DAVIS BOTANICAL SOCIETY

UPCOMING EVENTS!

Sat. April 2   Arboretum/Conservatory Plant Sale
Sat. April 23  Zim Zim Falls Field Trip
Sat. April 23  Arboretum/Conservatory Plant Sale
Thu. May 5    Spring Meeting and Speaker, Hugh Safford, “Fear and Loathing in the Sierra Nevada, Confronting a Wicked Climate Change Problem”
Sat. July 16   Field Trip to Mount Conard, Lassen National Park

LASTHENIA

LASTHENIA, the Newsletter of the Davis Botanical Society, is published in collaboration with the staff of the UC Davis Botanical Conservatory and Center for Plant Diversity.

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Student Member at Large: Allyson Ayalon
Ex officio: Dan Potter, Ernesto Sandoval, Ellen Dean
Biodiversity Museum Day, which took place on February 13, 2016, was a great success at the Botanical Conservatory, Herbarium, and the nine other collections that participated.

I regularly thank visitors for breathing extra carbon dioxide onto the Conservatory’s plants during their visits, and on Museum Day, our plants received a good amount! The sheer numbers of visitors that come to campus on Picnic Day probably generate a higher amount of CO₂, but if we were to measure the quality of the visitor experience, I would argue that that annual collaboration of campus museums has greater value to our attendees.

Each museum set its hours that day; the Conservatory was open from 10am-4pm and the Herbarium from 1pm-4pm. The 700 people who visited the Conservatory lingered, listened, and thoroughly enjoyed our diverse collection.

We couldn’t have made the visitor experience so memorable without the help of a number of people. During the first part of the day, visitors had Doug Walker (Director of the College of Biological Sciences greenhouses) and John Stuart Berger (volunteer of all things succulent) to serve as docents for the desert rooms. Barry Rice (carnivorous plant guru and volunteer extraordinaire) captured the minds and imaginations of those who congregated around the carnivorous plants. Jonathon Holguin (Plant Biology major and Conservatory student employee) helped out in various locations and explained the ethnobotanical importance of plants along with generally sharing the wonders of the biology of our botanical beauties. Allyson Ayalon (graduate student in Plant Sciences and current Davis Botanical Society board member) maintained her post at the Titan Arum plant which awed visitors with its significant single...
MUSEUM DAY (CON’T. FROM PAGE 1)

Allyson Ayalon explaining the Titan Arum. Photo: Eunah Cho

leaf. Allyson also expanded on the fine features of its flowers, and when time allowed, she showed visitors the fruits of the firecracker plant.

I spent some time engaging visitors as they arrived and oriented them to the entrance to our "emerald cathedral." Since we had a profusion of Phalaenopsis flowers, I decided to demonstrate the finer points of orchid pollination by pointing out the presence of pollinia and the often deceptive pollination cues that are characteristic of this diverse group of plants. A pointy pen cap served as the perfect pollinator to show the sticky nature of the relationship between plants and their pollinators.

In addition to the longtime and loyal volunteers already singled out, I must thank the three volunteers from campus service sororities who helped direct visitors to and from our collection and handed out maps to the other collections.

The other collections had similar success stories that day. Besides the Conservatory and Center for Plant Diversity Herbarium, the other participants were: the Arboretum and Public Garden, the Bohart Museum of Entomology, the Museum of Wildlife and Fish Biology, the Anthropology Museum, the Paleontology Collection, the Phaff Yeast Culture Collection, the Nematode Collection, the Raptor Center, and the Haagen-Dazs Honey Bee Haven. A big shout out is due to Tabatha Yang for coordinating the event and signage. The event was supported by many departments, colleges, and administrative bodies on campus, including the Office of the Chancellor. All in all, I think we had one of the most successful Saturdays ever at the UC Davis Botanical Conservatory.

E. Sandoval

MUSEUM DAY IN THE HERBARIUM

Allyson Ayalon explaining the Titan Arum. Photo: Eunah Cho

Visitors learn about where Vanilla comes from at Museum Day. Photo: Eunah Cho

Ernesto using a pen cap to demonstrate orchid pollination. Photo: Eunah Cho

The hands-on “make a plant specimen” table where kids, young and old, played with glue and dried plants. Photo: Kathy Keatley Garvey

Above: Director Dan Potter shows visitors flowers from the daisy family under the microscope.

Right top: Student Preparator Diego Verduzco shows visitors how he mounts plant specimens.

Right bottom: Curator Ellen Dean shows visitors how to press plants. Photos: Kathy Keatley Garvey

E. Sandoval
Thank you for your support!

RECENT GIFTS

Herbarium Endowment
Eric Conn
Beth Corbin (In memory of June McCaskill)
Joseph DiTomaso
Lewis Feldman
Sue Nichol
Robert Preston
Calvin Qualset
Mandy Tu
Carol Witham

Herbarium Operations
Judy Jernstedt
Stephen & Jill Rae
Lesley Randall
Katherine Mawdsley

Herbarium Gifts in Kind
Vera Gottlieb
Ellen Halteman
Johanna Kwan
Katherine Mawdsley
Marcel Rejmanek
Thomas Rost

Conservatory Operations
Reynotta Hoberecht
Carole Ludlum
San Francisco Succulent & Cactus Society

Davis Botanical Society
Student Grants Fund
Eric Conn
Ann Johnson
Marie Jasieniuk & Frank Roe

Jack Major Student Grant Fund
Anonymous
Mary Hektner
Ann Johnson

UPCOMING FIELD TRIP TO LASSEN NATIONAL PARK

The Davis Botanical Society is organizing a field trip to hike to the summit of Mount Conard in Lassen Volcanic National Park on July 16, 2016. Lassen Volcanic National Park is located in northeastern California at the southernmost end of the Cascade Range. The park is known for its geologic features and recent volcanic activity, and also boasts a rich diversity of plant and animal life. Mount Conard is a remnant of the 600,000 year-old composite volcano, Mount Tehama, located in the southwest corner of the park.

The hike will begin at the Kings Creek Picnic Area and will follow the trail through the red and white fir forest to the lush subalpine meadows at Crumbaugh Lake, where a variety of wildflower species can be observed blooming in midsummer. Some plants we expect to see along this section of the hike include early snowmelt species such as fawn lily (Erythronium purpurascens), marsh marigold (Caltha leptosepala), and steer’s head (Dicentra uniflora), and meadow species such as corn lily (Veratrum californicum var. californicum), western columbine (Aquilegia formosa), and scarlet Indian paintbrush (Castilleja miniata ssp. miniata).

From Crumbaugh Lake, the hike will leave the trail and continue cross country up the ridge to the summit of Mount Conard, which rises to 8,204 feet elevation. Mount Conard is open and windswept and supports plants that are adapted to high elevations and xeric conditions, such as silky raillardella (Raillardella argentea), flat-stemmed onion (Allium platycaule), and Drummond’s anemone (Anemone drummondii var. drummondii). The hike is approximately 4.3 miles round trip, with 1,000 feet of elevation gain, and we will likely encounter patches of snow while hiking.

The hike will be lead by Dave and Mary Ann Showers, who worked for many years as Ranger Naturalists at Lassen Volcanic National Park. During the summer season they led hikes throughout the park, including walks that focused on wildflowers and geologic features. They also presented evening campfire programs at the park amphitheaters.

Dave and Mary Ann wrote and illustrated The Field Guide to the Plants of Lassen Volcanic National Park, available for purchase at the park visitor centers. With Vern Oswald, a renowned botanist, they co-authored the 1995 revision to the Flora of Lassen Volcanic National Park.

In 1982 they began a research project at several locations in the park to document changes in alpine flora; they revisited the sites to collect data in 2012, 2013, and 2014. In 1996 transects were established at the summit of Lassen Peak to assess seedling recruitment and growth of selected alpine species. Dave studied the mosses of Lassen Volcanic National Park for his master’s thesis, and the park was one of several Cascade Range study locations for Mary Ann’s master’s thesis, which investigated the systematics of Gray’s catchfly (Silene grayi), cascade alpine campion (Silene suksdorfii), and Sargent’s catchfly (Silene sargentii).

Cherilyn Burton & Mary Ann Showers
Those of you who have been reading this newsletter for more than just a few years may recall that I study the neotropical genus *Lycianthes* in the tomato family (Solanaceae). *Lycianthes* is best known for the horticultural shrub Blue Potato Bush (sometimes called Paraguay Nightshade - *Lycianthes rantonnetii*), a beautiful plant that (in California) produces dark purple flowers for most of the year. I wrote an article for *Lasthenia* in 2008 that recounted the herbarium hopping I did in Mexico in 2007 to examine specimens of *Lycianthes*.

Since then, I have continued my SLO-O-O-WW but steady progress on the genus, and that stick-to-it-ive-ness was rewarded in 2015 with the funding of a National Science Foundation grant to study the phylogenetic relationship between *Lycianthes* and its closest relative *Capsicum* (green peppers/chili peppers). The grant is being led by several researchers: Lynn Bohs (Univ. of Utah), Gloria Barboza (National University of Córdoba), Allen Van Dynze (UC Davis), Sandra Knapp (British Museum), and me. This team is going to do field work, write on online species descriptions for all the New World species of *Lycianthes* and *Capsicum*, describe new species, and produce a phylogeny for both genera based on the latest genomics techniques. I am in charge of the species descriptions for *Lycianthes* of Mexico and Central America.

How does one begin such a project? First, review work that has already been done: look at floristic treatments for areas where *Lycianthes* grows; look at publications that have come out describing new species or covering parts of the genus; and review the last monographic treatment of the genus (done in 1919 by the German botanist Georg Bitter). Scan or download electronic versions of the different articles and put them in little folders in Dropbox. Thankfully, I had a wonderful intern from Brazil last summer named Igor Jacarini. He scanned and made pdfs of all my paper *Lycianthes* files so that I can work on them anywhere I go. Then, a post-doc on our grant, the wonderful Genevieve Walden (who was an undergraduate in the herbarium pre-2005), did yet more article-hunting and downloaded yet more *Lycianthes* materials and put it all in little folders in Dropbox.

After this, we began to organize all the names that have been published for *Lycianthes* species since the time of Linnaeus. The names may have been published in a different genus (like *Solanum*), and so this list is constantly expanding. Each name has a type specimen associated with it that is in a herbarium somewhere in the world. Many of these type specimens are now available online at the website Global Plants. So, one can look at them online, or ask for a scan of the specimen, or have the specimen sent on loan. To organize this information, we have constructed a spreadsheet listing every name we have found, including the journal where the species was published and information about the type specimen. We are also making a little Dropbox folder for each name, and inside the folder is an electronic version of the original species description and, if we have viewed it, a scan of the type specimen. This is A LOT of work. No wonder no one wants to be a taxonomist. And that is just the beginning.

Once this preliminary leg work has been completed, it is time to choose a group of species within *Lycianthes* and actually look in great detail at as many specimens from the group as one can. *Lycianthes* has not been studied as a whole since 1919. In any group of species, there will be some species that are somewhat well-understood and others that are poorly known. This means that many specimens are not identified correctly in herbaria. I have very specific measurements that I take on every specimen - hairs, stems, leaves, flowers, etc. And it is also important to record the data on the specimen labels that pertain to the collection location, including elevation, date, and plant community. Information is entered into data forms or spreadsheets. Sometimes, I also take photographs of the specimens so as to remember what they looked like.

After all this work, I have a good idea of the variation included in a particular group of *Lycianthes* species, and I have to decide how many species I am going to recognize in the group. This is harder for me; it often involves a lot of pacing, sighing, drinking water, and using the bathroom. Then, more pacing and sighing. Finally I have to assign names to the species I am recognizing. This is where the spreadsheet of names and type specimens comes in. I need to make sure that I use the oldest correct name for the species I am recognizing, and if more than one name has been used for the same species, I have to place those other names into synonymy with the one that I am using. Finally, I construct a species description for each species, summarize where the species grows, including elevation and habitat, and construct a dichotomous key to the species. This is all very detailed-oriented work. Did I mention that there are reasons that NO ONE wants to be a taxonomist?

I am extremely excited about this project and working with the researchers involved in the grant. The specimens that I measure are usually borrowed from herbaria with strong Neotropical collections such as the New York Botanical Garden or the Missouri Botanical Garden. However, as part of the grant, I have funding to visit some other herbaria. This past summer, I spent a week at the Field Museum of Natural History, and this year, I will be visiting the Smithsonian Institution’s herbarium.

To date, I have already described two new species, *Lycianthes michaelneei* (named for my mentor and great Solanaceae taxonomist Michael Nee) and *Lycianthes venturana* (named for the prolific Mexican collector Francisco Ventura). That takes the number of new species that I have described to six (along with two varieties), and I have more to go. There are plenty of mysterious *Lycianthes* in Mexico and Guatemala, two more places that I will be visiting.

I will give you updates as we get further into the project.

_E. Dean_
CURATING A COFFEE BREAK:
THE HERBARIUM NEWSPAPER EXHIBIT

My personal botanical journey did not begin with hiking or gardening, but rather in musty, picked-over thrift shops in the smoggy San Fernando Valley of Los Angeles. From the moment I got my driver's license on my 16th birthday, my first adventures were to flea markets and second-hand stores. From a young age I have been obsessed with all things vintage. In hindsight this is perhaps due to watching many old sitcoms like, "I Love Lucy," "Happy Days" and "The Brady Bunch" on Nick-at-Night as a kid. My friends and I would spend hours hunting for antique trinkets, and I particularly found myself captivated by treasures and trinkets with beautiful floral patterns and botanical illustration—especially if they had the plant’s Latin name.

So, the first time I saw the UC Davis Herbarium during a class tour, I instantly fell in love with the museum of dead plants. The posters with antique prints of Helianthus and Lavendula immediately charmed me, and the absolutely unmistakable smell of 300,000 dead plants that infuses the first floor of the Sciences Lab Building—like old records but better—had me hooked. Five years after my first tour at the herbarium, I now get to give tours, curate floras, and build exhibits— including the apparently most un-botanical exhibit displayed at the annual botanical tea this past January.

The idea for the “newspaper exhibit” came up about two years ago when I was curating some of the collections of Dr. Ledyard Stebbins. In the process of preparing labels for plants collected over many decades, we discovered that, in addition to the unique flora Dr. Stebbins was known for collecting throughout his 60-year career, he left behind a special trace of history one could have easily overlooked: the newspapers in which he placed newly collected specimens. Although in Stebbins’ time they were merely day-old headlines, the old news has become part of American history to us today. Articles, photographs, and illustrations told subtle stories of culture, race, gender, and politics that were amazing to read in today’s context.

So for the next two years we set aside interesting sheets and snippets of newsprint. I became obsessed with reading the stories, as well as finding vintage advertising and photos from the culture of yesteryear. It was a task that was easy for a girl who grew up digging for nostalgic goodies at the Goodwill.

This project involved a careful cross-over of curation from two viewpoints: the first is curation of plant collections, which was essential in order to process the plants held in the newspapers at the beginning of this process. The second involves curating museum exhibits, which involves selecting elements intended to teach or illustrate something novel for the visitor. Both aspects of the curatorial process undoubtedly involved spending many hours over minutiae in order to get my vision to come to fruition.

I was also determined to reach out to the greater, multi-disciplinary campus community to bring new visitors to the herbarium. Herbaria around the world have a special role as both science and historical museums, and this exhibit was intended to illustrate just that. Over the years that I have worked at the herbarium, I have made it my personal mission to share what I call “the best kept secret at UC Davis” with the greater public. So, drawing in a new audience to come see this exhibit, teaching the broader community about the special role of herbaria in science and museums, and even simply encouraging great conversation over a cup of coffee, makes all of the work invested into this exhibit worthwhile.

A. Ayalon
VIRUSES EXTRACTED FROM HERBARIUM SPECIMENS PROVIDE INSIGHTS INTO THE PAST

Herbarium specimens are known for their usefulness for plant taxonomy (see my article on Lycianthes elsewhere in this issue), including as a source for DNA. In addition, in the past decade the specimens of the Center for Plant Diversity herbarium have been used in studies of plant viruses.

In her 2007 article in the Journal of Ecology, Carolyn Malmstrom of Michigan State University and her co-authors reported on their successful isolation of barley cereal yellow dwarf viruses (BYDVs) from early 20th century specimens in our agronomy grass collections. These viruses suppress grass growth in both native and cultivated systems, and Dr. Malmstrom has hypothesized that they may be partly responsible for the decline in native California grasses and the invasion of nonnative grasses during the 19th century.

The genetic material from (dead!) viruses that Malmstrom’s team extracted from our specimens is among the oldest virus material yet recovered from plants; the oldest grass specimen used was from 1917. Her analysis of the viruses extracted from our specimens provides new information about the timing of the introduction of BYDVs into California and proves that they were already present in California in the early 1900s.

Similar work was done more recently using our grape vine specimens by M. Al Rwahnih et al. of UC Davis. In a note published as a Plant Disease “First Look” paper in 2015, the authors reported on their successful isolation of grapevine red blotch-associated virus (GRBaV) genetic material from a 1940 Sonoma County specimen. This work proves that GRBaV was certainly present in vineyards in California by 1940, if not earlier.

Use of our specimens for the isolation of virus material is innovative; it has become possible due to new DNA isolation and sequencing techniques. Using our specimens for these types of studies requires destruction of part of the specimen which will, of course, never grow back. We have to weigh whether possible interesting results from a research project are more important than the destruction of part of a leaf. In the case of the research reported here, I think that the results are exciting enough to justify the leaf tissue that was taken from the specimens.

E. Dean

COLLECTIONS NEED ADOPTIVE PARENTS

We have important uncataloged collections that need several thousand dollars of curation funding. Funding is used to pay staff, buy paper and glue, and pay for database support. As of this writing, we have just learned that Shirley Tucker will be providing funding for the curation of John Tucker’s last collections (thank you, Shirley!), but there are many more collections that need curation. If you would like to donate to this project, please let me know (eadene@ucdavis.edu). Together, we can do this.

The large collections that still need to have labels made (from notebooks and notes on collection newspapers) include collections made by: Jack Major in Alaska, Utah, Europe, and Nepal; Charles Goldman at Castle Lakes; and James Neilson at the Tahoe Basin. The Major and Neilson specimens are tricky and difficult to curate, and the label-maker needs to work from cryptic notes on the edges of newspapers. The specimens may not be identified to genus. Therefore, the curatorial assistant has to have several skills, including familiarity with geography and plant taxonomy, and the ability to decipher handwriting. This skill set is more complex than our usual work-study student has, and so we hire a recent alum who has been with us for a while. This costs more than our nonexistent budget can handle.

I joke that over the past 100 years, many people left their “last five percent” in the herbarium. This was work that got lost in the shuffle of busy lives. When I came to the herbarium in 1995, there were nearly 100,000 specimens in need of some type of curation (unlabeled, unmounted, or in need of repair). Many were specimens sitting in newspapers left by visitors, faculty, and students. This is called a herbarium “backlog.”

With the hard work of a very dedicated team, Jean Shepard, Kate Mawdsley, Tom Starbuck, and an army of students, we have nearly curated our unlabeled backlog, although there is still a mounting backlog of about 10,000 specimens. Jean and I are in “label it or throw it away” mode. With funding from the National Science Foundation, we have recently finished the labeling of Ledyard Stebbins’s last five percent (found in a greenhouse in the early 2000s). Over the past 15 years we have curated the last five percent of: Beecher Crampton, Charles Rick (also found in a greenhouse), Gilbert Muth, Rodney Myatt, Alfred Kinsey, Grady Webster, June McCaskill, Andrew Leiser, Albert Koyama, and numerous (too many to count) lesser-known collectors, many of them students.

Help us get to the top of the mountain and finish the labeling of the backlog! Please contact me, if you would like to donate to this cause.

E. Dean
When I arrived in Davis in the dusty month of September, there wasn’t much in bloom that begged to be photographed. Thankfully, tucked away in the herbarium is the underappreciated but highly photogenic “Fruit and Cone Collection,” or as Ellen Dean jokingly calls it, the “Cone and Cone Collection” (since most of the collections are conifer seed cones). These fruits and cones are too big to mount on paper in the usual fashion, so they have their own drawer spaces in the herbarium and their own database and numbering system. This database made it relatively easy for me to find cone specimens of the pine species that the *Jepson Manual* recognizes for California in order to study and photograph them to create a poster.

Fun fact: there are approximately 100-120 species worldwide in the genus *Pinus*, with 18 occurring in California (that’s a lot!). All 18 are shown in three-quarter scale on the poster, which is 16x23 inches. We hope that this poster will not only communicate the beauty and diversity of the genus *Pinus* in California, but also demonstrate the importance of our herbarium as a resource for studying plant diversity. Check out our website for a free digital version of the poster at herbarium.ucdavis.edu/taxonomicresources. Copies of the poster will be on sale soon with proceeds funding Center for Plant Diversity curator.

A huge thanks to Judy Jernstedt for providing funding for the printing. Ann Shivers-McNair, Susan Nichol, Genevieve Walden, Jessica Budke, Ellen Dean, Jean Shepard, Daniel Potter, Tom Starbuck, Craig Thomsen, Mac Alford, Kate Mawdsley, and Ernesto Sandoval gave helpful feedback. Jennifer Hurst at PIP Marketing did an amazing job with the color proofing and final prints. And thank you to my generous family for funding a lot of the necessary camera equipment: Steve and Mildred McNair, Jerry and Beth Shivers, and Catherine Clark.

D. McNair

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**A DONOR’S EXPERIENCE** (CONT. FROM PAGE 1)

development person at the library. But I was interested, and impressed, by what happened between that first coffee and my signing a letter of intent in late December. This activity coincided with, and was part of, updating trust documents, which was my principal 2015 “resolution;” timing is certainly important.

There was absolutely no hard sell, just lots of information about changes and needs in the library, which is dealing with the digital revolution at many levels and in many new ways. We also had several conversations about my other interests on campus, which are the Herbarium and the Natural Reserve System. Over a period of several months, the library's development person met with her colleagues from the College of Ag and Environmental Sciences and the Office of Research, the units to which my other interests report. Ultimately I received a folder containing “opportunities” from each of the units, with price tags. Some of them, endowing positions, for example, were most impressive, and way beyond my means and intentions. But there was a range, with some needs I’d been aware of but also quite a few I didn’t know about.

I had unlimited time to think about all the issues that factor into these kinds of decision. Younger readers won’t know what I’m talking about, but lots of you will. (Remember, I’m one of the Membership Vice Presidents of DBS; I know our readership.) Finally I made my choices: how much, to which units, and when.

If anyone was disappointed with my decisions, I never had a clue. The plan was written up officially; I was given

language to put into my trust document to refer to the agreement; and ultimately an electronic document appeared in my inbox one day for electronic signature. I’m sure they would have been happy to hand carry a paper one, if that had been my preference.

I’ll say it again: I was positively impressed with the sensitivity, ability and desire to identify projects that were important to me, and low-key, unhurried tempo throughout the process. I’ve spent 50 years on the Davis campus and in two of the campus Natural Reserves, and I’m happy to think that I’ll ultimately make a lasting contribution to the activities that have given me a sense of purpose for most of my life.

K. Mawdsley