



KALMIOPSIS

Journal of the Native Plant Society of Oregon



Kalmiopsis leachiana

EDITORIAL

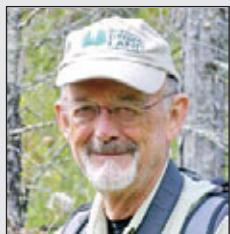
KALMIOPSIS

Journal of the Native Plant Society of Oregon, ©2013



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Thirteen years, fourteen issues; that is the measure of how long I've been editing *Kalmiopsis*. This is longer than I've lived in any given house or worked for any employer. I attribute this longevity to the lack of deadlines and time clocks and the almost total freedom to create a journal that is a showcase for our state and society. Those fourteen issues contained 60 articles, 50 book reviews, and 25 tributes to Fellows, for a total of 536 pages. I estimate about 350,000 words, an accumulation that records the stories of Oregon's botanists, native flora, and plant communities. No one knows how many hours, but who counts the hours for time spent doing what one enjoys? All in all, this editing gig has been quite an education for me. I can't think of a more effective and enjoyable way to make new friends and learn about Oregon plants and related natural history than to edit the journal of the Native Plant Society of Oregon. Now it is time for me to move on, but first I offer thanks to those before me who started the journal and those who worked with me: the editorial board members, the authors who shared their expertise, the reviewers, and the State Boards who supported my work. I especially thank those who will follow me to keep this journal in print, to whom I also offer my files of pending manuscripts, the services of an experienced pagesetter, a reliable printer and mailing service, and the opportunity of a lifetime: editing our fine journal, *Kalmiopsis*. —Cindy Roché, Editor.

This issue is dedicated to Rhoda Love, who retired from the editorial board at the completion of Volume 19, after working untold hours editing the articles that appeared in *Kalmiopsis* since the first issue in 1991. She has also been one of the journal's more prolific authors; she contributed seven articles, most about historical botanists, and three book reviews.



Cover Photo: The Oregon endemic for which our journal is named, *Kalmiopsis leachiana*, photographed by Robert Korfhage in the York Creek Botanical Area in the Kalmiopsis Wilderness on April 16, 2013.

Disclaimer: The opinions expressed by the authors do not necessarily reflect those of the Native Plant Society of Oregon.

The Discovery of Shepherd's Desert Parsley (*Lomatium pastorale*), an Oregon Endemic

David H. Wagner

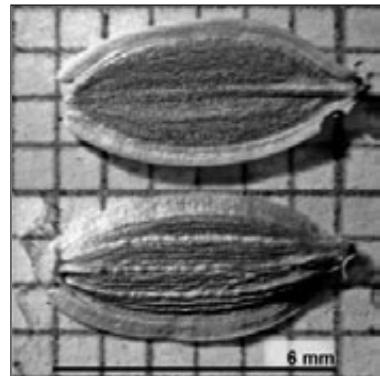
Northwest Botanical Institute, PO Box 40064, Eugene, Oregon 97401

In 1978 I went on a long field trip to northeastern Oregon with an aphidologist, Dave Voegelin. We spent time in the Wallowa Mountains and the Blue Mountains. Our main camp in the Blue Mountains was near some springs on the north slope of Green Mountain. The meadow across the road from our camp was dominated by a *Lomatium* in fruit. It was so abundant that chipmunks or mice had left piles of the empty husks of its mericarps around the ends of logs. Upon returning to Eugene, I found I could not identify it so I sent a specimen to Dr. Lincoln Constance, the guru of *Lomatium* in North America. He replied that he couldn't place it, thought it was new, and sent me a draft Latin description by return mail! He also suggested that I send a duplicate specimen to Mark Schlessman, a graduate student who was working on a taxonomic study of a group of lomatiums that might be related to the one I'd found and see what he thought. Well, he thought my plant was not new but rather a form of *L. leptocarpum*. Lincoln and I decided to shelve the idea of describing it as new, at least for the moment.

A Shepherd's Lomatium?

In July 1980, I returned to the Blue Mountains on a field trip with the Emerald Chapter of the Native Plant Society of Oregon

(NPSO). We camped at the same site on Green Mountain where Dave Voegelin and I had camped two years before. We were joined by several NPSO members from eastern Oregon, including Bob Meinke (now Plant Conservation Biology Program Leader, Oregon Department of Agriculture) and Charlie Johnson (former Umatilla National Forest ecologist, now deceased). In the course of our excursions we found an additional population of the Green Mountain *Lomatium* on Ruckel Ridge and compared it with the other *Lomatium* species in the area. All, including the local experts, agreed that a new species was at hand. In 1983 Lincoln Constance and I reviewed the material in the herbarium at Berkeley. This affirmed our conviction that this plant should be formally described as a new species. I chose the specific epithet



Mericarps of shepherd's desert parsley. Ventral view, top; dorsal view, below. Photo by David Wagner.



By 1907 the mountains of northeastern Oregon had been subjected to over 20 years of heavy grazing, creating large areas where the native vegetation had been "tramped out." The foreground was described as low weedy cover surrounded by bare soil and "erosion pavement," a range management term for rocks remaining after the soil had been eroded away (Skovlin *et al.* 2001). Photo by Arthur W. Sampson in 1907; courtesy of the USDA Forest Service Pacific Northwest Experiment Station Starkey Experimental Forest and Range, LaGrande.

pastoralis to reflect the historic sheep grazing at the original locality. The abundance of the desert parsley was probably the result of the severe former disturbance to its habitat. Charlie Johnson had pointed out that the dearth of grasses in the Green Mountain meadow was a consequence of proximity to the waterhole and previous use as a sheep bedding area when numerous bands¹ of sheep grazed along the spine of the Blue Mountains. Even though 80 years had passed since the heaviest grazing had ended, grasses had still not returned to the density found in other meadows. Historic trampling and compaction that removed essentially all the native grass cover may be the reason that shepherd's desert parsley could maintain its amazing abundance (estimated over 10,000 plants) at the Green Mountain site.

Despite our conviction that we had a good species, Lincoln and I continued to hesitate on publication because Mark Schlessman maintained a different view. There seemed no reason to rush into print. More sites could be explored to determine the extent of its populations. The several populations that I had found after the initial discovery appeared to me to be stable and secure. By this time, I had become immersed in studying liverworts and the *Lomatium* manuscript languished in a file. Lincoln Constance had plenty of other things to do to keep him busy and did not push me. Starting up a private consulting business focused on bryophytes in 1993 kept my attention away from *Lomatium* until 2006, when Jimmy Kagan (Director of the Oregon Biodiversity Information Center) urged me to move on formalizing the name. In the meanwhile, Mark Schlessman's interest in the plants had waned. Botanists in eastern Oregon had found the plant in several new sites and were anxious to have a proper name. Jimmy introduced me to Mark Darrach (Umatilla National Forest, Pendleton), who offered to co-author the paper. I accepted with alacrity. We began work on the manuscript together in 2010 and by 2011 published the new species as *Lomatium pastoralis*², 34 years after

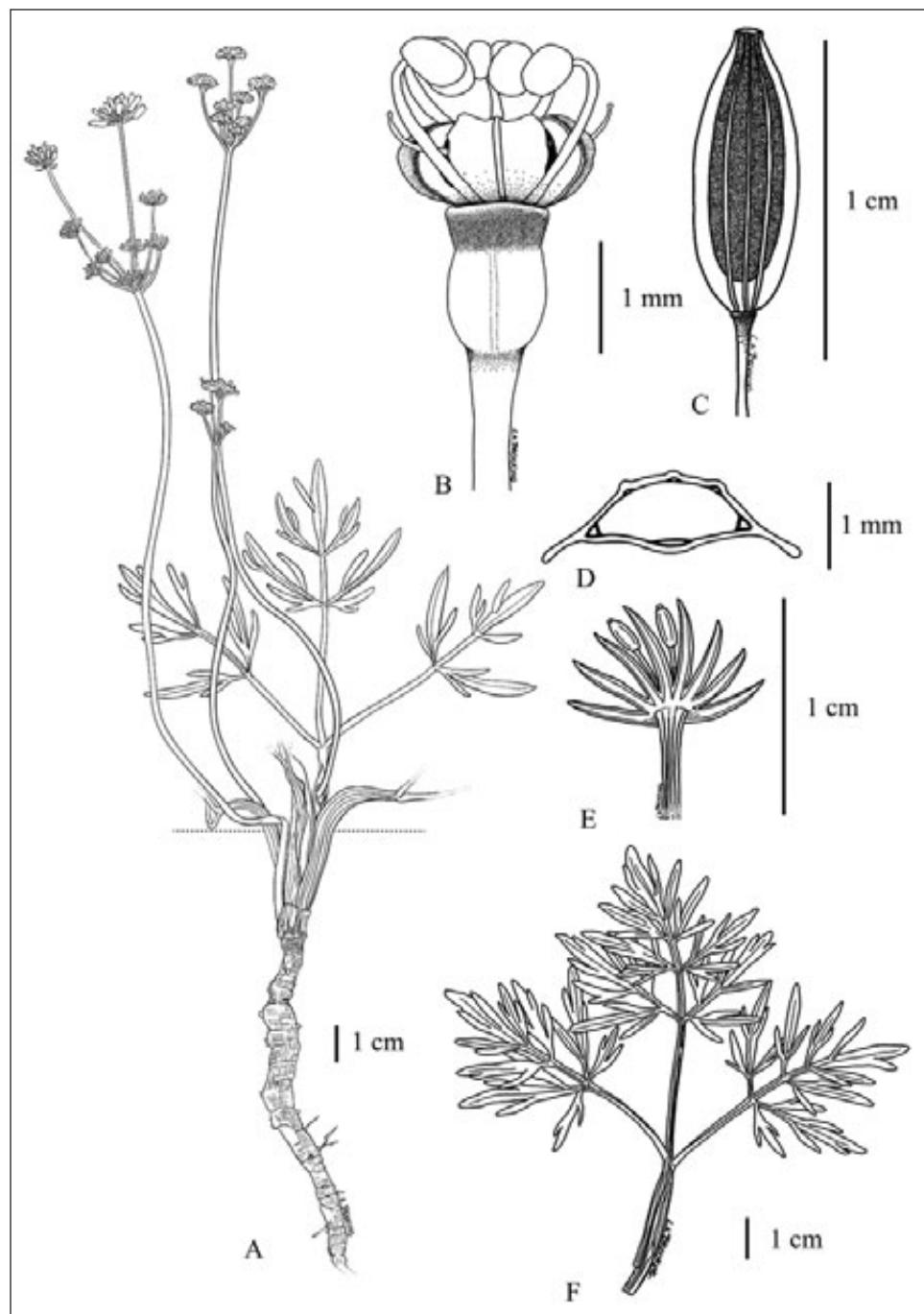


Illustration of *Lomatium pastoralis*, drawn by Linda Brooking from Mark Darrach collection #429 on 15 June 2009. A. habit with dashed line representing typical location of ground surface; B. perfect flower at anthesis; C. mature fruit; D. mature fruit transection depicting vittae; E. involucel; F. typical leaf morphology. Reprinted from the Journal of Botanical Research Institute of Texas (5:429), by permission from Barney Lipscomb.

I first recognized the plant (Darrach and Wagner 2011). The new species, *Lomatium pastoralis* D.H. Wagner ex M.E. Darrach & D.H. Wagner, has been added to the Oregon Flora Project checklist (Cook and Sundberg 2011).

Distribution

Shepherd's desert parsley is a narrow endemic found only on the Umatilla and Wallowa-Whitman National Forests in Umatilla County of northeastern Oregon (see map). The original collection

1 Under the Forest Service permit system, a band comprises 1,000 ewes.

2 The International Code of Nomenclature for Algae, Fungi and Plants requires that the gender of specific epithet match the genus, so the proper Latin termination is *pastorale*.



Developing fruit and asymmetrical (dimidiate) involucel of shepherd's desert parsley. Photo by Mark Darrach, taken at the type locality in Umatilla County, 15 June 2010.

in June 1978 was from shallow, rocky soils at 1,555 m on a gentle south-facing slope on the north ridge of Green Mountain in Umatilla County on the Umatilla National Forest. Experienced field botanists on the Umatilla and Wallowa-Whitman National Forests conducted numerous surveys in the general area during the last three decades. Two populations recently studied by Forest Service botanists are confined to small areas within several square kilometers.

What Differentiates Shepherd's Desert Parsley?

Shepherd's desert parsley is most easily distinguished from other members of the genus by relatively broad simple leaflets, narrowly elliptical fruits on short (but easily observed) pedicels, a strongly dimidiate involucel (the whorl of small bracts immediately below the individual flower clusters is asymmetrical), and peduncles that remain strongly decumbent at the base but with ascending middle and upper segments.

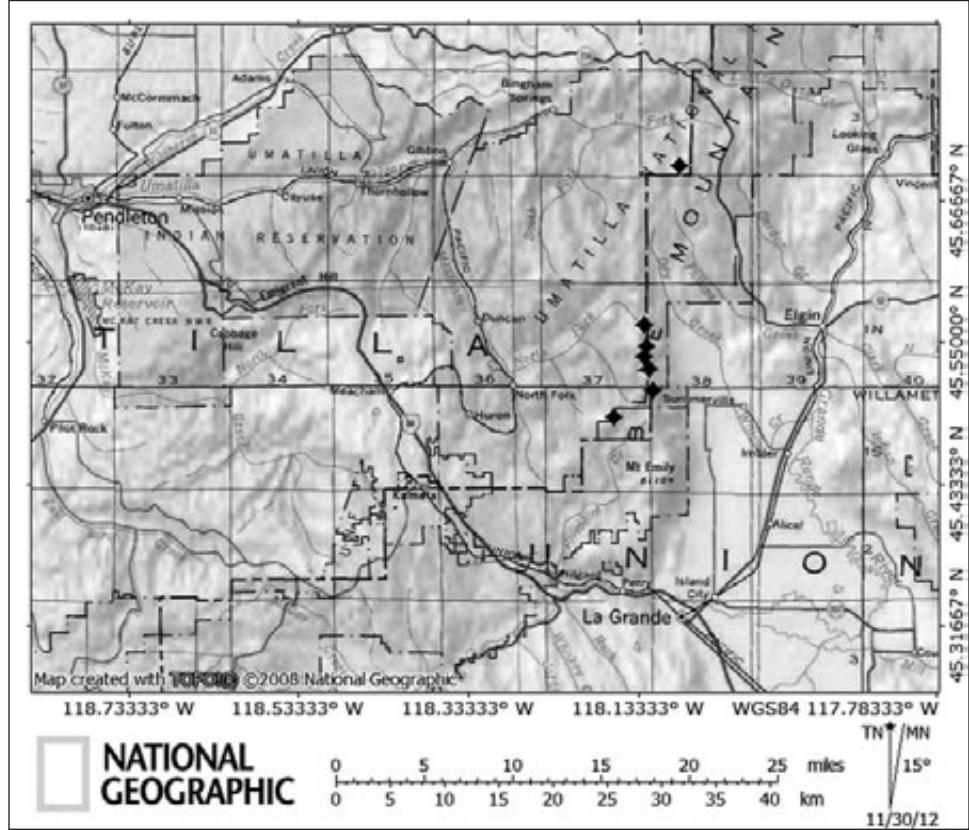
The two species with which *Lomatium pastorale* is most likely to be confused are *L. ambiguum* and *L. leptocarpum*, which are occasional to frequent associates. *Lomatium leptocarpum* differs in having nearly sessile, narrowly oblong fruits, a usually

well-developed radial involucel, narrow and more numerous leaflets, and peduncles which are only rarely strongly decumbent at the base. *Lomatium ambiguum* is found only infrequently scattered within the known *L. pastorale* populations, being more abundant on adjacent slightly steeper scabland slopes with better drainage. *Lomatium ambiguum* has long pedicels with upright fruits, lacks an involucel entirely, typically includes at least one cauline leaf on mature specimens, and the peduncle bases are not decumbent.

Phenology and Ecology

Look for shepherd's desert parsley to emerge in late April or early May. Its bright yellow flowers appear about a month later, with flowering peaking the last week of May through the first week of June. By the end of June, the mature fruits are dehiscing, and

the plants are senescing so that by mid-July only remnant dry leaves and stems remain around the root crown. Examinations of annual scars on root crowns indicate that individuals may live more than 60 years.



Map of shepherd's desert parsley locations in northeastern Oregon. Prepared by Cindy Roché using TOPO! software by National Geographic.

This tap-rooted perennial grows exclusively on shallow, poorly-developed soils over Miocene age Columbia River Basalt bedrock in open, vernal moist sites. Although these areas are referred to as scablands, there is typically very little exposed rock. In these lithosols, roots of these plants penetrate the layer of highly fractured basalt. Common associated species include other geophytes (*Allium fibrillum*, *Fritillaria pudica*, *Lomatium nudicaule*, *L. leptocarpum*, *L. grayi*, *L. piperi*, *Triteleia grandiflora*), sparse native bunchgrasses (*Achnatherum lemmontii*, *Danthonia unispicata*, *Poa secunda*, *Pseudoroegneria spicata*), and various forbs (*Achillea millefolium*, *Balsamorhiza hookeri*, *Eriogonum heracleoides*, *Senecio integerrimus*). For a full listing of associated species, refer to Darrach and Wagner (2011).

Conservation

Dense populations grow as the dominant species in early seral sites that are recovering from severe disturbance; in contrast, plants tend to be widely scattered in habitats in later seral stages. In response to periodic disturbance, shepherd's desert parsley populations appear to increase relative to associated grass species. Shepherd's desert parsley was found in greatest abundance in areas that had been nearly completely denuded by destructive grazing practices in the early 20th century that left the sites in a vegetative disclimax condition that persists to the present (Darrach and Wagner 2011). It has also been found growing on fractured basalt bedrock on the excavated floor of an inactive crushed rock quarry. These factors led me (and my colleagues in the field) to surmise that it is an early seral species that relies on a persistent disturbance regime to maintain population levels. Thus, this rare species might require grazing management as a conservation practice. Other forms of disturbance that may favor its survival are pocket gophers (*Thomomys talpoides*), herds of large ungulates, off-road vehicles and fire control activities.



Shepherd's desert parsley in full flower on 31 May 2010. Note the decumbent peduncles. Photo by Mark Darrach.



Arthur Sampson's photo of a sheep camp and bed ground in 1907 near Standley Spring in the Wallowa Mountains shows the band of about 1,200 wethers that grazed the surrounding range all summer. Close herding and night corraling were done for protection from predators, which were still numerous. Reprinted from Skovlin et al. 2001, courtesy of the USDA Forest Service Pacific Northwest Experiment Station Starkey Experimental Forest and Range, LaGrande.

Acknowledgements

Martin Vavra, Emeritus Rangeland Scientist, Starkey Ungulate Ecology Team, La Grande, provided the images of sheep on public rangeland, scanned by Brenda Carlson. Joan Frazee, Forest Service botanist, and Mark Darrach, Umatilla National Forest, contributed photographs of the desert parsley. Barney Lipscomb, editor of the Journal of Botanical Research Institute of Texas, sent a high resolution file of the type illustration. Cindy Roché prepared a distribution map.

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David Wagner holding a freshly excavated individual of shepherd's desert parsley; note the lack of tuberous thickening in the roots. Type locality, Umatilla County, Oregon. Photo: self-portrait, 4 June 1979.

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David Wagner was raised by missionary parents in India, attending boarding school in the foothills of the Himalaya Mountains from kindergarten through high school. Early in life he fell in love with mountains and nature. Depending on the season, he collected ferns, beetles, and butterflies, tracked birds and mammals, and chased snakes. After graduating from high school he returned to the USA for college. He received a BA (1968, Biology, Chemistry and Geology) from University of Puget Sound, Tacoma and his MS (1974) and PhD (1976) in Botany from Washington State University in Pullman. From there he moved directly to Eugene, Oregon, where he has lived and worked for over 35 years. He was Director and Curator of the University of Oregon Herbarium 1976 to 1993. Since 1993 he has operated the Northwest Botanical Institute, dedicated to research, education, and public service. He specializes in ferns, mosses and liverworts with a focus on field botany and taxonomy. He has been deeply involved with the Native Plant Society of Oregon, the Eugene Natural History Society and the Mount Pisgah Arboretum. He created the Willamette Valley Nature Calendar for 30 years, with the final edition published for 2012. Among his writings are the treatment of *Polystichum* in *Flora of North America* and the electronic, web-based *Guide to the Liverworts of Oregon*. He now writes a monthly nature column, "It's About Time," for the Eugene Weekly newspaper. His website is fernzenmosses.com.

Identifying *Lomatium pastoralis*

For ease of identification, I inserted *L. pastoralis* into the *Lomatium* key adapted from the Flora of the Pacific Northwest (Hitchcock and Cronquist 1973). Only relevant leads are shown.

- 1a Ultimate segments of leaves large, many or all at least 1 cm long
- 2a Ultimate segments wide, leaflets mostly > 5 mm wide
 - other species (including *L. martindalei*, *L. triternatum* and *L. nudicaule*)
- 2b Ultimate segments narrow, leaflets mostly < 5 mm wide
 - 6a Fruit linear to narrowly oblong, mostly > 3 times longer than wide
 - 7a Involucel absent; pedicels long, 4-13 mm
 - other species (*L. ambiguum* and *L. idahoense*)
 - 7b Involucel present; pedicels short or long
 - 9a Larger leaf segments mostly > 2 mm wide; mature pedicels 2-12 mm
 - 10a Stem puberulous; peduncles erect from base
 - L. triternatum*
 - 10b Stem glabrous; peduncle decumbent at base
 - L. pastoralis*
 - 9b Larger leaflets mostly 1-2 mm wide; mature pedicels 0.5-3 mm
 - other species (*L. orogenioides* and *L. leptocarpum*)
 - 6b Fruit broad, mostly > 4 mm wide or less than 2.5 times longer than wide
 - other species
 - 1b Ultimate segments of leaves relatively small, rarely any as much as 1 cm long
 - other species



Botanizers in the Land of Conifers: Oliver Matthews, Al Hobart, Eugene Parker

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In the 19th century, both men and women took up botany as a popular avocation for the betterment of their minds, souls, and social lives (Keeney 1992). A number of men and women, some still living and others now dead, have played similar roles in Oregon botany, carrying the amateur scientist tradition well into the 20th century. The self-described botanical tramp Oliver Matthews had two friends in southwestern Oregon who shared his passion for botany and Oregon trees: Eugene Parker, who ran a cleaning business, and Al Hobart, who was an Agricultural Inspector at the California-Oregon “bug” station. These three men bonded over their interest in trees and the flora of southwestern Oregon and each played a role, as enthusiastic self-taught botanists, in bringing our flora to the attention of a wider audience.

Oliver Vincent Matthews (1892-1979)

GREETINGS!!!!!!!!!!!!!!
So began many of the letters that Oliver Matthews enthusiastically pounded out on a manual typewriter.

Oliver Matthews was a classic 19th Century botanizer who was fanatically devoted to the study of Oregon's trees. A self-taught dendrologist, he described himself as a “botanical tramp” and spent much of his free time driving around Oregon in his Model A Ford (Old Henry) in search of the state's biggest and best trees. The Forestry Club in the School of Forestry at Oregon State College granted him membership as an Honorary Fernhopper. A tall skinny man with a thin neck, round glasses, a shock of curly white hair and high-laced black shoes, Oliver Matthews was a familiar figure in every corner of Oregon. However, we like to think that southwestern Oregon with its great variety of conifers was his favorite place. This article focuses on his activities there.



Oliver Matthews (age 35) in front of door at Hueneme Beach Location on 31 August 1927. Photo courtesy of the Special Collections & Archives Research Center at Oregon State University.

Salem Roots

Oliver's father, James T. Matthews (1864-1942) was born in Penzance, England, and immigrated to Oregon with his parents in 1872. James was an influential and popular professor of mathematics at Willamette University; he and his wife, Rebecca Grant Matthews had two sons, Oliver and Donald (Lang 2009). Oliver Vincent Matthews was born on March 24, 1892 in Salem. Oliver graduated from the University in 1913, later receiving teacher training as a post-graduate at Oregon College of Education in Monmouth (now Western Oregon University). He taught grade school students for only a short time before deciding it was not his forte. He had no formal botanical training, but

trees and other woody plants became his life's passion. Oliver's mother often accompanied him on his travels (he referred to her as “Puss” in his field notes) before she died on May 20, 1942. His father lived only two weeks longer.

Oliver Matthews served in the army in Europe during World War I and then worked as an extra in the silent film industry in Hollywood in the 1920s. He became a carpenter and collected wood as a hobby. In 1928 he returned to Oregon, settling in Salem, where he worked seasonally in a cannery and as a carpenter. Comments in his letters like “my Beet job ended on Friday, September --th” and “Pumpkins are to start the 14th of October” refer to his work in the cannery. He would register at the cannery in June for the season's work; he “thot [sic] maybe that during July (My job probably won't begin till along in August) I would take a few short trips” (letter of June 21, 1957 to Al Hobart). He never married, so seasonal work provided him enough money to live and, more importantly, time to devote to botanical travel in the study of Oregon's trees. His meticulous, typewritten field notes, and letters are remarkable; he often filled these with “HOORAYS and !!!!!!!, and finished with an increasingly large signature as his eyesight failed. He was an accomplished avid photographer of trees



Oliver Matthews next to his home in Salem, Oregon, undated photo, probably in the 1940s. Photo courtesy of the Special Collections & Archives Research Center at Oregon State University.

and landscapes; most of his images were donated to the archives at Oregon State University and are stored, along with 41 numbered scrapbooks and extensive fieldtrip logbooks, in the Valley Library. Scrapbooks contain everything from bills and bus tickets to letters and photographs.

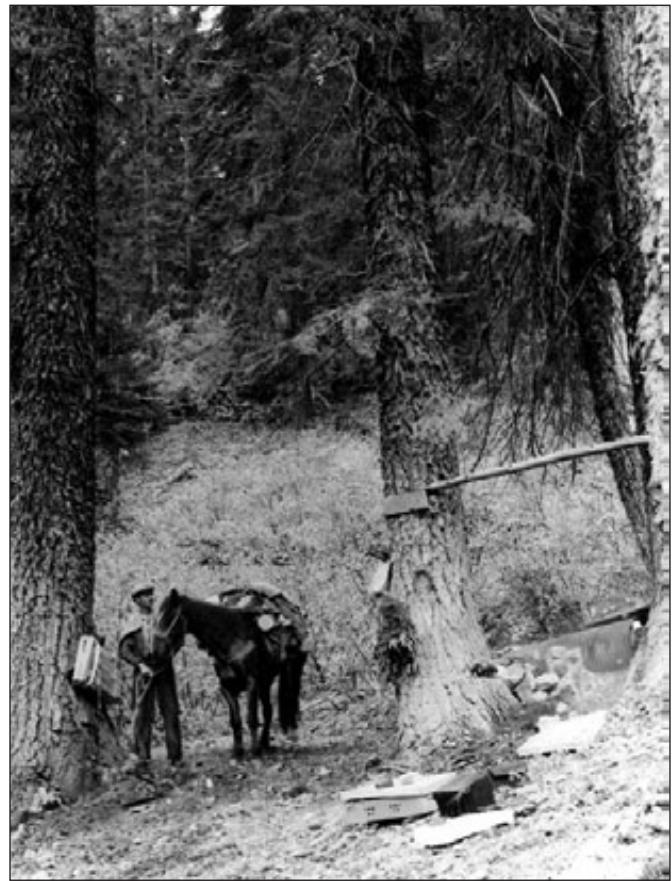
Matthews lived most of his life in the Salem house where he was born, but he never stopped his solitary wanderings, even into his 80s when his eyesight had failed him. During his final years in a retirement home, his crumpled fedora and white cane were frequent sights on Salem buses. In the words of his niece Ruth Tabor, he was “a loveable eccentric, a free spirit before it was fashionable.” This niece also said that although he had prostate cancer for a decade, he “simply died of old age in his sleep” in late March 1979 (Sullivan 1979).

In Pursuit of Oregon Trees

For over forty years, Oliver Matthews scoured the woods of Oregon with ax, camera, and notebook in hand. He needed the notebook to record precisely the location, date, and site conditions for each tree he found; the camera, of course, to record an image; and the ax to “clear an acre or two of forest if need be, so that the favored tree will stand alone in all its glory” (McCulloch 1958). He was taking photos for a book he planned to write on Oregon trees, “*Roughings Out*.” Unfortunately, he never published his book. But in his relentless search for information, he put 225,000 miles on one motor in a second-hand 1929 Model A Ford that he bought in Los Angeles in 1930, added 23,000 miles on a second engine until the odometer broke, and then tallied many thousand miles more until 1953 when

the body of Old Henry finally gave out (McCulloch 1958). After Old Henry, Matthews never had another car of his own and had to depend on public transportation or friends and relatives to give him rides, which severely limited his travels.

Matthews had “ABSOLUTELY no use for the little colored slide.” He bought a Karl Zeiss camera, set it at F:32, used an exposure meter, a sturdy tripod, and took at least four exposures of each subject. Sometimes more. “Film is cheap. What are a few dimes. You have traveled hundreds of miles, Flat tires, run out of money, heat and cold. What is a dime. PHOOEY” (letter to Frank Sesock (Callahan) dated August 11, 1974). Actually, film for that particular camera was not cheap; Matthews invested a great deal of money to capture in excess of 7,500 black and white pictures that, along with the camera, he ended up donating to OSU.



Oliver Matthews (age 47) with his pack horse at the Miller Lake campsite on June 5, 1939, which was reached after “a 1.5 hour breath-taking hike up the Miller Lake Trail.” Just out of the picture to the left was a “delightful little spring” among the Sitka alders. The larger trees in the photo he “took to be white firs.”

The Oracle Oak

In Josephine County, a little tree growing along lower Grave Creek at the mouth of Poorman Creek caught the attention of children on their way to school because it was an evergreen broadleaf tree. Fame of the lone tree spread along with the mystery of how it could be native and the only one of its kind in the entire region (Anonymous 1957). In 1945, Matthews collected samples and, using Morton Peck’s *Manual of the Higher Plants of Oregon* (1961), he identified it as oracle oak (*Quercus x morehus*). He shared



Oliver Matthews' image of the "world's largest cypress" that once bore his name, taken from the trail to Miller Lake. Grayback Mountain is in the far background. Photo No. 4-102 65 5, taken July 6, 1941.

specimens with botanists in Salem and Corvallis, who concurred with his diagnosis. At that time, the only other known oracle oaks were in California. Of course, this intrigued Matthews and when he started tracking down leads for it, he found it in Douglas County and in other locations in Josephine County. When he visited Miller Lake with Dr. Albert N. Steward (Curator of the Oregon State College herbarium) in 1956, Oliver took a closer look at a small shrub near the lake that he had always assumed to be Brewer oak. To his surprise, it keyed to oracle oak. Having found so many widespread locations, he was mystified that he had not identified it long before. To his chagrin, he realized that he had seen it in 1931 and failed to identify it.

We now know that the explanation for the distribution of Oracle oak as widely scattered lone trees is that this oak (*Quercus ×morehus* Kellogg) is actually a stable hybrid between California black oak (*Q. kelloggii*) and interior live oak (*Q. wislizeni*). Although the current distribution of *Q. wislizeni* lies to the south of Oregon in California, fossils at the John Day Fossil Beds and Sweet Home fossil site indicate that it once grew in Oregon. *Quercus wislizeni* is one of the few oaks that will hybridize with *Q. kelloggii*. As a stable hybrid, Oracle oak reproduces and sustains itself generation after generation (Baldwin *et al.* 2012, p. 808).

However, it turns out that Matthews was mistaken in his 1956 identification of the scrub oak at Miller Lake. According to Frank Callahan, Matthews was correct in his original thinking that this

tree looked like Brewer oak and was also correct that it was a hybrid, but it is not oracle oak. It resulted instead from a cross between two white oaks: Brewer oak (*Q. garryana* var. *breweri*) and saddler oak (*Q. sadleriana*), a hybrid that is not uncommon where these two oaks grow near each other (Baldwin *et al.* 2012, p. 806).

Baker Cypress

Siskiyou or Matthews cypress (*Cupressus bakeri* ssp. *matthewsii*, now *Hesperocyparis bakeri*) was named by Carl Brandt Wolf (1905-1974) at the Rancho Santa Ana Botanic Garden, Claremont, California (Wolf 1948). Wolf and E. R. Johnson collected the isotypes (which are stored at the Gray Herbarium, Harvard University) above Seiad Creek, Siskiyou County, California, on October 9, 1934. According to Matthews, the Botanic Garden was looking for a cypress to replace Monterey cypress, a coastal species that did poorly when planted in the hot Central Valley of California. At the time, the Baker cypresses in northwest and southeast Siskiyou County were considered the same. But "That Man, Matthews, from far away Oregon showed up with a few pictures of Oregon's cypress trees" and "an intensive study in the nursery brought out ...appreciable differences (between the two populations)." Matthews was elated that Wolf named it in his honor, and even more so when "Prof. Peck, in his 1962 [sic] revised edition of *A Manual of the Higher Plants of Oregon*, comes right out and gives Oregon's tree the common name MATTHEWS CYPRESS" (both quotes are from Matthews' correspondence in the Special Collections & Archives Research Center at Oregon State University).

Matthews widely promoted his namesake tree for cultivation in parks and arboreta. In 1965 he wrote to Al Hobart that his friend A.D. Radebaugh¹ in Dayton, Washington, "may write to you for Preston Peak Matthews Cypress seed. He is the manager of the local City Park, and is having lots of fun building up a little Arboretum in same. After considerable experimentation, etc. he is finally having very good success with the propogation [sic] of the MATTHEWS CYPRESS. He tells me the tree is extremely hardy to cold, and heat, but does not take kindly to transplanting. If your tree looks kind of peekged [sic] give it a shot of Epsom Salts as I told him to do. As the tree grows on rock rich in magnesium. He has had very good luck in giving this old fashioned remedy. Ha, Ha, Ho, Go...HOORAY!!!!!!!!!!!!!!" (OVM letter dated Feb. 21, 1969).

Ken Chambers wrote to Matthews in 1974 confirming that "there are indeed plants of the Matthews Cypress at the Royal Botanic Gardens in Kew, England." Here is a sample of Matthews' enthusiasm: "That, folks, is about the story of how a grandson of our 1872 immigrant family from Penzance, Cornwall, England, with the aid of a few small plants, 'crashed' the Kew Gardens under the guise of *Cupressus bakeri* Jepson ssp. *matthewsii* Wolf. An honor accorded very few individuals. To have had the family name tacked onto any kind of tree, let alone 'crashing' the Kew Gardens, certainly was something for the hatband!"

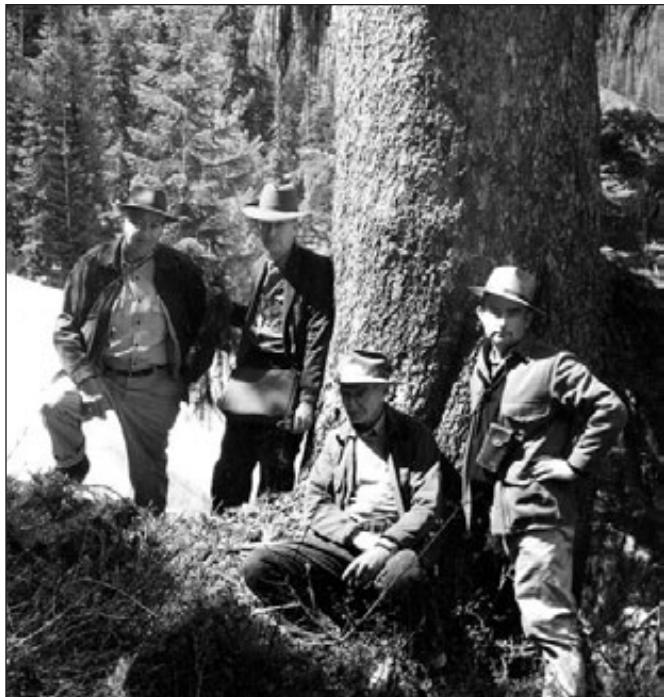
Since then taxonomic revisions eliminated Matthews's subspecies (Eckenwalder 2009, http://www.conifers.org/cu/Cupressus_bakeri.php). Sadly, with changing city priorities, the cypress trees planted in the Dayton City Park arboretum were later cut down to create ball fields.

¹ Director of the Green Giant Company office in Dayton, WA. The same company employed Matthews in Salem, OR.

Weeping Spruce and Gray Pine

In 1941, "Dad had given his son \$100 to use as he saw fit," so Matthews started pursuing his dream of finding as many of the World's Largest Trees as possible for the American Forest's Big Tree List. On July 5, 1941, he documented a weeping (Brewer) spruce (*Picea breweri*) on the north slope of Miller Peak in the Siskiyou Mountains that measured 46.44 inches in diameter. He extolled: "the beauty of the tree was just out of this world."

In 1945, based on information from District Ranger Lee C. Port of the Rogue River National Forest, Matthews documented the first gray pine (*Pinus sabiniana*) in Oregon at Rock Point near Gold Hill in Jackson County (Callahan 2009).



Posing in front of the Miller Lake Brewer spruce on June 4, 1962, from left to right: Lyle Anderson from the Medford Forest Service Office, Dr. Elbert Little, head dendrologist in Washington, DC, Oliver Matthews (age 70, seated) from Salem, Oregon, and Eugene Parker (age 36) from Medford. Photo by Gene Parker.

Engelmann Spruce and Subalpine Fir at Mt. Ashland

Matthews made a number of trips to southern Oregon, including a visit to Mt. Ashland (*a.k.a.* Ashland Peak) in search of subalpine fir and Engelmann spruce. In September and again in October 1937, he took Old Henry (his car) from Salem to Grants Pass, driving "by yourself" (according to his quaint, somewhat peculiar, habit of referring to himself in the second person). On both trips he traveled south through Murphy to Ruch along the Applegate River, then up Beaver Creek Road and along the Siskiyou Crest past Dutchman Peak to Mt. Ashland then down to the City of Ashland. The Civilian Conservation Corps had only recently completed construction of this Beaver Creek-Mt. Ashland Loop Road. On these trips he looked for various trees, including red fir (*Abies magnifica* var. *magnifica*), which he did not find, and Shasta fir (*A. magnifica* var. *shastensis*), which he did find, and from which he collected cones. He also procured wood of curl-leaf mountain mahogany (*Cercocarpus ledifolius*) for a cabinet project, and reported seeing an interesting western white pine (*Pinus monticola*).



Krummholz of subalpine fir (*Abies lasiocarpa*) at Mt. Ashland, July 1958.

When he returned to Ashland in 1958, Matthews was no longer driving, partly because of failing eyesight, but mostly because Old Henry was beyond repair. On his 24-26 July trip to Mount Ashland, LaRea Dennis (Johnston) and her boyfriend accompanied him; she was an MSc student at Oregon State College working with Dr. Albert N. Steward, curator of the herbarium. Her thesis project was the Flora of Mt. Ashland. The objective of the trip was to confirm reports of an alpine fir and an Engelmann spruce near the peak's summit. They spent the night of 25 July with LaRea's parents in Rogue River. The next day the three of them and LaRea's parents headed for Mt. Ashland where Howard Hopkins (USFS) met



Oliver Matthews in the Engelmann spruce (*Picea engelmannii*) stand on Mt. Ashland, September 1958.

them. Matthews received considerable cooperation from USFS personnel, most likely because of their common interest in trees but, perhaps because the Supervisor of the Rogue River National Forest at the time was Carroll E. Brown, known to Matthews as "Cousin Carroll."

Although their search for Engelmann spruce on the summit was unsuccessful, they did find and identify subalpine fir (*Abies lasiocarpa*) which Matthews photographed, and they collected a herbarium voucher specimen (Oregon Flora Project Atlas).

LaRea Dennis had to return to Corvallis on Monday July 28, but Matthews apparently remained in southern Oregon at least through Tuesday July 29, staying at his Cousin Carroll's house in Medford. He traveled by bus to the Ashland Ranger District Office to arrange a trip to the East Fork of Ashland Creek where Willis Lynn Jepson had reported finding Engelmann spruce in 1906 (Jepson 1909). Forest Service personnel advised him that September would be the best time to visit those trees so Matthews decided to return then. On September 24, 1958, he went with Mr. H.A. "Red" Thomas, the Ashland District Ranger,

to examine that stand of trees. Matthews photographed the Engelmann spruce and collected specimens for the herbarium (Oregon Flora Project Atlas). He ended his October 2, 1958 letter to Ranger Thomas with "Thanking You again for a most wonderful and PROFITABLE ride that day."

Matthews' Magic Circle at Miller Lake and the Miller Lake Botanical Area

As a fan of coniferous trees, Oliver Matthews became enthralled with the high country in the Siskiyou Mountains of southern Oregon. He planned for it to be one of the key features of his book on Oregon trees and campaigned vigorously for the designation of a Forest Service Botanical Area at Miller Lake. Here is his description of his Miller Lake Magic Circle: "Starting with Miller Lake itself, as the center, draw a circle, in this case one with a radius of 6 miles, just wide enough to include 'The Big Tree,' the big Douglas fir there at the Oregon Caves Natl. Mnt." What made this area special to him was that, in this small circle, he had found at least half of the 35 conifer species native to Oregon, "including the rare Matthews cypress," which was understandably quite special to him. After decades of urging from Oliver Matthews, in the 1970s the Applegate Ranger District set aside the Miller Lake Botanical Area.



Map of the Magic Circle at Miller Lake, the land of the conifers. "Starting with Miller Lake at the center, draw a circle with a radius of 6 miles...and it will include at least half of all the conifers native to Oregon." Prepared by Oliver V. Matthews.

His 1956 list of conifer species in this magic circle included:

1. Douglas fir (*Pseudotsuga menziesii*): Oregon Caves (Oregon's second largest specimen, 1956);
2. Grand fir (*Abies grandis*) at the end of Sturgis Fork Road
3. Oregon yew (Pacific yew, *Taxus brevifolia*) along Sturgis Fork Trail
4. Sugar pine (*Pinus lambertiana*) along Sturgis Fork Trail
5. White fir (*Abies concolor*) above Miller Lake
6. Shasta fir (*Abies magnifica* x *Abies procera*)
7. Siskiyou cypress (Baker cypress, *Hesperocyparis bakeri*) world's largest, east of Miller Lake
8. Weeping spruce (Brewer spruce, *Picea breweri*) world's largest, east of Miller Lake
9. Incense cedar (*Calocedrus decurrens*) east of Miller Lake
10. Mountain hemlock (*Tsuga mertensiana*) east of Miller Lake
11. California red fir (*Abies magnifica*) east of Miller Lake
12. Western white pine (*Pinus monticola*) east of Miller Lake
13. Knobcone pine (*Pinus attenuata*) world's largest, Steve Peak Trail
14. Ponderosa pine (*Pinus ponderosa*) near Iron Mountain, Steve Peak Trail
15. Port Orford cedar (*Calocedrus lawsoniana*) back of the Oregon Caves
16. Alaska cedar (*Callitropsis nootkatensis*) above Frog Pond Gulch, California, also Whiskey Peak, Oregon.

His 1969 list also included noble fir (*Abies procera*) and dwarf juniper (*Juniperus communis* var. *saxatilis*). Lodgepole pine (*Pinus contorta*) grows just outside his arbitrary circle, at Azalea Lake.

Oliver Matthews Research Natural Area

During the development of the Rogue River National Forest Plan in the 1980s, new Research Natural Areas (RNAs) were considered, including a proposed Craggy Peak RNA that included all botanically-significant portions of the Miller Lake Botanical Area. Most RNAs are named for a geographic or biological feature, but in their 1990 Forest Plan, the Rogue River National Forest decided to give the Craggy Peak area the commemorative name of Oliver Matthews RNA. This was intentional recognition of Matthews' contribution to the general public's appreciation for native trees and for his efforts in establishing the Miller Lake Botanical Area. According to the Plan, features of the proposed 1,429-acre RNA include a Shasta red fir-white fir forest, Brewer's spruce showing maximum development and, in one 30+ acre mixed conifer stand, the world's largest and tallest specimens of Baker cypress. Given how excited Matthews was to have a tree with his name on it planted in Kew Gardens, we can almost hear him cheering "HOOORAAAY !!!!!" for the naming of a Research Natural Area as a tribute to this remarkable "botanical tramp."



Oliver Matthews, on his 65th birthday, renewed his acquaintanceship with a big leaf maple tree that he played in as a child on the Willamette University Campus, Salem, Oregon. Photo courtesy of Special Collections & Archives Research Center at Oregon State University.

Take a Field Trip to Miller Lake

Matthews invited one and all to take a "look-see to satisfy one's own curiosity about the trees" near Miller Lake:

"For convenience, it starts there just south of the Rogue River Bridge there at Grants Pass, Oregon: where the Redwood Highway, US 199, takes off to the right, and the Old Pacific Highway, US 99, takes off to the left. Somewhere in between these two highways watch closely for Oregon Highway 238 for Murphy and waypoints, follow same either along the north or south sides of the Applegate River, in either case a most pleasant drive, to the community of Applegate. But before we turn right south up Thompson Creek, it might be well to digress for just a minute and drive on east to Ruch, turn south for the Star R.S. [now Siskiyou Mountain Ranger District office] for maps, the latest road and trail information. Then back to Applegate....After a long steady uphill climb to come to what down through the years the writer has called 'The Hump' (Summit)...just a short distance further down the road, taking off pretty much on the level to the right, west, we come to a second logging road, namely one up Sturgis Creek, and points west: the final objective...Jog right here, and follow same to where it crosses the creek there at the foot of the Lewis Creek Logging Road. If the conditions are favorable, one might be able to drive up this road, then turn right, west, to end up about a half mile below Miller Lake. With lots of Cypress trees. ...Otherwise one will have to take to the old Trail, a steep rough 1.5 mile – 1.5 hour hike in to the lake."

Barbara Mumblo, botanist on the Siskiyou Mountains Ranger District, offers a current version of directions to Miller Lake: From the town of Applegate go west 0.1 mile on Hwy 238 to Thompson Creek Road. Follow Thompson Creek Road approx. 12.5 miles to the top of the ridge to a junction of three additional roads. Take Road 1020 to the right and go downhill about 1.5 miles to a junction where Road 1020 continues to the right and Road 1015 goes to the left. Follow Road 1020 for about three miles to road 400. Follow Road 400 to the river (Sturgis Fork). The bridge has been removed at this location so your choices are to ford it with a high clearance vehicle (when the stream is low) or wade across and walk. In the fall of 2012 the ford was improved for use but after winter it may be rough. The trailhead is about four miles past this river crossing at the end of the road. Miller Lake is about a half mile from the trailhead.

Alternatively, you may start from the Star Ranger Station (where you have obtained maps and learned about the latest road conditions). The Ranger Station is seven miles south of Ruch on the Upper Applegate Road, so continue on Upper Applegate Road to the south end of Applegate Lake (about twelve miles). At the stop sign, turn right on Carberry Creek Road (called Road 10 or County Road 777). Follow Carberry Road for about nine miles before turning left on Road 1015. Continue on Road 1015 about 0.7 mile to Road 1020, then follow Road 1020 about three miles to Road 400. Follow Road 400 to the river (Sturgis Fork). From there the directions are the same as above.

Alva L. Hobart (1898-1981)

Oliver Matthews first wrote to Al Hobart in October of 1956 after getting his name from J. A. Mattoon, Ranger on the Siskiyou National Forest. Oliver Matthews and Al Hobart became fast friends through their mutual love of Oregon native plants and especially their enthusiasm for trees. Fortunately, much of their correspondence has been preserved.

Alva L. Hobart was born February 13, 1898 in Wisconsin. He served in the US Navy during World War I. A life-long bachelor, he lived in the Illinois Valley for 52 years and spent untold hours scouring the Siskiyou Mountains to learn their botanical secrets. His cabin in Packer's Gulch was near the mouth of Packer's Creek on the Illinois River south of Takilma, just across the state line in California. After working in a lumber mill in the Illinois Valley, he served for ten years as a seasonal (April or May through October or November) Plant Quarantine Inspector for the California Department of Agriculture at the Redwood Highway Inspection Station. Although the timing of this work interfered with his botanical explorations, one thing he liked was that they worked ten or twelve days in succession followed by five or six days off, giving him opportunities to "get into the mountains for 2 or 3 days of prowling a couple of times a month" (letter to OVM dated April 19, 1957).

Al wrote a column called *Winding Trails* for the Illinois Valley News from August 22, 1963 to January 16, 1969. The column on June 25, 1964, featured his autobiography: *Al Hobart and "Little Toot," his Faithful Steed.* (Little Toot was his 4-wheel-drive jeep.) Here it is in its entirety:

"In answer to a rapidly diminishing number of requests, (I think we received one or two) for more information about the "Young Man of the Mountains," Al Hobart, the Illinois Valley News proudly brings you this refreshing autobiography of our own man from the Winding Trails. While Al states he lives in California (which he does) we think it should be explained that the Illinois Valley, in its rambling layout, accidentally slopped over into our neighboring state a time or two. This is no reflection on Al for settling there, however, he probably didn't realize where he was there, either. And to help explain it further, the only way out of Packer's Gulch, barring helicopter or Al's feet, is through Oregon and the Illinois Valley. He belongs to the Valley, make no mistake about that." —editor of the Illinois Valley News.

"In 1898, on February 13, an event took place in the little village of Fairchild, Wisconsin, that was to have an important bearing on my entire life, and to play fantastic tricks over the years with the thinking of my friends and

relations. On that date I made my first and most important debut. I had arrived.

At the age of seven, having spent my first school year in Fairchild, I moved with my parents and three brothers to Willapa Harbor in the state of Washington. We made our home in the old town of Willapa, and there I spent my early youth and school years, graduating from high school and into the U.S. Navy at the age of seventeen.

The years following my navy experience were devoted in large part to a mixture of various occupations and mild adventure, the latter always managing to interfere with the former at just the right time to prevent permanent entanglement with profession or homemaking. I celebrated my completion of a three-year course in electrical engineering by traveling around the rim of the United States.

On several occasions, when I was young and of possible, if questionable, matrimonial material, I almost made the serious mistake of staying too long in one place. Once I had even bought a marriage license, but luckily, just at the last moment, the moon and Jupiter slipped out of phase, and the deal was off. Outside of that, my life has been relatively smooth and beset with few hazards.

In June 1930 I made a mistake that proved to be the happiest and most important event in my life—I went prospecting up the wrong river! For several years prior to that time I had been working in the meat packing industry in Washington. On our vacation my closest friend and co-worker, John Dingman, and I decided to go down and pan gold in Smith River, where John had been once long before. When we crossed the east fork of the Illinois River, Fate whispered (and John echoed) "This is it, this is Smith River." So I drove up the wrong river, and here in Illinois Valley, in Packer's Gulch, just inside California, I found not gold but the place I knew at last was home, and here I happily put down deep and permanent roots.



Al Hobart, on the Sky Lakes Trail, August 1964. Photo from Hobart collection, courtesy of Lee Webb.



Winding Trails

Al Hobart with his jeep, Little Toot; this was the byline photo for his newspaper column, "Winding Trails," in the Illinois Valley News. From Hobart archives, courtesy of Lee Webb.

For a number of years, I worked in the lumber industry here in the Valley as an edger operator, after which, for ten years, I was an inspector at the Redwood Plant Quarantine Station. Now I am retired and devote almost all my time to wild plant studies. My principal hobbies and greatest joy are studying, hiking and mountain climbing, all of which fit in as important adjuncts to my botany work.

Although my formal education ended with high school, except for occasional intermissions I have never stopped studying, the acquisition of knowledge of the world we live in having always been of the deepest satisfaction to me. And so the study of wild plant botany came as a natural to me when I found myself settled here among the forested mountains of the botanically rich Siskiyous, the sort of environment that I have always loved above all others.

Always interested in natural history, in the past twelve of fourteen years I have made a determined and intensive effort to catalog the wild plant life of my home region, the Siskiyou Mountains. In that period I have found, identified and written the descriptions of more than 1200 wild plants. The healthful exercise and deep satisfaction involved in this occupation to me is incalculable. One of the greatest thrills I have known was being given official recognition for having first discovered two new plants for California, the little water club rush (*Scirpus subterminalis*) and the snow dwarf bramble (*Rubus nivalis*). My greatest ambition is, of course, to find one new to Science.

More than once I have been told that if I fell into a swill-barrel, I'd come out smelling like a rose; and when I think of the strange quirk of chance that led me to mistake one river for another, and the many happy and profitable years that have followed that lucky mischance, I can't help but agree."—Al Hobart

By 1963 Hobart had retired from the Inspection Station, and thus spent most of his time "tramping the mountain trails, studying the wild plant life of the Siskiyous." In a letter responding to Siskiyou Forest Supervisor J.R. Philbrick's request that he not drive the old roads into the new Kalmiopsis Wilderness, he wrote, "As an amateur botanist... I look upon the Siskiyou Mountains as my private little world. The goodwill of the Forest Service is a very important adjunct to my happy existence in that world, and my conduct has always been and will be in accordance with that realization" (letter on Dec. 5 1963 to J. R. Philbrick, Forest Supervisor Siskiyou National Forest).

Hobart compiled a 289-page book covering the flowers and trees of the Siskiyou Mountains of southern Oregon and northern California. He left a copy of this book, which was never published, with his good friend and fellow botanist, Veva Stansell of Pistol River.

Al Hobart died at the age of 82 on January 23, 1981 in the Mount Hope Retirement Lodge in Cave Junction. He was survived by a sister, Georgia Tooker of Los Angeles.

Eugene L. Parker (1926-1993)

Many of the letters between Matthews and Hobart wrangled endlessly about the identification of true firs. The authority on *Abies* species in the Siskiyou Mountains of southwestern Oregon

was Gene Parker of Medford, who began corresponding with Oliver Matthews in 1960 (Parker 1988).

We (Callahan and Lang) knew him because of his enthusiasm for trees, particularly the genus *Abies* in southwestern Oregon. One of his primary contributions concerned the relationship between noble fir, *Abies procera* and California red fir, *A. magnifica*. Parker made a convincing case that our so-called Shasta red fir (*Abies magnifica* var. *shastensis*) might be a hybrid between noble fir and red fir. His argument was most persuasive when presented, in person, in the field with his extensive collection of frozen cones, branches, and needles from throughout the ranges of the three taxa. Some scientists, such as Dr. Jerry Franklin at the University of Washington, questioned Parker's ideas and evidence, but Parker didn't seem to be particularly troubled by this. Others recognized Parker as a local authority on the true firs; for example, when Tang-Shue Liu was working on *A Monograph of the Genus Abies* (Liu 1971), he stayed at Parker's home and traveled with Parker to the local hotspots for true firs. The author mentions Parker's contribution in his acknowledgments: "Mr. E. Parker, located at Medford, Oregon, Specialist in the native firs of the western United States, joined us to the Rogue River National Forest, in the southern part of the Cascade Range." To Parker's credit, modern molecular studies (Oline 2008) validate his hybridization idea.

Among his many talents were his artistic abilities and skill as a pen-and-ink draftsman, best displayed in his illustrations of his beloved trees, especially foliage and cones. I (Frank Lang) managed



Eugene Parker at age 54, in 1980. Photo courtesy of Kevin Parker.

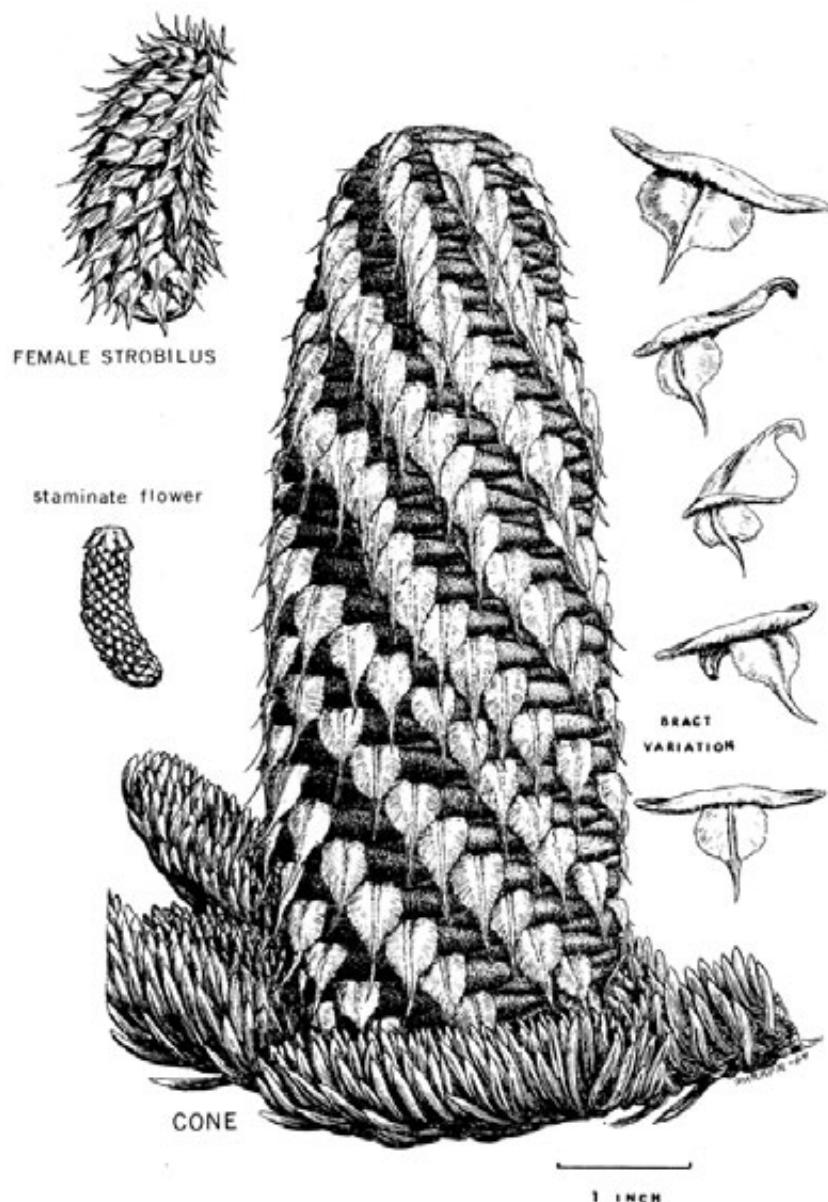
to get him to give a demonstration to at least one of my biological illustration classes. Unfortunately, following his death, his widow Lesley forwarded the drawings to Jack Duffield (US Forest Service Tree Geneticist) in Seattle, Washington, who died several years ago in Shelton, WA. The whereabouts of the drawings is unknown, a loss to southern Oregon botany.

Callahan and Lang joined Parker in the field on several occasions. They visited the general type locality of Shasta red fir at Panther Meadow on Mount Shasta², looked at firs along the Siskiyou Crest from Mount Ashland to Dutchman Peak, and hiked the Pacific Crest Trail from Cook and Green Pass east to examine a stand of Pacific silver fir Parker discovered in 1961 between Copper Butte and Joe Creek (in northern California). In September 1991, the three of us checked on the status of the subalpine fir krummholz near the summit of Mt. Ashland. Parker wrote a report on its status for the Forest Service, including photographs, maps of the stand and its location, and a written assessment of the stand's nature (size, age, number of cone bearing stems) and recommendations for its preservation (Parker 1991).

From the previous paragraphs, one might wrongly assume that Gene Parker had a degree in botany or a related field. His obituary makes only a passing mention of forestry, making his botanical accomplishments even more remarkable. Eugene L. Parker was born September 23, 1926 in Medford and died on October 24, 1993 in Medford. He attended schools in Medford and on Mare Island, California. He married Lesley B. Schleigh on May 11, 1946. The couple had three sons and two daughters. He served in the Army Air Corps from 1945 to 1946 and again from 1950 to 1951 at Mather Air Force Base in California. After returning to Medford, he worked at Timber Products for several years. He was also a tree faller. From 1961 until retiring in 1988, Parker owned and operated the Service Custodians Janitorial Service. After his retirement, he drove a bus for the local school district. During the last five years of his life, he was a bus driver for RVT (Rogue Valley Transportation District). An avid pilot, he enjoyed building and rebuilding airplanes and was a member of the American Experimental Aircraft Association. As a former member of the Medford Linebackers, he supported local football teams and also enjoyed hunting and fishing.

His stationary letterhead reflects Parker's own view of his role in botany:

² John G. Lemmon, author of the name, simply mentioned the slopes of Mount Shasta in his description (Lemmon 1890).



Sample of illustration of a conifer cone, Noble fir (*Abies procera*) by Eugene Parker. Reprinted from The Four Seasons 8(1):13.

"Eugene L. Parker
CO-OPERATING IN TECHNICAL RESEARCH OF
THE WESTERN CONIFERS
FIELD COLLECTIONS AND INVESTIGATIONS
BOTANICAL ILLUSTRATIONS."

At the bottom of the page is the logo of the Society of American Foresters between the words Member Retired.

Acknowledgements

Julie Hall with the Grants Pass Daily Courier tracked down the obituary for Al Hobart. Jerry Black searched the archives at OSU for images of young Oliver Matthews. Lee Webb (retired, Siskiyou National Forest wildlife biologist) provided the images, old letters and other records for Al Hobart. Wayne Rolle (Rogue-Siskiyou

National Forest botanist) gave us information on the proposed Oliver Matthews RNA. Barb Mumblo (botanist, Siskiyou Mountains Ranger District) provided directions for reaching Miller Lake and the newspaper obituaries for Eugene Parker and Oliver Matthews. The Special Collections & Archives Research Center at Oregon State University provided images from Oliver Matthews' records. Kevin Parker and his wife Jean Maxwell provided the photo of Eugene Parker and reviewed his biographic section. Stephen W. Edwards of the East Bay Regional Park District granted permission to use the illustration of the cone originally published in their publication, *Four Seasons*. Jeri Chase, Agency Web Coordinator/Public Information Officer with the Oregon Department of Forestry, checked their archives of *The Forest Log* for us.

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Frank Lang has a long history with southern Oregon botany, retiring as Emeritus Professor of Biology at Southern Oregon University after 31 years and with NPSO (State President twice) and *Kalmiopsis*. He was the first editor of *Kalmiopsis* and has served on its editorial board since 2004. Previous articles in this journal include John Jeffrey in the Wild West: Speculations on His Life and Times (1828-1854?) and Plant of the Year, Green-flowered Wild Ginger (*Asarum wagneri*). He was honored as NPSO Fellow in 2000. His interests include history of botanical exploration of the Pacific Northwest, fern evolution, threatened and endangered plants, Charles Darwin in the Southern Hemisphere, Patagonia and Tasmania. Known as Dr. Nature Notes, he has produced over 300 radio scripts broadcast weekly on Jefferson Public Radio communicating the wonders of the natural world to the public. A selected script is published in each issue of the *Jefferson Monthly*. He has also contributed a large number of online entries for the Oregon Encyclopedia; as he says, he is computer literate (and he has a sense of humor).



Frank Callahan, member of the Siskiyou Chapter, is a conifer fanatic, and avid pursuer of big trees of all kinds. This botanizer is also crazy about pretty flowering native bulbs (*Calochortus*, *Chlorogalum*, etc.). His previous articles in *Kalmiopsis* include California buckeye, Gray pine, and Hinds walnut. He manages Callahan Seeds, which markets tree and shrub seeds. He was President of the Siskiyou Chapter for two years. He now serves with the Southern Oregon University Herbarium volunteers when he is not out roaming the valleys and mountains of Oregon and California, following his mantra "Never Stop Discovering!"



Cindy Roché came to Oregon in 1998 and joined the Siskiyou Chapter that fall. Previous articles in *Kalmiopsis* include *Asarum wagneri* and *Centaurea xkleinii*. After a sojourn in *Asteraceae*, she now focuses on *Poaceae*. She teaches a workshop on grass identification at the Siskiyou Field Institute each May and is currently working with the Carex Working Group on a *Field Guide to Grasses of Oregon and Washington*. She currently serves as regional coordinator in Southwestern Oregon for the Quilts of Valor Foundation and also enjoys gardening, backpacking, bicycling, yoga, and raising chickens.

Cypress Species in Oregon

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Although not widely known, four species of cypress are native in southwestern Oregon, a northern extension of the California Floristic Province. These are Baker cypress (*Hesperocyparis bakeri*), Mendocino cypress (*H. pygmaea*), MacNab cypress (*H. macnabiana*), and Sargent cypress (*H. sargentii*). (New World cypresses, formerly *Cupressus*, are currently classified as *Hesperocyparis*; see sidebar.) I will tell the story of how and where they were discovered and named, what is known about their ecology and management, and speculate on the prospects for their survival.

Baker Cypress¹

In 1914 Forest Ranger William "Bill" C. Fruitt discovered the first cypress found in Oregon on Steve Peak in the Siskiyou Mountains while clearing the route for a phone line to the lookout. Unfortunately, he did not document his discovery with specimens (Matthews 1963).

Three years later, on 24 August 1917, Forest Ranger Joseph L. Mackechnie and Matt W. Gorman, Superintendent of the Forestry Building in Portland, collected voucher specimens from the site. Dr. Elmer Applegate also collected specimens there on 29 July 1930. Unfortunately, all of the foresters and Applegate misidentified these trees as MacNab cypress when in fact the trees were Baker cypress. I traced the misidentification to *Forest Trees of the Pacific Slope* (1908) by George B. Sudworth, US Forest Service dendrologist, where he described the northern extent of Macnab Cypress as "on the west end of the Siskiyous, at a point about 10 miles from the mouth of Seiad Creek." Even though the discoveries in Oregon were all made after Jepson's 1909 publication (see footnote), none of the foresters caught the error. Adding to the confusion, Jepson (1923) subsequently submerged *Cupressus bakeri* into *C. macnabiana* as var. *bakeri*. In 1965, James Griffin correctly annotated Mackechnie's collections as *C. bakeri*.

In 1926 Nelson Nye (1871-1946) found an "an old juniper patch" on Willits Ridge, north of Flounce Rock near Prospect in Jackson County, Oregon, about 70 miles northeast of Steve Peak. When Nye's trees were shown to Dave Neville (1902-1985), he told

¹ Milo Samuel Baker (1868-1961) discovered Baker cypress in 1898 on basaltic lava flows in the Timbered Crater Grove in southwestern Siskiyou County, California. Jepson (1909) named the species in Baker's honor, using the following collection as a type specimen: California, Siskiyou Co., Near Dana, between Hills Farm and Little Hot Springs Valley, Aug 1898, Baker s.n. (JEPS).



Bob Adams standing next to a Baker cypress trunk; note the characteristic flaking bark. Photo by Frank Callahan.

two botanists from Southern Oregon College (SOC) who concluded that they were Baker cypress. This site is the northernmost cypress population in North America. Ted Maul, state forest patrol ranger, Sam Taylor of Elk Lumber Company and Ed Marshal, US Forest Service, measured the Baker cypress at Flounce Rock in 1953; the



Wind-thrown Baker cypress at Willits Ridge; the trees were exposed to wind damage when the area to the northeast was cleared in 1986 in a timber sale called the Cypress Garden. Photo courtesy of the Medford District BLM archives.



Female cones of Baker cypress (*Hesperocyparis bakeri*) are covered with resin-filled warty protuberances. Photo by Robert Korfhage.

tallest trees were 75 feet tall and 22 inches in diameter (Anon. 1953). The trees varied from 30 to 40 years and older (Sam Taylor, pers. comm.). In a letter to Oliver Matthews, Warren R. Randall stated that there were “old cypress stumps throughout the stand that indicated that there had been cypress in the area for several hundred years” (ltr dated Sep. 23, 1953).

In 1948 Carl B. Wolf added subspecies *matthewsii* in *C. bakeri* in honor of Oliver V. Matthews, who described morphological differences between populations of Baker cypress. (See more information on Matthews on pages 6-11) This subspecies is no longer recognized; *C. bakeri* is “treated as a monotypic species” (Afzal-Rafii 1994; Elbert L. Little and Jim Bartel, pers. comm.).

In 1950 entomologist Dr. “Rosy” Robert George Rosenstiel (1910-1995) visited the region west of O’Brien, Oregon, and collected about fifteen specimens of native plants including Baker cypress “8 miles west of O’Brien” (77599OSC). I verified the herbarium specimen at Oregon State University, annotated by Helen M. Gilkey. Although I have relocated all the other species he collected there, I have not found his cypress despite extensive searches of most of the roads and old trails. Much of this vast area of rocky, rugged ultramafic terrain burned in the 2002 Biscuit Fire. If the distance indicated on the label was air miles, the specimen was collected in Curry County, in the Baldface Creek drainage.

In 1973 Jim Frazier and his wife reported discovering a small grove of Baker cypress in the Sky Lakes Wilderness, Klamath County, where an old wooden sign bolted to a tree read “Iron Lake.” Jim knew the species from Flounce Rock, but unfortunately, he did not collect specimens. He described the trees as “at about 45 to 50 feet in height and branched with foliage nearly to the ground [without a] browse line like we observed at Willits Ridge,

Flounce Rock. The trees were well spaced with trunks exceeding 2 feet in diameter at chest height.” Not long afterwards, Jim moved away, and I lost contact. I checked with the Prospect and Butte Falls Ranger Districts, but no one had ever heard of Iron Lake. An intensive search of the Sky Lakes Basin map produced over 100 unnamed lakes or small ponds, any of which could be Iron Lake. To date, these cypress have not been relocated.

Mendocino Cypress²

Oregon’s second cypress might never have been discovered but for a series of serendipitous events. In the early 70’s, I had purchased property near Gold Hill about the same time as my new neighbors, Earl and Ruby Millhouse. Soon after Earl and I met, I learned that he was a certified millright and licensed electrician. In return for his assistance in preparing for a house on my property, I helped him landscape his property with junipers, pines and Arizona cypresses. These prompted Earl to tell about logging in the redwoods in 1947 and 1948 in the Brookings/Harbor area where he had encountered a stand of trees on the lower Winchuck River that really puzzled him. After felling several of the trees he examined the foliage and cones and concluded that they must be cypress. He took the samples to the foreman, who was unimpressed and remarked, “We will market the logs as Port Orford cedar as the price is right.” Earl kept quiet about it because “In those days, you did not argue the issue, I needed the job and could ill-afford to be fired or blacklisted.” But after work, he went about collecting cones, foliage and bark samples in order to get these trees identified; he also collected seeds for later planting. He put the dry foliage samples in newsprint in a leather suitcase along with some bark samples and about a pound and a half of seeds. He noted that the largest stumps were only about 300 to 500 years old and none of the trees showed any decline. They cleared the bottomland along the Winchuck, blasting, bulldozing and burning the stumps because the landowner wanted to convert the area to pasture. At that point in our conversation, Earl opened his suitcase to display



Female cones of Mendocino cypress (*Hesperocyparis pygmaea*) have an almost smooth surface and the scales bear a small broad prickle. Photo by Robert Korfhage.

² Mendocino cypress was described as *Cupressus pygmaea* (Lemm.) Sargent in 1901 in the Botanical Gazette 31:239: “Sparsely found on the ashen ‘white plains’ back from the coast near Mendocino” (1895) Lemmon and Wife [Plummer] s.n. (lectotype) designated by C.B. Wolf 1948.

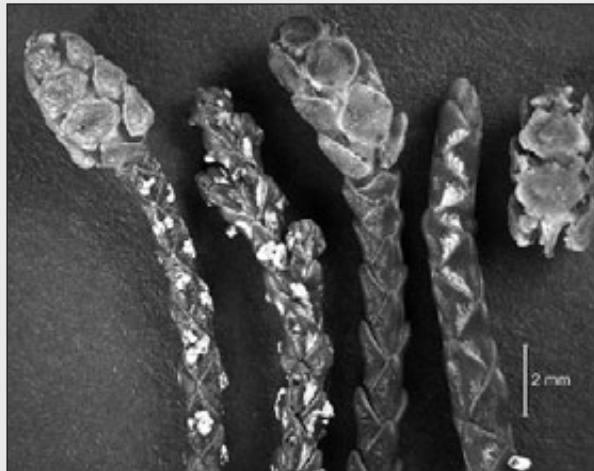
the specimens and asked "What cypress is this?" The samples certainly resembled the Mendocino cypress shown in Sudworth and McMinn (McMinn 1939) and I promised that I would collect Mendocino cypress specimens at Ft. Bragg for comparison, which I did in May 1975 and September 1976. The Winchuck and Ft. Bragg specimens were identical.

MacNab Cypress³

During the 1970s I visited the UC Berkeley-Jepson Herbarium, where one of the curators brought me a specimen of *Cupressus macnabiana* from "Foothills west of O'Brien [homestead], Josephine County, Oregon, 1920." The O'Brien homestead comprised about 80 acres located near the present town of O'Brien (Greg Walter, pers. comm., 2012). John Thomas Howell (1903-1994) annotated the specimen in 1926. There was a bold ink stamp on the sheet that read, EXTRALIMITAL, and the curator said to me, "You are from Oregon and what is your opinion of this, as we don't think it is valid." I examined the specimen and verified that the species determination was certainly correct; however, the locality might be questionable because it is well out of the known range. On the other hand, the O'Brien area is characterized by ultramafic geology that is a common habitat for the MacNab cypress. The curator told me that the specimen was in transit (not part of the accessioned herbarium collection), so was slated for discard as they had no idea who the collector was. Upon researching the issue, I suspect the collector was Thomas McGrew (for whom McGrew Mountain is named). The McGrew road, built in 1853, is located west of O'Brien off Wimer road and travels from the basin to the summit of the ridge where it connects with several other roads. The collection is certainly from the area where McGrew resided for many years and today his stone corral stands in testimony of his settlement. I gave the curator my address and asked that, if he were to discard the specimen, to mail it to me and I would place it in an Oregon herbarium. I never heard back from him and, when I returned to the herbarium in 2009, the specimen was gone. Later, Ray Godfrey and I spent considerable time trying to relocate both McNab and Baker cypress in the O'Brien area. In 2010, Joey Malone and I searched the area using GPS and aerial photography but were unable to locate either grove of trees. Today locations of both species remain a mystery.

Although I had searched for cypress on many ultramafic sites in Oregon, by 2007 I had not yet explored Spriggett Butte in the Wells Creek drainage in northern Jackson County near the confluence of the West and East Forks of Evans Creek. Starting at the southern base of Spriggett Butte, I hiked to the summit, staying east of a timber harvest that was taking place in the draw. On my return from the summit (4036 ft. elev.), I noticed that the logging had concluded for the day and decided to walk along the road instead of bushwacking. There I noticed some unusual chunks of cordwood with a bark pattern that was gray and quite furrowed. I strapped the largest piece to my backpack and took it home, where it joined my collection of wood disks for later identification.

Three years later, I returned to Spriggett Butte with Mike Backen of Lone Rock Timber Management Company. At a spring



Left to Right: Baker, MacNab, Mendocino, and Sargent cypress.
Photo by Cindy Roché and Robert Korfage.

Foliage and Pollen Cones of Oregon Cypresses

Cypress leaves are scale-like, toothed on margins, decussate and closely appressed to the branch. The branching is 4-angled, except MacNab cypress, which forms planar spraylets. The yellow-orange pollen cones are deciduous after pollen is released from the peltate, toothed scales, except for MacNab cypress, which has persistent pollen cones.

MacNab cypress leaves are thick, often much longer than broad, with margins that are waxy from resin glands. (Pollen cone not shown.)

Mendocino cypress leaves are dark green and thick, but lack resin glands and wax. Pollen cones have rhombic to round scales (scales are elliptical in the three other cypresses).

Sargent cypress leaves are thick, large and coarse. Resin glands are rare; note the two distinct waxy bands on the edge of the leaf at the bottom of photo.

³ Andrew Dickson Murray named *Cupressus macnabiana* in 1855, honoring James McNab (1810-1878) of Irish ancestry, a founder and president of the Edinburgh Botanical Society and curator of the Edinburgh Botanic Garden (Little 1979). The type locality was Whiskeytown, California, where the entire stand was destroyed by construction of Whiskeytown Lake (Griffin J.R. 1967).



Distribution of cypress species in Oregon and northern California.
 ●: *H. macnabiana*; ▲: *H. bakeri*; ■: *H. sargentii*; ★: *H. pygmaea*. Map redrawn from Little (1971) by Cindy Roché.

Sargent Cypress⁴

The first report of Sargent cypress in Oregon came from a chance meeting with a miner. After teaching the Conifer Class at the Siskiyou Field Institute (SFI) in July 2009, I stopped for lunch in Selma. A scruffy looking character walked up to me and asked, “What brings you out here?” I teach conifers at SFI. “You mean the Deer Creek Ranch,” he commented, “You must know about the Sargent cypress west of Selma.” I countered that Sargent cypress is not known this far north, “are you sure they aren’t Baker cypress?” He answered, “I worked for many years mining in Lake County, California, where Sargent cypress is very common on the serpentine in the hills and canyons south of Middletown along Highway 29. The trees I found in the foothills west of Selma are identical, about 45 feet tall and resemble incense cedar in form, with small round cones about an inch in diameter; there were 5 or 6 trees that burned in the 2002 Biscuit Fire. The Forest Service was back-burning the area and I’m certain the trees were destroyed. You will just have to search the area for survivors.” We shook hands and I thanked him for the information. He was quite private and never even gave me his name. In October 2010, I went up the Squaw Creek Road at the Deer Creek Center and discovered four small trees that looked quite different. When I knelt down to inspect the trees, I found burnt cypress cones on the ground. I found no trees further upstream, only the charred remains of

burnt-out stumps and a debris pile of blackened limbs, cones and strips of bark. The seedlings must have established from cones that were flushed downstream following the Biscuit Fire. I collected a voucher specimen (OSC229704) from this site for the OSU herbarium. In Selma again the next fall, I struck up a conversation with the driver of a pickup loaded with firewood, and asked about cutting firewood in the Biscuit Fire area. I mentioned Squaw Creek and that I was looking for cypress wood. To my surprise, the woodcutter had cut firewood near the Squaw Creek Road after the fire. I described what cypress looked like and he responded, “We bucked up some logs that had thin bark peeling off them and round cones on the limbs. We limbed the logs and put the debris in a brush pile and considered milling some lumber out of the wood. I guess we cured the wood wrong, as it split, so we cut it up for firewood. I still have the largest chunks of wood left if you could use them.” I followed him to a nearby woodshed where he gave me two rounds of firewood that I had no doubt was cypress, because there was a cluster of cones still attached. At home I sawed and sanded a number of disks from the cordwood and counted 70 to 74 rings. The rounds were about thirteen inches in diameter; the clear, widely-spaced, uniform rings indicated rapid growth. Matching this diameter to the height given by the miner (45 feet), the cut must have been low on the bole, so I added another ten to



Baker cypress cones grow from the bole of the tree, a common trait in *Hesperocyparis*, but not in *Chamaecyparis* or *Callitropsis*. Photo by Frank Callahan.

⁴ Jepson (1909) named *Cupressus sargentii* after Charles Sprague Sargent (1841–1927) using a specimen from Red Mountain, Mayacamas Range, southeastern Mendocino County, as the type. Collected June 17, 1908, W.L. Jepson 3027.

twelve years for the total age. The five or six burned stumps I found matched the number that the miner had given me. That there were so few trees can be attributed to the logging history of the site that was previously harvested by Rough & Ready Lumber Company.

Ecology of Oregon Cypresses in the Klamath Mountains

All four species of cypress grow in Oregon as very isolated populations; there are also large gaps among populations in California. In both states these trees are always located on marginal soils. The Oregon species are all located in the Klamath-Siskiyou Bioregion in the California Floristic Province. This mountainous region is characterized by old, complex geology, a mild, relatively moist climate, high species diversity, and a great number of endemic taxa.

Habitats

Baker Cypress

Baker cypress grows as a slender spire and is by far the most tolerant of cold and snow of all North American cypresses. At Miller Peak, Baker cypress grows up to 6,000 feet elevation on shallow soil veneers in a post-glacial cirque, where snows up to 30 feet deep have been recorded (Matthews, pers. comm. 1973). Associated species at that site are Brewers spruce, mountain hemlock, western white pine, white and noble fir. It has survived temperatures as low as -30°F at Timbered Crater, California, but

cold dry winds damage foliage. Baker cypress seldom grows below 3,000 feet elevation. It occupies soils derived from a wide range of parent materials: Miocene basalt-andesite residuals (Willits Ridge at Flounce Rock), quartz mica schist (Miller Lake-Steve Peak), ultramafic (Seiad Creek, California, and Iron Mountain, Oregon), and granitics (Independence Creek, Marble Mountain Wilderness, California). Baker cypress has very small gray cones with resin-filled warty protuberances and very fine resinous foliage with a white waxy bloom. Baker and Mendocino cypress have the smallest and lightest seeds among western North American cypress species.



Female cones of MacNab cypress (*Hesperocyparis macnabiana*) have large conical horns that are often hooked at the apex; cones are up to $\frac{3}{4}$ inch in diameter. Photo by Robert Korfhage.

MacNab Cypress

MacNab cypress has a broad, open crown that is often as wide as the tree is tall (much like an open grown Monterey cypress). The consequence of this architecture is that MacNab cypress cannot handle heavy snow loads and hence grows only below

4,000 feet elevation. McNab cypress also tolerates a wide range of nutrient imbalanced soils: Mesozoic serpentines, Devonian Meta-rhyolites, Eocene marine sediments and Pleistocene and recent basalts (Griffin and Stone 1967). McNab cypress tolerates blistering summer heat on some of the most inhospitable sites where the only other trees are also thermophiles: gray pine (*Pinus sabiniana*) and Douglas oak (*Quercus douglasii*). The broad crown conserves moisture by shading the soil surface over the root system, which reduces soil temperatures during the summer heat. Once, when the air temperature was 115°F, I measured soil temperature differences of 60°F between soils exposed to the sun and those shaded by trees: the shaded ground was a cool 80°F compared to the sunlit soil at 140°F. A good character for identifying McNab cypress in the field are its flat (planar) spraylets or short sprays of foliage that are highly resinous (resin glands



The largest known MacNab cypress, which grows near Midway south of Highway 44 in Shasta County, California, has a basal diameter of nearly four feet and is 60 feet tall with a canopy spread of 60 feet wide. Photo by Frank Callahan.

exude a glaucous waxy coating on the leaves to counter the high heat of direct solar exposure); the odor is quite pleasant, almost like citrus. The cones vary from rounded without strong prickles to cones with spur-like projections; the Oregon trees exhibit the latter trait. The tree is used for firewood and the bark is used for basket weaving (Callahan, K.H. pers. comm.) and has no use for lumber as the trees lack a distinct bole.

Sargent Cypress

Sargent cypress is seldom found off serpentine (ultramafic) soils. It is adapted to hot interior climates, but also thrives in the milder wet areas of the California Coast Ranges⁵. With a rounded crown at maturity, it tolerates some snow loading, which allows it to grow at elevations up to 3,000 feet. It is often found with McNab cypress; in several areas the two have hybridized (Lorraine *et. al.* 1975, Little 2004). Both trees have similar fibrous, gray bark, so hybrids were detected by foliage differences and terpene analysis. Sargent cypress often grows near redwood in the more mesic bottoms of ravines or on open slopes of the inner Coast Range where fog drip is nearly continuous. As a component of the chaparral in the outer Coast Range, Sargent cypress perseveres under very harsh conditions. But it is not as drought hardy as McNab cypress and its range extends no further east in California than the outer Coast Range, where on the summits of ridges, the lack of adequate moisture and hot drying summer winds create bonsai-like growth forms.

Under favorable conditions, juvenile trees grow rapidly, with very sharp pointed leaves that possibly deter browsing. Trees growing in the moister Inner Coast Range and on ultramafic sites with springs and ample subsurface water become the largest of the species and may live up to 300 years. My observations of ring counts indicate that trees from drier sites in the Outer Coast Range seldom live beyond 150 years. The trees are often used as firewood by local ranchers, but due to size and heart rot, are seldom milled for lumber. Sargent cypress foliage is coarser than the other three Oregon cypress species; it is a dull glaucous green and feels harsh to the touch. Sargent cypress cones in Oregon have a long peduncle, small prickles, and are gray at maturity (but lack the wartiness of Baker cypress cones). The seeds are quite large and exhibit a waxy coating similar to that in McNab cypress. The larger seeds with greater endosperm allow the seedlings greater time to establish a deep taproot and the waxy seed coat reflects ground heat that might kill exposed seeds. The resin glands are somewhat active, but not to the extent of excessive resin droplets on Baker and McNab cypress.

Mendocino Cypress

Mendocino cypress is easily recognized by its dark green foliage, inactive resin glands on the scale-like leaves and long whip-like leaders. Its black or dark brown seeds are the smallest and lightest of the cypress species. The specific epithet *pygmaea* was chosen to describe the stunted trees initially discovered on the flat barrens or “white plains” near Fort Bragg, California. This habitat has poor growing conditions because its podsolized⁶ rusty-white sandy soils

are poorly drained due to a cemented hardpan layer about 12 inches below the soil surface. I use the common name Mendocino cypress, not pygmy cypress, because on better soils, trees of this species grow as large as 8 feet in diameter and nearly 200 feet tall (Wolf *et al.* 1948), larger than any other species of cypress in North America. Mendocino cypress is a tree of extreme vigor; its upward growth can compete with coast redwood for sunlight. The largest Oregon trees were about 300 to 500 years old at the time they were logged (Earl Millhouse, pers. comm. 1947-48 information), but their growth was still accelerating. The climate at Fort Bragg and near Brookings, Oregon, is characterized by summers with mild temperatures (averaging around 65°F) and intense fog which blankets the immediate coastal forests, both of which are optimal conditions for survival and growth of Mendocino cypress. The Winchuck River site where the cypress grows receives more precipitation than other sites, an average of 14 inches of rain from April through September, and up to 175 inches in a year (Maguire 2001). The Winchuck River site is 195 miles north of Fort Bragg but still in the coast redwood zone (see distribution map).



Sharon Siewert standing next to Mendocino cypress in the Strauss Arboretum, on Emigrant Creek Road, near Ashland. This cypress was grown from seeds collected by Earl Millhouse along the Winchuck River, Oregon. Photo by Frank Callahan.

Serotinous Cones and Fire

All cypress species in Oregon and California have serotinous cones, which require heat or the death of the branch to open and release seeds. The degree of heat or drying differs among species; the three

⁵ In California, there are two mountain ranges parallel to the coast: the Inner Range lies closer to the coast (more western) and the Outer Range is more inland (to the east of the Inner Range).

⁶ Acidic soils under forests that have been severely leached of minerals; pH levels between 2.8 and 4.3 limit nitrification by soil organisms and the availability of nutrients to plant roots.



Figure 12. Female cones of Sargent cypress (*Hesperocyparis sargentii*) have a large peduncle at base of cone and minor resin pustules on the cone scale; at an inch in diameter, these cones are twice as large as Baker cypress cones. Photo by Robert Korfhage.

inland species usually require a fire or excessively high summer temperatures. Cones of the coastal Mendocino cypress open when temperatures reach 80 to 90°F, or with senescence of lower branches. At Miller Lake where there has not been a wildfire in well over 250 years, encroachment by other conifers is overwhelming the Baker cypress population. Based on ring counts of downed trees, I estimate that the Miller Lake cypress trees are close to 300 years old, which is approaching the normal lifespan of this species.



MacNab cypress cones consumed by western gray squirrels, which eat only the fleshy outer parts of the cone. When left in the sun afterwards, the cones release the seeds as they dry, but the squirrels have not been known to return to eat the seeds. Photo by Frank Callahan.

Wind has toppled many of the larger trees, indicating that the root systems in shallow soil are not equipped to support trees over 100 feet tall. Baker cypress is holding its own with Brewers spruce on the site, but is losing ground to the more shade tolerant true firs and mountain hemlocks that are establishing more seedlings. The cypress depends on fire to expose mineral soil, open the site to sun, and release seeds from its cones. Fires that are too frequent can be devastating to cypress populations because it usually takes at least ten years for saplings to produce fertile seed cones. Baker cypress has thin flaking or fibrous bark at maturity, so even mature trees are quite susceptible to fire damage and can be killed outright by ground fires. Sargent cypress is less fire dependent because cones open on the trees as the lower branches die. Thus it grows as mixed age stands at many locations.

Squirrels and Seed Dispersal

Downhill establishment of seedlings is easily explained by gravity, but I spent years wondering how cypress seeds are moved upslope. Then one day while sitting on a stump eating lunch, I noticed a local western gray squirrel doing the same. I think we were observing each other with equal interest, wondering what the other participant was having for lunch, but the squirrel was extra vigilant because it did not want to become someone else's lunch. Using my binoculars, I saw that it was dining on MacNab cypress cones. This was news to me, so after lunch, I inspected the cones, and found that the squirrel had eaten only the outside of the cones, which left the seeds unscathed. It did not take long for the chewed cones left on sunny stumps to dry out and begin releasing intact seeds. I was fascinated that the squirrel left behind what was obviously the more nutritious food, but perhaps it was deterred by the sharp, bladed edges of the seeds. I looked around noting all stages of young cypress trees in the stand and that the squirrel's dining outposts were uphill from the main population where there was a better view of overhead predators. So the uphill movement of cypress all came down to the botanical assistance of the western gray squirrels (Callahan 2012). And how did all of the great botanists miss this event? Well, they never went to lunch with the squirrels!

Paleobotany

Cupressaceae is an ancient family (some 160 million years old), probably derived from an extinct conifer family (*Voltziaceae*) that persisted until the lower Jurassic, about 200 million years ago (Farjon 2008). Unlike many ancestral conifer families, the cypress family has members that have persisted to the present. In the Western Hemisphere, the center for diversity is the California Floristic Province (twelve species and one variety); an additional four species grow in Mesoamerica. Baker cypress is the most northern (southwestern Oregon) while cedar blanco or teotlate (*Cupressus lusitanica*) in Honduras, El Salvador and Costa Rica is the most southern.

Botanists have categorized cypresses as originating from the New World (North/Mesoamerican) and Old World (Asiatic/North African); however, this distinction becomes somewhat blurred when one considers possible lineages of modern taxa. Raven and Axelrod (1978) proposed the Madrean-Tethyan link to explain the relationships between Old and New World cypresses through

migration between the Asian and North American continents before they drifted apart. For example, Kvacek and others (2000) found cones, foliage and seeds of *Tetraclinis*, a cypress relative, in the Lost Creek Reservoir fossil floras of eastern Oregon. The modern species of *Tetraclinis* (*T. salicornoides*) is known only from southern Spain, Malta and North Africa. The presence of *Tetraclinis* in the fossil record of Western North America and its absence in eastern Asia (both the fossil and current floras) suggests that the taxon migrated across the North Atlantic during the early or middle Tertiary (Kvacek *et al.* 2000).

Predecessors of Oregon and California cypress species could have migrated from the Old World during the Tertiary (65 to 5.5 million years ago) when the Bering Land Bridge connected North America with Eurasia and Africa (Ickert-Bond *et al.* 2009), or during two later time periods: 1) when sea levels fell as much as 397 feet between 20,000 and 18,000 years ago, or 2) when coastal land along the Bering Strait was exposed from eastern Asia to Alaska during the Pleistocene (about 11,000 years ago). Mao and others (2010) hypothesized that all New World cypresses derived from Asian ancestors sometime after 49.9 million years ago, when junipers also diverged. Other evidence suggests that the cypresses and their close relatives (Alaska yellow cedar and Port Orford cedar) migrated from eastern Asia during the Pleistocene. For example, because the morphology and DNA of newly described *Xanthocyparis vietnamensis* from North Vietnam strongly resembles Alaska yellow cedar, Farjon (2008) placed the two in the same genus.

Chaney (1927) first recognized the striking similarities between the Eocene flora of the John Day Basin and those of modern Asian forests. During the Cenozoic (65 million years ago) deciduous angiosperms and conifers are thought to have crossed this land bridge which may have been situated as far north as 80 degrees N Lat. (O'Connor and Dorsey 2009). During the late Pliocene, mountain building episodes combined with a cold off-shore current drastically changed the climate, replacing the great subtropical rainforests that covered most of Oregon and Washington during the Eocene and early Oligocene with a summer dry Mediterranean climate (Raven and Axelrod 1978). During the Pleistocene, scores of species

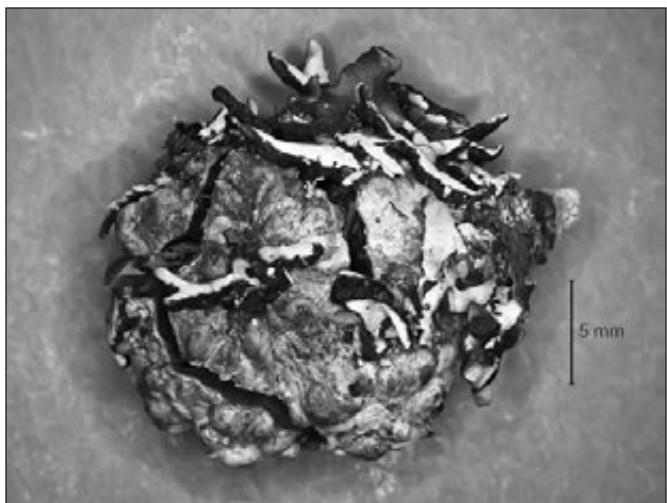
that flourished under the previous summer rainfall disappeared from the landscape. Others, such as Mendocino and Monterey cypresses, survived in mesic, north-facing canyons or in coastal habitats with cool, summer fog typical of a maritime climate. The discontinuities in their present distribution may have arisen when the xerothermic period (ca. 8,000 to 3,000 ago) brought a hotter, drier climate to coastal habitats (Axelrod 1980). The distribution of “closed-cone” forests (including most of the coastal cypresses as well as pines with serotinous cones) contracted severely as a result of the changing climate. Fossil records suggest that Sargent cypress grew over a large area during the Pliocene (5 to 6 million years ago), when the climate was much moister than it is today.



Cattle damage to a MacNab cypress; note the browse line on tree and the exposed roots from trampling by cattle. Michelle Sesock, the author's sister, is standing next to the tree on the Strauss property near Ashland. Photo by Frank Callahan.

“Paleobotanists Peter Raven and Daniel Axelrod believe that it became restricted to moist serpentine soils when a drying climate forced it out of other areas” (Hensen *et al.* 1993). The development of modern vegetation patterns occurred only in the last 1,500 to 3,500 years. Although no fossil records were found for Baker cypress and Mendocino cypress, fossil records in general indicate

a recent contraction in the ranges of all cypresses north of Mexico, most of which have highly fragmented distributions and occur on soils that are inhospitable to competing species. In contrast, regions with summer monsoonal precipitation, (e.g., Arizona, northern Mexico and central and southern Mexico's cloud forests) still support large populations of cypress in mixed conifer forests.



Baker cypress serotinous cones remain closed up to 15 years; five species of lichens grow on the surface. Photo by Cindy Roché and Robert Korfhage.



MacNab cypress collected from the Oregon site: note: prickles modified to horn-like projections on scale. Photo by Robert Korfhage.

A Future for Cypress in Oregon?

Timber harvest, firewood cutting and conversion of forest to farmland have been the primary threats to cypress species in Oregon. In California, entire populations have been destroyed by dams (Whiskeytown Lake and Shasta Lake), conversion of forest land to vineyards, and housing developments. Planting of non-native Monterey cypress near our native cypresses may lead

to hybridization. Fortunately, wind does not carry cypress pollen (which lacks air bladders) long distances, so adequate spacing can protect the genetic integrity of native populations. Native cypresses planted in proximity with each other also hybridize, for example Mendocino and Arizona cypresses (Adams *et al.* 2012). In addition, like most conifers, cypresses are highly sensitive to many commercial herbicides. Grazing by domestic livestock (goats, cattle and sheep) has severely damaged cypress populations worldwide. A browse line on the Baker cypress trees on Willits Ridge and the failure of seedling recruitment, along with soil compaction and erosion, are effects of poor range management on these BLM lands. Similar effects are evident from cattle grazing in MacNab cypress stands as well.

Decline of the world's species of cypresses should be a warning that human activities are rapidly destroying plant diversity of the planet. Habitats in the Klamath-Siskiyou bioregion of Oregon have provided refugia in the past and may continue to into the future. In addition to conserving the remaining native habitats, plantations for the presently endangered cypresses could be created as is being done by the Arboretum de Villardebelle in France. Individual citizens could also contribute to the conservation of native cypresses. Consider adding native species to your Oregon landscaping. The non-native Arizona and Monterey cypresses that are commonly planted in western Oregon could be replaced by our native cypress species. DO NOT plant Leyland cypress, which is a hybrid between Monterey cypress and Alaska yellow cedar and is an aggressive, fast-growing pest.

Baker, MacNab, Sargent and Mendocino cypresses are not well known in Oregon's nursery trade, but two nurseries in southwestern Oregon sell them (Plant Oregon at Talent and Forestfarm at Williams). Baker cypress has been planted on the Southern Oregon University campus and as highway corridor tree in Grants Pass where it grows with knobcone and gray pine. So far, MacNab, Sargent, and Mendocino cypresses occur primarily as novelties in private collections and arboreta but are well suited to being more widely planted (individually, to prevent hybridization) in home and public landscapes.

Recent phylogenetic investigations of the subfamily *Cupresoideae* have found evidence to suggest that *Cupressus* is not monophyletic. The genus splits into two distinct geographical clades: Old World cypresses (OWC) and New World cypresses (NWC) rendering *Cupressus* polyphyletic, with *Juniperus* as a sister to a clade of Old World *Cupressus* species. In light of this evidence, Little (2006) placed all NWC in the genus *Callitropsis* including the type: *Callitropsis nootkatensis* (D. Don in Lambert). Further research by Terry and others (2012) determined that there was evidence of four distinct clades: *Callitropsis (nootkatensis)*, *Xanthocyparis (vietnamensis)*, *Hesperocyparis* (all NWC), and *Cupressus* (all OWC). Baldwin *et al.* 2012 recognize *Callitropsis nootkatensis* (formerly *Chamaecyparis*) and *Hesperocyparis* (formerly a part of *Cupressus*). In short, all New World cypresses are now grouped under the genus *Hesperocyparis*, with *H. bakeri* as the first lineage within the genus.

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PLANT OF THE YEAR

Western Juniper (*Juniperus occidentalis*)

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“**M**aligned by many and admired by few” is how Stu Garrett (1995) described western juniper in the Plant of the Year article in the fifth issue of *Kalmiopsis*. This is such a common, well-known species, so why are we revisiting it as plant of the year? A single page doesn’t begin to do justice to this remarkable tree of Oregon’s “High Desert.” There’s more to this native plant than first meets the eye and, as with most things, greater knowledge brings greater appreciation.

Western juniper is nearly omnipresent on the dry side of Oregon. Almost every hill and every valley, if not dominated by it, has at least one or two hiding in the shadows. It is so ubiquitous that its presence is often lost in the background. Even while sitting in the shade of a western juniper, botanists have been known to omit it from their plant list for the site.

It’s a plant with a dual identity. At times it plays the wizened monarch of the rimrock, its girth and gnarly visage testaments to its age. At other times, and in other places, it’s the upstart, the bully. It moves onto land it did not previously occupy, ousting the long-standing inhabitants, and wreaking havoc in an otherwise nice neighborhood.

Humans venerate the old beaten up snags and barely living remains, which inspire them to designate wilderness areas (e.g., Oregon Badlands near Bend), create photographic art, and write poetry; in contrast, expanding populations of younger trees are the target of wholesale slaughter. It seems that people either love this juniper or hate it, really hate it.

My hope with this article is to present, in mostly layman’s terminology, a clear and concise overview of western juniper for those who may not be familiar with this native tree. The scope is limited to its basic biology, some

ecological information, and some of the effects of its changing presence on the natural landscape. Recently, copious research has been published on the subject. For readers who want to learn more about this native conifer, I recommend *Biology, Ecology, and Management of Western Juniper*, a technical reference produced by Oregon State University (Miller et al. 2005), which served as a basis for much of what is presented here.



These photos were taken from essentially the same location on the Crooked River National Grassland. Top photo was taken in 1905 and shows a farming operation with the homestead in the lower center of the photo, at the site of a spring. Western juniper exists as scattered trees on the ridge in the near background. Ninety years later, bottom photo shows the same scene in 1995. The ridge is virtually covered with trees, as are the buttes in the far background. Western juniper has even invaded the long-abandoned tilled ground, and the spring is gone. Photos courtesy A. R. Bowman Memorial Museum, Prineville.

Western Juniper or Something Else?

Junipers are members of the cypress family (*Cupressaceae*), a coniferous bunch that includes the majestic redwood (*Sequoia sempervirens*) as well as the cypress species described by Frank Callahan in this issue. In Oregon, we have three native junipers: western juniper (*Juniperus occidentalis*), common juniper (*J. communis*) and Rocky Mountain juniper (*J. scopulorum*) (Oregon Flora Project 2013).

Common juniper is easy to distinguish. It generally grows at higher elevations, seems to be more prevalent in the Cascades and west, and the plant is mostly decumbent, while western juniper is erect, usually with a central stem (trunk). Also, leaves of common juniper are longer (up to $\frac{3}{4}$ inch) and needle-like, in contrast to western juniper's appressed short leaves (less than $\frac{1}{4}$ inch) (Hitchcock and Cronquist 1973).

Rocky Mountain juniper more closely resembles western juniper, but its leaves are almost always in pairs. Western juniper's leaves are more commonly whorled, but they are sometimes paired, as well. Also, Rocky Mountain juniper is at the edge of its range in Oregon, and is only found in the extreme northeastern part of the state.

Sierra juniper (*J. grandis*, formerly *J. occidentalis* var. *australis*), which grows in California and Nevada, is dioecious; an individual tree generally bears either all male or all female cones. In contrast, western juniper is monoecious, normally bearing male and female cones on the same tree, although some trees may produce predominantly one or the other (Miller *et al.* 2005).

William Jackson Hooker, Director of the Royal Botanic Gardens in Kew, described western juniper in 1838 from a collection by David Douglas in 1825 from "the higher parts of the Columbia [River], at the base of the Rocky Mountains" (Kew Herbarium Catalog). The largest populations of western juniper are in Oregon, but it also grows in scattered locations in Washington, northeastern California, extreme northwestern Nevada and southeastern Idaho (USGS 2013).

Its Morphology – What Western Juniper Looks Like

Western juniper is the dominant tree across much of the non-montane landscape of eastern Oregon. Mature trees are typically 13 to 32 feet in height with a single, erect stem up to about two feet in diameter (Miller *et al.* 2005). Anyone from central Oregon can vouch that western juniper comes in almost as many shapes and sizes as there are trees. Trees have been documented to be as tall as 78 feet and to have stems more than six feet in diameter (American Forests Big Tree Register 2013).

The leaves of mature trees are scale-like, and usually no more than a tenth of an inch in length. These scales overlap each other on the stem as opposite pairs



The current range of western juniper (*Juniperus occidentalis* var. *occidentalis*) (USGS 2013).

or in whorled groups of three, so what the lay person might call a juniper leaf is actually a number of tiny leaves overlapping each other along the entire length of a branchlet. Each leaf also has a resinous ridge, resulting in an overall stickiness. In contrast, leaves of young junipers are long and needle-like. In fact, young



Immature male cones of the western juniper. Within a couple of months these cones will have released their pollen and, by late summer, will have dropped from the tree. Photo taken by author, Feb. 20, 2013, near Prineville.



Female cones of western juniper. Photo taken Feb. 15, 2013, west of Redmond. Photo by author.

trees (under 25 years) appear so unjuniper-like that the novice can easily mistake them for an entirely different plant. I once witnessed a seasoned BLM range conservationist bait a cadre of fresh-faced summer range technicians into identifying a four-inch juniper as a phlox.

Junipers are coniferous, which means “to bear cones.” In common vernacular, the female cones are called juniper berries because they look like small gray-blue berries. The male cones begin to develop during the late summer and early fall of one year, and then shed their pollen early the next spring. They appear as small, brown extensions of the green branchlets, and as pollination approaches, predominantly male trees will appear reddish-brown as the cones swell and eventually open. Male cones drop soon after they release their pollen.

The end of pollination is a time of celebration throughout eastern Oregon, because for many Oregonians, juniper pollen is a severe spring allergen (Pollen Library 2013). However, the physical act of a tree releasing its pollen is remarkable. Once, a



Galls caused by a wasp are often mistaken for female cones. Photo taken by author, Feb. 15, 2013, west of Redmond.

rancher told me that he saw a juniper tree “shudder,” just before it shot off a noxious cloud of yellow pollen into the surrounding air. The shuddering part is questionable, but a slight breeze can certainly trigger the simultaneous release of billions of grains of pollen from open cones.

The female cones begin to develop in the spring, and by summer they’ve reached their mature size, although it will be another year or more before they drop. The mature cone consists of a glaucous (covered by a waxy coating), deep blue, berry-like structure that contains two or three seeds enclosed in a resinous pulp.

Many trees have growths that appear to be cones, but are actually insect galls formed by larval infestation of a branchlet. Midge larvae (*Walshomyia* spp.) and moth larvae (*Heinrichiesa sanpetella*) have both been documented from these galls (Purrington and Purrington 1995). A colleague once came to me during a field trip, embarrassed and red-faced, admitting that for years she had told people these galls were the female cones of western juniper.



The bark of an older western juniper is usually furrowed. Photo taken by author, Feb. 15, 2013, west of Redmond.

The Geezer Factor –How to Know an Old Tree When You See It

Like people, the appearance of western juniper trees changes with age, and with the oldest one documented at 1,600 years old, there can be a lot of change. However, you can’t simply judge the age of a tree by its size; genetic and environmental factors greatly influence how fast and how large a tree grows. A tree 30 feet tall with a DBH (diameter breast height, 4.5 feet from the ground)

of 24 inches, for example, might be 200 years younger (or more) than that stunted, scraggly tree on an exposed, windswept basalt ridge nearby. Other characteristics can help identify a tree as a geezer (Miller *et al.* 2005), although counting tree rings is the only accurate method.

Most obvious is its overall shape. Young trees are more likely to have a cone-shaped top, reflecting their fast-growing nature. Tree tops become more rounded at about 150 years of age, and at this age the terminal growth of the leaders on the branches in the upper area becomes limited. Older trees also have trunks and large branches that are twisted and often dead. Even the tops can die, producing what is known as a “spike” top. Sometimes a live branch is connected to the rest of the tree only by a narrow strip of living tissue (cambium), with the rest of the branch dead.

The tree’s trunk also provides clues for aging. Bark on an older tree is usually furrowed or in strips, and not scaly like that on a younger tree. The bark of the oldest trees often turns from gray to red. Also, because heart rot is so common in older trees, the trunks are often hollow. Old-growth juniper usually makes for poor firewood, but good habitat for small mammals and birds.

Just like the old guys at the coffee shop, old trees have their friends. The dead and dying branches play host to the colorful chartreuse lichen (*Letharia vulpina*), often collected for its decorative value, and the thick duff (shed leaves and other organic matter that holds moisture) below these ancient trees gives rise to extensive communities of moss (*Tortula ruralis*).

It is a treat to come across one of these ancients in its natural habitat, be it on a windswept basalt rimrock high above the valley below, or as part of an old-growth juniper savannah on sandy, ash-derived soils in central Oregon. The proverbial “if only they could talk” certainly applies, and one can only imagine the stories these trees could tell.

Surviving in a Harsh Environment: An Accomplished Competitor

Perhaps most fascinating are the various ways western juniper is able to achieve a competitive edge. One adaptation is the change in the ratio of male to female cones depending on environmental factors. Although each tree has separate male and female cones, it’s common for trees to be predominantly male or female; anecdotal evidence suggests that the sex ratio changes according to

availability of moisture. Reportedly, female cones proliferate during wet years and male cones during drought. In support of this observation, a study of monoecious plants by Freeman and others (1981) showed a tendency for male cones to be more prevalent on xeric sites and for female cones to be more abundant on mesic sites.

Another trait that confers a competitive advantage to western juniper lies in how its seeds are disseminated. Beyond the usual methods of gravity, wind, and water, juniper “berries” are favored by a number of birds (*e.g.*, American Robin (*Turdus migratorius*), Cedar Waxwing (*Bombycilla cedrorum*), Pinyon Jay (*Gymnorhinus cyanocephalus*) and Townsend’s Solitaire (*Myadestes townsendi*)), especially in the winter. After feeding, the birds find a suitable perch to process their meal, where the seeds pass through the gut and are eliminated. Later they germinate where dropped, as evidenced by lines of young junipers along fences. Birds often perch on shrubs, especially sagebrush (*Artemisia* spp.), where there is a further advantage to juniper in that the seed finds itself in a



A typical ancient western juniper, showing the rounded, partially dead crown, dead and broken branches, and an abundance of the lichen *Letharia vulpina*. Photo taken by author, Feb. 15, 2013, west of Redmond.

protective microclimate that moderates temperature and moisture extremes typical of arid central and eastern Oregon. In fact, western juniper seedling establishment has been documented to be the most successful when it occurs within the confines of a sagebrush canopy (Soulé *et al.* 2004). Various mammals also eat juniper “berries,” including coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), and mule deer (*Odocoileus hemionus*) as evidenced by juniper seeds in the scat; that cattle sometimes browse both foliage and fruit can also be seen in their droppings (Frank Callahan, pers. comm.).

Juniper seeds have the capacity to remain dormant until environmental conditions are suitable for germination. Dormancy can be broken by exposure of the seed to suitable cool-moist conditions (stratification). Moreover, genetic variability in the capacity for dormancy among seeds allows a single seed crop to germinate successively over a period of several years (Miller *et al.* 2005).

Since dependable moisture in Oregon’s arid lands lies far below the soil surface, germinated juniper seedlings immediately begin to grow taproots, which continue to penetrate deeper and deeper over the subsequent decade. Above-ground structures, stems and leaves, are produced during this period as well, but are not the priority. The long, needle-like leaves of juvenile juniper may maximize photosynthesis necessary for root development. However, the stomata on these leaves are less protected than on mature scale-like leaves, which exposes the young plant to desiccation during hot, dry seasons. Thus, in addition to providing a protected environment for seed germination, sagebrush shelter increases juvenile survival by lowering temperature and increasing humidity.

Home is Where the Root Is – Almost Anywhere

Using a 1988 survey of the extent of western juniper in eastern Oregon, Gedney and others (1999) looked at occupied habitats and concluded that ideal conditions for western juniper are sites with annual precipitation of 10 to 15 inches, an elevation ranging from 4,000 to 5,000 feet, arid-xeric or xeric-arid soils, and landform positions of terraces and flood plains, or plateaus and uplands. Those are apparently optimal conditions, but under current land management practices, western juniper is a master in establishing itself under a wide variety of environmental conditions.



The colorful chartreuse lichen, *Letharia vulpina*, commonly grows on dead branches of older western juniper trees. Photo taken by author, Feb. 15, 2013, west of Redmond.



This branch is predominantly male, as evidenced by the proliferation of male cones, but a few female cones are also present, as well as the moth-induced galls. Photo taken by author, Feb. 20, 2013, near Prineville.

Gedney and others (1999) found western juniper on sites where the mean annual precipitation exceeded 30 inches and on sites with as little as five inches. Elevation ranged from about 1,000 feet up to 8,000 feet. The Oregon Flora Project data contains a record of western juniper from a site only 223 feet in elevation, and the species also occurs along the Columbia River near Mosier at 100 feet elevation (Frank Callahan, pers. comm.). Gedney and others (1999) reported western juniper on soil series within all 18 soil classes found in eastern Oregon (<http://soils.usda.gov/technical/classification/taxonomy/>), as well as on 10 associated vegetative-topographic land forms (*e.g.*, basins and valleys, grass-shrub uplands, lava flows).

Once Here and There, Now Nearly Everywhere

Although on a different timescale, western juniper, like many of Oregon’s residents who came from California, migrated northward when temperatures warmed after the Pleistocene. The earliest evidence of western juniper in Oregon is pollen from lake and pond sediment cores near Fort Rock, which is about 7,000 years old (Bedwell 1973). Once established here, western juniper populations expanded and contracted in response to cyclic climate changes until about 1860.

Ecologists (Gedney *et al.* 1999; Miller *et al.* 2005) now separate the geographic range of western juniper into two time periods, before and after Euro-American settlement, with the line of demarcation about 150 years ago (1870). Based on tree-

ring analysis, as well as on old photographs and other historical documents, pre-settlement juniper occupied specific sites on the landscape, areas more or less impervious to large-scale wildfire. These included such sites as rimrock and sandy soils where the scarcity of fine fuels prevented stand-replacing fires (Burkhardt and Tisdale 1969). Without a stand-replacing fire, the trees were allowed to mature. This further insulated them from fire because old trees are not so vulnerable to fire as their younger relatives, which may germinate in response to fire, but are just as quickly killed by a subsequent fire (Tirmenstein 1999).

All was well and good until European settlement of the West changed how fire was allowed to influence the natural landscape. Along with the outright control of fire, the introduction of livestock grazing caused a reduction in the fine fuels necessary to carry wildfire. Areas previously subject to periodic fires that restricted western juniper to the rimrock and other "fireproof" sites no longer burned. Thus juniper had free rein to expand its range, a situation exacerbated by favorable climatic conditions that promoted juniper reproduction (Soulé *et al.* 2004).

Grazing associated with settlement also removed the native bunchgrasses and introduced unpalatable exotic annual grasses and forbs that became flash fuels, further altering the timing and severity of wildfires. Other effects of grazing were trampling and other soil disturbance that removed the biotic crust and altered nutrient cycles, infiltration and runoff patterns, and provided an ideal seedbed for juniper. Controlling wildfires allowed young western juniper to survive and reproduce; at the same time, density of fire-sensitive sagebrush also increased, further enhancing establishment of juniper seedlings. Over half of the present-day juniper forest was established between 1850 and 1900 (Gedney *et al.* 1999).

Recent research adds another factor contributing to the range expansion of western juniper: the rise in atmospheric carbon dioxide. According to Knapp and others (2002), increased atmospheric CO₂ enhances growth of woody species, including western juniper, which would help explain an increase in juniper density even in areas where the natural fire cycle continued.

Today, the abundance of western juniper in Oregon is much different than it was even 80 years ago. The 1988 inventory estimated that western juniper existed on six million acres in Oregon, ranging from mature juniper forests to landscapes where juniper occurs as an infrequent solitary tree. Habitats included grasslands, sagebrush shrub-steppe, marshes, aspen stands, and ponderosa pine/mixed fir forests. Juniper forest, defined as at least 10 percent crown cover of juniper, was mapped on 2.2 million acres. This is a five-fold increase over the estimated 420,000 acres identified in 1936 (Gedney *et al.* 1999).

This Can't Be Good: Human-mediated Changes Alter Western Juniper's Role in Our Environment

An old-growth juniper woodland or savannah, consisting of scattered old trees, infrequent seedling survival, and a healthy understory of shrubs, herbs and grasses, provides many benefits: habitat for a variety of native wildlife and invertebrates; healthy soils with intact mineral and hydrological cycles; and a vigorous diversity of vegetation covering the landscape. Conversely, an increasing density of post-settlement western juniper has many interrelated and negative effects on many aspects of the environment. While not exhaustive, the following discussion covers the major points.

Western juniper has a competitive edge in both disturbed and relatively undisturbed environments. Once it has put a taproot down to a dependable source of water, the tree produces lateral roots, forming an extensive mat of fibrous roots close to the soil surface. These lateral roots normally extend out for at least a distance equaling the height of the tree, but can extend to three times the tree height (Miller *et al.* 2005).



A young western juniper is nurtured within the protective confines of a mature big sagebrush (*Artemisia tridentata*). Photo taken by aurhot, Feb. 20, 2013, near Prineville.

The widening canopies intercept up to 42 percent of the precipitation (Young *et al.* 1984), resulting in less surface moisture for understory plants that must also compete for soil moisture with an expanding mass of lateral juniper roots. As an evergreen, western juniper continues to transpire and extract soil moisture during cool seasons when understory species are dormant. At some sites, the growing season for understory plants was reduced by six weeks through a reduction in available soil moisture (Bates *et al.* 2000). Once soil moisture has been depleted, the overlapping resinous leaves of mature western juniper cover the stomata, minimizing transpiration.

Changes in soil fertility begin to occur, including a shift of organic matter and essential nutrients from the tree interspaces to under the juniper canopy and of the above-ground nutrients stored in plant biomass to the juniper. Less sunlight and water as well as fewer nutrients are available to the understory plants (Klemmedson and Tiedemann 2000).

Eventually, composition and density of the understory change. On some sites, especially the drier sites with a restrictive soil layer, the species with shallower roots, such as Thurber's needlegrass (*Achnatherum thurberianum*), are the first to go. On others sites, it's the sagebrush that pays the price. More mesic sites with Idaho fescue (*Festuca idahoensis*) seem to maintain a healthy cover of native grasses and herbs in spite of western juniper dominance. Other sites become dominated by annuals, for example, cheatgrass (*Bromus tectorum*) (Miller *et al.* 2000). One can't always predict how a site will change, but by the time the shrubs weaken and die, the juniper has won.

Reduction and loss of the associated understory plants result in further environmental decline. Additional modifications to the hydrology of the site occur. Fewer plants in the interspaces means the soil is more susceptible to the effects of raindrop splash and overland flow. Water that was previously slowed by these plants and their associated organic matter and allowed to percolate into the soil, now flows freely across the landscape. The result is soil loss and additional degradation of the site (Pierson *et al.* 2007). The loss of understory species further reduces the ability of the site to carry fire. The fine fuels are gone, and a mature, post-settlement woodland has made itself virtually fireproof.

The abundance and composition of wildlife species change as the result of conversion to western juniper woodland. Open woodland with a low density of western juniper, which also includes a healthy shrub component, provides maximum structural complexity for songbirds. Conversion to a closed juniper forest and the associated loss of the shrubby understory reduces habitat complexity and causes a corresponding decrease in the number and diversity of avian species (Noson 2002), although some cavity nesters (*e.g.*, Mountain Bluebird (*Sialia currucoides*) and Red-breasted Nuthatch (*Sitta canadensis*)) prefer juniper woodland. Food and cover for small mammals is also lost, while some species, such as bushy-tailed woodrats (*Neotoma cinerea*), rabbits (*Lepus* spp. and *Sylvilagus* spp.), and porcupines (*Erethizon dorsatum*), thrive as western juniper increases (Maser and Gashwiler 1978).

Large herbivores use western juniper habitats for food and cover, but as sites transition to a closed woodland, shrub species are lost. This adversely affects species that rely on sagebrush for food and cover, such as Greater Sage Grouse (*Centrocercus urophasianus*). Additionally, as the trees increase in density, an animal's ability to spot predators is decreased. More trees also mean more ideal perch habitat for birds of prey, which keep populations of small mammals and birds in check.

Say It Ain't So: Another Viewpoint

As with most things in life, there are two (or twenty-two) perspectives. Some subscribe to the viewpoint that, even though western juniper expansion has a demonstrable effect on species composition and herbaceous biomass, there are few detrimental effects on hydrology, soils, or wildlife habitat on affected sites (Belsky 1996).

Conclusion

If your sole experience with western juniper has been a blur in the background during your sub-sonic drive from Bend to Burns in search of that special *Eriogonum*, hopefully you gained some knowledge by reading this article. This important native Oregon plant has its place, but its ongoing increase across the landscape definitely presents challenges. These challenges, of course, have led to research studies designed to halt its advance and restore damaged ecosystems. Consideration of these topics is left for a later chapter. Now that you have a better appreciation for western juniper, on your next hike, take a moment to ponder that tree before you and appreciate it for more than just its shade. How old is it? What do the cones look like? Would I have found this tree here 200 years ago? What other species depend on it for their survival?



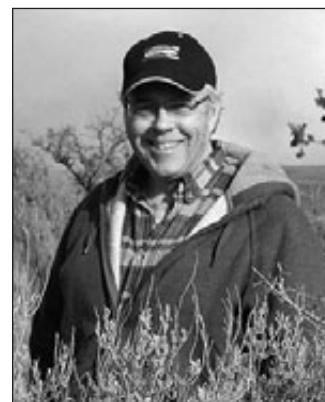
The leaves of trees generally younger than 25 years old are noticeably longer and grayer in color than those of the mature trees. Photo taken by author, Feb. 20, 2013, near Prineville.

Acknowledgements

Special thanks to Tim Deboodt, staff chair of the Crook County Oregon State University Extension Service, for a thorough technical review of this document. Tim has had years of experience with western juniper, especially dealing with its management, and is an author of a number of related publications. His PhD dissertation, Watershed Response to Western Juniper Control, was completed in 2008. Also, thanks to Steve Lent, assistant curator of the A. R. Bowman Memorial Museum, in Prineville, for providing photos used to illustrate the present density of western juniper compared to its historical situation. His assistance in this project, as well as in other recent endeavors, is irreplaceable.

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Ron Halvorson received a BS in Animal Science in 1972 from California Polytechnic State University, San Luis Obispo, and MS in Renewable Resource Management in 1974 from the University of Nevada, Reno. That same year he began his career with the Prineville District of the Bureau of Land Management in Oregon, as a Range Conservationist. In 1985 he converted to a Natural Resource Specialist so he could focus his energy on his true love, plants. From then until his retirement in 2008 he was primarily responsible for the botany program in the Prineville District. Ron remains in Prineville with Gayle, his wife of more than 40 years.

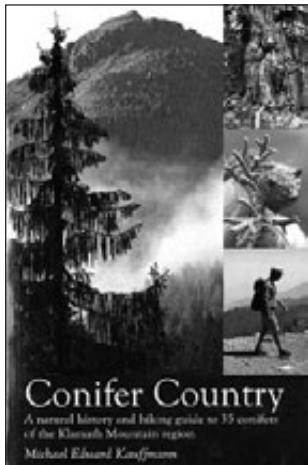
BOOK REVIEWS

Conifer Country

Michael E. Kauffman, 2012. Kneeland (CA): Backcountry Press. 206 pp. ISBN 978-0-578-09416-8 \$24.95 paper.

Being a trailblazer at heart, I normally have little use for the plethora of hiking books on the market. But when Michael sent me of copy of *Conifer Country*, I couldn't resist reading it. I was a little disappointed that the rest of the biota was left out, because botanical endemism is particularly high in the Klamath Range. Of course, the author had to focus his efforts and, with 39 conifers recorded in the region (even without the Del Norte pine, which is still in question), he had more to work with than in any other temperate mountain range of its size on the planet. The first part of the book covers climate, geology and the tree species. Well over half of the book is dedicated to Klamath conifers and their distribution and his maps are the best yet. I found some mis-statements in the section describing the conifers. For example, in the section for gray pine (*Pinus sabiniana*) (pages 84-86), the 500 to 2,500 ft. elevation range should be from nearly sea level to 7,000 feet elevation (at Sawtooth Peak, Inyo County), and that the pine is dependent on fire to regenerate is misleading because both birds and rodents are involved. The description of its distribution in Oregon as outlier populations that naturalized from plantings for food or landscaping in recent human history was refuted in a 2009 article in this journal (*Kalmiopsis* 16:1-14). On page 99, the author states that an underlying band of serpentine that runs east to west from the mountains to the coast north of the Chetco is an edaphic barrier to northward movement of redwoods. These serpentine belts actually run north to south; rather than inhibited by this substrate, coast redwood thrives on weathered serpentine-derived soils. Then on page 113, he comments that "Alaska-cedar trees do not reach significant size in the Siskiyous—I've never seen one more than 35' tall." I've seen Alaska cedars 70 feet tall and nearly 3 feet in diameter on Whiskey Peak in the Oregon Siskiyous. These and a few other errors will be corrected in the second edition, coming soon.

The remainder of the book is all about hikes, but not to worry, none of these is anywhere as long as the Pacific Crest Trail or the Desert Trail, which both extend from the Mexican border and to the Canadian border. If you are a teacher, with a three month vacation, you might have enough time to complete the PCT in one season, or you can complete a half dozen of the 29 hikes listed in *Conifer Country*. The author is a teacher and clearly he has put his time to good use by writing this intriguing book (that is not only for teachers). The important thing to remember is to select hikes that are within your capability and time frame and be prepared to deal with the elements and strenuous climbs. Be sure to take time to smell the conifers and explore the geology and hydrology. When you are fit enough, you may want to do the Iron Man hike *a.k.a.* the 400-mile Bigfoot Trail mentioned at the end of the book. If you push so long



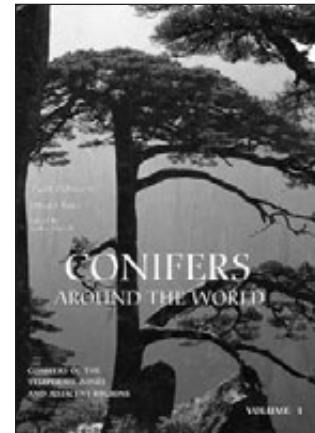
and hard that you think you've just seen Bigfoot, it's time to take a break! Is he really out there? Well, you will just have to take the trail and discover for yourself.

This book is well written and very readable, the color photography is superb and just enough black and white photos to draw you into the mountains to see the real colors. Would I recommend that you buy the book, well no, not unless you get off your duff and put it to good use! This guide to the Klamath Mountains can give you an experience of a lifetime. Don't pass up the opportunity, and be sure to take the book with you (carry it in a zip-lock bag to keep the elements out). —Frank Callahan, *Siskiyou Chapter*.

Conifers around the World: Conifers of the Temperate Zones and Adjacent Regions

Zsolt Debreczy and István Rácz, edited by Kathy Musial. 2012. 2 vols. ISBN (Vol. 1) 978-963-219-063-1; (Vol. 2) 978-963-219-064-8 (Vols. 1-2) 978-963-219-061-7-0. 1089 pp. DendroPress Ltd., Budapest, Hungary. \$250.00 hardcover.

This enormous work is the most ambitious and comprehensive treatment of conifers ever realized. As the outcome of 2,000 field days through the temperate world by the authors and scores of volunteers during more than sixteen years, the two volumes weigh a total of 14 pounds and comprise 1,089 glossy 9- by 12.5-inch pages, 474 range maps, 541 taxa of 56 non-tropical conifer genera, 1,300 drawings, and over 3,700 photos. In Volume 1, conifers are introduced in a strikingly illustrated discussion entitled "About Conifers" that includes the age of discoveries, conservation, classification and identification, above-ground morphology, distribution, and climate. Next is a discussion of families (by Robert A. Price) and genera among conifers that fills 43 pages. The authors recognize seven families: Araucariaceae, Cephalotaxaceae, Cupressaceae, Pinaceae, Podocarpaceae, Sciadopityaceae, and Taxaceae.



The world's temperate conifer forests are divided into eleven regions: Europe, continental Asia, Japan, western and eastern North America, etc. The authors describe each region's climate zones, geology, history, floristics, illustrated with photos of conifer habitats. This section sets the scene for full-page treatments of that region's conifer species and varieties, arranged in alphabetical order. These treatments are the heart of this momentous work. Each includes accepted nomenclature, synonymy, brief discussions of ecology, distribution, or notable natural-history topics, and a compressed botanical description. Each page is dominated by a large photo of the tree, always in its natural habitat, accompanied by smaller ones showing details of cones and foliage. Three fir species and a variety and a pine species, all Mexican, have Debreczy & Rácz authorship, resulting from this project. Range extensions of several species are noted, including one of 500 km for Douglas fir in southern Mexico.

Volume 2 includes a Bark Gallery of 648 tree trunks, an appendix

of taxonomic and genetic variation issues, a glossary, references, and species list. An epilogue mourns the loss or endangerment of many of the habitats depicted in this work since they were visited in the project. There are many sidebars and other features conveying a variety of information.

The basic description above does not express the level of organization, dedication and perspiration that went into the numerous expeditions into remote areas to visit all these conifer habitats, (e.g. three trips to China and two to Mexico) or the rigors of finding, isolating and photographing examples of all these taxa in whatever weather the photographer (mainly Rácz) encountered. The photographs are excellent quality. The sepia-toned drawings, mostly by Emese Bárczi, meet the highest standard of botanical art. The editor has rendered the text with remarkably few errors and clear explanations of complex matters. The style is relaxed contemporary American English usage without the awkwardness of most translations. Impeccable design and construction make these volumes a joy to explore and peruse.

No worker can be expected to agree with all of Debreczy's hundreds of taxonomic decisions or emphases. For example, I feel that natural hybridization is slighted, especially in western North American pines (Jeffrey x Coulter, Jeffrey x ponderosa, singleleaf pinyon x Colorado pinyon, knobcone x Monterey) and firs (California white x grand); animal dispersers are given short shrift; and some taxa are more or less deserving of their rank than others. But such crotchets are a scant detraction from this invaluable summary of two centuries of conifer study. —Ronald M Lanner, Placerville, CA.

David Douglas: A Naturalist at Work. An Illustrated Exploration Across Two Centuries in the Pacific Northwest.

Jack Nisbet, 2012. Seattle, WA: Sasquatch Books. 192 pages. Line drawings, maps, photographs, index. ISBN 13: 978-1-57061-829-1. \$27.95, hardcover.

A few years ago, I took part in a field trip at Mount Pisgah Arboretum led by Rhoda Love. I was totally taken by the story she told of David Douglas's trek through the Willamette Valley in search of sugar pine (*Pinus lambertiana*). He may not have set foot on Mount Pisgah, she said, but he wasn't far from here. She piqued my curiosity about Douglas, so when I first saw *David Douglas: A Naturalist at Work* in a bookstore, I was drawn to acquire it. I wanted to know more about the Pacific Northwest that Douglas saw, and I found the illustrations, especially the colorful line drawings of wildflowers in the book, lovely.

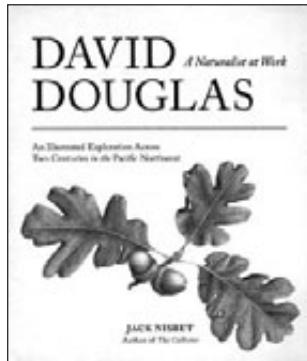
After Nisbet completed his biography of David Douglas (*The Collector*) [see review in *Kalmiopsis* 17:29-30], he became aware of how much more there was to tell about where Douglas traveled, his personality, and the plants and animals he collected or described. This book differs from *The Collector*, which was written as a biography. In his second book Nisbet uses a series of essays to connect "aspects of Douglas's work to modern reality." Nisbet pairs the adventures of a naturalist in the Pacific Northwest in the

1820s and early 1830s with his own experiences while researching Douglas's life and times two centuries later. Nisbet documents the people Douglas interacted with, the state of natural science at that time, and his excitement in describing the flora, fauna, and geography of a land that had not yet been well explored from a scientific viewpoint. The London Horticultural Society financed Douglas's journey to gather seeds and bulbs of horticultural value for the British Isles and to add to the taxonomic knowledge of the flora and fauna of the New World, and provided him letters of introduction to the Hudson's Bay Company.

In eleven essays (a prologue and ten chapters), Nisbet covers a variety of topics: Waters of the World (Crossing the Columbia Bar), Going Their Own Way (The People of the Northwest Coast), Awakening (The Roots of Plateau Culture), Science and the Company (Outsiders in the Hudson's Bay Company Empire), Invisible Kin (Mixed-Blood Families of the Fur Trade), Comrades and Miscreants (Bringing the Northwest to London), The Forest and the Trees (After the Fire), The Wise Economy of Nature (Adapting to the Landscape), The Iron Sphere (Earth's Magnetic Pulse), and Travelers (Riding the Wind).

Through these essays, Nisbet presents us with sketches, literal as well as descriptive, of the residents and explorers of the land where Douglas traveled. We meet ship captains, doctors who double as naturalists, fur traders and explorers, eminent botanists and geographers of the time, politicians/administrators/entrepreneurs who oversaw the Hudson's Bay Company's business, and native people who, for the most part, welcomed Douglas and fed his inquiring mind. We learn that native Hawaiian sailors who washed ashore after a shipwreck were the source of the name Waikiki Beach for an inlet at the mouth of the Columbia River. We are given glimpses into Douglas's gear and day-to-day tasks. Most readers of this review will be familiar with plant collecting equipment like the vasculum and plant press, but may not know how Douglas preserved animal skins using arsenic. Using the scientific instruments of the time, Douglas measured magnetic fields to determine latitude and longitude. Douglas described the native people and how they used plants and animals for food and to make clothing, baskets, and digging tools. All of the essays are richly illustrated: some are photographs of specimens sent to England by Douglas; many are lovely, colored line drawings of plants from *Edward's Botanical Register*, Hooker's *Flora*, and Richardson's *Fauna*. Nisbet is a historian so, in the back of the book, he supplies documentation in the form of a Chronology, Chapter Notes, Illustration and Caption Credits, a Bibliography and an Index.

The final chapter, "Travelers," seems particularly relevant to NPSO members with its thoughtful analysis of plant migration. He illustrates his points with lambsquarters (*Chenopodium album*), a weed with a long history of human use that was already well established in the Pacific Northwest when Douglas arrived. Douglas also collected another species widely regarded as a European weed, reed canarygrass (*Phalaris arundinacea*), in pristine native habitats. Its subsequent invasiveness is now attributed to hybridization with European cultivars and disturbance of wetland habitats. A similar scenario is described for fireweed (*Epilobium angustifolium* [*Chamerion angustifolium* according to the Oregon Flora Project]), native to both North America and northern Europe, but more aggressive in England after the introduction of New World genes. Two of our native shrubs, salal (*Gaultheria shallon*) and salmonberry (*Rubus spectabilis*), have spread in Great Britain to form dense thickets that displace native plants.



I recommend this book to anyone who enjoyed Nisbet's first book about David Douglas and to those who want to delve deeper into his world as well as into the natural history of the world around us today.
—Mary Beth Averill, Emerald Chapter.

The Jepson Manual: Vascular Plants of California, Second Edition.

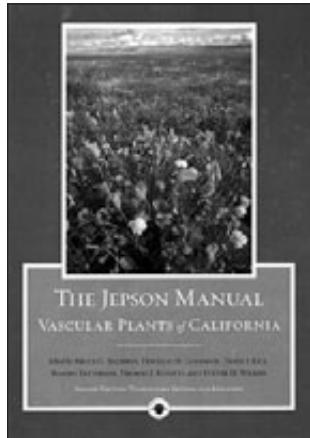
Bruce G. Baldwin, Douglas H. Goldman, David J. Keil, Robert Patterson, Thomas J. Rosatti and Dieter H. Wilken, editors. 2012. ISBN 978-0-520-25312-4. 1568 pp. University of California Press. Berkeley. \$125.

Twenty years ago, in 1993, I reviewed the new Jepson Manual in the third issue of *Kalmiopsis*. Now the second edition of California's definitive flora The Jepson Manual (TJM2) is published and available as both hard copy and electronic book. Like the first edition the 1500+ pages of TJM2 means it is no field manual. The quality paper appears to be well bound, but the book lacks a dust jacket. Only time will tell how well the volume

will stand up to the unintentional abuse that floras receive by users that are constantly switching back and forth from keys to description to illustration and back again under a variety of environmental conditions. (The digital version allows the user to do this "flipping back and forth" using links.)

The second edition retained many of the features of the first edition, but with some nice additions and needed omissions. TJM2 updated discussions of the Geographic Subdivision of California and the Geologic, Climatic and Vegetation History of California. These sections have ecological value beyond the presentation of the flora. TJM2 no longer has a discussion of the pronunciation of scientific names, nor does it list the horticultural value for various species. Horticultural information was moved to an online database. Other acknowledgements of the digital age are inside the front cover: smart phone QR (Quick Response) codes for online access to the Jepson Flora Project and the Consortium of California Herbaria.

Modern enthusiasms for genetic and phylogenetic analysis accepted by the editors resulted in re-classification of vascular plants at the family level. These changes will perplex many users, especially older individuals who still struggle with accepting previous family names for the ones they learned in college, e.g., Brassicaceae for Cruciferae or Lamiaceae for Labiateae. The family classification appears inside the back cover and its facing page as a cladogram, which you can imagine as representing a figurative branching tree. This tree shows how TJM2 is organized to follow current understanding of vascular plant phylogeny. There are eight main branches (or clades) familiar to most readers (Lycophytes, Ferns, Gymnosperms, Eudicots, and Monocots), and some new ones, including Nymphaeales, Magnoliids, and Ceratophyllales. Each clade branches again and again, eventually terminating like some golden fruit in a family name that is either familiar or new. A number of genera formerly included in the Liliaceae have been placed in a different family e.g., *Camassia*, *Chlorogalum*,



Hastingsia and *Leucocrinum* are now in the Agavaceae and a number of former Scrophulariaceae (e.g., *Mimulus*, *Penstemon*, *Digitalis* and *Collinsia*) are now lodged in the Plantaginaceae. The main problem for most users will be to learn where their favorite taxon moved. To their credit, the editors chose to arrange the families, genera, and species in alphabetical order within their higher group making locating them a little easier.

In the cladogram asterisks indicate that a family comprises only non-native taxa (not part of the native California flora): * indicates naturalized, at least in part, or ** which indicates waifs only. Mercifully, the family name at the end of each branch is followed by the page number where the family occurs in the text. I will be very surprised if users find this particularly useful. The index might be clumsier than the cladogram, but quicker because it is alphabetical. Alternatively, download one of the several available alphabetical lists of family names with TJM page numbers. As with all changes, there will be grumbling until new things are learned and the old if not forgotten, at least set aside and the new accepted.

On the other hand, those who prefer going back to the 1970s might like some of the changes in the former Gramineae (Poaceae). *Stipa* is back, and includes all its former members (which had been split into *Hesperostipa*, *Achnatherum*, *Nassella*, etc.). The fescues are all back together again, including the cultivated fescues, tall and meadow (*F. arundinacea* and *F. pratensis* are *Schedonorus* in Flora of North America), and all the annual fescues (*Vulpia*), as well as *Leucopoa kingii*. Our Oregon fescue (*F. roemeri*) is gone, submerged into *F. idahoensis*. Then the lumping process goes even further: the former *Lolium* ryegrasses are also fescues, now *Festuca perennis* (which includes *L. multiflorum*) and *F. temulentia*. *Podagrionis* is gone, returned to *Agrostis*. Crested wheatgrass is still *Agropyrum cristatum*, but the other *Agropyrum* species of the 1970s are mostly *Elymus* here, e.g., *E. repens*, *E. smithii*, *E. trachycaulus*, *E. lanceolatus*, *E. ponticus*. Our beautiful native vanilla grasses (*Hierochloe*) remain submerged in *Anthoxanthum* with the weedy vernal grasses (as in Flora of North America).

The question for Oregon botanists is "Should I spend that much money for TJM2?" The answer might be yes, depending on the proximity of your botanizing sphere to California, or if you are keenly interested in the California flora and want to know how the collaborators classified and named it. Unfortunately, as a big complicated book, TJM2 has a big complicated errata list: http://ucjeps.berkeley.edu/JM12_errata.html. Most Oregon botanists are probably hoping that the wait for our Oregon Flora will not be too long; it will be more important to us to see how the Oregon Flora Project handles the nomenclature, classification, and identification of Oregon's vascular plants which, so far, is not following the California lead. —Frank Lang, Siskiyou Chapter.

Oregon Geology: Sixth Edition.

Elizabeth L. Orr and William N. Orr, 2012. Corvallis (OR): Oregon State University Press. 304 pp. ISBN 978-0-87071-681-0. \$24.95 paper.

All botanists who are serious about understanding the native and introduced flora of a region should have, along with their floras and field guides, at least one good geology book on the reference shelf. Based on my recent experiences as editor of this journal in having to arbitrate disputes over geology in manuscripts, the Orrs' Sixth Edition Oregon Geology would be my choice of a reference.

This book is an Oregon classic and, because this is the sixth edition, you can be sure that most of the errors that creep into the publication process have long since been corrected. Since the previous edition in 2000, the overall shift in geologic thinking has been toward tectonics and away from general geology and economics. Thus, the Orrs place more emphasis on the geologic hazards of earthquakes and tsunamis, both of which are more directly relevant to ordinary citizens, than on gas and mineral reserves (still relevant, but indirectly).



There are two obvious ways that one might organize the material for a book on geology: chronologically or geographically. The authors chose to tell the long history of Oregon's geology by region, which makes the information more accessible to botanists whose map reading skills may be better than their fluency in the language of geologic time. The authors chose to tell the long history of Oregon by region, which makes the information more accessible to botanists whose map reading skills may be better than their fluency in the language of geologic time. After an introductory chapter (*Life on the Edge*), the book comprises nine chapters: Blue Mountains, Klamath Mountains, Basin and Range, Owyhee Plateau, High Lava Plains, Deschutes-Umatilla Plateau, Cascade Mountains, Willamette Valley and Coast Range & Continental Margin. Closing out the book are a long list of references and a comprehensive index.

One of the most valuable parts of the book is the chart on pages 10 and 11 in the *Life on the Edge* chapter. (*Life on the Edge* refers to Oregon's position on the leading edge of a moving crustal plate.) The chart displays clearly the relationship between time and space in Oregon geology. Along the left vertical axis is geologic time (by era, period, epoch, and millions of years ago) from the Archean through the Holocene. Horizontally, the middle column is Western Oregon and Cascades and the right column is Eastern Oregon. Below each of these headings are the formations and events (terranes, volcanism, glaciations, etc.). Put a tab on this page when you get your book, so you can refer back to it to keep your bearings while reading the material about specific locations, as this is "the big picture." I'm sure I'm not the only botanist who can't always remember the relationship of the Eocene to the Pliocene.

The other most valuable aspect of this book is the abundance of line drawings, maps and photographs. There is no color inside the book, but that doesn't detract from the value of the illustrations. (It only detracts from the price, which is a good thing.) New to this edition are the human interest biographical sketches and photographs of noteworthy geologists whose work contributed to this volume. For example, I learned that Mark Ferris, a native of Medford and raised in nearby Phoenix, grew up in the shadow of the Eocene Payne Cliffs Formation, which is the view out my front window.

This book is packed with so much fascinating information about parts of Oregon that I'm going to pack it in the utility box in the back of our 4Runner so we have it with us every time we travel the back roads of Oregon. —*Cindy Roché, Siskiyou Chapter*.

Walking Distance - Extraordinary Hikes For Ordinary People.

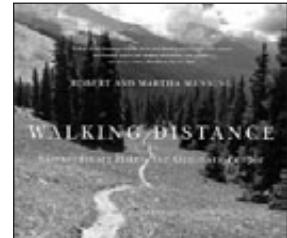
Robert and Martha Manning. 2012. ISBN 978-0-87071-683-6. 248 pp. Oregon State University Press. \$35 paper.

Having walked some of the world's better-known trails, I was intrigued with this book when I first saw it advertised in the OSU Press catalogue. The title immediately piqued my interest as I am always looking for a new hiking adventure. Here was a book with thirty walking routes scattered around the world, of which I had completed only two. As I turned the pages, my bucket list lengthened, and I found a wealth of information to get me started planning my next big hike.

The title of the book combines the terms "Walking Distance" and "extraordinary Hikes." I was puzzled because I always considered my long distance foot travels as hikes not walks. However, after checking with the dictionary, the difference became clear and I understood why the author used both terms. Walking is defined as travel on foot at a moderate pace; hiking is walking a great distance. So if you like to walk, and want to extend your miles into long distances, and like to travel afar, then this book will divulge many new opportunities for you.

The brief introduction provides the essential basics for those who haven't done a long distance walk before, including how to walk, planning a long-distance walk, clothing, gear, food, way finding and walking ethics.

The thirty extraordinary hikes described in the book include eleven routes here in the United States, with the remainder in other countries around the world, ranging from New Zealand and Australia to Europe and South Africa. There is one in Peru and another in Turkey. From rugged mountain hikes at high altitudes, pastoral hikes through country landscapes of Europe, to spiritual walks across an entire country, the book offers hikes that vary in ruggedness and amenities. The descriptive pages offer hiking opportunities for different skill levels and interest. The hike descriptions are like hors d'oeuvre before a big dinner. There is just enough information to whet your appetite for the full meal to follow. To enjoy the main course of actually doing the hike, one will have to do additional planning using the section entitled "further reading" at the end of each chapter. I have walked a couple of the routes that are in the book and find the authors have covered the basics rather well. Each walk description includes a general location map, length, types of accommodations (commercial, huts/refuges, camping), availability of baggage transfer, if there is an opportunity to walk the distance in sections and the degree of challenge. Since the authors have traveled all the routes described in the book, they offer their personal insights to each of the trail's attributes and nuances.



Botanizing and walking fit together like hand in glove. Here is a book that can enhance your exploration of the world's flora and variety of ecosystems by offering you a collection of paths guaranteed to be well-managed and well-marked. Most of the trail descriptions discuss the ecosystem through which you will be walking, unusual botany, wildlife, or historic aspects of the walk and point out any precautions that should be taken. With the information in this book and some careful planning you can latch onto your hiking poles, grab your wildflower field guide and start walking in places you might not otherwise have ventured. —*Robert Korfhage, Siskiyou Chapter*.

NPSO FELLOWS AWARDS

Kareen Sturgeon

Kareen Sturgeon richly deserves the Fellows Award for 33 years of contributions to the Native Plant Society of Oregon. NPSO was the first organization that Kareen joined when she arrived in Oregon in 1980, and she immediately met many like-minded plant-lovers who remain friends to this day. Despite the length of her service, she is not slowing down at all. But there is no need to delay the award, as she is not one to rest on her laurels. She has already begun organizing the 2014 NPSO Annual Meeting which will be hosted by the Cheahmill Chapter in Cannon Beach. She is well qualified for the task, as she also chaired the committee that organized the 2006 Annual Meeting in McMinnville.

Kareen's childhood was surrounded by beautiful plants. When she grew up in West Los Angeles, lemon and avocado groves were still prevalent on the hillsides of the Santa Monica Mountains, deer ate her father's roses, and cougars frightened the neighbor's horses at night. The Santa Monica Mountains were protected from development and their chaparral-covered slopes were the playground for her and her two siblings. Each weekend, she and her brother and sister were required to contribute several hours of yard work; among the many exotic, enticing plants in this Mediterranean garden were bird-of-paradise, ginger, aloe, hibiscus, papyrus, apricot, banana, avocado, gingko, and eucalyptus. She recalls her teenage amazement when she first realized that leaves had veins and that seeds could fly (a maple samara)! Family vacations were always outdoors and nature-oriented; they visited all the National Parks in the West and spent their days watching wildlife, swimming and hiking.

She was in her mid-20s by the time she realized that she could build a career around her love of nature, plants in particular. After earning a degree in Public Health (UCLA) and working in that field for several years, she went back to school and studied coevolution between insects and their host trees (MS, California State University East Bay, 1976; PhD, University of Colorado, Boulder, 1980). Her research took her throughout the scenic rugged mountain ranges of the West (Sierra Nevada, Cascades, Rockies). After completing a post-doctoral project in forest genetics at Oregon State University (1980), she began teaching biology at Linfield College in 1981.

Kareen helped found the Cheahmill Chapter in 1997. At the first meeting to assess support for having an NPSO chapter in McMinnville, over 50 people attended. She served as the first President of the new chapter and has been actively involved on the Board ever since. With her numerous professional contacts in botany, she has helped the chapter find interesting speakers and she has given several presentations herself, including all-day workshops on plant identification. In 1991 she organized the first McMinnville NPSO Wildflower Show, which is now an annual chapter activity.

Other chapters, as well as the State NPSO, have also benefited from Kareen's dedication. She has made numerous presentations to chapters (Portland, Mid-Columbia, Emerald and Corvallis) on the botany of the Malheur and Steens Mountain area, Siskiyou



Mountains, Arctic Alaska, and Switzerland. She has served as Director-at-Large on the State Board for many years, and has served on the Editorial Board of *Kalmiopsis* for two years. For several years (2002-2005), Kareen served on the Strategic Planning Committee that developed a Strategic Plan for the organization, revised the Mission Statement, and compiled information for, and wrote, the NPSO Handbook.

In my opinion however, Kareen's greatest contribution to NPSO is not everything that she has done and is still doing for the organization (which might be considered preaching to the choir). Her greatest contribution has been recruiting the next generation of informed and passionate citizens to "enjoy, conserve, and study native plants and habitats."

Kareen retired in 2008, after a 27-year career as Professor of Biology at Linfield College

in McMinnville. She taught Systematics of Flowering Plants; Plant Ecology & Diversity; Plants & Society; Evolution; the botany and evolution sections of Principles of Biology; Environmental Science and honors courses, such as Environmental Literature, Ecology, Economics & the Environment, and Science & Gender. She and her students conducted research in plant ecology and systematics in Arctic Alaska, in mountainous regions of the northwest, and in the Willamette Valley (Kareen lists 26 student research presentations at professional meetings since 1993). Kareen led numerous field trips for botany students to such places as the Malheur/Stoons Mountain area, the Siskiyous, and the Columbia River Gorge. She taught month-long classes abroad in Switzerland (systematic botany) and Costa Rica (tropical biology). She established an online database of what is now over 4,000 plants in the Linfield Herbarium, which has specimens dating back to the late 1800s. At the end of each spring semester, herbarium label information from student collections was entered into an electronic database that was sent to the Oregon Flora Project at OSU; thus, their collections became part of the statewide effort to prepare a flora for the State.

Students from Linfield College regularly attend Cheahmill Chapter meetings. Chapter members were often invited to participate in Linfield trips that Kareen led for students, including to the Columbia Gorge and Mt. Hebo. Beginning in 1995, Kareen led summer hiking and wildflower tours to the Swiss Alps. The tours were sponsored by the Linfield College Alumni Association, and many of the participants (including my husband and myself) were members of NPSO.

Since her retirement, Kareen has continued to inspire native plant lovers with her volunteer work. For three years, she has taught the botany and plant identification sections of the Yamhill County Master Gardener training course. She has donated hundreds of her own plant photos to the Oregon Flora Project. All of these activities, inside and outside of NPSO, contribute to keeping NPSO an active, interesting and enjoyable organization that attracts new members to our cause.

—Susan Aldrich-Markham, Cheahmill Chapter.

Paul Slichter

A computer search for photos of Pacific Northwest plants, using a scientific or common name, often finds Paul Slichter's treasure trove of plant photos and information called Flora and Fauna Northwest (<http://science.halleyhosting.com>). Over the years, Paul developed this website that offers plant lists for a variety of popular locations in Oregon and Washington, plant images, user-friendly keys, and many other excellent and useful features such as an especially nice section on birds. Paul started the website about 1994 as an aid to teaching Gresham High School biology students the 40 wildflowers they were required to know. Because they also needed to make a wildflower collection, he began adding Gorge wildflowers, then added leaves and trees and shrubs to assist their efforts. The rest of the website was an expansion from the botany section.

He tagged many of his photos with both scientific and common names, greatly facilitating computer searches.

Paul was reared near Spokane, and he has a special fondness for the drier climate of eastern Oregon and Washington. He completed an undergraduate degree in biology, chemistry, and education at Central Washington University in Ellensburg, followed by graduate work at Portland State. His first plant collections were from Klickitat County in 1978 for his first plant taxonomy class. During the summer of 1974 he worked on a road crew for the Gifford Pinchot National Forest. This is when he began photographing wildflowers during hikes on Mt. Adams and exploring the Dark Divide Roadless Area between Mt. Adams and Mt. St. Helens.

He joined the Native Plant Society of Oregon in 1986 after he began attending spring wildflower shows held by the Portland Chapter at the Western Forestry Center to become more familiar with the local flora, information that he could use teaching his biology classes. Russ Jolley presented slides from the Gorge at one of those flower shows, which inspired Paul to take more of his own wildflower photos and develop a collection of wildflower slides for his students. He found Russ, Jerry Igo, Barbara Robinson, Lois Kemp and Jan & Dave Dobak to be great field trip leaders and inspiring teachers, and he used Jolley's book, *Wildflowers of the Columbia Gorge*, to become proficient at searching for new species. Before long Paul was leading field trips himself, and then served as field trip organizer for the Portland Chapter for two years. In 2003, when the Portland Chapter hosted the annual meeting in John Day, Paul organized the field trips, which involved driving 250 miles to explore trails, learn the flora, and recruit hike leaders in the John Day area.

Paul retired from teaching in 2008. In 2011, he volunteered to organize field trips when the Portland Chapter hosted the Annual Meeting in Logan Valley south of the Strawberry



Mountains, which required a great deal of travel for scouting and becoming familiar with plant phenology. In addition to the traditional Saturday outings, he offered two field trips on Friday and one on Sunday. These extra trips, two of which he led, were very well attended and gave members the opportunity to learn from three field trips at the Annual Meeting.

In August 2004 he began assisting David Biek and Susan McDougall, co-authors of *The Flora of Mount Adams, Washington*. He visited between 30 and 50 sites around Mount Adams each season through the fall of 2007, when the manuscript went to print. He explored not just the high country, but all the lower slopes of Mt. Adams (excluding the Yakama Reservation) as well, listing the plant species in those areas and contributing greatly to the botanical knowledge of the region.

In 2009, he began doing plant surveys for the University of Washington's Rare Care project, performing two to three listed monitoring projects in the Gorge each year. He found enough new rare plant locations to send in about a dozen or so new sighting reports each season. Among the rare plants he located was a population of more than 1,500 Western ladies' tresses orchid (*Spiranthes porrifolia*) in the Catherine Creek area, which is more than had previously been found in Washington. His surveys helped convince the Forest Service that the Catherine Creek area merited special management for disturbance activities (e.g., trail building, horseback recreation), and may bolster future preservation efforts. In summer 2011 on Friends of the Gorge Land Trust land, he discovered *Orobanche californica* ssp. *grayana*, which was thought to have been extirpated from Washington State because it had not been seen since 1882. He plans to continue with Rare Care this year, as well as monitor at least one species for the NPSO Citizens Rare Plant Monitoring Project.

In short, since retiring Paul has taken on a second career as a field botanist. This self-described "Nature Bum" is finding great pleasure in exploring new places, photographing plants, surveying, keying, and making species lists, and going to workshops. He has been leading NPSO hikes for at least a dozen years, which he feels is a way to give back to NPSO for all the help previous leaders had given him. He has also given at least a dozen presentations to NPSO chapters, including the Cheahmill, mid-Columbia, Portland, and Willamette Valley chapters. In the fall of 2011, he joined the Advisory Board for the Oregon Flora Project. His constant joy in discovery and his pleasure in sharing his knowledge with others serve as his most important contributions to NPSO and the botanical community.

—Barbara Robinson, Mid-Columbia Chapter.

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Members of the Native Plant Society of Oregon and others are invited to submit articles, book reviews, artwork, and photographs for publication in *Kalmiopsis*. All materials submitted should pertain to Oregon's native vegetation and flora. Acceptance will be based on suitability (articles dealing with formal nomenclatural proposals or of a highly technical nature are not acceptable). *Kalmiopsis* publishes two series articles: *Plant of the Year* and *Oregon Plants, Oregon Places*. We also publish articles about botanical history and features related to native plants or plant communities in Oregon.

Please consider that the readers of *Kalmiopsis* are people with varied educational backgrounds and all articles must be

comprehensible to a broad, but relatively well educated, audience. The goals of *Kalmiopsis* are to disseminate correct information about and generate interest in native plants; thus each article is reviewed by the editorial board and selected technical reviewers before publication.

Contributions of artwork and photographs without accompanying manuscripts are welcome; color submissions must be suitable for publication in grayscale. Contact the *Kalmiopsis* editor to request a copy of Instructions to Authors or to inquire about the suitability of an idea for an article.

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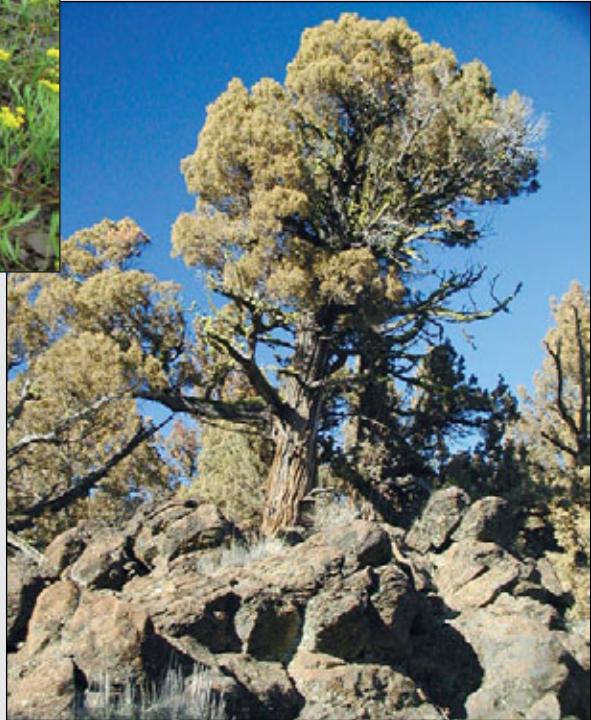
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Shepherd's desert parsley is the dominant species on shallow soil in the old bedground for domestic sheep. The spring is in upper right of the photo. Photo by Mark Darrach, 31 May 2010, at the type locality.



Western Juniper (*Juniperus occidentalis*) in basalt rimrock habitat where it is protected from fire. Photo by Ron Halvorson, taken February 15, 2013, west of Redmond, Oregon.

MacNab cypress growing in hot open exposed areas will often grow broader than tall, which reduces ground temperatures and conserves soil moisture by shading the root zones. This trait is also seen in juniper species growing under similar conditions. Photo by Frank Callahan.



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TABLE OF CONTENTS

**The Discovery of Shepherd's
Desert Parsley (*Lomatium
pastorale*), an Oregon Endemic**
by David H. Wagner..... 1

**Botanizers in the Land of
Conifers: Oliver Matthews,
Al Hobart, Eugene Parker**
By Frank A. Lang, Frank Callahan
and Cindy Roché..... 6



Cypress Species in Oregon
by Frank Callahan..... 16



**Plant of the Year Western Juniper
(*Juniperus occidentalis*)**
by Ron Halvorson..... 26



Book Reviews 34
Fellows Awards 38