hulsea* for years now, in cooperation with *Hulsea* guru Dieter Wilken (Santa Barbara Botanic Garden). *Hulsea* offers an interesting ecological comparison with *Chaenactis*, although the two genera are not as closely related to one another as *Hulsea* is to tarweeds, arnicas, and woolly sunflowers, which we also study. All four of the last-mentioned groups belong to an expanded tarweed tribe, Madieae, unlike *Chaenactis*, which belongs to tribe Chaenactideae, as do two monotypic genera in the California flora, *Dimeresia* (doublets) and *Orochaenactis* (California mountain-pincushion).

Much of our attention to *Chaenactis* has been on the annuals, as discussed in the last *Globe* issue, but the biennials/perennials and their origin are also of interest. Palmer Stockwell, who monographed *Chaenactis* in 1940, suggested that the montane perennials represented the ancestral ecological condition in the genus and gave rise to the annuals, which generally occur in more xeric, lower elevation settings. That hypothesis was in line with the long-held view that evolutionary transitions in herba-



Chaenactis nevadensis, Cascade Ranges



Chaenactis douglasii var. *alpina*, Rocky Mtns

ceous flowering plants were in the direction of perennial to annual and were irreversible. Phylogenetic studies of Californian and other plant groups have provided multiple examples of perennials evolving from annuals, however, generally in association with transitions to more equable or colder climates (e.g., in maritime or montane habitats), very much in keeping with the evolutionary and anatomical conclusions of Sherwin Carlquist. *Chaenactis* appears to be another case-in-point, with mounting evidence that the perennials and biennials represent an evolutionary radiation associated with the transition to montane situations and a change in habit from an ancestrally annual condition, as previously shown for western North American *Lupinus*.

Hulsea does not include any annuals, although it does include biennials and short-lived perennials and is sister to the monotypic annual genus *Eatonella*. *Hulsea* is primarily montane and includes spectacular, long-lived alpine perennials. Relationships of

the alpine perennials to one another and to taxa at lower elevations, and the implications of those relationships for historical biogeography and ecology, are of great interest to us, as they are across the rest of tribe Madieae and in *Chaenactis*. The evolutionary duration and lability of montane flowering plant lineages is pertinent to predicting consequences of anthropogenic climate change, which poses special perils for alpine flora. Another important conservation goal is gaining refined resolution and recognition of the overall diversity of evolutionary lineages of these lovely plants. I look forward to sharing our future findings with the Friends as these projects continue to move ahead. 🌿

Photo credits: Susan Fawcett



Hulsea algida, Rocky Mtns



Hulsea nana, Cascade Ranges



Hulsea algida, Great Basin


New to the *Jepson eFlora*: Pop-up Definitions & Images

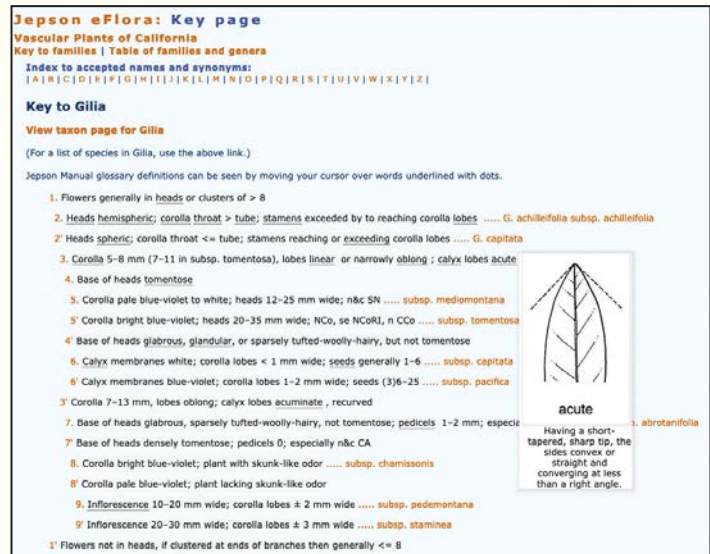
By Jason Alexander

The *Jepson eFlora* is the foremost authority on the native and naturalized vascular plants of California. Over the years, we have been adding new features and enhancements to the *eFlora* and this past year we have restored the pop-up definitions to the *Jepson eFlora* keys. The pop-up definitions can be seen online by hovering your cursor over any word that is underlined. When that is done, the definition of the word, as it appears in TJM2, pops up on screen. The popups were originally added by Dick Moe in 2012 and when the *eFlora* was revised in 2015 with new species pages, illustrations, and images, the popups were removed due to technical conflicts with the new web pages. I have revised Dick Moe's original code

to be compatible with the new *eFlora* format, allowing these popups to be restored to the keys. In a future update to the *eFlora*, popup text will be added to the descriptions on each species page.

Additionally, through a generous donation from Stephen Rosenthal, the popups now include digital scans from the illustrated glossary plates in the printed book (TJM2). Not all images from the print edition glossary are cur-

rently used; more popup images will be added in a future update. We thank Stephen for his support of the *Jepson eFlora* and for making it possible to hire undergraduate student employees to work in the Herbarium. 



Jepson eFlora: Key page
 Vascular Plants of California
 Key to families | Table of families and genera
 Index to accepted names and synonyms:
 [A][B][C][D][E][F][G][H][I][J][K][L][M][N][O][P][Q][R][S][T][U][V][W][X][Y][Z]

Key to Gilia
 View taxon page for *Gilia*
 (For a list of species in *Gilia*, use the above link.)
 Jepson Manual glossary definitions can be seen by moving your cursor over words underlined with dots.

1. Flowers generally in heads or clusters of > 8
2. Heads hemispheric; corolla throat > tube; stamens exceeded by to reaching corolla lobes *G. achilleifolia* subsp. *achilleifolia*
- 2' Heads spheric; corolla throat <= tube; stamens reaching or exceeding corolla lobes *G. capitata*
3. Corolla 5-8 mm (7-11 in subsp. *tomentosa*), lobes linear or narrowly oblong ; calyx lobes acute
4. Base of heads tomentose
5. Corolla pale blue-violet to white; heads 12-25 mm wide; n&c SN subsp. *mediomontana*
- 5' Corolla bright blue-violet; heads 20-35 mm wide; NCo, se NCoRI, n CCo subsp. *tomentosa*
- 4' Base of heads glabrous, glandular, or sparsely tufted-woolly-hairy, but not tomentose
6. Calyx membranes white; corolla lobes < 1 mm wide; seeds generally 1-6 subsp. *capitata*
- 6' Calyx membranes blue-violet; corolla lobes 1-2 mm wide; seeds (3)6-25 subsp. *pacifica*
- 3' Corolla 7-13 mm, lobes oblong; calyx lobes acuminate , recurved
7. Base of heads glabrous, sparsely tufted-woolly-hairy, not tomentose; pedicels 1-2 mm; espec
- 7' Base of heads densely tomentose; pedicels 0; especially n&c CA
8. Corolla bright blue-violet; plant with skunk-like odor subsp. *chamissonia*
- 8' Corolla pale blue-violet; plant lacking skunk-like odor
9. Inflorescence 10-20 mm wide; corolla lobes ± 2 mm wide subsp. *pedemontana*
- 9' Inflorescence 20-30 mm wide; corolla lobes ± 3 mm wide subsp. *staminea*
- 2' Flowers not in heads, if clustered at ends of branches then generally <= 8

acute
 Having a short-tapered, sharp tip, the sides convex or straight and converging at less than a right angle.

abrotanifolia

An Update on our NSF Digitalization Grants

This semester the digitizing lab has been buzzing with undergraduate students working on two NSF funded projects. The first project focuses on mistletoes — shrubby, aerial-branched parasites that obtain water, mineral nutrients, and some carbon from their host plants. Distributed worldwide, mistletoes are important members of forest landscapes. Some are damaging forest pathogens but there is more to the story. Mistletoes are now known to be a significant source of food and shelter to animals in forested ecosystems. The mistletoe collection at UC/JEPS is the largest in the world and is not duplicated elsewhere. Specimen records from over 2,000 specimens will soon be available via our online specimen database.


The second project focuses on ferns and involves both living and fossil collections. Students will image and database over 180,000 fern specimens collected from all over the world.



Working in the digitalization lab at UC/EPS (left to right): Annika Khan, Margaret Wetherwax (Lab Manager), Aurora Langford, and Emily Antunez

Because ferns have an excellent and extremely long fossil record, they are an ideal system for studying evolutionary and ecological processes through time. When united with fossil data, records from herbarium collections will help us understand deep evolutionary history of major land plant lineages and develop models to predict how plants respond

to environmental change.

We are excited to welcome 15 undergraduate students to our team this semester. Each one will gain valuable experience in databasing, museum operations, collections management, and world geography, and will have opportunities to share what they've learned through outreach to the public. 

How We Spent our Summer – Digitizing Fossil Ferns!

By Mackenzie Kirchner-Smith and Ixchel Gonzalez-Ramirez, graduate students in the Department of Integrative Biology

This summer we spent a month working in the Paleobotanical Collections of the National Museum of Natural History (NMNH) in Washington, DC, as part of the Pteridophyte Collection Consortium project (PCC), a NSF-sponsored project led by Carl Rothfels, Cindy Looy, and Diane Erwin.

The project seeks to digitize more than 1.7 million modern and fossil pteridophyte specimens from 36 herbaria and museums (*pteridophytes.berkeley.edu*). Pteridophytes (ferns, lycophytes, and their extinct free-sporing relatives) are a diverse group of plants that today comprise approximately 12,000 species and play a major role in terrestrial ecosystems. Pteridophytes were even more important in the past, especially before the evolution of the gymnosperms and the flowering plants. This group of land plants were the first plants to evolve roots and leaves, the first to colonize drier habitats, and the first to form forests.

Historically, the research communities interested in extant pteridophytes and those studying the fossil ones were largely separate from each other. The extant and fossil specimens were housed in different facilities (herbaria and paleontological museums, respec-

tively) and their researchers often worked in different departments. The PCC was developed to promote the integration of these communities by bringing together specimen data and associated resources for both living and fossil pteridophytes.

During our time at NMNH, we digitized more than 700 pteridophyte specimens from the Paleobotanical Figure and Type Collection. The digitization process included taking photographs of the specimens and building databases that include the name, locality, geochronology, and all the references that illustrate and/or describe them.

Digging through the collections, we traveled back to the Devonian when the landscape was dominated by early vascular plants like *Psilophyton* and *Serracaulis*. We also digitized lycopod specimens like *Lepidodendron* from the Carboniferous swamp forests. Working with these collections was amazing since it allowed us to see famous type specimens that we had only read about such as the lycopods *Baragwanathia*, *Drepanophycus*, *Sigillaria*, *Lepidodendron*, horsetail relatives

Calamites and *Sphenopteris*, *Pecopteris* ferns, and the progymnosperm *Rhacophyton*. Also, it was very impressive and satisfying to see some specimens with well-known living relatives (like *Gleicheniaceaphyllum*, *Osmundacaulis*, *Lygodium*, *Woodwardia*, and *Isoëtites*) and observe the same diagnostic characters in both living and fossilized specimens!



A look in the drawer with the Late Pennsylvanian Kinney Brick Quarry fossils.

Not only did the specimens we digitized cover a wide taxonomic and temporal scale, but they also were collected in 28 different states across the US. The inclusion of fossil specimens in the PCC project is one of its greatest contributions, being particularly important in a group like pteridophytes that has such a rich and diverse fossil record. The records from this summer will soon be uploaded in the PCC portal (*pteridoportal.org*) making the information available for researchers around the world. We expect that different research groups will use this information to work on topics as diverse as genetics, morphology, taxonomy, biogeography, evolution, and global change. 🧐



Mackenzie and Ixchel pose with Darwin in the new paleontological exhibit in the NMNH.



Annularia stellata, a Late Pennsylvanian horsetail relative.

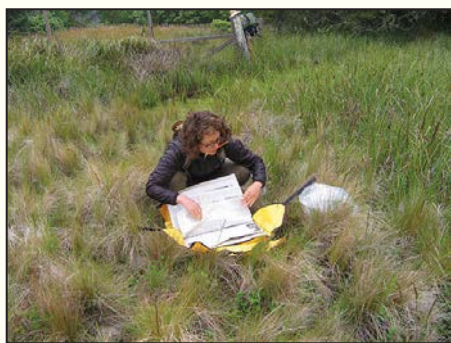
(Point Arena, continued from page 1)

ifornia field office (BLM). The goal was to provide a current floristic treatment that would help inform land management decisions. The project had Garden staff visiting the site for two days each month from June – September in 2016 and February – May in 2017. Given our limited field time, it was understood that this project was just a beginning step toward a comprehensive floristic inventory and BLM staff asked us not to include the dunes north of the Garcia River in the current project.

To provide a baseline taxon list and introduction to the site, we used the article *A Floristic Study of Point Arena, Mendocino County, California*, by Clare Hardham and Gordon True published in *Madroño* in 1972. David Baxter from the University and Jepson made an extract from the Consortium of California Herbaria (CCH) for plants that have been documented within the region, if not from the actual parcel. The digitization work of the CCH member herbaria is an amazing resource for these kinds of projects.

We made over 500 new collections in the field representing about 370 taxa. The specimens will be deposited into the University Herbarium and to offset the real costs to the Herbarium associated with the mounting, digitizing, and filing of the herbarium sheets, we worked with Staci Markos to ensure these expenses were covered with project funds.

Members of the California Native



Assistant Curator Clare Loughran presses specimens from a near-monoculture of *Deschampsia elongata*.



Graduate student Isaac Marck, Horticulturist Ben Anderson, and Assistant Curator Clare Loughran examine coastal bluffs for early spring taxa.

Plant Society, Dorothy King Young Chapter, were and continue to be fantastic partners. We are grateful to Dr. Nancy Morin, Jon Thompson, and Julia Larke for sharing their time, expertise, and suggestions for focusing our limited field time to their favorite or otherwise notable botanical sites.

Baldwin Lab undergraduate Steve (“Lee”) Fram was hired on the project to make determinations of many of our field collections and graduate student Isaac Marck generously mentored Lee’s honor’s student thesis in comparing present and past collections.

We were also fortunate to have assistance with the determinations from UCBG volunteer Barbara Keller, Isaac Marck, Dr. Bruce Baldwin, Dr. Peter Zika, and the CNPS members already listed.

Garden staff and students will continue to survey the flora and collect on



Dr. Nancy Morin pointed out that *Toxicoscordion fremontii* exists here in two forms: one is dwarf and has a distinct flowering period. This is the more widespread typical version (taller) seen in late May.


the Stornetta Unit into 2020, focusing on the BLM’s Seeds of Success program to develop native plant materials for local use. We have made 14 seed collections to date, gathering as many as 10,000 seeds (no more than 20% of the seed set) of common species that can be used for research and to augment or restore areas of the property. For more information about this program see: www.blm.gov/programs/natural-resources/native-plant-communities/native-plant-and-seed-material-development/collection. 

Photo credits: UC Botanical Garden



The Point Arena Lighthouse is a picturesque feature of the landscape; it is owned and operated by a private non-profit.

A New Face in the Herbarium

Roxanne Andersen joined the staff of the Jepson Herbarium this summer as our Administrative Assistant. Her efforts mostly support our development and workshop programs.

While new to the Herbarium, Roxanne has a long relationship with UC Berkeley having received her BA in Religious Studies here and worked in the Department of Student Affairs for seven years. More recently, she completed the Landscape Architecture program at Merritt College. Her years of taking horticultural classes, including many plant ID classes, will come in handy. Obviously, it was her love of plants that led her to come work for the Herbarium.

Roxanne is also a landscape designer. For over five years, she has had her own design business working on residential gardens in the East Bay. Splitting her time between the Herbarium and her



Roxanne Andersen with parsnip.

design business has proved to be the perfect balance.

Roxanne has lived in Oakland for 20 years with her husband and two kids. There she has a relatively extensive urban garden growing a wide range of edibles and ornamentals. 📍

The Jepson Herbarium on YouTube

If you haven't seen them yet, check out *The Jepson Videos on YouTube!*

The videos describe the diagnostic features of a species and share details about ecology, habitat, and ethnobotanical uses. We've tried to incorporate landscape images so the viewer can see the associated species and get an idea about what to expect in the field. Two of our current favorites are *Polystichum munitum* (watch as the spores are actively launched!) and *Amsinckia furcata* (great explanation of pin and thrum flowers). What's your favorite video? Explore the playlists to dive into plant identification at the family level.

This past year, we've enjoyed working with Chris McCarron, an undergraduate student at UC Berkeley (pictured below). Chris has been an enthusiastic and knowledgeable member of our team – he has taken photographs, edited scripts, and assisted with video production. This semester, Chris will be managing our Instagram account; follow us there or subscribe to our YouTube Channel and stay tuned for more videos. *To get involved in the Jepson Video project, please email Staci Markos (smarkos@berkeley.edu)* 📍



Photo of *Amsinckia furcata*



Chris McCarron and *Polystichum munitum*

JEPSON HERBARIUM RESOURCES & PROJECTS RELATED TO THE CALIFORNIA FLORA

The Jepson Herbarium includes 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* (Chaenactidiaceae, Compositae), and *Collinsia* (Plantaginaceae).

Curator of Ferns and Lycophytes: Carl Rothfels

Divergence and hybridization in Californian ferns and lycophytes (especially *Notholaena*, *Cystopteris*, *Isoetes*).

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

Asst. Director for Development & Outreach, and *Globe* editor: Staci Markos

Biodiversity Informatics Manager: Jason Alexander

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

Archivist and Librarian: Amy Kasameyer

Public Programs: Allyson Greenlon

Membership, workshop enrollment, and *Globe* design: Roxanne Andersen

Staff Research Associate: Bridget Wessa

Jepson Videos: Staci Markos, Allyson Greenlon, Amy Kasameyer

Trustees:

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

***Constancea*:** UC Publications in Botany (online)

Herbaria Alumni and Graduate Student Picnic

In August, the faculty affiliated with the Herbaria hosted a picnic for alumni, current students, and new lab members. The group included members from the labs of Brent Mishler, Bruce Baldwin, Carl Rothfels, Cindy Looy, Paul Fine, and David Ackerly. Many of our former students are now faculty members at other universities, are working in industry, or with public agencies. The picnic is a great way for new and current students to hear about career opportunities and alternate, non-academic paths. Alumni hear about current research being conducted by the graduate students. It's a great afternoon!



Back row: Bruce Baldwin, Doug Stone, Pablo Vargas, Brent Mishler, Ben Carter (and son, Linden), Ivo Duijnste, Ellen Currano (visiting from Wyoming), Tracy Misiewicz, Reilly Hayes, Kyle Rosenblad, Alex Yang, Rachael Oliff-Yang (with Theo), Eric Harris, Ty Norvell
Front Row: Olivia Vargas, Olga Gómez, Cayenne Carter, Carl Rothfels, Cindy Looy, Jenn Wagner, Jane Barden, Louise Barton, Gabe Trujillo, Henry Harris, Nate Norvell, Staci Markos

SUPPORT THE HERBARIA

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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.

HERBARIA FUTURES ENDOWMENT

14891

Support the infrastructure and care of the collections.

- I prefer to receive my copy of *The Jepson Globe* electronically (no paper copy).
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- Please send me information about including the Herbarium in my will or estate plan.

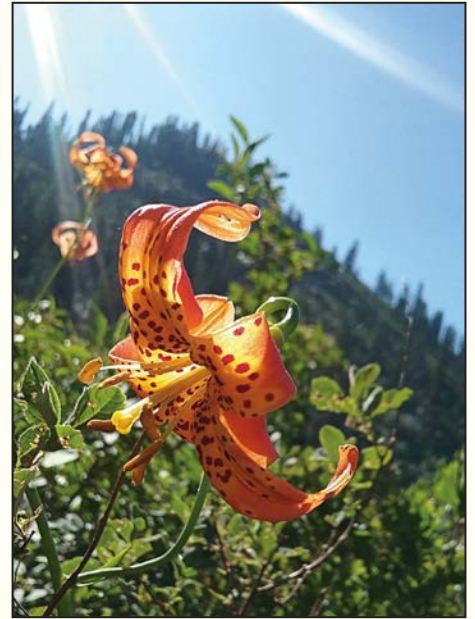
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Jepson Herbarium, 1001 Valley Life Sciences Building #2465, University of California, Berkeley, CA 94720-2465

Thank you for supporting the Herbaria!

2019 WORKSHOPS – YEAR IN REVIEW

This year’s highlights included: **(Below)** The Castle Crags workshop group celebrates a great weekend of plants with a visit to the famed fairy portal (photo credit: Aaron Sims). JJ Soski shows off the sea palm *Postelsia palmaeformis* (photo credit: Windell H. Os-kay). Steve Matson, one of the most active contributors of photos of plants to *CalPhotos.org*, hard at work. The group stands in awe among the oldest trees in the world—the bristlecone pine, *Pinus longaeva*, in the White Mountains (photo credit: Lynn Hori). **(Flowers on Right)** The Shasta Lily, *Lilium pardalinum* ssp. *shastense*, is undeniably likable (photo credit: Bob Hotaling). *Raillardella pringlei*, a CNPS list 1B.2 plant, was a “life” plant for many of us (photo credit: Clare Loughran). The wind poppy, *Papaver heterophyllum*, never gets old when spotted during a workshop.





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ADDRESS SERVICE REQUESTED

Curatorial Volunteers Needed at the University and Jepson Herbaria!

Are you interested in:

- *Learning more about the California flora*
- *Gaining first-hand experience with herbarium techniques*
- *Providing much-needed assistance with the specimens that are the raw data on which our knowledge of the California flora is based*
- *Socializing with fellow native plant enthusiasts*

One **Saturday** of each month is a **Group Volunteer Day** in the Herbaria. Group Volunteer Saturday begins at **10:00 am** and finishes up by **4:00 pm** (participants need not stay the full time). We also welcome **individual volunteers** who can come in during our regular hours (M–F 8–5). We will try to match your unique interests, abilities, and schedule to one of over numerous curatorial projects. To be added to the Group Volunteer reminder list or for more information about volunteer opportunities, please contact Ana Penny (510) 642-2465, or e-mail: apenny@berkeley.edu

Group Volunteer Saturdays for 2019 - 2020

10:00 am – 4:00 pm

October 5, November 2, December 7,
February 8, March 7, April 18 (Cal Day), May 9

Don't forget to renew your membership this fall before the new workshop season is announced – current members 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.