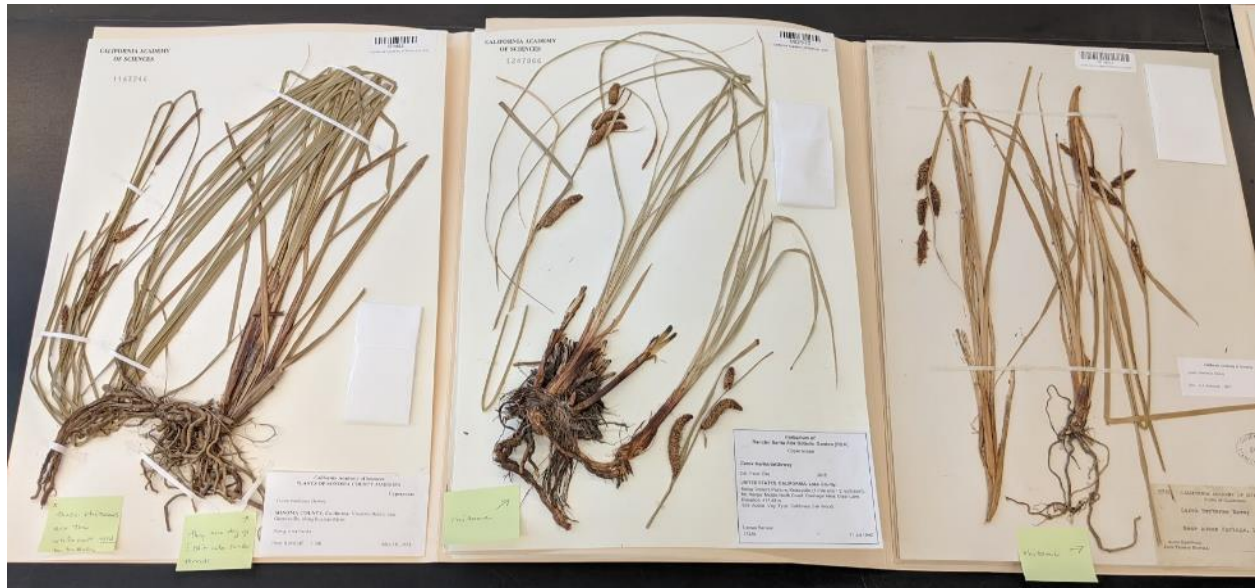


Botany News. 4.

California Academy of Sciences



Carex barbarae specimens for new Collections Gallery as examples of Native Pomo basket plants

Hi everyone,

We hope you are all settling into the holiday season. We have had some exciting developments in the department, even though we are still limited in our access to the building below our usual capacity. In this installment of the newsletter, you'll be treated to several interesting updates. The Collections Gallery team is busy looking at specimens in each department in order to finalize their plans for the new exhibit for Spring 2022. We received permission to allow Rose, our new Curatorial Assistant who you met in the last newsletter, into the department to continue her training in digitization efforts and we have made headway on our new trial project. Manuel has settled into life in the UK, Jim is wrapping up field work in Northern California, Tom demystifies scientific illustration, and Frank takes us back to Africa for more spectacular scenery and plants. Last but not least, Dr. Sarah Jacobs, our new Howell Chair of Western North American Botany, says, "Hello!"

Take care, stay safe and enjoy the newsletter! -The Botany Department

Greetings from Kew

Manuel Luján

Dear Calacademy's plant people. I wanted to take this opportunity to give you a short happiness report from the UK. As some of you may know, I recently moved to London to start on my new position as taxonomist for the Americas team at the Royal Botanic Garden, Kew. It is amazing the number of the researchers and curatorial staff that work with the collections here which is estimated to have over 8.5 million specimens in the herbarium! The facilities and resources available to do plant research are really wonderful and the living collections are just incredible. They grow plants from all over the world and there are entire teams dedicated to look after each of those collections. Kew is in the process of writing their new Science strategy for the forthcoming years and they have identified the collections, herbarium, seeds and living plants, as their most important assets. They have big plans to build a new Science quarter and make significant improvements to the historical buildings, but they need to raise the money first!

I am very motivated with my work in particular because I now have free reign to develop my own research programme with Neotropical plants. I am resuming my work with the genus *Clusia* (Clusiaceae) for which I have a ton of molecular data waiting to be analyzed as well as many other new ideas. One of the new ideas I have is to write a taxonomic treatment of the Clusiaceae from Chiapas. During my last days working at the Academy, I had the chance to study the great collections of Dennis Breedlove, and I am now studying all the Chiapas material from Kew, as well as digital images of *Clusia* specimens from other herbaria including New York, Missouri, Field museum, Smithsonian Institution and the Mexican National Herbarium. Interestingly, while studying these digital images, I identified a couple of specimens with very distinct leaf morphology. So, I requested a loan of the material from the American herbaria to make some dissections and study floral parts in detail. Now I am working with collaborators from Mexico to make molecular analysis and describe this new species of *Clusia* from Chiapas. What I find interesting about this process is that first, I am relying entirely on herbarium collections because I have not put eyes on this living plant yet, and that I am using mainly digital images to make this discovery. What a great time to be a taxonomist!

At home everything is going very well. The kids are enjoying eating fish and chips more often, and my wife Gabriella has already started rebranding and reimagining a new baking business. We miss California and all of you terribly and we are thinking of you everyday.





Upper left: Male flowers of *Clusia guatemalensis*; lower right: male flower of *Clusia lundellii*, both taken in 2016 during my trip to Chiapas. Business cards from Gabi's new endeavor. Thumbs up next to the spiral staircase of wing D of Kew herbarium!

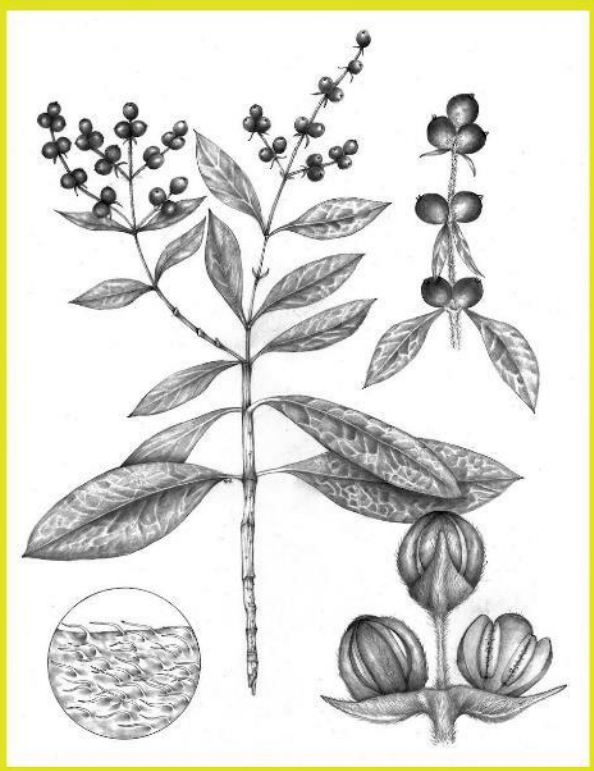
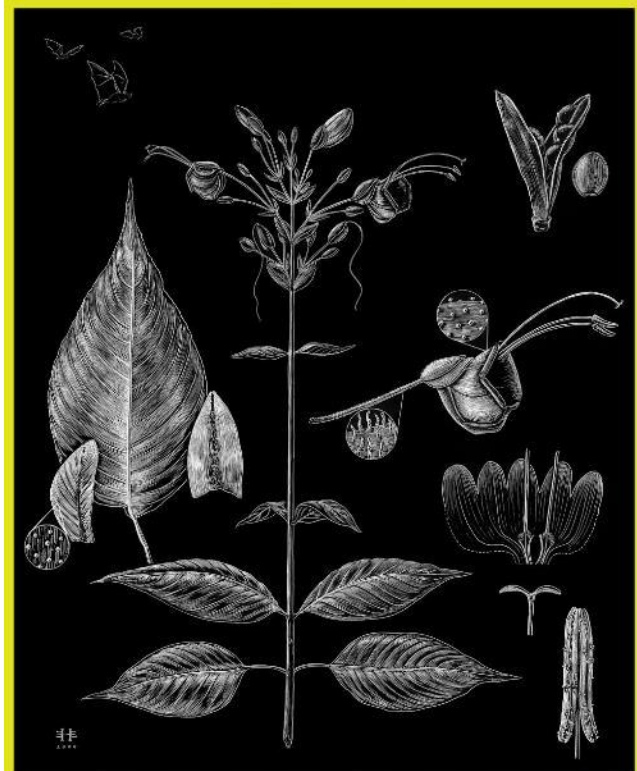
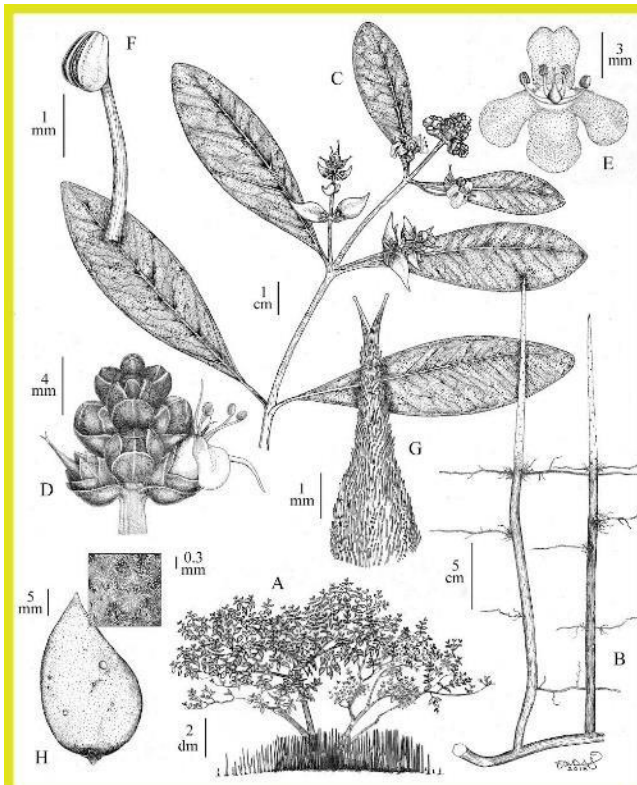
Botanical Illustration: A Learning Process

Tom Daniel

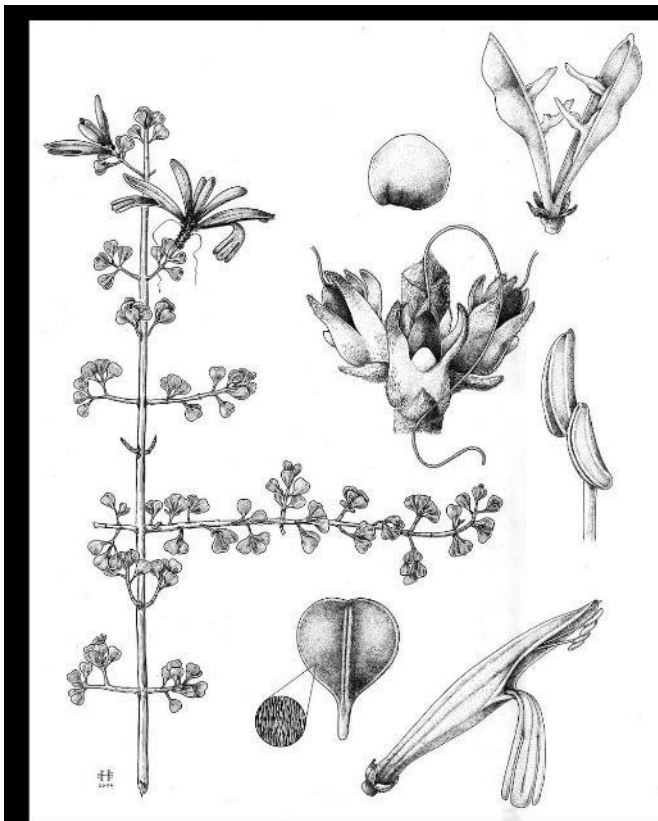
One of the things I've especially enjoyed while at the Academy has been working with artists and illustrators in conjunction with my botanical research. It has been a pleasure to work with at least 11 professional and 15 student (high school to graduate students) illustrators, most of the latter through the Academy's annual internship in biological illustration. In the era of digital photography and other types of imaging, why do botanists still use hand-drawn illustrations to assist in describing species? I was asked this by a reputable scientist some years ago, and we had a lengthy discussion on the merits of illustration vs. photography in publications. Here, I'll just say that good quality photography certainly has its place, and I use it frequently, when it is available. But it is rarely a sufficient substitute for highlighting all the important features of a plant that a well-executed illustration can provide. Illustrations are generally drawn from herbarium specimens, so those specimens that best show important morphological features of a species (e.g., flowers, fruit, leaves, anthers, hairs, etc.) can be used in creating a composite plate. It is the illustrator's job, working with a botanist, to 1) accurately draw the various components (e.g., shapes, sizes, and proportions), 2) use perspective to sort of bring the pressed (± 2 -D) specimens back to life (i.e., 3-D) in a 2-D medium (e.g., pen and paper), and 3) arrange the components in an aesthetically and scientifically useful layout. I admit that I cannot draw (at least not very well), and there is nothing I can teach the student interns about drawing or perspective. But a scientist working with an illustrator knows what needs to be drawn, can help interpret what the illustrator sees on the specimens, and can check the accuracy of the rough drawings before they are inked/finalized in case any modifications need to be made. Thus, there is considerable back-and-forth between the illustrator and the botanist. The first plate below shows examples of some of the styles of illustrations we have worked with. Mostly, we use pen and ink (which permits the most flexibility), but it has been interesting to experiment with other techniques.

Working with illustrators, I've learned (sometimes the hard way) about what works in composing a good botanical plate, when overlapping components of a plate works and when it does not, and the benefit of making very small things large. Sometimes I have learned something new about the morphology of a structure—something I missed seeing, but that the artist did not miss. A case in point would be the protrusions at the base of one of the calyx lobes of *Louteridium parayi*, which I had not noticed but the illustrator drew – good thing, too because this turned out to be an important characteristic of that species.

I thought it might be informative relative to the importance of illustrators and illustrations to me personally, by relating the following story. In the early 2000s, I came across specimens at several herbaria of a plant from a remote region of Madagascar that appeared to represent a new species of the genus *Anisotes*. I borrowed several of these so that I could study the specimens to verify the taxonomic status of these plants and to have an illustration made of the species, if it proved to be undescribed. Indeed, it did prove to be an undescribed species, and in 2006, I was to host an illustration intern for eight weeks in the summer. The problem was many of the specimens had the stems and leaves broken, and they would have to be pieced together in order to draw the habit (growth form) of the plant. I thought that such a “reconstruction” project might be overwhelming for the student intern, Erin Hunter, but she put the pieces together and showed me a rough (pencil) drawing of the plant. It seemed odd that the branches came off at right angles to the stem (not a common feature of plants, especially among Acanthaceae), but we agreed that it should be drawn as reconstructed, and her final drawing showed this feature (see the plate below). Soon after, we learned that Frank Almeda was to lead an Academy tour to Madagascar, and that the group would be visiting the very remote location where this plant had been collected. I gave him a copy of Erin's drawing and asked him to be on the lookout for this plant, and to see if it really had the branches divaricating at 90° angles. Luckily, using the drawing, Frank and his group indeed found the plants at that site, took photos, made a specimen, and confirmed the branching stance. We included the drawing and photos of this plant in its publication as a new species of Acanthaceae endemic to Madagascar; and we named it *Anisotes divaricatus*. Erin's drawing had not only been accurate, but led to the finding and incorporation of additional information about this rare species. She completed other excellent illustrations during her internship, including the scratchboard rendition of the night-blooming and bat-pollinated *Louteridium* in the first plate. Like many of the interns in biological illustration that we've worked with, Erin has gone on to have a successful career in illustration—teaching, illustrating children's books, creating colorful cards with birds and plants, etc. I often wonder whether I don't learn more from the illustration interns than they learn from working with me!



Four illustration techniques used by illustrators working at CAS (clockwise from upper left): black mangrove (*Avicennia germinans*, pen and ink by Tom Davis), three species of clock-vine (*Thunbergia* spp., color computer graphics by Alan Chou), laurelleaf silk tassel (*Garrya laurifolia*, pencil by Nadia Strasser), and palo aguañoso (*Louteridium mexicanum*, scratchboard by Erin Hunter).



**Anisotes
divaricatus**
(Erin Hunter, illustrator)

Anisotes divaricatus, a local endemic species of Acanthaceae in Madagascar (clockwise from upper left): final illustration, typical specimen used for the illustration, photo of flowers in the wild, and Erin Hunter completing the illustration at CAS.

Finishing a bryoflora basically in one field season

Jim Shevock

As I mentioned previously in one of our earlier department newsletters, I have put my entire field collecting energy this summer and fall toward developing a Bryoflora of the Russian Wilderness and adjacent slopes of the Salmon Mountains, Klamath National Forest, Siskiyou County. I just returned home the evening of October 28 from another exploration trip in what is likely to be the last collecting event before the snow arrives in the high country. It was indeed very brisk at night the last two evenings while camping. In addition, daylight departs early in the forests now by 3:30 and it is becoming too dark in dense forests to collect and one needs to be back at the car by 4:30. It is dusk shortly thereafter. After dinner with temperatures falling one just gets in the sleeping bag around 7:30 and it is not light until 7 the next morning. Nonetheless, I again reached my goal of making over 100 bryophyte collections during this limited amount of available field time over 2 days.



Subalpine granitic slopes about Upper Albert Lake, Russian Wilderness

The great advantage about working with bryophytes is that I am really not season dependent like my flowering plant colleagues. There are just a few bryophytes in California that behave like ephemeral species when they can only be observed during a restricted period of time, but overall, I can do inventory work year round. For the Russian Wilderness area it will be the arrival of snow and the closure of forest roads by locked gates that will stop collecting and exploring in the high mountains.



The common rheophytic moss *Codriophorus acicularis* on granitic rockslabs of a rivulet with water flowing over the plants during snowmelt.

Between these multiple field trips since June, David Toren has been examining the collections and either confirming my field determinations or after a detailed microscopic exam he realizes that I have the wrong name on a handful of collections. But it is amazing how many I guess correctly in the field. With practice one gets a feeling for how species partition both the habitat and the substrate. This is what we call a 'gestalt' for what it has to be. Another colleague, David Wagner from Eugene, Oregon is also a co-author on this Russian Wilderness bryoflora project and he is doing the IDs for the liverwort collections. I am not very good selecting the correct species or even the genus for many of them, especially the rheophytic liverworts. Yes, I am guilty of being moss centric even though I realize that liverworts are just as important to study. Fortunately, this bryoflora will have both groups covered.

So now a draft manuscript for this bryoflora is written and all that is required is to insert additional specimens into the distribution of the species entries. The statistics on the number of species present will be the last step. But I can now estimate that the project area of only around 55,000 acres will have about 175 mosses (out of 650 or 27% of the California moss flora) and 40 liverworts (out of 150 or 26% of the California liverwort flora). This is one of the amazing differences between species distributions between the California bryoflora and the California vascular flora; we can have a very large percentage of the total number of bryophytes in the state within a very small geographic area although many can be very rare in such a small area.

In addition, five lake areas in a portion of what became the Russian Wilderness in 1984 was surveyed as part of a bryophyte flora conducted in 1976 by Katie McGrew as her Master's thesis project under the direction of Dan Norris while at Humboldt State University. She made 786 collections for her thesis project that are now at UC so my plan is to examine as many of them as possible as soon as I can receive permission to enter the UC herbarium due to the current covid-19 shutdown. I am most interested in locating and examining those collections she reports for species that I have not encountered during my collecting in the Russian Wilderness this summer. As specimens are confirmed, then those additional species can be added into the manuscript. However, some collections are most likely misidentified, so once annotated, they too can be added into the manuscript. Besides the McGrew collections, Dan Norris accompanied her on two collecting trips so there are nearly 175 of his collections to examine too. So this bryoflora will have nearly 2000 collections available. I made around 1000 collections this summer in the project area.

So now it is full speed ahead to have the manuscript ready for the peer-review process by the end of December. I am facilitating a special bryophyte issue with the editor of *Madroño*, A West American journal of botany published by the California Botanical Society. So this Russian bryoflora is planned to be 1 of 5 bryofloras presented in this special volume.



Bingham Lake below Russian Peak

Deb Trock continues from Kansas to transcribe the CAS bryoportal data into Specify. She has done over 10,000 bryophyte entries so far!! Great job Deb. Katherine Fines completed transcribing the Jamieson field notebooks and now is well into the Horton field notebooks. This is simply amazing. Trying to recreate a collecting event has required a lot of detective work including searches for place names and tracking routes down by GoogleEarth. And of course Alice continues to keep me well-supplied in all types of fragment packets and packets for shipping off exchange duplicates. The total of the bryophyte accessioned specimens is now approaching 144,000. We started 2020 at 136, 200 accessions in the bryophyte component of the herbarium. I should easily be able to accession another 1,500 before Christmas which will be another great year, and a bit remarkable considering the covid-19 situation. David Toren continues to name specimens by the bushel basket although of late he has been swamped with the Russian Wilderness project material. Once we all can return to the office hopefully sometime in 2021, there will be plenty of Jamieson and Horton specimens now ready to label, process, and file. More exchange is en route from various partners so there will be no shortage of specimens to process and there will be lots of North American specimens to digitize too.

On another note, I received the CAS Fellows' Distinguished Service Award presented at the 2020 Fellows Annual Meeting (virtually held this year) on October 12. A great honor and of the bryophyte cadre had a hand in contributing to this award that came as quite a surprise.

Botany in the *new* Collections Gallery

Emily Magnaghi and Lindsay Palaima



Beach strawberry, *Fragaria chiloensis*, a nectar plant for the extinct Xerces Blue and extant Silvery Blue butterfly

Work is underway on the new Collections Gallery which will replace the Project Lab and the Gem Vault on the public floor, and will feature our very own Cal Academy collections. We have been working with the Exhibits Department to provide specimens unique to the emerging themes in the new Gallery and have been collaborating between departments to showcase a few mutualisms between plants and other organisms. One possible story is about introducing the Silvery blue butterfly [Glaucopsyche lygdamus](#) into the Presidio to see if it will fill the niche left behind by the Xerces blue butterfly, *Glaucopsyche xerces*, which went extinct in the 1940s. To showcase the restoration efforts in the park and the habitat offerings for the new butterflies, we selected a variety of host plants and nectar plants from the collection which were made in the Presidio. If necessary, I may collect a few newer specimens from the former Xerces habitat area so they still have their color and are a bit more vibrant.

There is also a plan to display a few of our Pomo baskets from the Academy's Anthropology Collection. Botany has several nice specimens of *Scirpus* and *Carex* species (bulrushes and sedges, respectively) used in basketry, including their rhizomes which is the part that is used the most. I tried to find specimens collected within ancestral Pomo lands and near current Pomo localities in Mendocino, Sonoma, and Lake counties. Collecting these plants with their rhizomes is difficult work, especially in clay soils, so many botanists just collect the aboveground parts. Pomo basket weavers try to find plants to tend in sandy soils along river courses which may

make it a little easier. Their techniques for promoting rhizome growth seem to work very well and it is my hope to make a collection with a Pomo basket weaver in the future.

I pulled examples of unique, strange-looking plants from Madagascar out, as well as Galapagos specimens from the 1905 expedition that restarted the Academy's collections after the big earthquake and fire of 1906. There was also a freshly pressed *Rosa gymnocarpa* specimen I made this summer which will be used for photo-documenting while mounting the specimen. This may be displayed as an interactive digital plant pressing station to give visitors a chance to see what it's like going through all the actions necessary to collect a plant.

Our current research projects will be highlighted and there is an emphasis on women in science and diversity. There are some really great ideas emerging from the Collections Gallery work and I'm sure whatever we decide on will be an informative addition to the public floor and give visitors an up-close view of what we REALLY do at the Academy.



The prep room with specimens on display; interesting plants from Madagascar, *Alluaudia montagnacii*

Congratulations to Research Associate and Bryologist Dennis Ma!

Jim Shevock

Botany Research Associate Wenzhang 'Dennis' Ma is now a father. His wife Minjie gave birth to a son on October 26 in Kunming. Say hello to baby Ma!



Wildlife Safari to Southern Africa: South Africa and Namibia

Frank Almeda

Hi, All, Hope you are staying safe and finding plenty to do. In a previous newsletter we included a link to a powerpoint that I prepared for A Wildflower Safari to the Cape Province of South Africa since I have spent some of my time at home labeling images from past trips to various parts of the world. We did that trip in 2015 to South Africa, Namibia, Botswana, and Victoria Falls in Zimbabwe. I noted in the previous newsletter that I was still labeling images of the animals and plants from that trip. In this newly assembled powerpoint I have focused on the animals (mostly birds and mammals) of the Cape Province plus the animals and some of the plants that we saw in Namibia. For the images of mammals I have included information on group or herd size, diet, longevity, predators, and a distribution map of the species. The flora of Namibia is not as large and diverse as that of South Africa but it is still very interesting. I am now also working on the images we took in Botswana and Zimbabwe (Victoria Falls) for a future powerpoint. The biggest challenge in assembling this new powerpoint presentation was how much to include. I also have lots of videos but chose not to include any of them because it would just make the presentation too long.

The new assembled PDF is available [here](#). In the third and final Africa powerpoint I will focus on the fauna of Botswana and a small part of Zimbabwe around Victoria Falls. All total I think I have now gone through a total of about 4600 images from the 2015 trip. Inferior, duplicate, and out-of-focus have all been discarded. That is one of the joys of digital photography. Enjoy.

Hello, I'm Sarah!

Sarah Jacobs

Hello! My name is Sarah Jacobs - I'm the newest addition to the collection of plant lovers here in the Herbarium, in the form of an assistant curator. I've been given an incredible opportunity to fill the Howell Chair of Western North American Botany position, and I can't tell you how honored and excited I am to be here...

But, I can try!

First, the honor (with a bit of background first).

I grew up in Arkansas and began learning about plants and taxonomy in my senior year of college at the University of Arkansas in Fayetteville. After a close encounter with a daffodil and a dissection microscope, I sought out botanical training at the local herbarium. The director of the herbarium, Dr. Johnnie L. Gentry, let me volunteer as an extra set of hands for field work in the summer. That quickly led to other positions in the herbarium (including mounting, filing, specimen repair and other curatorial tasks), as well as additional college courses, and his passion for botany really instilled in me a great respect for herbaria and a love of plant taxonomy. It also taught me how much there was to learn about taxonomy, classification and plants in general!

That herbarium position led me out west in pursuit of a graduate degree where I could learn more (I didn't really care at that point what I was learning, I just knew that I wanted to know more)! I ended up at Washington State University where my masters program was very tightly connected to work in the Marion Ownbey Herbarium. This is when I began learning a new flora (that of the Pacific Northwest) and where I also began to recognize the names of collectors on specimen labels. Many of these were names I'd first seen as authors of the new species of plants that I was learning (for example, Suksdorf and Cusick), but there were old familiar friends, too - names of collectors that were active in the southern states and whose names I'd learned while working in the stacks in Arkansas (for example, Delzie Demaree, whose label data often consisted only of the nearest post office to the collecting site). I also saw some of the plant collections that have been so important for building knowledge about evolutionary processes. For example, the cabinets full of *Tragopogon* specimens collected by Ownbey that spurred his research into speciation via hybridization and genome doubling (one of the first known observations of a plant species forming in nature and a study system that has become one of the most famous and well studied)!

Since my time at WSU, I've followed my love of plants, taxonomy, and herbaria by diving deep into plant systematics (a field of research that combines taxonomy, phylogenetics (the study of evolutionary relationships), and evolutionary processes) and species delimitation (the process of identifying and delineating new species). My doctoral studies took me to the University of Idaho, where I worked with Dave Tank, studying the genus *Castilleja*, as well as serving as a curatorial assistant in the Stillinger Herbarium. I was very nervous about working in that particular system—*Castilleja* tends to be very difficult to identify. I remember telling Dave that I wasn't sure working in a genus where I couldn't even identify species was a very good idea! He laughed and told me that I'd learn ... Well, that 'difficulty identifying *Castilleja*' has ended up

being a good thing. It turns out that the hallmark taxonomic complexity in *Castilleja* is really fertile ground for all kinds of questions about species (What are species? What are the boundaries between species? How do we best define species?), the speciation process (What factors drive the process of speciation? Do different groups of species share or differ in the way they speciate?), and what it all means for our classification system (How do we best classify newly forming species that are difficult to identify?).



I tend to get pretty excited when I find rare species ... Here (on the left) I'm pointing to the species (on the right), *Castilleja salsuginosa*. It's found in alkaline flats in east central Nevada. It's super hard to find (both because it's very rare but also because it blends in with the soil). We'd been looking for hours and hours and finally found it, right as the daylight was fading!



A couple of other favorite pics of *Castilleja*. At left is *Castilleja schizotricha* from the high (sub)alpine areas in NW California and SW Oregon. At right is a population of *Castilleja miniata* in the Northern Rocky Mountains.

Anyway, back to the honor and excitement that I mentioned earlier. Being here at the Academy, I'm filled with a sense of honor for all the awesome and inspiring botanists that have come before me—both here in California, and in western North America. Knowing that I could peek into the collection, in pretty much any cabinet, and find collections made by Howell, Eastwood,

Brandege, Dudley, Ferris, Abrams ... and so many more, is pretty exciting! But I also feel a sense of camaraderie and familiarity, working among specimens made by those who shared similar interests and passions. I'm also wondering if I'll see any of Delzie's post office localities in our stacks! I am very much inspired by these collectors and their specimens and I hope to contribute to this collection in a way that mirrors my esteem and respect for their work.

My work in all the various herbaria on my career path has provided me with many and varying experiences—from bread-and-butter curatorial work to herbarium database management; from organizing collecting trips and forays to instructing students in field-based collections research. I am so excited to continue working with and learning about plants here at the Academy and I very much look forward to meeting and working alongside all of you!

Congratulations to Jim!

Nathalie Nagalingum

In October James “Jim” Shevock received the Distinguished Service Award from the Fellows of the California Academy of Sciences in appreciation and acknowledgement of his contributions to our institution. In 1983 Jim was appointed as an Academy Research Associate, and he was later recognized as an Academy Fellow in 2007. Upon his retirement in 2009 he immediately began a new “role” at the Academy, where he has been an active and valued member of the Botany Department. During this time he has been prolifically building and developing the CAS bryophyte herbarium through expeditions and a specimen exchange program. To support this work, he has managed a large group of committed and enthusiastic volunteers.

Distinguished Service Award



James R. (Jim) Shevock
California Academy of Sciences

- Botanist with an emphasis on bryophytes
- Served for 32 years at the USDA Forest Service and National Park Service where he assumed many roles, including Botanist, Associate Regional Director for the Pacific West Region (for 58 park units), and Research Coordinator
- In 10 years, Jim has added over 90,000 accessions into the Academy herbarium, roughly tripling the bryophytes collection with the help of a dedicated cadre of volunteers he has led
- Has served in a leadership role in the California Botanical Society, the California Native Plant Society, the American Bryological and Lichenological Society, and the International Association of Bryologists
- Published over 100 scientific botanical and plant conservation articles
- Has named over 20 vascular plants and 15 bryophytes in California

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Slide from the virtual award presentation ceremony held on October 13, 2020.

Jim obtained undergraduate and Masters degrees at California State University, Long Beach, and spent his career in public service. He served for 32 years at the USDA Forest Service and

National Park Service. Beginning as a ranger, he assumed many roles, including as a Botanist, Associate Regional Director for the Pacific West Region (for 58 park units), and Research Coordinator.

Throughout his career Jim has advanced scientific understanding of plants. He continues to publish new species, and has named over 20 vascular plants and 15 bryophytes in California. Jim has over 100 scientific papers in peer-reviewed journals, contributes to flora treatments, especially in China, and serves as the English editor for two journals.

He is a prolific collector of both flowering plants and bryophytes with currently over 50,900 collections (10,000 California vascular plants and the remaining collections represent bryophytes). He has collected in North America, China, Taiwan, Philippines, South Korea, Australia, New Zealand, South Africa, São Tomé e Príncipe, Chile, Rota, and Hawai'i. All of his flowering plant and bryophyte collections are housed at CAS, and duplicates have been deposited across the US and worldwide.

In his roughly 10 years at the Academy Jim has added over 90,000 accessions into the herbarium. Prior to Jim's arrival the bryophyte collection comprised about 50,000 specimens, and next year, as a result of his dedication, the bryophyte herbarium will have tripled its size to 150,000 accessioned bryophytes. This is a remarkable feat and demonstrates his incredible service in expanding our collections and achieving our mission.

Thirteen plant species have been named in his honor including seven flowering plants and six mosses including the moss genus *Shevockia* endemic to Asia. Given his years of dedication to the Academy, the Fellows' Service Award is a fitting tribute to add to these honors.

Thank you Jim!

Holiday plants mini-class

Nathalie Nagalingum

WINTER IS COMING, and no matter what holiday you celebrate, prepare to get festive! From boughs to berries and branches to blooms, I'll be talking about holiday plants—Christmas, Kwanzaa, Hanukkah, Saturnalia, Festivus, you name it—and why they're part of our celebrations. Join me on [YouTube](#) on December 22 at 10 am.

For past and upcoming breakfast club mini-classes on the Academy's [website](#).



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