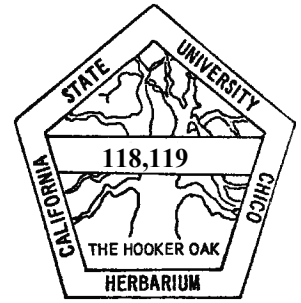




Friends of the Herbarium

The Chico State Herbarium
California State University, Chico



Volume 23 Number 1
April 2017

Newsletter

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Join the Friends of the Herbarium at their Spring Open House

Friday, May 12th 1:00—4:00 PM
Holt 129

Spring Student Photo Contest Entries will be on Display
Refreshments will be served



Student's Photos
2016

Friends of the Herbarium are hosting the 7th Annual Student Photo Contest

Open to all Grades 6 through 12 students; Submission Deadline: May 1st
Cash Prizes plus an Herbarium t-shirt for the top three entries

Subject must be flowers (preferably native); Two entries per student; Format 8"x10" print plus a digital copy.

See page 7 as well as the FOH website for more details



Photo by Sylvia Arnott

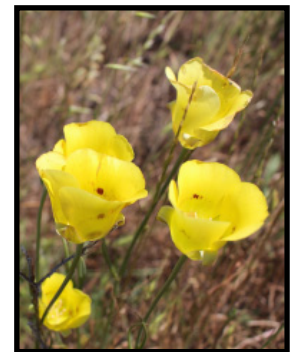
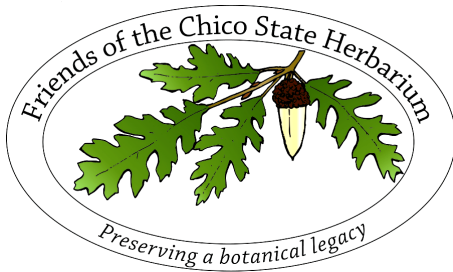


Photo by Julia Barrios

Student entries from the Spring 2016 Photo Contest



The **Friends of the Chico State Herbarium**, California State University, Chico, was formed to help maintain the high quality of work known to be associated with the Herbarium. The primary purpose of the group is to provide community support for the Herbarium. This includes raising funds for items that are not covered under the University budget, in particular the curator's position. Scientific and academic pursuits are the focus of the group. The Friends also offer low cost workshops and classes on various botanical topics.

The **Friends of the Herbarium** operates under the auspices of the California State University, Chico, and enjoys non-profit status and has access to the use of University classrooms and equipment.

Memberships are renewed on January 1 of each year.

BOARD OF DIRECTORS

Elena Gregg	Linnea Hanson
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Lawrence Janeway
Herbarium Curator
Newsletter co-Editor
Colleen Hatfield
Herbarium Director
Newsletter co-Editor

Newsletter

Volume 23 Number 1

The Newsletter is published two times per year by the **Friends of the Herbarium**, California State University, Chico. Subscription is free with membership. Submissions on herbarium-related topics are welcome.

2016 Endowment Drive was a Huge Success

Following last year's highly successful endowment drive, the Friends of the Herbarium launched a second endowment drive for the Herbarium in late 2016. The drive was started in late November with a \$30,000 match challenge and ended in mid December. During this period, just over \$65,000, including the match, was added to the growing endowment. Friends and the Herbarium are thrilled at the outcome of this drive and are very grateful for all the wonderful supporters that recognize the importance of the Herbarium. The ultimate goal is to build the endowment to support the part-time curator. Currently, that position is funded primarily through workshops that the Friends put on during the year. With this successful drive, we are approximately one-third of the way to meeting our endowment target of \$500,000. We thank each and every one of you for your contribution and your support!



Spring Cleaning in the Herbarium

By Lawrence Janeway

Well, not exactly spring cleaning but certainly change. This past winter The Chico State Herbarium was able to accomplish the shifting of specimens to plant family arrangements that match The Jepson Manual second edition (2012). At the same time we were also able to reduce the crowding within the herbarium cabinets by spreading out the whole collection into several new cabinets. Two people in particular carried out the exhausting task of moving all of our specimens from the cabinets in which they were stored into nearby cabinets, and sometimes into distant cabinets when the change in family placement was distant alphabetically: student and herbarium assistant, Claire Meehan, and long-time herbarium assistant Emily Doe. Funding for the new herbarium cabinets and for the herbarium assistants came from several generous public donations to the herbarium.

We've been anticipating these changes in family arrangements since well before The Jepson Manual second edition; see Fremontia volume 30, number 2 (2002) for an almost complete summary of the family changes that were already anticipated for the California flora. In fact, the special presentation at the Friends of The Chico State Herbarium annual meeting on Nov. 1, 2003 was by

(Continued on page 11)

Experienced volunteers are instrumental in helping us keep up in the Herbarium. Volunteers such as Cindy Weiner (middle) are key in helping with our databasing, training and guiding students, and leading an occasional tour. Have time on Friday? Consider volunteering. We would love to have you!

Contact :

Lawrence Janeway at
LJaneway@csuchico.edu
or Colleen Hatfield at
chatfield@csuchico.edu

Experienced Volunteers Welcome



Chico State Herbarium Accessions during 2016

By Lawrence Janeway, Herbarium Curator

Eighteen years ago Vern Oswald started the annual tradition in this newsletter of summarizing all of the collections accessioned into The Chico State Herbarium during the preceding year by county and collector. Here is the summary for 2016. The total number of accessions for 2016 was 1819 specimens.

We continue to owe a HUGE debt of gratitude to our volunteer mounting specialist and plant collector extraordinaire, Lowell Ahart. Aside from a few exchange sheets that came to the herbarium already mounted, and the bryophytes and lichens, which are accessioned into the collection in folded paper packets rather than mounted, Lowell has mounted almost all of the specimens accessioned into the herbarium in 2016. In fact, Lowell has mounted almost all of the specimens accessioned into the herbarium each year since 1995! For 2016, this means that Lowell prepared about 1750 beautifully mounted specimens that were accessioned into the collection during the year (and many more that haven't been accessioned yet), all as a volunteer! Thank you once again, Lowell, for your continuing contribution of countless hours of invaluable time and service to further the goals of The Chico State Herbarium and northern California botany.

All new incoming specimens are databased before they are filed. The databasing during the past year (and filing) has been done by our wonderful volunteers Cindy Weiner, Mari Moore, Herman Gray, Cheryl Ballantyne, Mariby Cruz, and students Claire Meehan, Laura Lampe, Kristin Quigley, Shannon Nielsen, Daysi May, Jennifer Morales, and Herbarium Assistant Emily Doe.

Also, thanks also to all of the collectors, as shown below, for their time spent collecting, identifying, and making labels for all of the specimens that they contributed to the herbarium. A tremendous amount of time goes into this process and I know that most, if not all, of this time is volunteer time on the part of the collectors.

The following table summarizes the plant specimens accessioned into The Chico State Herbarium during 2016, based on plant group, local collectors, and county.

2016					
GRAND TOTAL:	1819	LOCAL COLLECTORS		TOTAL CALIFORNIA:	1541
		– more than 8 collections –		– top 10 counties –	
Slime molds	12	Lowell Ahart	910	Butte	413
Lichens	14	Lawrence P. Janeway	277	Modoc	187
Mosses	166	Peter F. Zika	171	Tehama	186
Liverworts	3	Barbara Castro	59	Plumas	171
Horsetails	2	Barbara L. Wilson	45	Lassen	132
Ferns	10	Sara M. Taylor	31	Yuba	96
Conifers	2	Matthew Forster	26	Contra Costa	52
Flowering plants	1610	Len Lindstrand III	13	Shasta	38
		Emily Meigs Doe	10	Colusa	37
		David Isle	9	Del Norte	24



Upcoming Workshops

Below are highlights of upcoming scheduled workshops. The workshops feature some in the Herbarium and some as field trips. You can get more information on each workshop and how to register by visiting the Friends webpage: www.friendsofthechicostateherbarium.com.

Saturday, April 27—Plant Collecting and Making Herbarium Specimens

This workshop will focus on how to collect plants, press them, and make herbarium specimens. Plant collections are useful to document what plants are found in an area, provide information on plant distribution and provide examples of diversity. It can be a enjoyable pastime, but is also an essential tool used by various botanists and researchers. This workshop will guide you through the entire process from plant collecting to processing specimens. The workshop is led by two professional botanists, Linnea Hanson retired botanist from the Plumas National Forest and Emily Meigs Doe currently working for the Plumas.



Thursday, May 11—Riparian Ecology along the Middle Sacramento River: Understanding Riparian Ecology from the Perspective of Flowing Water

Physical river processes drive riparian ecology. In this field workshop, participants will be guided through an examination of how the hydraulics of river flows have formed the sediment and vegetation patterns across the floodplain of the Middle Sacramento River. The workshop will include hiking across floodplains and river banks and onto in-channel sandbars. This workshop is led Dr. Tom Griggs, Senior Restoration Ecologist (retired) with River Partners, Michael Rogner, Associate Restoration Ecologist currently with River Partners and Stefan Lorenzato, Chief Riverine Ecosystems Section with the California Department of Water Resources.



Thursday, June 8—Butte County Butterflies and their Host Plant Affinities

This popular workshop will introduce workshop participants to the systematics, taxonomy and biology of butterflies as well as the evolution and biogeography of butterflies and their larval food plants. Major butterfly families of Butte County will be covered along with a representative survey of local butterfly species and their habitats. There is an optional field trip on Friday, June 9th. This workshop is led by CSU Chico Entomologist, Dr. Don Miller.



Saturday, June 24—Introduction to the Serpentine Ecosystem

Serpentinite – the state rock of California! – is associated with the more familiar term “Serpentine” which refers to the soils and ecosystems that develop on serpentinite and related rocks. Serpentine soils are very low in the macronutrients and also harbor high levels of heavy metals. Serpentinite outcrops harbor a high number of endemic stress-tolerating plant species and an abnormally high number of rare species. During this fieldtrip workshop, led by Forest Service Regional Ecologist Dr. Hugh Safford, workshop participants will learn about the geologic history of the northern Sierra Nevada, the geologic sources of serpentinite, and the effects that serpentinite has on the vegetation that grows on it.



Stay tuned as we are planning more exciting workshops for the fall. Don't forget to visit the Friends of the Herbarium website for updated information as workshops are announced. (www.friendsofthechicostateherbarium.com)



Watch for the Charismatic Little “Steer’s Head”—an Ephemeral Geophyte

By Rob Schlising

When you find the flowering Steer’s Head (*Dicentra uniflora*, Papaveraceae) you may have an immediate urge to photograph it. Pictures abound on the Internet, but surprisingly little information is available about the biology and behavior of this little perennial. In 2009 I invited Hal Mackey to join me in a field study on growth and reproduction in this smallest *Dicentra* (also known as “DIUN”). We established three field sites in openings within coniferous forest at higher elevations in Butte County to answer questions about this species, like how long the flowering season lasts, how it survives our hot Mediterranean summers, how successful it is in producing seeds, and what the seedlings are like. We had three years of excellent study, when we obtained a great deal of numerical information that we hope to publish in a journal. Then there were several (drought) years when DIUN was very scarce or we were not able to access it. But we hope 2017 will permit us to continue our field study. And we hope many people will watch for this interesting little plant this spring and early summer.

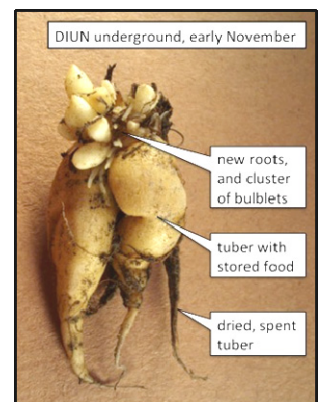
Flowering. A leaf or two, and also one flower per plant may appear, often soon after snow melts. Clusters of flowers represent interesting tight clusters of separate plants. Flowers are pink for a couple days, then turn brownish as the fruit capsules inside swell with seeds. We have seen no flower visitors in many hours of field observations, except for one bumblebee that flew to a flower but immediately left it (probably confusing it with the abundant manzanita flowers she had been visiting). So, this little plant routinely makes seeds by self-pollinating. The length of time from leaf emergence through flowering and seeding varies according to microhabitat (with different exposures to the sun) but is about 4-6 weeks, and the term “ephemeral” can be applied well to DIUN.

Over-summering. After flowering and producing seeds, a DIUN plant dries up and “disappears.” There is no aboveground plant body in the hot, dry summer. Photosynthesis in the spring develops structures that are summer-dormant. A dormant plant in summer shows one or two dried-up (spent) tubers that supported growth in the spring, one or two plump, new tubers 30-40 mm long made during the spring, (which will help start the new growth in the fall) and few to many small white bodies called “bulblets” at the top of the tubers (the photo shows all these structures as well as several delicate roots that start to develop with the fall rains). We have collected and planted bulblets, and find that these small asexually-produced bodies grow into tiny, new DIUN plants. We have not yet determined how long a DIUN plant can live, but expect that a plant can reproduce by seeds aboveground and by tubers and bulblets underground for many years. Possession of “over-summering” below-ground structures certainly qualifies DIUN as a perennial “geophyte.”

Seeds. Numbers of ovules in a DIUN ovary that mature into ripe seeds may vary according to microhabitat. At our lowest site (Carpenter Ridge at 4600 feet) an average of 88% of the ovules (about 52 seeds per plant) matured in 2010, but in some sites and years the averages were much lower. Seeds mature in fruits that lie directly on the ground, so it is not surprising that we find fruits that have been “robbed” of their seeds. Each black seed has a small, soft, whitish elaiosome (fat body) that detaches easily, suggesting that ants would be attracted to the seeds and perhaps carry them away. But we have not (yet) succeeded in finding ants (or mice?) picking up the seeds. However, in some places and years we have enough seeds escape so that DIUN does produce some seedlings (matching the seedlings we see in our own plantings).



Flowering Steer’s Head plants
Photo by Robert Fischer



One opened fruit (capsule), showing pale elaiosomes on most seeds (5 mm grid)

(Continued on page 9)

Friends help sponsor the 2017 Northern California Botanist Symposium

By Elena Gregg

On January 9-10, 2017 the Northern California Botanists held their 8th Symposium at California State University, Chico. The Friends of the Chico State Herbarium helped to sponsor the symposium with a cash donation. In appreciation for cash donations, the Northern California Botanists offered the opportunity to their sponsors to set up an exhibitor booth at the symposium. With the symposium being such a great forum to publicize the importance of the Chico State Herbarium and the workshops provided by the Friends to a wide variety of professional botanists as well as students, the Friends jumped at the chance to set up booth. To help draw interest to our booth, we exhibited some of the beautiful photographs submitted during last year's Fall Photo Contest. We offered fliers for upcoming workshops and membership information and had T-shirts with the Friends logo for sale. In addition to the Friends information, we also had books for sale published under the Studies from the Herbarium. The new *Vernal Pools in Changing Landscapes* (2016, Robert A. Schlising, Erin E. Gottschalk Fisher, and C. Matt Guilliams, editors) paperback had just been released for sale and was a big hit! For the two days that the booth was set up at the symposium we had two amazing Chico State students, Claire Meehan and Laura Lampe, volunteer to run the booth. We couldn't have done it without them and the Friends board members who helped set up the booth!



Specimen Spotlight

My Favorite Specimen

By Cindy Weiner

In nine years volunteering at the herbarium I've seen thousands of specimens while databasing new acquisitions, annotating existing ones or filing them in their cabinets. Many are worth a second look. Ones I've seen in the wild cause me to try to recall their locations. Many others are beautiful or unusual or mounted in a striking way. Some have labels with the habitat so well described, it's easy to get a vivid mental picture.

My favorite specimen, however, made me stare in astonishment for some minutes. It's accession number 110443, collected by Barbara Castro in 2007 but not databased until 2013. It's a fortunate combination of a striking plant, thoughtful pressing by Barb, and expert mounting by Lowell Ahart that produced such a stunning result. This beauty is *Monardella venosa*, veiny monardella, found in only a few locations in Butte and Tuolumne Counties. Presumed extinct, it was rediscovered by Barb and Lawrence Janeway in 1992.

Veiny monardella is an annual that grows about a foot tall. The specimen contains two plants, one the usual purplish-pink morph and the other the even rarer white morph. The specimen still retains both colors. Below the flower clusters are translucent bracts with candelabra-shaped veins, making the bracts resemble leaded-glass windows. The plants' bracts are carefully arranged to display this characteristic to best advantage.

Number 110443 lies tucked away in its cabinet, available for another look whenever I need reminding that the earth is full of wonders.



Monardella venosa CHSC
110443 Castro 1623



Photographs in the Herbarium

By John Whittlesey

To further the awareness of the flora of California, the Friends of the Herbarium has hosted the **Fall Photo Event** and the **Spring Student Photo Contest** for the past 7 years. The fall event is open to all ages with all photographs required to be of a California native plant. The student contest is open to students through 12th grade, and while the photos are not required to be of native plants, it is encouraged.

We receive anywhere from 50 – 75 photographs which makes for a dynamic and colorful display at our Spring Open House. The photographs are judged by the FOH board and herbarium staff and volunteers. Judging as many as 75 photographs is a challenging task, but one we all enjoy. Submissions for the student contest must be submitted by May 1st award. For more information and details go to the FOH website.

Last fall we made a few changes to what had been called the **Fall Photo Contest**. To encourage people who enjoy photography, but did not want to have their photos judged, we opened a new ‘non-judged’ category. This allowed FOH board members to submit their photos, we also designated two categories – Landscape and Close-up – which made the judging, while not easier, more logical.

Last fall, we had some stunning entries in both categories. The diversity of California’s flora and habitats was well represented at our annual meeting. Some of these photographs are still on display in the herbarium’s display cabinet in Holt Hall. Come by and take a look. We hope it encourages others to submit their photographs next fall.



Upper Park—Spencer Dykstra



Bald Fire recovery—Mike Dolan

Winning Entries from the Fall

Native Photography Event



Pink sand verbena (*Abronia umbellata* var. *breviflora*)
Ayla Mills



**A new plant for the Butte County flora,
a weed in the family Asteraceae:**

***Symphyotrichum subulatum*
var. *elongatum***

By Lowell Ahart

Barbara Ertter e-mailed me on 06 September 2015 and asked me to collect aquatic and mud flat plants for her aquatics workshop planned for The Jepson Herbarium on October 10 – 11, 2015, in Berkeley. She said she would pick up the plants on the 5th or 6th of October. I got busy and put a number of local rice field weeds in buckets of water for her. Plants will last a long time when collected with lots of dirt and put in water and in the shade. When it got closer to the 5th of October I put these recently collected plants in plastic bags and put them in my refrigerator. I then went to places where I had collected aquatics before to get more species for the workshop. I made a long trip to Round Valley Reservoir in the mountains near Greenville, then to Antelope Lake, and collected aquatic plants. I did not have any *Azolla filiculoides* (Large Mosquito-fern) or *Wolffia* species (Watermeal) yet, so I made a trip to the Feather River southwest of Oroville. Where I had expected to find the Watermeal the pond was dried up (remember the drought), and the large pond where I knew there was Large Mosquito-fern had many people around so I decided not to collect there. So I went to Oroville and then almost to East Biggs. From there I went east to the dredge area and to the Feather River. There were good plants along the river and I got a number of aquatics and mud flat plants. Barbara Ertter arrived on the 5th of October and picked up the plants I had collected for her (70+ different species).

I had not collected many plants for the herbarium while I was collecting aquatic plants for the workshop, for they would have just duplicated specimens I had collected for the herbarium years earlier. But the area along the Feather River east of Biggs looked like a good place to collect *Eleocharis*. So on 20 October 2015 I returned and collected many plants, mostly weeds. I got tired and decided to make one more trip south along the river. By the way, both sides of the river in this area are badly infested with *Sesbania punicea* (Scarlet River-Hemp or Rattlebox). As I came to the end of a low bank I had to either go into the water or through the jungle of Scarlet River-Hemp. I decided that I had had enough and started back. Along the way I noticed a plant with showy purple flowers. I thought it was just *Symphyotrichum chilense* var. *chilense* (California Aster). I continued on my way but then wondered why the *Symphyotrichum* was growing where it was. Puzzled, I went back and collected it

and discovered that it was annual and therefore not California Aster. Now, there is a lot of *Symphyotrichum subulatum* var. *parviflorum* (Annual Saltmarsh Aster) in the area and I had collected some, but it does not have showy flowers. I pressed the unusual plant and when I got home I ran it through the keys in the Jepson Manual 2 and it came out to *Symphyotrichum subulatum* var. *elongatum* (Ahart 20,572). This is a new plant for Butte County, and for Oswald's Selected Plants of Northern California when a revision to that book is made. It's all a matter of making collections, going later in the year or a little farther, and one can find new plants for our local floras. Now remember it's just a weed, but **All Right!!!**

Curator's note: The Jepson eFlora website states that this variety is only known from SCo in California (South Coast, in southernmost coastal California), and in Baja California, and that it is "native to southeastern United States." However, a check of herbarium specimens at the Consortium of California Herbaria website (of which The Chico State Herbarium is a member) shows that this variety is now also known from the southern Sacramento Valley of Yolo and Solano counties. This is documented by three specimens in the herbarium at UC Davis collected in 2010 and 2012. Lowell's 2015 collection from Butte County in the central Sacramento Valley represents a 52 mile northward extension from the collection site in Yolo County, thus significantly expanding the known distribution of this variety in California. Is this taxon spreading northward from southern California or are there just not enough active collectors of herbarium specimens to fully document California's flora? 🐼



Lowell Ahart collecting aquatic plants on a trip to the Inner Coast Range of Colusa County with John Dittes and Josephine Guardino. Feb 2016
(photo by J. Dittes)



Symphyotrichum subulatum
var. *elongatum*
CHSC116324 Ahart 20572

(Steer's Head—Continued from page 5)

Seedlings. Hal designed neat protocol with which we plant seeds of the year—in the field so that they receive only natural summer and winter temperatures and precipitation. By spacing the seeds exactly 50 mm by 50 mm apart in grids, and also marking sites with toothpicks, we can identify seedlings as they appear. The seedlings may not seem interesting at all. But, we determined that in its first year a DIUN seedling produces only ONE tiny, photosynthetic leaf. (Apparently this is a single cotyledon, even though species of *Dicentra* are DICOTS). A seedling also “out of necessity” produces a tiny tuber (and sometimes a bulblet too) before it dries up aboveground for the summer. We hope to obtain additional data on how many years it takes for a seedling to grow into a flowering individual, and we wonder too if a bulblet grows into a flowering plant faster than a seedling does.



Dicentra uniflora seedling
(5 mm grid)

Dicentra uniflora has a wide geographic range, in the mountains from central California to British Columbia, and to parts of the Rocky Mountains. Could this wide range have been promoted through the ages with the help of deer? Judging by deer tracks at our sites where DIUN fruits have been nipped off (some probably containing mature seeds), this species may have been slowly dispersed through time by these large animals.



Highlights from Recent Workshops

Identification of Northern California Grasses, November 12, 2016—By John Dittes

The well-attended workshop provided an overview of this diverse, ecologically important and challenging group, as it is represented in Northern California. Spring-flowering species from valley and foothill annual grassland and vernal pool habitats were available for instruction. Also on hand were higher-elevation, summer-flowering representatives from the southern Cascade and Northern Sierra Nevada Ranges. Participants traveled from as far away as Arcata, Susanville, Oakland and King City to attend. We had ~70 taxa available for instruction, representing more than 40 genera and all “Groups” found in the Jepson Manual keys. As we worked a species through the key, we examined other specimens to illustrate examples of the “alternative choice” in the couplets. In this fashion, we maximized the number of specimens examined with the diversity at hand, in the limited time available. Participants were encouraged to make personal reference collections with index cards and tape provided. All in all, it was a successful and productive day. Thanks again are given to Lowell Ahart, who over years has collected for our Poaceae workshops, and to Josephine Guardino, Lawrence Janeway and Rob Schlising for their help in setting-up, and cleaning-up after the event.



Making Wreaths with Native Plants, December 3, 2017—By Adrienne Edwards

Botany and warm comraderie were shared at the Wreath Making with Native Plants workshop, led by the inimitable Jennifer Jewell and her erstwhile bough sidekick, Adrienne Edwards. The workshop featured clippings from many native plants, such as incense cedar (*Calocedrus decurrens*), coast redwood (*Sequoia sempervirens*), manzanitas (*Arctostaphylos* species.), California bay (*Umbellularia californica*), toyon (*Heteromeles arbutifolia*), and deerbrush (*Ceanothus inter-*



(Continued on page 10)

(Recent Workshops Continued from page 9)

gerrimus). Each plant contributes different texture and shades of color. Wreaths were embellished with white sage (*Salvia apiana*), fallen lichens, buckeyes (*Aesculus californica*), acorns (*Quercus lobata*), and/or ribbons. Thus, each workshop participant created a personalized design, far more interesting than monochrome pine bough wreaths from stores. But this workshop also provided the opportunity to celebrate California native diversity, as well as time to relax and contemplate the meanings of the many holidays at year's end.



Natural Plant Dyeing, January 28, 2017—By Adrienne Edwards

Sasha Duerr brings plant color palettes to fiber using non-toxic methods. With a joint appointment in textiles and fine arts at California College of the Arts, her expertise in natural fibers, visual arts, gardening, and botany offered a unique opportunity to learn about dyeing with plants. Sasha presented a fabulous day-long workshop to participants with diverse backgrounds (from professional artists to agricultural experts to hobbyists. We all came away with courage and excitement to view the plants in our environments as color palettes to create art and upcycle wardrobes.

Sasha began her workshop discussing the history of dyes, emphasizing that pigments were derived entirely from natural sources (primarily plants) until the late 1800s. Production of synthetic dyes (primarily derived from coal tar!) coincided with widespread production of factory-produced textiles and clothing by the early 1900s. Today, synthetic dyes and textile finishers are one of the top sources of heavy metal contamination (including chromium, lead, mercury, cadmium sulfur, chlorine compounds, arsenic, nickel and cobalt) in wastewater¹. Many of those metals serve as mordants to bind dyes to textiles. Sasha is championing the approach of “stacking functions” (getting multiple uses from one action or material), through a return to non-toxic dye methods that can be made from kitchen scraps, weeds, native plants...and then composted when done!²



The workshop focused on a few dye plants and mordants, which help make dyes more colorfast and can modify dye colors. One of the quickest dyes made use of a lovely weed known as yellow wood sorrel or sourgrass (*Oxalis stricta*). This *Oxalis* produces salicytic acid, resulting in reduced pH. That acid serves as a mordant, “biting” into the fabric, and producing a sunny yellow. The color is pH sensitive, which can mean that alkaline soap will fade it, but that also inspires creativity. In another dye bath, we boiled tannin-rich oak galls (from *Quercus lobata*), and tannin also serves as a natural mordant. Interestingly, she showed us that we could smash *Oxalis* flowers into our gall-dyed fabric and make yellow spots. Indeed, mordants can completely change the color of a dye. For example, boiled manzanita branches (*Arctostaphylos manzanita*) without mordant made a rosy color, but with iron mordant made gray. Manzanita leaves with alum resulted in butterscotch yellow!



Sasha Duerr leading workshop participants through the

In addition to dyeing with and without mordants with a range of plant dye, Sasha showed us ways to embellish our fabrics with folding techniques, modifiers, and resist pastes. We all came away with a greater appreciation of how plant material, pH, mordant, temperature, and the type of textile can reveal a range of colors. Natural dyeing is a beautiful and sustainable fusion of botany and art³.

¹Kant, R. 2012. Textile dyeing industry an environmental hazard. *Natural Science* 4: 22-26.

²Duerr, S. 2016. *Natural Color: Vibrant Plant Dye Projects For Your Home and Wardrobe*. Watson-Guption Publications, Berkeley.

³Duerr, S. 2010. *The Handbook of Natural Plant Dyes: Personalize Your Craft with Organic Colors from Acorns, Blackberries, Coffee, and Other Everyday Ingredients*. Timber Press, Inc.

(Continued on page 11)

(Workshops Continued from page 10)

Introduction to Fern and Lycophyte Biology and Evolution Workshop, March 11, 2016.

By Linnea Hanson

Carl Rothfels from the University of California at Berkeley taught this workshop. He described the evolution of lycophytes, ferns and seed plants and how each of these groups are related to each other. He explained the fern life cycle and how it differs from bryophytes, lycophytes and seed plants. We learned how to talk fern with all the particular terms to describe a fern.

Carl then described the three different groups of Lycophytes: club mosses, quillworts and horsetails. What a fascinating group of plants! He then described each of the various families of ferns that are found around the world and in California. The variety is amazing!

We visited the Giant Chain Fern, *Woodwardia fimbriata*, along the creek on campus. And in the afternoon we also visited Fern Wall on the south side of Chico Creek in Upper Bidwell Park. We found five different ferns along the Wall plus liverworts, mosses, hornworts and lichens. The ferns we saw were: Gold-back Fern, *Pentagramma triangularis* var. *triangularis*, California Sword Fern, *Polystichum californicum*, California Maidenhair Fern, *Adiantum jordanii*, Southern Maidenhair Fern, *Adiantum capillus-veneris*, and Fragile Fern, *Cystopteris fragilis*.

We all became fern fluent and skilled fern observers by the end of the workshop.



(Spring Cleaning—Continued from page 2)

Ellen Dean, Director and Curator of the UC Davis Herbarium, titled “What plant is that? How to manage plant identification in an era of taxonomic change.” In this talk Dr. Dean explained how these sorts of name changes happen, some of the science behind these changes, what are the changes in placement of genera within particular families within the California flora as currently understood, and some advice on coping with the changes, personally and in the herbarium.

Now that the arrangement of plant families within the collection matches that of The Jepson Manual, the use of the collection by students and visitors will be much more in sync with current knowledge of the California (and world-wide) flora. We will continue to update species names to match those presented in The Jepson Manual in order to make the collection even more readily accessible and up to date.



All Hands on Deck Claire Meehan, Herbarium Assistant

The past few months saw the shifting and rearranging of specimens into current The Jepson Manual second edition families, as well as updating name changes and new folders for specimens in our filing system. As one of the heavy lifters of this project, I was able to recognize the changes made and follow the logic of these phylogenetic transfers. For example, pulling several genera from Scrophulariaceae and placing them into Plantaginaceae follows current Cladistical standards. Our cabinets now resemble the phylogenetic map at the back of The Jepson Manual second edition.

This project also resulted in greater ease and organization of databasing and filing incoming specimens. Emily Doe and I were able to work with Lawrence to develop some new procedures for student assistants and volunteers. Although this project was tedious and overwhelming at times, it was a pleasure to become familiar with and research the changes of new families. Also, there is plenty of room for new specimens!



Claire busy with the update



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