



The Plant Press

THE ARIZONA NATIVE PLANT SOCIETY

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In this Issue

- 3 Arizona's Magnificent Trees Program
- 5 Message from a Big Tree Hunter
- 10 Observations on Plant Life of the Cienega Creek Natural Preserve, Pima County, Arizona
- 13 Chronicling Place-based Plant Diversity

Plus

- 17 Save the Date: Botany 2019, AZNPS 16th Annual Meeting
- 19 Volume 17 of *Flora of North America* Published

With Regular Features

- 2 President's Note
- 8 Book Review: *Catalina Mountains*
- 9 Who's Who at AZNPS
- 14 Book Review: *C.G. Pringle*
- 17 Spotlight on a Native Plant
- 18 Book Review: *The Natural History of the San Francisco Peaks*

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Back in the early 2000s, Ken Morrow and Bob Zahner (L–R), then co-coordinators of the Arizona Register of Big Trees, took a hike in the Santa Catalina Mountains to visit the Arizona Cypress (*Cupressus arizonica*) Champion Tree. Photo courtesy Glenda Zahner.

The Fascination with Trees

by Douglas Ripley, Arizona Native Plant Society, Cochise Chapter

What native plant lover does not have a special fondness and appreciation for Arizona's fascinating trees? From the fragrant conifers and hardwoods of our moist mountains to the rich and colorful trees occurring along our streamsides and other riparian areas, to the highly adapted, drought-tolerant trees of our deserts, there is much for the observant individual to discover, study, and appreciate in our arboreal diversity.

Realizing the benefits of raising the public's awareness of the State's trees, as well as in an effort to enlist their support of tree conservation, the Arizona Department of Forestry and Fire Management established the Arizona Magnificent Trees Program, which is described in the next two articles. With the guidance provided by this program, individuals can locate and visit Arizona's famous trees. And using the guidance provided, Arizona Native Plant Society members may wish to search for and nominate new individuals to the National Champion Tree Registry.



President's Note *by Douglas Ripley* jdougripley@gmail.com

Welcome to the Spring/Summer issue of *The Plant Press*! This spring, all Arizona native plant lovers really have something to celebrate in the form of the showiest wildflower bloom in years, thanks mainly to the exceptionally heavy rains we received this past fall and winter. The display is without a doubt the most impressive I've encountered in the eleven years I have resided in Southern Arizona. I do hope you have been able to enjoy this very special gift and that we may continue to enjoy it throughout the spring.

I'm happy to report that our Society continues to move forward on an even keel by continuing its various programs in support of its primary mission — to promote knowledge, appreciation, conservation, and restoration of Arizona native plants and their habitats. Toward that goal, we have continued our long-established offerings of monthly chapter meetings and field trips and the publication of our semi-annual journal *The Plant Press* and our quarterly newsletter *Happenings*. A recent exciting initiative which is currently underway is a revision and complete updating of our website. While the current website has served us well, it is in need of a new look, including the addition of a number of new features that will allow for better graphics, easier updating, and user interaction. We anticipate having the new website available online by the end of May.

Addressing our conservation mission continues through the conscientious efforts of our Conservation Committee and its Chair, John Scheuring. Most recently, John has overseen a major eradication effort for several recently reported occurrences of the aggressive invasive Globe Camomile in Pima County.

We have finalized planning for our annual Botany 2019 conference, which will be held at the Eastern Arizona College in Thatcher 31 August – 1 September 2019. We have decided to have a general theme for this conference meaning that presentations on any topic relating to Arizona or Southwestern native plants are welcome. The second day of the conference will offer field trips to areas of local botanical interest such as the Safford Grids, the Gila Box National Conservation Area, and the Pinaleno Mountains. A call for oral presentations and posters is posted on the AZNPS website along with additional meeting details and a registration form. See page 17 for more information.

We hope you will enjoy this issue of *The Plant Press*, which does not have a specific theme, but rather offers articles and book reviews on a range of current native plant projects and background information on individuals who have contributed to our understanding of Arizona's rich native flora.

Best wishes for an enjoyable and productive summer.



Spectacular display of Mexican Poppies (*Eschscholzia californica* subsp. *mexicana*) in the eastern foothills of the Pinaleno Mountains, Graham County, Arizona, March 2019. Photo courtesy Doug Ripley.



Figure 1. The Granite Mountain Alligator Juniper (*Juniperus deppeana*) with Granite Mountain Hotshots in 2013.

Arizona's Magnificent Trees Program

by Jon Orona¹ All photos courtesy Arizona Department of Forestry and Fire Management.

Arizona's Magnificent Trees program recognizes the largest trees of their species (Champion Trees), trees that have cultural or historical significance (Heritage Trees), and trees verified to have been alive at Arizona's statehood on February 14, 1912 (Witness Trees). Why is it important that we recognize these trees? Throughout human history, trees have played an important part in shaping our future. Arizona is no exception to this fact, and we have many interesting and important historic trees.

Champion Trees: The largest trees of their species

The Granite Mountain Alligator Juniper (*Juniperus deppeana*). This champion alligator juniper is the largest tree of its species in the nation (Figure 1). It is estimated to be thousands of years old. But due to a recent tragic event it also qualifies as a Heritage Tree. Due to its old age and Champion Tree status, the Prescott Fire Department Granite Mountain Hotshots were sent to protect the old champion when the Doce Fire threatened the tree in 2013. Thanks to their hard work, the tree survived. Sadly, a week later, 19 of the 20

Granite Mountain Hotshots were killed in the Yarnell Hill Fire. This tree now serves as a living memorial to those brave men that gave their lives to protect our homes, communities, and lives.

Arizona White Oak (*Quercus arizonica*). Located in Canelo, Santa Cruz County, this tree is the National and Arizona Champion (Figure 2).

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Figure 2. Arizona White Oak (*Quercus arizonica*) Champion Tree.

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Figure 3. The Jail Tree of Wickenburg.

Arizona's Magnificent Trees *continued*

Heritage Trees: Trees with cultural or historical significance

The “Jail Tree” of Wickenburg. When the gold rush started, the town needed a place to incarcerate criminals. A velvet mesquite tree (*Prosopis velutina*), located at Tenger and Wickenburg Way (Highway 60), did the trick for 27 years. Until a jail was built in 1890, lawbreakers were shackled to this sprawling tree (Figure 3).

The George Washington Elm (*Ulmus americana*). Planted on the campus of Northern Arizona University in April 1931, the cutting for this tree came from an American elm in Cambridge, Massachusetts under which it is said George Washington stood in 1775 when he took command of the Continental Army (Figures 4 and 5).



Figure 4. Planting the George Washington Elm in 1931 at the Old Main Building, NAU Campus.



Figure 5. The George Washington Elm today.

How to Learn More and Get Involved

The Magnificent Trees Program accepts nominations for Champion, Heritage, and Witness trees at any time. If you are interested in submitting a nomination, please email UCF@dffm.az.gov and we will send you a submission form.

The Arizona Champion Tree Register is found at <https://dffm.az.gov/forestry-community-forestry/urban-community-forestry/recognition/recognition-programs/magnificent-trees-directory>.

Trees nominated as Champion Trees in Arizona are forwarded to American Forests' National Big Tree Program for consideration as National Champions — <https://www.americanforests.org/get-involved/americas-biggest-trees/champion-trees-national-register/>.

We are in need of experienced big tree hunters to verify species/measurements/locations and to photograph our champions. If you are interested in volunteering your time and expertise, please contact us.

Visit <https://dffm.az.gov/magnificent-trees-program> to learn more or feel free to contact Jon Orona at (602) 771-1407 or jorona@dffm.az.gov with your questions about Arizona's Magnificent Trees Program.



Figure 1. Whitethorn acacia (*Vachellia constricta*).

Message from a Big Tree Hunter

by Scott Roederer¹ All photos courtesy Arizona Department of Forestry and Fire Management.

I'm a big tree hunter, although I dislike the term — hunting suggests death, but finding a big tree is about life at its fullest and best. Champion trees are survivors, the longest lived and largest of their kind — in the state, perhaps in the nation, and maybe in the world. We celebrate that feat when we recognize them as champions.

Not that every champion is huge. One of mine is only 16.5' tall! It is a whitethorn acacia (*Vachellia constricta*). You probably know it only as a shrub, but under the right conditions, it grows single-stemmed and makes quite a handsome tree (Figure 1).

It's not necessary to make arduous hikes into the back country to find big trees. I found the acacia in my neighborhood. You can find champion trees in everyday places—residential areas, parks, and maybe your own backyard. I found the state champion honey mesquite (*Prosopis glandulosa*) in a shopping

center parking lot in Tucson. A big pecan (*Carya sp.*) along a farm road became another champion (Figure 2).

Being on the lookout for big trees enhances every walk I take in the desert, in the mountains, and in shopping center parking lots. It has sharpened my awareness of all of nature and honed my identification skills. Perhaps you'll find it does the same for you.

We could use help finding champion trees. The core group of nominators, those who built the Arizona list, has dwindled over the years. The qualifications are simple. You need a keen interest in plants and the desire and ability to identify them. It helps if you're the kind of person who experiences a sense of awe when you come across a big tree.

It may surprise you to find a saguaro (*Carnegiea gigantea*) on the Arizona and National Registers of Champion Trees. A saguaro is a single-stemmed, woody plant, which qualifies it for the lists. The champion is 54' tall and has a circumference

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continued next page



Above: Netleaf Hackberry (*Celtis reticulata*).

Left: Figure 2. Pecan (*Carya* sp.).

Message from a Big Tree Hunter *continued*

of nearly 7'. It's possible you've walked past a saguaro that is even bigger. You may have stopped to admire it. It may be the next champion.

To nominate a tree you have to measure it, and that may seem daunting. It shouldn't. The process is fairly simple, and it gives you a sense of intimacy with an individual tree. You'll even get to hug the tree (unless it's a saguaro, of course).

A champion tree isn't necessarily just the tallest or the fattest. A tree's "bigness" is determined by the height in feet, the trunk circumference in inches, and a quarter of the average crown spread in feet. Added together, these become its total points. The champion saguaro is 54' tall and 83" in circumference. It has a spread of 15' That gives it 141 points.

You can use simple techniques to get an estimate of a tree's size. As a beginner, I stood next to a tree, while my wife stood away from the tree and counted how many 6'4" "Scotts" it was tall. For the crown spread, I perfected a three-foot stride to measure the widest spread and the shortest to arrive at an average. A laser measure for home carpentry jobs works well for that.

The circumference is the only thing you need "equipment" for. I first carried a flexible seamstress tape. A retractable tape measure or a ball of twine also workd well. You'll need to measure the trunk at 4.5' above the ground. Wrap that tape around the tree in a big hug for the measurement.

continued next page



From left:

Blue Palo Verde
(*Parkinsonia florida*).

Desert Ironwood
(*Olneya tesota*).



Above, from left: Arizona Alder (*Alnus oblongifolia*). One-seed Juniper (*Juniperus monosperma*). Chihuahua Pine (*Pinus leiophylla*).

Message from a Big Tree Hunter

continued

If you get serious about big tree hunting, you'll eventually have a forester's tape for circumference and a clinometer or forester's laser unit for height. A handheld GPS helps with locations. Perhaps you'll celebrate your first national/state champion tree by buying some of these tools!

Your measurements should be as accurate as you can make them, but they don't have to be spot on. As a nominator, you're only submitting a tree for consideration. If the state coordinator thinks the tree might be a champion, he'll send an experienced measurer to validate your identification and numbers.

You'll want to send pictures of your tree. I take a picture of the entire tree, a close-up of the leaves, and a photo of the trunk bark. Good directions to the tree are essential.

Although you may know the names of our native trees, the registers include all trees. I've told you about my smallest champion, a native tree. My biggest champion is "Mr. Big," a huge river red or longbeak gum (*Eucalyptus camaldulensis*) in Boyce-Thompson Arboretum State Park. It's native to the Northern Territory of Australia.

In any case, sooner or later you'll need a good field guide to trees. National Wildlife Federation, Peterson, National Audubon, and Sibley offer guides. My favorite is the NWF guide, but all of them are good. Audubon and Peterson offer regional guides for the West. There are fewer trees in them, but the books are smaller and fit nicely in a day pack. An excellent tree guide for Southern Arizona is Frank Rose's *Mountain Trees of Southern Arizona — A Field Guide*.



Above: Fremont Cottonwood (*Populus fremontii*).

Below: Arizona Walnut (*Juglans major*).



As you can tell, I'm enthusiastic about big tree hunting. If you're interested, I'd be glad to answer your questions or help with a nomination.



BOOK REVIEW *Ries Lindley, University of Arizona Herbarium, Tucson; and Arizona Native Plant Society, Tucson Chapter*

Catalina Mountains: *A Guide Book with Original Paintings*

by Frank Rose, 2019. 89 pages.

ISBN: 978-1-7325402-3-1. \$19.95. Hardy Perennial Press, 1645 W Valencia Rd #109-154, Tucson, AZ 85746. Also available at [Amazon.com](https://www.amazon.com).

There must be a lot of people who make trips to the Santa Catalina Mountains because they know they can have a really personal experience with nature there. The feelings we have when we sit under an oak in Molino Basin or walk through the Scouler willows above the ski resort are ours, and sharing them accurately would be hard for most of us, but fortunately not impossible. In *Catalina Mountains* Frank Rose has shared his relationship with the Catalinas clearly and in a way that few others can.

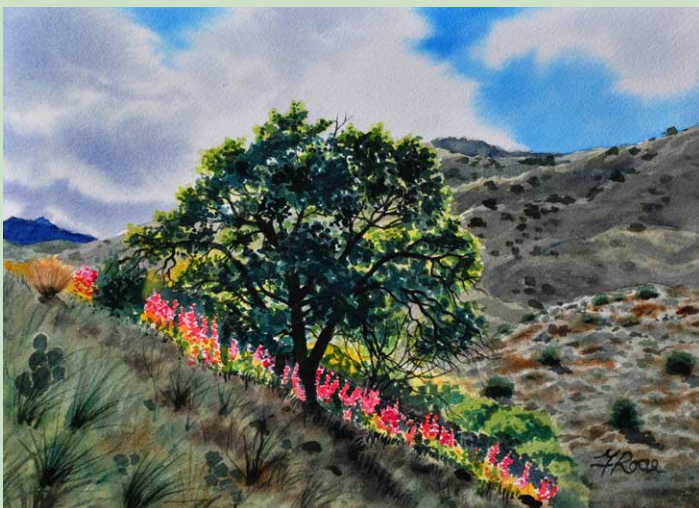
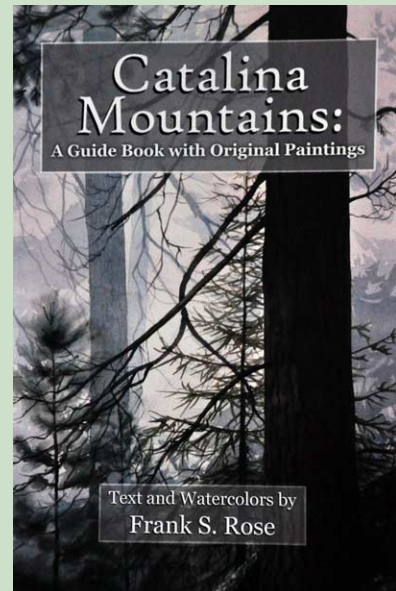
Although this book is only a slice of the complexities that make up the author and the mountains, it is well aimed at the target audience of folks who want a notion of all that is offered. The guide takes us on an imaginary drive with not-so-imaginary stops, and at those stops, we get a short, descriptive word tour and one or more intimate watercolors of things to be seen there.

Catalina Mountains begins with “viewing the mountains from below.” There are several landscapes in this section, and they explain perfectly why the author, an accomplished

photographer and artist, has chosen to illustrate the guide with paintings. In fact, the paintings were photographs first. On page three, a landscape of Cathedral Rock looks like a photo at a glance. If you are a fan of Arizona sunrises, you will recognize all the high-contrast reds and purples immediately. But in the sky above the mountain are clouds that look like drops of dye that have dripped into water. The colors that seem to try so hard to penetrate the shadows in the mountains below are free to bleed into each other in the sky above, making a fine contrast between the firmament above and the not-so-prosaic earth below.

Even for readers who think they know the mountains, the descriptive vignettes of each tour stop along the main route may have surprises, i.e., Incinerator Ridge used to be home to a trash-burning facility and therefore was not named for summer temperatures on the ridge crest. The paintings speak eloquently for each stop. There is a scene with a backlit aspen at Aspen Draw Trail, a flaming red Big Tooth Maple at Bear Wallow, or just an eye-level view of tree trunks at Meadow Trail. After seeing these, it wouldn't surprise anyone if Frank's next book was a collection of Japanese triptychs. There is a fine understanding here of nature as art.

There are twenty-nine stops on the way up the mountain, but being a good botanist, the author knows you see different things on the way back. It's a rule. So there is a downhill tour of ten stops for what you missed on the way up, and it's quite a lot actually. Included here are the “Little Window” in the rock below Windy Point and the views looking down on Molino Basin. And there is that business of simply stopping to look at things from a different perspective.



Penstemons under the oak. *Original painting by Frank Rose.*

continued next page



From left: Claret cup cactus. Top of the world. Original painting by Frank Rose.

BOOK REVIEW **Catalina Mountains** *continued*

As a bonus, each stop is accompanied by a painting of a flower that may be found there. These little flower portraits add a feeling of personal connection between the reader and the place, as though they are shared secrets.

The painting reproductions seem like miniature watercolors and not so much like reproductions. The colors are true and even the paper appears to be a scaled-down watercolor medium. There is something about a well-done painting

that makes it easy for the viewer to become part of the scene. On page ix of the preface, there is a painting of what appears to be an Alligator Juniper. Part of the tree seems to have died and lost its bark, and other parts of the tree still live on. In the sun near the tree are splashes of yellow and red flowers contrasted with a sand-colored soil and grasses. It's quintessential Arizona, and it draws you in. Who wouldn't want that?



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Observations on Plant Life of the Cienega Creek Natural Preserve, Pima County, Arizona

by Julia Fonseca¹

When I began graduate studies at the University of Arizona, the late Dr. Paul Martin invited me to review a manuscript, the now classic “Cienegas—Vanishing Climax Communities of the American Southwest” by Dean Hendrickson and W.L. Minckley. Little did I know that I would be in charge of a former cienega just a few years later.

As the first preserve manager for the Cienega Creek Natural Preserve, I took on an education in the dynamics of water, plants, and politics. The new preserve would be managed for

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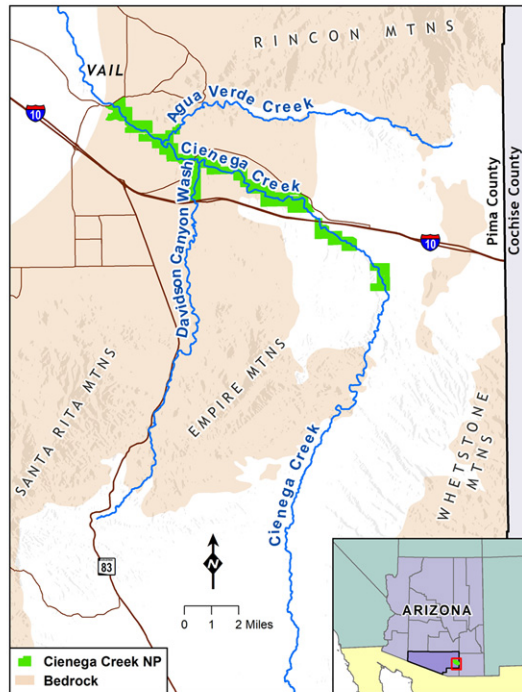


Figure 1. Location map. Map courtesy Julia Fonseca.

livestock grazing at a time when livestock management on public lands was most controversial. (Livestock were removed from most of the Preserve by 1992.)

The Cienega Creek Natural Preserve is a protected area southeast of Tucson, first established by the Pima County Regional Flood Control District in 1986. Over the next decade, the Preserve was expanded via a series of land acquisitions to its present area, including some twelve miles of valley bottom (Figure 1).

I began learning about riparian plants in 1987. I joined the Arizona Native Plant Society and in the years that followed, kept a plant list based on observations by plant experts, and

continued next page



Figure 2. Lower Cienega Valley. To the left are Pleistocene ridges of alluvium and bedrock meeting the railroad. To the right of the railroad is a Holocene terrace of mesquite that was once a floodplain grassland dominated by sacaton, and an incised channel bordered by cottonwoods. Photo courtesy Michael McNulty.



From left: Figure 3. These giant sacaton plants (*Sporobolus wrightii*) were planted in the 1990s from seed collected onsite by Arizona Native Plant Society members. The field was cleared for phreatophyte control back in the 1970s before the Preserve was established. Figure 4. Andesite bedrock contributes to the microsite diversity and harbors some species not found elsewhere in the Preserve. Photos courtesy Julia Fonseca.

Cienega Creek Natural Preserve *continued*

encouraged botanists I knew to attempt a flora or to at least collect something there.

Among other projects for the Flood Control District, I bolstered the legal basis for water rights through historical research that substantiated early ranching claims to water. This research revealed how much the area had changed over the past 150 years and fed my wonder and curiosity about historical ecological change.

Sacaton and cienegas along Cienega Creek were replaced by mesquite bosques (Figure 2). Grasslands once roamed by pronghorns now have characteristic Sonoran desert vegetation, including saguaros and paloverde trees. But streamflow persisted.

After the removal of livestock, I witnessed the growth of new cottonwood-dominated forests and the expansion of riparian wetlands. Today, however, many of the riverine wetlands I once knew have disappeared. Record heat, a drier climate, and reduction of streamflow have motivated my interest for documenting the modern flora of the Preserve. Perhaps closer examination can reveal the outline of a new re-organization under changing conditions (Figure 3).

By 2013, encouraged by tools available through swbiodiversity.org and its SEINet database and the training offered through the Arizona Native Plant Society, I began documenting the flora for the University of Arizona Herbarium as a fun side project, outside my job. The work is not complete, but SEINet hosts a preliminary checklist, the product of hundreds of field-hours by myself and friends. Some preliminary findings follow.

Diversity and Its Drivers

The Cienega Creek Natural Area is rich in plant diversity. Approximately 580 species have been documented within the 4,267-acre Preserve. Readers are invited to review my checklist at swbiodiversity.org. The species richness compares favorably to the San Pedro Riparian National Conservation Area (635 species on approximately 46,950 acres), or the 560 species found in the Sonoita Creek and San Rafael State Natural Areas combined (26,690 acres).

My perception as a non-botanist was that the wetter stream segments would be the principal areas of greatest biodiversity. I soon learned how geography, geology, aspect, shading, and microclimates contribute to diversity of life as much as the variation in water availability.

The dark-brown andesite porphyry (Figure 4) offers one of the most interesting substrates in the Preserve. The andesite tends to erode into landforms that offer sites for a number of species not found elsewhere including *Quercus pungens*, *Myriopteris lindheimeri*, *Abutilon mollicocum*, and *Justicia longii*. These rock outcrops are also important for hosting tinajas, which provide seasonal wildlife waters.

Several taxa in the Preserve flora prefer the dry, exposed Pantano Formation: *Gaura coccinea*, *Verbesina rothrockii*, and *Thelesperma megapotamicum*. So far I have not found *Eriogonum terranatum*, a rare perennial buckwheat in the Preserve despite intensive searches.

The tributaries of the main channel each offer unique species. Agua Verde Wash drains the southern Rincon Mountains and

continued next page



From left: Figure 5. Mexican Passion Flower (*Passiflora mexicana*). Photo courtesy Jillian Cowles.
 Figure 6. Harlequin Spiralseed (*Schistophragma intermedia*). Photo courtesy Julia Fonseca.

Cienega Creek Natural Preserve *continued*

supports species such as *Passiflora mexicana* (Figure 5) and *Oenothera elata* that are either rare or absent elsewhere. Davidson Canyon drains the northern Santa Rita and Empire Mountains and supports several species that are not found elsewhere such as *Schistophragma intermedia* (Figure 6). Anderson Wash originates in the Whetstone Mountains and supports species such as *Baccharis brachyphylla* and *Talinum paniculatum*.

There is a pronounced change in the flora from west to east, from Sonoran desertscrub to semi-desert grassland. For instance, brittlebush (*Encelia farinosa*), sangre de drago (*Jatropha cardiophylla*), foothills paloverde (*Parkinsonia microphylla*), triangle-leaf bursage (*Ambrosia deltoidea*), and saguaro (*Carnegiea gigantea*) are confined to the western half of the Preserve. *Lycium pallidum* is found only in the eastern half of the Preserve. Elevation likely contributes only partially to the changes, as there is less than 900 feet of elevation change in the Preserve.

Non-native Species

In the 1980s, red brome (*Bromus rubens*) was the dominant understory of the mesquite bosques. Today, red brome is no longer a principal cover type, but it is not uncommon in wet winters.

Johnsongrass (*Sorghum halepense*) forms dense, monotypic stands in some open, ephemeral, low-energy floodplains. The extent of cover of this species as well as blue panic grass (*Panicum antidotale*) appears to have increased since the 1990s.

Buffelgrass (*Pennisetum ciliare*) is becoming more prevalent. I see it establishing new locations, particularly along hot, sunny, tributary channel banks and alluvial slopes.

Past management efforts have focused primarily on tamarisk (*Tamarix* sp.) and arundo (*Arundo donax*). In the 1980s, I used to see blankets of tamarisk seedlings each summer and a number of clumps were already maturing along the main channel. I did not see any tamarisk seedlings from 2013 to 2017, but tamarisk seedlings were evident in 2018, perhaps as a result of the August 2017 flood.

Arundo was present in the 1980s at several historically occupied terrace locations, but has evidently expanded along the main channel during the last decade or so. Pima County Regional Flood Control District staff successfully removed several patches located on terraces. At least one offsite source population remains. Still, the influx is low, and periodic removals could conceivably control this species.

Pampas grass (*Cortaderia* sp.) removed by Bill Rick and Dale Turner long ago has not re-established. How could it have even gotten there in the first place? One small patch of *Vinca major* has persisted despite persistent drought and heroic efforts by summer interns and others. It poses little risk given its landscape position.

Wetland Species

Have wetland species of my earlier decades of acquaintance been extirpated? I'm still looking to include *Bidens laevis*, *Hydrocotyle*

continued next page

Chronicling Place-based Plant Diversity

by Julia Fonseca¹

A checklist can be as simple as a set of photographs of identified plants, or as complicated as comparative analyses of plant diversity based on years of collection and specimen preparation.

Why prepare a checklist or flora? It will force you to learn plant identification. You realize how ignorant you are by getting to know the differences that matter. Why learn plant identification? What at first seems like a just a few plants, over time becomes much more complex, a symphony of change over time and space. One begins a new comprehension of diversity by knowing the elements of diversity. Slowly, the delicate adjustment of organisms to place emerges out of a muddle. Close and careful study of plants and their situations is rewarding. Plants have stories to tell. Without knowing the differences among plants, you can't read the stories.

SEINet (swbiodiversity.org) and the related help pages at Symbiota.org make it easy to organize your photos and related information. SEINet offers wonderfully helpful imagery and can generate a checklist of plants for your area that are based on nearby herbarium specimens. You can even do this while you are in the field, if you have a phone connection.

A few tips for those who want to get started

Consider volunteering at your local herbarium, where you can learn the art of making a good-looking specimen and meet the

people who can help you get started. Mounting plant specimens will make you a better plant collector. You will have a better understanding of how much material to collect and how better to arrange it when pressing.

Peruse the pressed specimens, especially ones that have been annotated by experts. Despite the wonderful collection of photographs on SEINet, some of the photos may be incorrectly identified, or simply do not reveal the important characters of the plant that are needed for accurate identification. Seeing old specimens can also help connect you very personally with plant heroes from the past.

Don't put off learning to use a published key and learning some of the words used for naming plant parts. Keys tell you what characters are needed to discriminate between similar plant taxa. Use multiple keys; some are better for one set of plants, or for one region, than others.

The process of compiling a flora for an area can be personally rewarding and contribute to helping others understand plants.

Contact information for some Arizona herbaria:

Arizona State University Vascular Plant Herbarium:
elizabeth.makings@asu.edu

Desert Botanical Garden Herbarium: asalywon@dbg.org

Deaver Herbarium, Northern Arizona University:
deaver.herbarium@nau.edu

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Cienega Creek Natural Preserve *continued*

ranunculoides, *Lilaeopsis schaffneriana* subsp. *recurva*, and *Aquilegia chrysantha* to the current flora. Please let me know if you do see wetland plants that are not on the checklist, or post your photographic observations to SEINet.

Future Work

This spring promises to be the best since I began, so I hope to collect more specimens. I am still completing and correcting identifications. You can help review the checklist and specimens for errors. I will describe the distribution of plants in relation to land-use history, geomorphology, and changes in water

availability. Future analyses will compare the historic and modern floras, and floristic affinities.

Acknowledgments

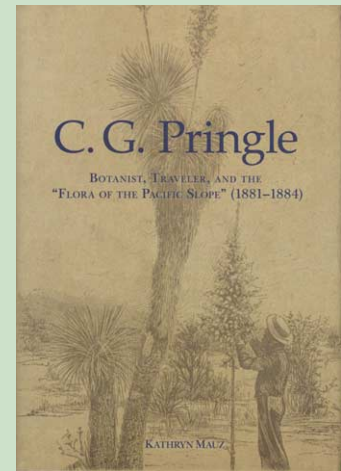
A huge thanks to Dale Turner, David Bertelsen, Jillian Cowles, my fellow plant lovers, University of Arizona Herbarium staff and volunteers, and ASU curator Elizabeth Makings. Permission to collect plants was provided under a permit provided by Pima County Natural Resources, Parks and Recreation.



BOOK REVIEW *George Ferguson, University of Arizona Herbarium, Tucson; and Arizona Native Plant Society, Tucson Chapter*

C.G. Pringle: *Botanist, Traveler, and the “Flora of the Pacific Slope,” (1881–1884)* by Kathryn Mauz

2018. xxii, 737 pages, 67 figures, 14 maps. *Memoirs of The New York Botanical Garden, Volume 120, Heritage Series, No. 3.* The New York Botanical Garden Press. ISBN 978-0-89327-556-3 (hardback) \$129.99



Not surprisingly, Cyrus Guernsey Pringle (1838-1911) — botanist and horticulturalist from Charlotte, Vermont — needs no introduction for most subscribers to *The Plant Press*. He was a traveler, as the book title asserts, and among the most prolific collectors of botanical specimens, distributing to various herbaria some 500,000 sheets of about 20,000 species; his own herbarium of about 100,000 specimens he donated to the University of Vermont. Accordingly, that institution houses Cyrus Pringle Collections Notebooks (1885–1909), handwritten field notes, cursory perhaps for his own use, recently accessible online: <https://scholarworks.uvm.edu>.

What readers may find surprising is that although his botanical work cataloging the plants of Mexico is well known (spanning 26 years, from 1885 onward, see *Life and Work of Cyrus Guernsey Pringle* by Helen Burns published in 1936), as well as his previous significant horticultural work at the family farm in Vermont, Pringle's early work as a field botanist was not. As author Kathryn Mauz puts it, “The botany of wild plants was a new branch of knowledge and experience that had slowly grafted to Pringle's rootstock, horticulture...” (p. 9). Ostensibly, nothing had been assembled regarding his budding field-botanist work (1881–1884) other than his catalog of early herbarium collections themselves with relatively complete label information for that era. No known diary exists from those years.

Quoted passages in this book review were reproduced with permission of the publisher from: Kathryn Mauz, *C.G. Pringle: Botanist, Traveler, and the “Flora of the Pacific Slope” (1881–1884)* (Memoirs of The New York Botanical Garden, Volume 120, Heritage Series, Number 3, © 2018 The New York Botanical Garden, Bronx, New York. Cover image of soaptree yucca courtesy of the Library of the Arnold Arboretum of Harvard University, Boston, Mass.

From this starting point in 1881, the author provides a cogent perspective and brings to life the personalities and Pringle's own sensibilities, which shaped his work. Pringle at age 43 was already collecting trees in Vermont and other eastern states for Charles Sprague Sargent (1841–1927) for the census of American forests. The previous year, Sargent and George Engelmann (1809–1884) had spent four months doing field work for the “Pacific Slope” survey commissioned for the forest census. Now Sargent (later known for his monumental two-volume *Manual of the Trees of North America*) had a new direction for Pringle: to finish the collection of tree and wood samples (now located in the Jessup Collection of North American Woods at the American Museum of Natural History) where they had left off in Arizona, California, Oregon, and Washington.

The author delves into every aspect of those travels in enormous detail and impressive precision. I imagine she came to know him well, finding the details in a wealth of correspondence to and from his friends and colleagues, some who were luminaries in American botany at the time. Throughout the book, she simply refers to him as Pringle. “Pringle's western fieldwork spanned thousands of miles along trails and wagon roads, stage routes, rivers, and railroads, across four field seasons that encompassed portions of two Mexican states and four U.S. states and territories” (p. xxii). As Pringle arrived in Tucson, Arizona Territory, on 5 April 1881 by train, we learn that the transcontinental route connecting the Santa Fe and Southern Pacific Railroads had just been completed, the day after he left Vermont!

Eloquently, the author weaves an intricate illustration of anecdotes of Pringle's movements from the chronology of his labeled specimens, moreover investigating museum receipts, relevant newspaper articles, and others' published observations during those times, as well as finding pertinent

continued next page

BOOK REVIEW

photographs of the era. For example this vignette: “He was on his way from Arizona to San Francisco...moving on to the ‘great metropolis’ as Sargent expected him to, Pringle likely took the local train ... to Los Angeles, from which the Southern Pacific’s express left for San Francisco at 5:15 p.m. each day. In doing so, he would have seen a nearly full moon rising at dusk over the western Mojave Desert, descended through the Tehachapi Loop in the dark, and passed much of the San Joaquin Valley overnight.” (p. 69). For Scarlett T. Townsend’s delightful review of Mauz’s book, see <https://www.nybgpress.org/Promotions/Reviews/huntia.pdf>.

How does one find a connection to Pringle? I first met Pringle through John Reeder, a retired agronomist then at the University of Arizona Herbarium (ARIZ), one of many institutions fortunate to house Pringle specimens; nearly 900 are at ARIZ, some 60 of which are type specimens and 40 from Pringle’s early collections. Dr. Reeder made a point to impress upon me the invariable completeness of Pringle’s specimens — all relevant plant parts present, especially true in the grass sheets he was studying. Pringle’s thoroughness soon became apparent to me, in the conifers, always replete with seed and pollen cones! Lunch and tea (and a cookie — “take two”) were required rituals on any weekend you were at the herbarium with John and Charlotte Reeder, and Kathryn Mauz was often present there, among others. For her doctorate, she was studying historic occurrences of riparian plants along the Santa Cruz River near Tucson, where Pringle had collected. Her thesis and her subsequent publication (see *An Agreeable Landscape...* Sida Bot. Misc. 35) highlighted these important collections from the past century, and thus the seeds were planted for Kathryn’s journey to document Pringle’s early botanical fieldwork.

How will you make a connection with Pringle? Perhaps it is in the summit register “Mt. Shasta Aug. 30, 1882 — C.G. Pringle, A.M. Charlotte, Vermont — Collector Am. Mus. Nat. History, New York.” (p. 182). Or the beach stage and steamer at Coos Bay, Oregon, to collect “the sought after specimen of Port Orford Cedar.” (p.100). Maybe it is Cypress Point, California, where the same gnarled Monterey Cypress tree stands today “on the 18-mile loop from



Figure 1: “A specimen of Pringle’s lipfern with a photograph taken by Pringle of the original collection locality in the Tucson Mountains, about March 1884.” (p. 223). Courtesy of The C. V. Starr Virtual Herbarium, The New York Botanical Garden, Bronx, NY.

Monterey” (p. 166). Or the Torrey Pines where colleague Charles Parry (1823–1890) in San Diego (who discovered and described the trees during the Boundary Survey) encouraged him — “can be reached on the cars only 10 miles from here within the town limits” (p.126). Or the wagon road to “dry rocky hills near Wickenburg” (p. 156) where he found *Canotia*. Or maybe a trek from the Maricopa train station to the Sierra Estrella as “kind Dr. Parry advised me to operate in the vicinity of Maricopa he directed me to a shrub found by him and Parish last December on the rocky hills near that place. He thought it might be an undescribed species of *Bursera*.” (p. 157). Or the photograph he labeled “C. Pringlei Home,” type locality for Pringle’s lipfern, “Base of rocks in the Sierra Tucson” (p. 220) on the north side of Cat Mountain, one of the first new species he discovered (Figure 1). Or the “hills and mesas south of the Altar River” (p. 459) on his first venture into Sonora where he discovered growing among three other known columnar cacti an even larger one, a new species *Pachycereus pringlei* that you might relate to.

For me it is Pringle’s favorite collecting area, which he called in one of his letters “my dear Santa Rita Mts.” (p. 274). Engelmann and Sargent visited Sawmill Canyon there a year prior during the forest census work, in hopes of seeing Arizona pine in the field and verifying it as different from ponderosa pine. But they failed to locate the trees. It had been a lingering question for Engelmann ever since he named and described the species three years earlier from a type collection Rothrock (1839–1922) made near there. Mauz relates that “Pringle made observations for

continued next page



Figure 2: "Pringle in self-portrait with his wagon. 1884." "Left in the Desert." (P. 319). Courtesy of the Archives of the Gray Herbarium, Harvard University, Cambridge, Mass.

BOOK REVIEW **C.G. Pringle** *continued*

Engelmann about the distributions of the pines he had been sent to investigate," successfully obtaining, as he replied to Engelmann—"flowering specimens with cones... I suppose to be *Pinus arizonica*" (p. 42). Engelmann's response to Sargent was enthusiastic — "but here comes Pringle and sends lots! ... He took a little more than 5 minutes and found forests, forests of *arizonica*... Yes we might sometimes have saved a good deal of time and worry to have taken a little more than five minutes." (p. 42). Mauz explains Engelmann's jovial humor as the reader imagines the exacting Sargent calling "Five minutes!" to hurry the collectors along.

Here is a challenge to make a connection with Pringle—and I am certain the author would agree and would have done so herself — find the location of a Pringle photograph. I tried it with the one he entitled "'Left in the Desert': a self-portrait of himself sitting on a water barrel, surrounded by plant presses, with his covered wagon [which he referred to as 'my home on wheels'] in the background amidst a broad grassy plain." (p. 319, Figure 2). Having read the itinerary Mauz sequenced into the pages of her book, and from my discussions with plant ecologist Ray Turner some years ago, I realized that Avra Valley once supported a grassland, so I put two and two together. It took an hour of driving around to find the spot! I will not tell you exactly where, only this clue: between 6 and 7 miles west from "*C. pringlei* Home," so you can have the fun of finding it yourself. I can say, now, it is incorrect to assume, as the author has, "He and his

wagon are facing south." Just one other discrepancy I found in the book— in Pringle's photograph of a fishhook barrel cactus, locality also unknown, the author states "the presence of flower buds suggests a timeframe of late April to early May." (p. 266). Rather, Pringle's trip to Rillito Valley or through Avra Valley on his way to Sonora in early August is the time and place.

If you enjoy reading historic accounts, and especially the history of botanical exploration of the West, you will find this book remarkable. The author joins the ranks of scholarly historians with her thorough research and documentation in this tribute, comprising 289 pages of storyline, accompanied by 74 pages of detailed footnotes. An atlas of 14 fascinating historic maps — five are of Arizona — outline the routes traveled and points where collections were made. Rounding out the nearly 2 inch thick tome, weighing 4-¾ pounds on our mailroom scale, is a list of all the reference resources used, plus literature cited and 36 pages of index (actually two — one of people and place names, and another of scientific names and specimen label names). Geographically and taxonomically arranged lists of plant species collected by Pringle for his distributions during 1881–1884 and localities are included in 258 pages of appendices. The author reflects on what botanists of the era recognized as Pringle's "persistence and determination," which make his work indispensable (p. 318). It could similarly be said of Kathryn Mauz.



Save the Date: Botany Meeting 2019

Arizona Native Plant Society's 16th Annual Meeting

Exploring the Botanical Diversity, Ecology, and History of Arizona's Native Flora

31 August — 1 September 2019 at Eastern Arizona College
Gherald L. Hoopes, Jr. Activities Center, 615 Stadium Avenue, Thatcher, Arizona
Visit aznativeplantsociety.org for details and to register!

SPOTLIGHT ON A NATIVE PLANT *Bob Herrmann Arizona Native Plant Society, Cochise Chapter*

White Spine Pineapple Cactus, White Fish-hook Cactus (*Echinomastus intertextus*) (Engelm.) Britt. & Rose

Most species of cacti in southeastern Arizona bloom before the monsoons. The White Spine Pineapple cactus blooms in late February to early March, signaling the beginning of the long-awaited cacti blooming season. One species that responds to the monsoons is the Graham Fishhook (*Mammillaria grahamii*). The Compass Barrel (*Ferocactus wislizeni*) blooming in September signals the end of the cacti blooming season.

Although the White Spine Pineapple cacti can be found in small clumps, most are single globular cacti 2 to 6 inches tall. As the cacti age, their ribs begin to spiral, which gives them the appearance of a pineapple. Their 11 to 13 ribs have areoles that support 12 to 16 interwoven radial spines and 1 to 3 central spines. The blooms of the White Spine Pineapple are white to pale pink with light purple to brown mid stripes. They have striking pink stigma lobes surrounded by yellow anthers. These plants grow at 4,000–5,000-feet and are hard to find because they are small and well camouflaged in their surrounding environment.

Photographing bees pollinating these cacti can be challenging. You have to slowly creep up on the cacti because solitary cacti bees are very wary. Once I moved up on one to get some photos and the bees didn't seem to mind. After quickly taking photos I noticed that these bees didn't even move. What I discovered going on in the bloom was an ambush bug euthanizing the bees. The ambush bug patiently waits for a bee to visit the bloom then seizes the moment to grab the bee, injecting a liquid into the bee's abdomen with its proboscis, paralyzing the bee and liquifying its insides which the ambush bug then sucks out.

Most cacti bloom around noon, the hottest and sunniest part of the day. If you are inclined to photograph these beauties, it's good to carry lightweight camera equipment and a heavy amount of water.

The genus *Echinomastus* was described by the American botanists Nathaniel Lord Britton (January 15, 1859 – June 25, 1934) and Joseph Nelson Rose (January 11, 1862 – May 4, 1928) in 1922. The name is derived from the Greek: *echinos*, hedgehog, and *masto*, breast, referring to the spiny tubercles.



Photos courtesy
the author.

BOOK REVIEW *Glenn Rink, Northern Arizona University Herbarium (ASC), and Far Out Botany, Flagstaff*

The Natural History of the San Francisco Peaks: *A Sky Island of the American Southwest*

by Gwendolyn L. Waring, Ph.D. *Images courtesy the author.*

\$35. Available from its own website, <http://sanfranciscopeaksnaturalhistory.com/>

Not often can we fulfill our voyeuristic impulses and peek into the heart of another person's love affair. But that is what we are doing in reading and studying Gwen Waring's *The Natural History of the San Francisco Peaks*. This work is a lovely and intimate glimpse into Gwen Waring's heart and soul. Clearly, Gwen is deeply in love with her subject matter. And how can one express that love, except through experiencing the subject in its every mood of weather and scale, which is what Gwen has done? But she has taken it a step further, by exhaustively studying the literature, and then gushing for our benefit, a detailed review of what is presently known about the San Francisco Peaks.

Who has lived in or visited northern Arizona and not been drawn to the Peaks? How do we go about loving this symbol of our region? As the highest elevation point in Arizona (12,635 feet), Humphreys Peak has drawn many visitors who struggle, or run (!), to its summit. Many more are drawn to it as a ski hill. Fewer have explored its many moods and delved into its subtleties and nuances. View the summer solstice sunrise from the top of Core Ridge, when the rising sun aligns with Core Ridge, Sugarloaf Mountain, and O'Leary Peak, let yourself be enthralled by its dense forests of aspen, climb its high slopes in search of elusive deer and elk, study its unique plant communities, and you begin to understand Gwen's love affair.

Gwen has lavished many days reveling in the beauty of the Peaks, enjoying both its grand scale and its most special intimate treasures. She has played in the snow in the winter, hiked its canyons and ridges; her enthusiasm bubbles over on every page.

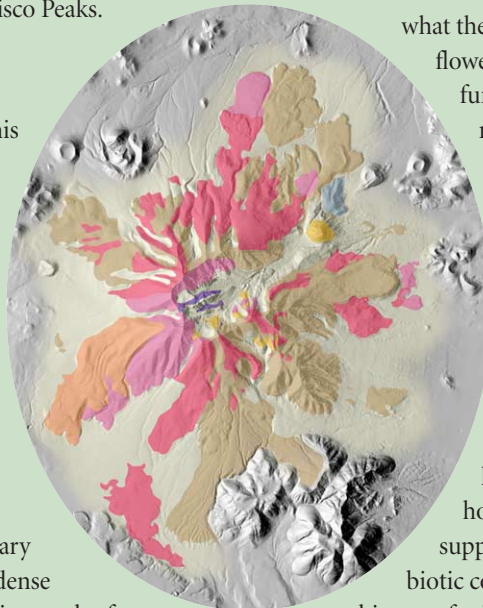
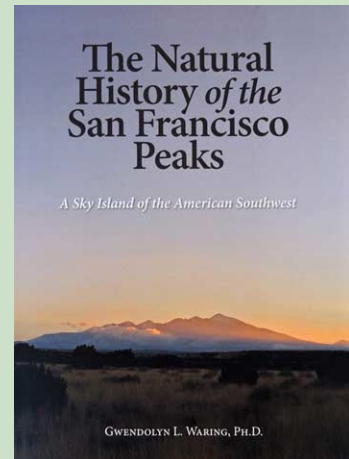
Gwen takes us on a journey from the mountain's inception as a hiccup in the earth's crust to its development as the last stand for high elevation species found at the southern end of their present range, as well as the northern point where

many other species reach the limit of their ranges. She goes on to discuss the Peak's unique potential role in both species' survival and demise during climate changes of the future.

Inbetween, she gives us the history of how the biotic communities have developed on the Peaks over time, how those communities are composed now, and also what the future may hold. Gwen considers flowering plants and conifers, cryptogams, fungi, invertebrates, birds, and mammals. And she has described the Peak's unique and interesting climate, including temperature and precipitation patterns along altitude and aspect gradients. She tells us about the "sweet spot" on the San Francisco Peaks, which holds the greatest diversity of biota. She covers drainage patterns and hydrologic aspects. She discusses the history of human use of the area, and how historical grazing and fire suppression have modified the natural biotic communities. Along the way, we get a history of scientific investigation on the Peaks. And Gwen relays the history of modern human communities development on the Peaks, including the Snowbowl and the Vulcan Mine.

Inside, you will find the answer to how a mountain in Arizona came to have the same name as a city in California. You'll learn that while most of the water that arrives on the Peaks moves north into the Colorado River in Grand Canyon, a small area on the Peaks holds the headwaters of the Verde River.

continued next page



Inset: Major Lava Flows on the San Francisco Peaks.



Primulus parryi in Snowslide Canyon.

BOOK REVIEW *continued*

This natural history has a 16-page center section filled with color images of plants, maps, and a snow pack graph. Respectively, 18 and 24 pages of this 205-page work are filled with literature citations and appendices, making this well-cited study an excellent resource for further research. It also has 9 tables and 75 figures to clarify Gwen's many topics of discussion.

In short, this book is one-stop shopping for everything you ever wanted to know about the Peaks.

The Peaks are a significant symbol to all who live in or visit north central Arizona. For those of us who live here, arriving within sight of the Peaks means we are nearing home. For travelers, it means we are arriving at a place of joy and exploration. For the Hopi, it is the "shrine we look to because it is the home of ancient Katsina spirits, emissaries of life."

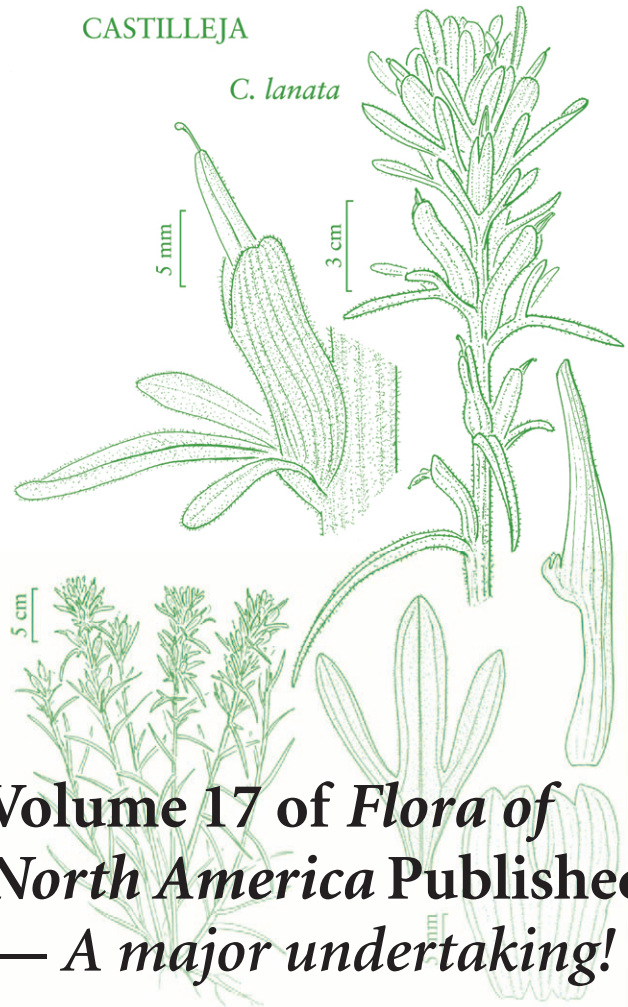
If you haven't spent time on the San Francisco Peaks, this book should draw you in. Take the trail into the Inner Basin through the surreal aspen forest above Lockett Meadow. Climb the Kachina Trail up to the edge of timberline, where you will find expansive views and precious cushion plants. Read Gwen's book. You will be enlightened.

We are lucky that Gwen has chosen to share her intimate love affair with us.



CASTILLEJA

C. lanata



Volume 17 of *Flora of North America* Published — A major undertaking!

The *Flora of North America* (FNA) project recently published Volume 17 which includes treatments of 8 families, 92 genera, and 936 species, including the snapdragon family (Scrophulariaceae), and segregate plantago family (Plantaginaceae, 469 species). FNA has now completed 21 of an anticipated total of 28 volumes — you can learn more about the scope of this major botanical undertaking by visiting FNA's website at: floranorthamerica.org.

The Arizona Native Plant Society sponsored the preparation of an illustration for Volume 17 — *Castilleja lanata* (Orobanchaceae) — the beautiful Woolly Indian Paintbrush that occurs between 2,500 and 7,000 feet elevation on dry slopes, often with granitic or limestone substrates. It occurs throughout the Southwestern United States and Northern Mexico but most commonly in Southern Arizona and New Mexico.

The FNA provided an archive-quality print to the AZNPS of this illustration. Individual sponsorships for new illustrations for the volumes currently in preparation (Numbers 10 and 11) may be purchased at the FNA website: <http://floranorthamerica.org>





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