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THE GENUS CASTILLEJA IN UTAH

by David E. Joyner

In The Legend of the Indian Paintbrush as retold by Tomie dePaola, a small Indian boy, called Little Gopher, who was unable to physically compete with the larger and stronger boys in his clan, was encouraged by the tribe's shaman to define his own destiny by employing his artistic talents. Inspired by the prophecies of the shaman, the boy contributed to the prosperity of the tribe by illustrating the great hunts and exploits of his people. Although creative in his work, he was unable, however, to fulfill a "dream-vision" that came to him one evening, a vision in which a young Indian maiden said, "Find a buckskin as white as this. Keep it and one day you will paint a picture that is as pure as the colors in the evening sky."

Little Gopher found a white buckskin, but using berries, flowers and other items to mix his paints, he could not create the colors of the evening sky. Late one night while resting in his teepee he heard a voice, "Because you have been faithful to the People and true to your gift, you shall find the colors you are seeking. Tomorrow take the white buckskin and go to the place where you watch the sun in the evening. There on the ground you will find what you need." The next evening Little Gopher raced to the top of a nearby hill where, as the voice had predicted, he found small brushes filled with paint. Little Gopher began to paint quickly and surely, using one brush, then another. He had found the colors of the sunset.

He carried his painting down to the circle of the People, leaving the brushes on the hillside. And the next day, when the People awoke, the hill was ablaze with color, for the brushes had taken root in the earth and multiplied into plants of brilliant reds, oranges and yellows."

Form and Function

Indian paintbrushes (Castilleja) are highly specialized members of the Scrophulariaceae (Figwort Family), a large family of approximately 220 genera and 3000 species. Included within this taxonomic assemblage are many of our most attractive western wildflowers, such as penstemons (Penstemon), monkeyflowers (Mimulus) and louseworts (Pedicularis). Unlike most members

of the Scrophulariaceae, whose flowers provide nectar guides and a landing pad as enticements to bumblebees, the flowers of Indian paintbrush are small and drab by comparison, having a form more typical of plants pollinated by hummingbirds or long-tongued insects. The greenish or greenish-red petals are fused into a narrow tube (corolla) slit at the distal end. In some paintbrush species the corolla tube extends beyond the bracts, whereas in others, the tube remains obscured. The bracts and sepals provide the brilliant floral colors most people associate with paintbrushes—the crimson so typical of Castilleja angustifolia or the reddish-orange of C. applegatei.

The array of floral colors found among Utah's paintbrushes is surprisingly broad, ranging from fingernail polish pink to fire-engine red, or from near lemon-yellow to an off-white. Many floral colors can occur within a single population in one geographic location, as exemplified by C. rhexifolia in Little Cottonwood Canyon (site of the 1996 Annual NARGS meeting) of the Wasatch Range. Pink and reddish-orange are dominant throughout Grizzly Gulch, a side canyon situated on the northeastern edge of Alta Basin at the top of Little Cottonwood Canyon. Within the Alta and adjacent Albion Basins, rose-red predominates, with an occasional yellow form hidden here or there. Pastels are common along the upper Gad Valley trail, which leads from the crest of Hidden Peak (11,000' endpoint for the Snowbird Ski Resort tram) located immediately west of the Albion Basin down through Gad Valley and ultimately to the Snowbird Resort, conference center for the 1996 NARGS Meeting.

The majority of Utah Castilleja form clumps, with several stems originating from the same woody root crown; only the single-stemmed C. exilis consistently deviates from this pattern. Although all Utah paintbrushes have alternate and sessile leaves, leaf form can vary considerably, even on the same plant. Leaves can be linear, lanceolate, linear-elliptical or lanceovate. In some species the lower leaves may be entire while the upper leaves are 3- to 5-lobed. In C. applegatei, the upper leaves are lobed and have wavy margins, a trait clearly discernible very early in the spring as new buds emerge.

Paintbrush flowers, which are borne on terminal spikes or spike-like racemes, develop cylindrical to ovoid seed capsules. With maturation, the capsules split open, and the seeds are dispersed through wind or animal action. Paintbrush seeds (at least dried seeds) have a very interesting structure: they consist of a brown, almond to kidney-bean-shaped seed encased within a tortoise-shell-patterned, transparent envelope. Presumably the envelope generates through light refraction the grayish color we associate with paintbrush seeds. The grayish seeds of elephanthead (Pedicularis groenlandica, also in the Scrophulariaceae) are

similarly structured, except the outer envelope is papillose (resembles "goose bumps") rather than patterned with tortoise-shell patches.

Indian paintbrushes are well known for their hemiparasitic growth habit. They are not alone in this oddity, for the closely related owl clovers (Orthocarpus) and louseworts (Pedicularis) also are facultative parasites or hemiparasites. Facultative parasites exploit the water and nutrients confined within the root system of their host but are not obligated to do so in order to survive. The fibrous root system of perennial paintbrushes is woody like a shrub rather than filamentous as one might surmise from their parasitic habit. The lateral roots form haustoria when coming in contact with a host's roots, entering the root and establishing a connection with water-conducting cells (see Heckard, 1962). Perhaps attachment occurs early in the development (meristemic elongation) of the parasite's new roots, prior to maturation and formation of a woody epidermis, or it may be limited chronologically, predominating during the first years or two of plant growth while the root system is expanding but limited in occurrence thereafter. Regardless of timing, facultative root parasitism probably provides selective advantages to paintbrushes, as suggested by Ronald Taylor in his book *Sagebrush Country*, "through this parasitic association, the paintbrush increases its tolerance to dry conditions and expands its geographical range."

Distribution

Of the more than 200 species of Castilleja, fourteen occur within Utah, and six (C. chromosa, C. exilis, C. linariifolia, C. miniata, C. applegatei, and C. rhexifolia) are common along the Wasatch Front. Five of the 14 have statewide distributions, four are abundant within the state but generally restricted ecologically to montane or desert habitats, and the remaining five are classified as uncommon or rare, their distributions often limited to a single mountain range. Two of these, C. aquariensis and both varieties of C. parvula (var. parvula and var. revealii), have federal TES (threatened, endangered, and sensitive) status: C. aquariensis (category 1, C1); C. parvula var. revealii (C2) and C. parvula var. parvula (C2/3c).

Castilleja aquariensis is a Utah endemic limited in distribution to the Aquarius Plateau, Garfield and Wayne Counties (southcentral Utah). This yellow-flowered perennial occupies sagebrush and grass meadow communities adjacent to aspen-subalpine fir on clay-loam soils at about 9,800 to 11,000' elevation. It closely resembles C. rhexifolia, which is rarely yellow, but is further recognized by the linear, appressed-ascending leaves and smaller (6-12" tall), fewer stemmed (1-few) plants. It is also similar to C. occidentalis, which is smaller (3-8" tall) and has decumbent stems. The single specimen of Aquarius paintbrush included within the paintbrush

collection at the Garrett Herbarium (Utah Museum of Natural History) was found growing among volcanic rocks on a gentle, north-facing slope of an exposed meadow near the edge of a spruce-fir forest at an elevation of 9,900'.

Castilleja parvula is also endemic to southcentral Utah, with var. parvula (Tushar paintbrush) restricted to alpine locales in Beaver, Piute, and Garfield Counties, while var. revelii (Reveal paintbrush) occurs at the 7,000-8,500' elevation in Garfield, Iron and Kane Counties. Castilleja parvula var. parvula frequents "igneous gravels and outcrops between 10,000-12,100' elevation," while var. revelii grows among ponderosa pine/bristlecone pine communities on gravelly soils of the Wasatch Limestone Formation. Understandably, the two varieties are similar in appearance, separated taxonomically by habitat, number of persistent stems (C. parvula var. parvula has several persistent 3.5-8"-long green stems, while var. revelii produces one or two purplish stems), and length of the calyx (C. p. var. parvula =0.5-0.7"; var. revelii =0.6-1.3"). The inflorescence of both varieties is crimson to magenta

Castilleja nana is another perennial species with limited distribution in Utah—alpine meadows in the Deep Creek Range of western Juab and Tooele Counties. This diminutive paintbrush looks like a pink-topped, 35"-tall bottle brush. Each narrow stem supports clustered, dark green, lobed leaves and a tightly compressed, pink inflorescence. Specimens in the Garrett Herbarium were collected from rocky granite ridges in alpine meadows at an elevation of 10,500-12,000'.

Castilleja pulchella (pretty paintbrush) is a short-statured, subalpine or alpine species whose distribution is limited to the Uinta Mountains of northeastern Utah. Goodrich and Neese (1986) describe this paintbrush as small (less than 6" tall) with predominantly yellowish, deeply lobed bracts, lobed leaves, and an inflorescence sometimes tinged with purple. The herbarium specimens look like short-stalked plants with an inordinately robust inflorescence. Castilleja pulchella is "fairly common across the crest of the Uinta Mts., tundra of alpine or subalpine rock stripes, fell fields, ridges, and meadows; 10,800 to 12,500'" and often co-occurs with the equally common Geum rossii (Goodrich & Neese, 1986).

The fifth paintbrush with limited distribution in Utah is C. occidentalis. This perennial herb grows in alpine meadows in the La Sal Mountains (Grand and San Juan Counties), east of Arches National Park along the Utah/Colorado border. The one specimen in the Garrett Herbarium is approximately 8" tall, with linear-to-elliptic leaves, drab yellowish bracts, and a very large inflorescence. Castilleja occidentalis was first reported in Utah in 1911 by P.A. Rydberg and A.O. Garrett.

Although Castilleja angustifolia, C. applegatei, C. flava, and C. rhexifolia are common in Utah, they prefer either desert or montane habitats. Castilleja angustifolia (northwestern paintbrush) is a Great Basin Desert paintbrush found in desert shrub or pinyon-juniper communities at elevations of 4,068-8,460'; it occasionally may occur at subalpine elevations. This perennial paintbrush is 10-15" tall with a robust root system, narrow, light green, deeply lobed leaves, and a pinkish (occasionally violet, purplish, orange, yellow, or whitish) elongated inflorescence. It can be found on rocky foothills growing alongside Ephedra spp. (Mormon tea), Artemisia arbuscula (low sage), and Pinus monophylla (single-leaf pinyon). Castilleja flava (yellow paintbrush) is superficially similar in appearance to Castilleja angustifolia but has yellow bracts; it also has a robust root system, narrow, lobed leaves, and an elongated inflorescence. Diagnostically, C. flava has a "calyx distinctly deeply cleft on [the] side opposite the galea (galea is a hood or helmet shaped petal)," whereas in C. angustifolia, the "calyx clefts [are] more nearly equal" (Shaw 1989). Castilleja flava prefers dry sandy or gravelly soil, edaphic traits typical of sagebrush and ponderosa pine (Pinus ponderosa) communities at elevations of 5,870-10,000' in the eastern half of the state.

Castilleja rhexifolia (rhexia-leaf paintbrush) and C. applegatei (wavyleaf paintbrush) are subalpine to alpine species found in northern Utah along the Bear River, Wasatch, and Uinta Mountain Ranges. Although the geographic distributions of these two perennials overlap, individuals often segregate by stratum. In Little Cottonwood Canyon, for example, C. applegatei dominates on the dry, fully exposed, granite outcrops of Albion Basin and on the steeper, south-facing slopes of Grizzly Gulch, while C. rhexifolia prefers cooler locations with a deeper organic soil profile, as occurs in gullies, along stream beds, in conifer stands, and in dense herb communities. Castilleja applegatei, represented in Utah by var. viscida (see Holmgren, 1971), is easily identified by its lobed leaves with "wavy" margins, bright orange or reddish-orange inflorescence, and short stature (under 10"), whereas C. rhexifolia has linear leaves, rounded bracts, a taller stature (up to 20"), and shows a variety of floral colors. Castilleja sulphurea, considered by Albee et al. (1988) to be synonymous with C. rhexifolia, also grows in the Albion Basin, but like C. applegatei, it prefers the well-drained mineral soils of exposed, rocky sites, such as along the Secret Trail of Albion Basin. Castilleja sulphurea is structurally like C. rhexifolia but much smaller in stature (8") and has drab, whitish to greenish-yellow bracts.

The five remaining paintbrushes, C. chromosa, C. linariifolia, C. miniata, C. scabrida, and C. exilis, have statewide distributions and tend

to favor desert over montane habitats. Within this group is our only annual paintbrush, C. exilis, a tall (to 24"), thick-stemmed, but shallow-rooted plant that grows in marshes, meadows, or along seeps or springs in salt desert shrub communities. Although western wetland communities are often dominated by moist-soil monocots, such as Carex nebrascensis and Juncus torreyi, the marsh paintbrush, being a very robust species, competes effectively against the more aggressive, rhizomatous sedges and rushes. Castilleja exilis flowers from June through August, and although the inflorescence is very long, up to one-half the total length of the stem, only the bracts of the uppermost flowers show a touch of bright red; bracts surrounding the lower flowers remain green. The lack of color and a typical "weedy" appearance due to its single stem with broad, lanceolate leaves can make C. exilis very difficult to identify at a distance if the plant happens to be growing among other similar-shaped, broad-leaved herbs. However, when in flower and viewed at close range, the long, linear bracts extending far beyond the corolla and tipped with fire engine red are diagnostic; no other Utah paintbrush looks like C. exilis.

The narrowleaf paintbrush, C. linariifolia, is a favorite of mine because of its long, slender leaves. Although leaf width and length can vary significantly in this species according to location, one population in the Holiday Park area (Weber Canyon) on the northwest corner of the Uinta Mountains has leaves so narrow they resemble the filamentous leaves of the submersed sago pondweed, Potamogeton pectinatus. In pondweeds and other submersed macrophytes, narrow leaves are an adaptation to reduced levels of light; they also minimize the effects of physical stress due to water movement and optimize leaf surface-to-volume ratio, thus increasing the efficiency of gas exchange and nutrient absorption. Castilleja linariifolia, however, is not a wetland species; in fact, it prefers dry, rocky upland sites, often co-existing with sagebrush. This preference for dry sites can be very dramatic. For example, C. linariifolia and C. miniata can be found growing side-by-side on a small dry ridge circumscribing one pond in the Holiday Park area, but only C. miniata (photo, p.266) grows within the flood plain of the pond. The range of Castilleja linariifolia ends abruptly as the base of the ridge merges into the flood plain, a vertical distance of 3-4'.

Since C. linariifolia is a dryland paintbrush and is not exposed to the same physical and physiological stresses affecting submersed pondweeds, why have filamentous leaves? The same question could be asked about other parasitic species within this family (C. angustifolia, owl clovers, and louseworts) that also have slender, filamentous or pinnately dissected leaves. If there is a reduction in total photosynthetic capacity due to reduced leaf mass, compared to what might occur with broader

leaves, is the potential loss of energy compensated for by the plant's parasitic habit? Would these species still have filamentous leaves if they were not parasitic, and are C. linariifolia and C. angustifolia more efficient at extracting nutrients from hosts than are broad-leaved species like C. rhexifolia? It would be interesting to determine to what extent environmental factors influence leaf variability in C. linariifolia and other parasitic species, and whether leaf shape also responds directly, indirectly, or not at all to the number, proximity, and composition of potential host species. This relationship could be examined under a variety of environmental conditions and with a plethora of potential host species, by investigating C. linariifolia, since its range extends from desert shrub to aspen-conifer communities, an elevational gradient of approximately 7,200'.

Castilleja linariifolia, unlike C. exilis, is not distinct morphologically and can be easily misidentified, especially in western Utah, where Castilleja linariifolia cooccurs and may hybridize with the narrow-leaved C. angustifolia. As is the case with C. flava and C. angustifolia, Shaw (1989) separates C. linariifolia from C. angustifolia by comparing the sepals: C. linariifolia has a "calyx distinctly deeply cleft on side opposite the galea," whereas in C. angustifolia, the "calyx clefts [are] more nearly equal." Furthermore, the bright red of C. linariifolia is concentrated on the calyx, while in C. angustifolia the bracts generate most of the color.

Two of our desert paintbrushes, both with relatively narrow leaves, are C. chromosa (desert paintbrush) and C. scabrida (Eastwood paintbrush). These species are so similar in appearance that many of the pressed specimens in the Garrett Herbarium have been identified several times, leaving us to wonder which of the naming authorities is correct. Both paintbrushes resemble C. angustifolia. Goodrich al Neese (1986) segregate C. scabrida from C. chromosa as follows: C. scabrida has a relatively large corolla, the galea is exserted from the calyx, and the stems are somewhat decumbent at the base and lack chlorophyll along the lower scaly portion. Castilleja chromosa, on the other hand, has a smaller corolla, the galea is concealed by the calyx and the erect stems are green throughout. It would be helpful if these two paintbrushes segregated by habitat but they don't. Eastwood paintbrush is typically in pinyon-juniper communities with sagebrush, occasionally in Elymus salina-shadscale or mountain brush communities in sandy soil or sandstone outcrops, or in mixed sand and clay from shale strata; at 5,000-8,200'. Castilleja chromosa is common and widespread in greasewood, shadscale, mixed desert shrub, sagebrush, pinyon-juniper, and mountain brush communities on many substrates at 4,700-8,500'. Castilleja scabrida apparently does not occur in the northern portion of the state, so plants

seen along the Wasatch, Bear River, and Uinta Mountains are more likely to be C. chromosa.

Our last paintbrush is C. miniata (scarlet paintbrush), a perennial herb of wet or dry sites, found on open slopes, in meadows, or in association with mountain brush, aspen, or spruce-fir communities. Principally montane in distribution, this species can be found throughout the Bear River, Wasatch and Uinta Mountains, the Wasatch Plateau of central Utah, and as far southwest as the Pine Valley Mountains of Washington County. It also occurs in the western Deep Creek Range, the eastern La Sals, and in the Raft River Mountains in Box Elder County (northwestern Utah). Similar in form and height to C. rhexifolia, it can be separated from C. rhexifolia by its acute and lobed bracts, which are linear and blunt in C. rhexifolia. Castilleja rhexifolia also tends to be subalpine to alpine in distribution, while C. miniata is typically montane, a distributional pattern particularly apparent along State Route 150 (Kamas-Bald Mountain-Evanston) in the Uintas.

Cultivation

If there was ever an incentive to explore the horticultural requirements of a species, it's having been told "you can't grow that plant, it's impossible!!" For most western rock gardeners, the advice on propagating paintbrushes provided by Linc Foster in *Rock Gardening: A Guide to Growing Alpines and Other Wildflowers in the American Garden* is most fitting: "When seed of any [Castilleja] species is available, sow it on a rocky slope, particularly among other existing plants." Unquestionably, living in the appropriate geographic area has definite advantages if you wish to use this method; the best and easiest horticultural strategy for growing paintbrushes in Utah is to put the seed where you want the plants to grow and let Mother Nature do her thing. I have successfully established C. rhexifolia, C. miniata, C. linariifolia and C. applegatei in my yard by coldstratifying seeds over winter, followed in early spring by selectively placing the seeds next to other plants. Sowing seeds randomly throughout the garden in late fall, however, has proven less successful; I assume because the seeds are eaten by overwintering birds or by insects.

Propagation of paintbrushes in 72-well germination trays or in pots is also relatively straightforward and may be the only practical method for rock gardeners living in the Midwest or along the East Coast. Seeds, following cold stratification, readily germinate out-of-doors (March-May) or under artificial light. Seedlings are transplanted in late May, or transferred to small pots where they are held until they can be planted.

If paintbrush seeds are germinated in pots without the use a host plant, the selection and maintenance of a proper planting location plus timing become critical steps in paintbrush propagation.

Paintbrush seedlings transplanted in spring or early summer into flower beds supporting an abundance of potential hosts (hence, a virtual web of roots to be tapped) often survive if the bed is kept moist throughout the summer. Allow the bed to dry out, or transplant too late in the season, and the seedlings usually die, regardless of the availability or composition of host plants. In a dry bed, seedlings either wilt and die within days or linger throughout the summer but show little new growth; these plants rarely if ever survive the winter. Planted in the fall, the seedlings apparently lack sufficient time to develop an adequate root system and amass sufficient reserves to survive the winter. Pick a location where few potential hosts exist and even with sufficient water, the seedlings usually die. I found this was the case even with desert species, such as C. chromosa.

One obvious solution for many of the transplantation problems is to germinate paintbrush seeds in pots already supporting a suitable host, and then transplant the two together. And what species are suitable hosts? My paintbrushes co-exist with Phlox paniculata, Artemisia ludoviciana (Louisiana sagewort), Helenium hoopesii (orange sneezeweed), plus a number of montane and subalpine composites (Asteraceae). Inadvertently, I also found the strawberry clover (Trifolium fragiferum) to be a superb host plant, and although most rock gardeners may be reluctant to transplant this aggressive lawn weed into their pristine rock gardens, other more acceptable legumes (Fabaceae) such as Astragalus, Oxytropis, or Hedysarum may serve equally well. In fact, an association between paintbrushes and legumes is clearly evident in the deserts of the San Rafael Swell of southeastern Utah (Emery County), where C. scabrida frequently parasitizes various species of Astragalus. Other acceptable host species might include Artemisia scopulorum (dwarf sagewort), various short-statured, clump-forming grasses, or even small composites.

During spring of 1995 I coupled several of the more difficult paintbrushes (e.g., C. nana and C. sulphurea) with Andropogon scoparius (little bluestem), a short-statured prairie grass I consider suitable for rock gardens or other natural areas. Time will tell whether the match was appropriate. And with success:

"Scarlet tufts

Are glowing in the green like flakes of fire;
The wanderers of the prairie know them well,
And call that brilliant flower the 'painted Cup'."

—author unknown

References:

Albee, B., L. Shultz and S. Goodrich. 1988. Atlas of the Vascular Plants of Utah. Utah Mus. Nat. Hist. Occas. Publ. No. 7. 670pp.

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Arnou, L., B. Albee and A. Wycoff. 1980. Flora of the Central Wasatch Front, Utah. Univ. Utah Printing Service: Salt Lake City, Utah.663pp.

Atwood, D. et al.1991. Utah Endangered, Threatened and Sensitive Plant Field Guide.

Blanchan, N. 1934. Wildflowers Worth Knowing. Doubleday, Doran & Company, Inc., Garden City:New York. 270pp.

dePaola, T. 1988. The Legend of the Indian Paintbrllsh. G.P. Putnam's Sons:New York.36pp.

Foster, H.L.1968. Rock Gardening. Bonanza Books:New York.449pp.

Goodrich, S. and E. Neese. 1986. Uinta Basin Flora. U.S. Forest Service.320pp.

Heckard, L. R.1962. "Root Parasitism in Castilleja." Bot. Gaz. 124:21-29

Holmgren, N. H. 1971. "A Taxonomic Revision of the Castilleja viscida Group."

Mem. N.Y. Bot. Gard. 21:1-63.

Shaw, R. 1989. Vascular Plants of Northern Utah: An Identification Manual. Utah State Univ. Press:Logan, Utah. 412pp.

Taylor, R. 1992. Sagebrush Country: A Wildflower Sanchlary. Mountain Press Publ.

Co.:Missoula, Montana. 211pp.

David Joyner gardens in Salt Lake City, where he tinkers with growing Utah wildflowers.



Sego Lily

Newsletter of the Utah Native Plant Society

VOL. 21 No. 2

MAR/APR 1998

CALENDAR OF EVENTS

**March 15 to April 24
Volunteer Opportunity**

Capitol Reef National Park: assist with survey for *Pediocactus winkleri* and *P. despainii*. Interested applicants should call Tom Clark at Capitol Reef (ph (435) 425-3791 x144 or email Tom_O_Clark@nps.gov). See note inside for details.

**March 30 6:30 p.m.
UNPS Board of
Directors Meeting**

Red Butte Garden and Arboretum Offices 18C deTrobriand St., Fort Douglas, Board Meetings are always open to Members.

**April 1 7:00 p.m. Utah
Valley Chapter meeting.**

Election of officers; speaker: Fred Liljegren of the BLM: xeric landscaping. Monte L. Bean Museum, BYU.

**April 18 Earth Day at
Hogle Zoo.**

Dick Hildreth will be there representing Red Butte Garden and Arboretum. Would Someone from UNPS like to have a table, sell posters, give out membership info? Call Therese if interested 272-3275.

**April 24 (6:00 p.m.)-
26. Utah Valley Chapter
trip to Lytle Ranch.**

Walks, talks, explorations. Call Sue Garvin (Shrub lab 377-5717) for reservations and info.

May 8, 9, 10

Dick Hildreth's Native Plant activities at Red Butte Garden and Arboretum. Classes on horticulture, native plant displays, and more. Call Red Butte (581-5322) for information.

**May 17 - 23
Wildflower Week**

Kickoff for Celebrating Wildflowers; see accompanying note for hotline number.

Winkler Footcactus (*Pediocactus winkleri*) Receives Endowment from National Park Service

by **Therese Meyer**

The Winkler Footcactus, *Pediocactus winkleri*, is one of eight species in the genus. All are from the Four Corners region (Utah, Colorado, Arizona and New Mexico), and most of the species are rare endemics; restricted to a small habitat by ecological features such as specific soil types, elevations or geologic formations. Only 3,500 individuals of this species are known to exist.

Tom Clark of Capitol Reef National Park recently secured funding for an endowment for this endangered species with the Center For Plant Conservation (CPC) at Missouri Botanical Garden. The National Park Service provided \$7000 for the endowment, with CPC responsible for the remaining \$3000 for a full endowment. The endowment will provide funding in perpetuity for seed storage and propagation studies. In this way, seeds and plants of this rare species would be available for recovery work (i.e. reintroduction of plants after disruption by activities such as mining, off-road vehicles, etc.) and possibly also for domestic horticultural use. This could also spare natural populations from illegal collection. Anyone interested in contributing to this endowment please contact Therese Meyer, who is the CPC representative for the Intermountain West (272-3275).

Field surveys and experiments on the impact of grazing, jointly funded by the National Park Service and BLM, will begin this spring (see request for volunteers for this project elsewhere in this newsletter).

P. winkleri is found in salt desert shrub communities on fine textured saline soils in the Fremont River and Muddy River drainages in Utah, on lands administered by the Bureau of Land Management (BLM) and Capitol Reef National Park. P. winkleri was proposed for listing as endangered in 1993. The listing was put on hold in 1995 during a Congressional moratorium on listings. At the present time, the Agency approach is to ratify a "Conservation Agreement" for this species and a closely related species, P. despainii, whose ranges coincide. Backing the Conservation Agreement are the above mentioned groups, and also Emery and Wayne Counties, U.S. Fish and Wildlife Service, and the Fishlake National Forest. The Conservation Agreement would embody much of the protection outlined in the Draft Recovery Plan for the two tiny cacti. A Tucson-based organization, Southwest Center for Biological Diversity, recently filed a federal lawsuit against the Interior Department's head, Bruce Babbitt, who oversees U.S. Fish and Wildlife Service, to force the government to determine whether the Winkler footcactus is worthy of protection under the Endangered Species Act. It is the Agencies' hope that speedy ratification of the Conservation Agreement will satisfy complaints and dispel legal battles.

P. winkleri is distinguished from several other members of the genus by its relatively larger stem size, wooly areoles and the yellow or pink tint of the bronzy flowers. Stem size of P. winkleri tops out at two inches in diameter, compared to some of the other Pediocacti, such as P. peeblesianus var. peeblesianus which reaches a maximum diameter of 1 3/4 inches, or P. papyracanthus which grows to 3/4 inches in diameter! P. simpsonii and P. sileri are

the largest members of the genus, reaching eight and four inches in diameter, respectively.

One of the most curious features of P. winkleri is that the plants are only visible during the spring and summer. During late summer they shrink down, withering as the habitat dries, and remain hidden under the soil surface until spring arrives again. They flower in late April and May, at which time they are above-ground and very beautiful. The flower buds form in the fall or winter during moderately cold temperatures.

The closely related species, Despain Footcactus, P. despainii, whose range overlaps somewhat with that of P. winkleri, was listed as endangered in 1987. They differ mainly in detailed aspects of their morphology, such as the hairs on the areoles (P. winkleri has more wooly hairs on the areoles, which are the points at the tips of the protrusions or bumps on the cactus) and the flower color. Some flowers have a more bronze tint to P. despainii flowers and more yellow and pink tint to P. winkleri flowers, but I have looked at both on the same day and have seen a range of colors in both from yellow-pink to bronze-peach. The wooliness of P. winkleri areoles may be a more decisive criterium for distinguishing these two species. Currently, a molecular genetics study on the Pediocacti has been funded by the Bureau of Land Management, and is being conducted by Ken Heil and Mark Porter at Ranch Santa Ana Botanic Garden in Clairmont, California. This work may clarify the phylogenetic relationship of the two cacti, and may support a decision to combine them under one species, winkleri, as subspecies.

The Draft Recovery Plan for these two small Pediocacti (the draft management plan which U.S. Fish and Wildlife compiled for future downlisting of the cacti to Threatened status) called for continued examination of likely habit in the hope that more populations will be discovered, so that a viable population size can be demonstrated. The plan stated that even with such future discoveries, the nature of the restricted population sizes and the vulnerability of these cacti due to possible illegal collection, trampling by cattle and off-road vehicles, and mining operations, would essentially preclude delisting.

Steve Brach of Mesa Garden (PO Box 72, Belen, New Mexico 87002) was successful growing many Pediocacti (and other high desert cacti) by sowing the seed in coarse sand and placing them in unheated greenhouses so that the flats were exposed to very low temperatures. Alternating wet and dry and freezing and thawing seemed to break dormancy of the seed. Mesa Gardens sells greenhouse grown plants with verification that they are not wild-collected; a very important aspect of protecting our rare wild plant species.

Why use botanical names? Won't common ones do?

Reprinted (and updated) from
Western Landscape Plus, Jan/Feb. 1995.

Since botanical nomenclature is based on what is considered an ancient, if not dead language, why use Latinized plant names like *Pelargonium tomentosum* when it's much easier to spell and pronounce the common English name, peppermint geranium?

Esther Truitt Henrichsen, head landscape designer for Temple Square and nearby LDS, church-owned properties in Salt Lake City until she opted for a career as a new mom and free-lance designer, makes a point with this story.

"My usual wholesale sources of ornamental grasses were not able to supply a plant I really needed to complete a project last year," she reports. "So I called a well established garden center in Salt Lake City and asked the woman who answered the phone if she had any *Miscanthus sinensis* 'Gracillimus' in stock. Her reply was, and I quote:

"Get real, lady. What's it really called?"

"I couldn't help but repeat the botanical name—that is what it's 'really called'!—adding that the common name for *Miscanthus sinensis* is maiden grass.

"A problem with the common name is that some people use it to refer to other *Miscanthus sinensis* cultivars. So when the woman said she thought the store carried maiden grass, I asked if she would please check the I.D. tags on the plants to make sure they were 'Gracillimus.'

After putting me on hold for at least 10 minutes, the woman told me the plants in stock were the plants I needed.

"I think she must have stopped reading when she saw *Miscanthus*,' or else the I.D. tags were incorrect, because I drove all across town with a fussy baby to find *Miscanthus sinensis* 'Zebrinus.' When your design specifications call for 'Gracillimus,' believe me, you do not want to use 'Zebrinus' as a substitute.



Miscanthus sinensis 'Zebrinus.'

Miscanthus sinensis "Gracillimus"

All 'red maples' are not created equal

Consumers sometimes have similar experiences but may not realize it or suffer the consequences for several years.

Mike Kuhns, Utah State University (Logan) Extension forester, says he often receives calls from local residents asking for advice on what trees to plant. "They might tell me they want a tree like their neighbor's—a big shade tree with red leaves, for example. I will probably tell them to look for a specific red-leafed cultivar of *Acer platanoides*, or Norway maple. 'Crimson King' is a good one to plant in this area.

"Unfortunately, I've learned employees at some nurseries think every maple having a red leaf at any time of year—whether it's in the fall or during the growing season—must be a 'red maple.' When that's the case—or if the nursery doesn't carry 'Crimson King' or I.D. tags are missing or incomplete—they may say something like, 'Oh, you're looking for a red maple?'

"If the customer assumes the employee is knowledgeable and says yes, they usually end up with the wrong tree. *Acer rubrum*, the tree whose common name is red maple, is a good example. It's native to forests in the Northwest," notes Dr. Kuhns, "and is subject to chlorosis when planted in alkaline soils like we commonly have in the Intermountain West. It is not a tree I would recommend for this area.

"Now I make it a point to tell people, 'Write down this botanical name I'm about to give you. Take it with you when you go to buy your tree. If you can't find this specific tree at the first few nurseries you visit, keep looking!'"

When is a hollyhock an *Althea rosea*?

Steve Linde, of Linde Horticulture Group, says he knows many people who think only intellectual snobs or fuss-budgets use botanical names—that down-to-earth "real" folks prefer to call a rose a rose.

Although most people who know Linde would say he is a down-to-earth sort of guy, he feels strongly that "plant professionals need to know both botanical and common names. The point is to be able to communicate on either level, depending on the situation.

"If my young neighbor shows me an *Althea rosea* growing in her back yard and asks what it is, she is asking if it's the same 'pioneer' plant she saw growing in her grandmother's garden. I'll tell my neighbor the plant is a hollyhock.

"However," Linde continues, "I would work only with botanical names if I were ordering plants for a retail garden center or for a particular landscaping project. Those are the names that will tell me if I can expect to get the specific plant I have in mind. Common names are either unreliable or not specific enough."

Some call it sassagoo

Skagit Gardens in Mt. Vernon, Wash., is one of several wholesale growers that organizes its catalogs of perennials, annuals and ground covers alphabetically accordingly to botanical names. The company is among those that go the extra mile by including a pronunciation key next to each species.

Nanci Hollerith Allen, catalog editor and sales representative for Utah and much of the surrounding trade area, says the Skagit (pronounced SKADG-it) staff is accustomed to hearing *Campanula* called *campano-NOOLA* or *Achillea* referred to as a-KILL-ya. "Our typical response is, 'Oh, yes, cam-PAN-yeh-la.' Or, 'Did you say 20 flats of AK-a-LEE-a?' Many of our customers have mentioned how much they appreciate hearing how to pronounce the words correctly."

Members of the Skagit sales staff sometimes find themselves on the horns of a moral dilemma when a customer slaughters a pronunciation. Allen recalls a budding horticulturist's phone order for some sassagoo. "Once the salesperson figured out what he was asking for, she had to decide how to tell him *Saxifraga* is pronounced sax-*IFF*-reh-jeh without making him feel foolish—or whether to let him go through life calling it sassagoo."

Allen notes that when the company decided to include pronunciation keys in its catalogs, Skagit employees had a great time correcting *each other*.

"One purpose of adding the pronunciation keys to the catalog is to help customers gain confidence and feel more comfortable when they place telephone orders," she adds. It also makes it easier for Skagit employees to avoid making order-entry errors when they and their customers are able to speak proper "botanese."

Common names are nice, but....

Botanical names overcome many problems associated with common names:

- *Many plants have the same or a similar common name.*

Dusty Miller is the common name for at least six popular plants sold in the western United States. A tulip tree could be a *Magnolia soulangeana* or a *Lireodendron tulipifera* (same family, different genus).

- *The same word is often used in common names for quite unrelated plants.*

For example, each of these six plants—daylily, delicate lily, lily-of-the-valley, flamingo lily, plantain lily, and lilyturf—belongs to a different family.

- *One plant may have several common names.*

One of Linde's favorite plants is a Utah native, *Rhus trilobata*, which sounds rather elegant when pronounced out loud (russ try-lo-BAY-ta). Among its common names are squawbush, oakbrush sumac and skunkbush.

- *Common names for plants in one region may be different for the same plants in other regions.*

For example, "Ironwood is an Eastern hawthorn hophornbeam, an American hornbeam or any of several other species—depending on which tree has the hardest wood in a region," notes Dr. Kuhns.

What most Westerners call a burning bush (*Euonymus alata*) is a plant Linde's grandmother and others living in the Midwest call a winged wahoo.

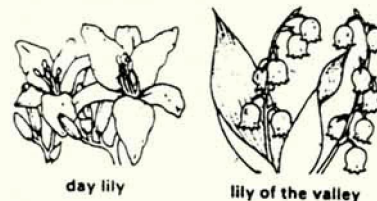
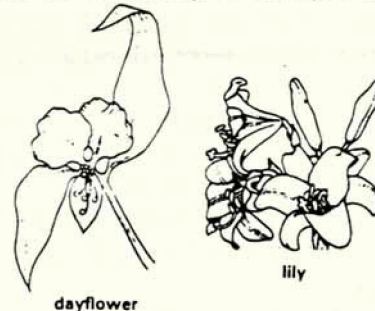
- *Many common name are misleading.*

Esther Henrichsen notes that a pineapple is neither pine nor apple. "A Japanese flowering apricot and Japanese flowering plum are the same plant," adds Linde. "The tree is a member of the *Prunus* family, but it is not a plum or an apricot."

- *Botanical names often say something about the plant's characteristics.*

For example, *alba* says it's white, *rugosa* says it's wrinkled, *reptans* says it's creeping. *Ptarmica* indicates "sneeze-producing"—a nice thing to know when selecting plants for a patio border.

Some common names, of course, do a wonderful job of describing a plant. Elephant's ear, lodgepole pine, and redhot poker are examples. Other common names like lady-of-the-night, bear's breeches, love-in-a-mist, mind-your-own-business, frog's-bit and tree-of heaven (some would say tree-from-hell) fall short as plant descriptions—although they sound as charming or intriguing as a winged wahoo.



How do people learn "botanese"? They find a pronouncing dictionary of plant-related names, read a page or so every day over breakfast, and say the words out loud between mouthfuls. Or they study catalogs like the one published by Skagit Gardens. Or they might take an introductory course in taxonomy.

Most experts agree: Spending the time and trouble to become familiar with plants' botanical names and their pronunciations is a worthwhile investment. People who are plant professionals or plant lovers *and* word-freaks may find it is also

more fun than a barrel of *Macacos*, commonly called monkeys.

"Anyone who considers themselves a plant professional or who is seriously interested in plants should be conversant with the botanical nomenclature. As an international language, it has worked extremely well for nearly 300 years. And it will continue to work extremely well as a language that allows us to communicate at a very precise level." — Steve Linde, Linde Horticulture Group.

Definition: Nomenclature

A method of naming plants based on international rules that botanists have agreed upon in order to promote a uniform and reasonably stable system. This permits only a single valid scientific name for each kind of plant, the discarded names being known as synonyms.

A Family Tree in a Nutshell:

Family: The basic botanical division in the plant kingdom; includes one genus or genera (more than one genus). Family names always end in *aceae* (pronounced as they are when one recites the alphabet: a cee ee)

Genus: A botanical division within the family; includes one or more related species. Also, the first word of the binomial (twopart) scientific or Latinized generic name of a plant. Pronunciation: JEE-nus. Always a proper noun (the first letter is capitalized). Should be italicized or underlined. Abbreviation: Italicized first letter of the word and a period.

Species: The second part of the binomial scientific name of a plant. One or more species are grouped to form a genus. Should be italicized or underlined. The first letter is not capitalized, even if it appears to be a proper name (*americanus* or *japonica*, for example).

Hybrid Species: The progeny of a cross between two species. Denoted by an *x* between the genus name or its abbreviation. (Many plant catalogs and other publications omit the *x*.)

Cultivar: A horticultural selection based on a plant's physical characteristics—a particular leaf or foliage color, for example. Denoted by single quotation marks around the cultivar name, or by *cv.* after the species name. Not italicized; initial letter(s) are capitalized. Often used interchangeably with "variety"—a naturally occurring subspecies rather than a cultivar bred by horticulturists.

Volunteer Opportunity:

Capitol Reef National Park and the Bureau of Land Management are conducting surveys for *Pediocactus winkleri* and *P. despainii* during March and April this year. We are interested in having a volunteer from **March 15 to April 24** to assist with the survey. Applicants should be able to walk up to 10 miles per day day-in and day-out through the survey period, be able to read maps, and carry a backpack. The field work will involve a treasure hunt for these tiny cryptic cactus in very rough terrain. It will

consist of long, tedious, and eye-straining hours searching for the cacti, interspersed with short periods of exhilaration when a cactus is found. Rewards include hiking in remote seldom visited areas with beautiful scenery, the thrill of finding a very rare species of cactus, and housing provided in Capitol Reef. Interested applicants should call Tom Clark at Capitol Reef (ph (435) 425-3791 x144 or email Tom_O_Clark@nps.gov).

UNPS Field trip

If there is interest in a field trip to help with the above survey, the Park Service will provide a camping site at the park; we just need to decide on a date. One problem may be that it will have to be on weekdays while the field crew is on. Is someone willing to coordinate this outing? How would April 23-24 (Thurs pm.-Fri.) suit people? Call Therese if interested 272-3275.

Web Page:

UNPS is planning to have an Internet Web Page. Dr. Susan Meyer of the Utah Valley chapter is spearheading this project, with technical assistance from Dr. Larry Meyer of the Salt Lake Chapter (also newsletter editor). They will post announcements for statewide and chapter activities, links to other plant and nature organizations, newsletter articles and other items of interest. Anyone interested in helping with this new endeavor please contact Susan Meyer: Forest Service Shrub Lab, 735 North 500 East, Provo, Utah 84606, (801) 342-5140 or email: semeyer@sisna.com or: Larry Meyer 272-3275 or email: l.meyer@m.cc.utah.edu.

"Wildflower Week" is May 17 - 23.

Celebrating Wildflowers 1998 is coming up. This is a national program sponsored by the Bureau of Land Management, the National Forest Service, U. S. Fish and Wildlife Service, and the National Park Service. The opening week commemorates a season long festival highlighting wildflower education, interpretation, and restoration activities on the 640 million acres of land managed by these four agencies. Last year hundreds of events involving public and private partners provided information and delight to persons of all ages. UNPS has donated \$500 for printing the winning poster in the annual school children Celebrate Wildflowers contest. We will receive 100 posters for free distribution, and the Forest Service (coordinating the activities) will have many more to give to interested groups.

Activities Web Page:

This year events will be posted on the **NatureWatch Homepage** (the URL is www.fs.fed.us/outdoors/naturewatch). This is an award-winning page full of interesting information. Postings of Celebrating Wildflower events will begin in April. A telephone Celebrating Wildflowers **Hotline** 1-800-354-4595 will also run April 1 through August 31, followed by a Fall Foliage Hotline at the same number which will run through late November.

UNPS SEGOLILY
c/o Jo Stolhand
Utah Native Plant Society
P.O.Box 520041
Salt Lake City, UT 84152-0041

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Native Plant Conservation Initiative.

UNPS will be joining this nationwide collaboration of at least nine federal agencies and, at last count, 55 non-federal cooperators. The Initiative is a non-profit organization which brings together public and private groups dedicated to preserving native plants in this country. It concentrates its efforts in four major areas: 1. Promoting plant conservation projects. 2. Conducting research that provides information vital to plant conservation actions. 3. Sharing information needed to conserve native plants throughout the country. 4. Helping people understand how important plants are to their daily lives and how they can help conserve native plants.

Native Plant/Xeric Gardening

Demonstration Project in Provo:

In the spirit of this initiative, UNPS is donating \$500 to the Utah Valley Chapter for a native plant/xeric landscaping demonstration project which they are coordinating with a local school. Susan Meyer is organizing the project. Our contribution will supply the plants. Dr. Meyer will compile a Project Model Plan for UNPS which can be used for future projects.

Workshop

UNPS and Red Butte Garden and Arboretum will co-sponsor a technical workshop in October with government land management agencies to update the Sensitive Plant List for Utah. Planning is underway.

UNPS Conservation Committee

Native plant enthusiasts are needed to study native plant issues. Activities include leading nature walks, giving talks, writing letters to government agency managers and legislators and writing newsletter items. Call Therese Meyer (chairperson, 272-3275) if interested in helping in this area.

Membership Application

New Member Renewal Gift

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Please send a complimentary copy of the **Sego Lily** to the above individual.

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P.O.Box 520041
Salt Lake City, Utah 84152-0041

If you prefer not to cut this out of your **Sego Lily**, feel free to copy the membership form or simply write the the information down and send it with payment and category of membership.



VOL. 21 No. 3

May/June 1998

CALENDAR OF EVENTS

**June 18
Thursday 6-8 PM**

Hike with a Naturalist: Weeds of The Foothills. A two hour walk with Dick Hildreth of Red Butte Garden and Arboretum. Call 581-8454 ASAP.

**June 25
Thursday 6-8 PM**

Hike with a Naturalist: Natural Areas Management. A two hour walk with Barbara Bentley of Red Butte Garden and Arboretum. Call 581-8454, by June 18th.

**June 27
Saturday
11-Noon**

Red Butte Garden and Arboretum: Walk with the Curator, Ralph Reitz. Learn firsthand what's blooming in the garden.

**July 11
Saturday
Nursery field trip and
hike**

Outing to Great Basin Natives, Robert and Merrill Johnson's Nursery, in Holden Utah. Either meet there at 10:00 AM, or meet at Dick Hildreth's for coffee and Car-pool or caravan at 7:00. Hike in afternoon among bristlecones and manzanitas and possible campout. Call Dick at the Arboretum, 581-8936. The Nursery is at 75West 300 South, Holden UT, (435) 795-2303.

The Utah Heritage Garden - An Idea Whose Time Has Come?

Susan Meyer, Horticulture Committee Chairperson
Utah Native Plant Society _ Utah Valley Chapter

As the population of the Wasatch Front area continues to grow, we see more and more of our favorite foothill wildflower patches disappear under concrete, asphalt, and kentucky bluegrass. The question we ask here is whether there is any way to help native plants coexist with people in this increasingly urban landscape. One place where Utahns and native plants could come to coexist is in a garden setting. The people of Utah are committed to gardening - perhaps if they learned to garden with native plants they might also become committed to the appreciation and preservation of these plants in the wild.

But how do we introduce people to native plants for their gardens? Only a few are readily available in the mainstream nursery trade, and many natives with truly outstanding horticultural potential have been grown only by a few aficionados (e.g., see Dave Joyner on paintbrushes in a recent issue of the *Sego Lily*) or not at all. On one hand, we need local nurseries that specialize in Utah natives, where people can find many beautiful and unusual kinds of plants. On the other hand, we need some way to let people know why they would like growing these plants instead of petunias. And while a picture may be worth a thousand words, a living, growing garden is clearly worth a thousand pictures. This brings us to the idea of a Utah Heritage Garden.

People are accustomed to thinking of their heritage in cultural terms, but each resident of Utah can also lay claim to a unique bioregional heritage that includes all the complex natural communities of the state and the literally thousands of different kinds of plants, animals and other creatures that inhabit them. Most of us know very little about this extraordinary natural heritage. One meaningful way to learn about this heritage is to grow native plants. As any serious gardener will tell you, growing a plant is a whole different experience from casual observation. Watching and aiding the astonishing transformation from seed to seedling to vigorous young plant to mature flowering plant can be transforming for the gardener as well. It also changes the way the gardener perceives that plant when it is encountered in a wild setting, growing without any human aid at all. The beauty and strength of native plants in the face of harsh conditions can be quite moving to those who have learned through gardening to see and to value them.

In the course of group discussions at the Utah Native Plant Forum, held in February 1997 at Utah Valley State College in Orem, we identified the need for native plant demonstration gardens in public places. The newly-formed Utah Valley Chapter of the Utah Native Plant Society decided to make establishment of a public native plant demonstration garden in Utah Valley a high priority. We began last summer by collecting seeds of some of the plants we wanted to grow, and we spent fall and winter learning how to propagate these plants

from seed. Then we started searching for an auspicious location for the garden. One of our chapter members, Darrin Johnson, is a teacher at Wasatch Elementary School and an avid gardener himself. He arranged for us to use a 2700-square-foot area at the school front entrance as the site for our demonstration project. The garden will be located at 1080 North 900 East in Provo, just east of the BYU campus. We are currently in the process of preparing the site for planting. This involves taking out lawn and foundation plantings, carrying out some manual weed control, tilling the site, shaping beds and laying paths, and bringing in donated landscape rocks and chip mulch. A volunteer work day for helping to prepare the site is scheduled for May 16, and we plan to plant most of the garden on June 6.

We brought our idea for a demonstration garden to the UNPS Board of Directors to ask for their input and support, and we received some good feedback. One idea was to document this project as a pilot effort that others could use as a model for developing similar gardens at schools and parks around the state. We have prepared a document that describes our goals and outlines a procedure for reaching those goals. In the process we realized that providing interpretive materials to explain the garden and its purpose would be important to its success. We will make these materials available to anyone who is interested, both in printed form and as part of the upcoming UNPS Website. As we thought about the possibility that many different groups might want to use our model, we decided the program deserved a name---and the Utah Heritage Garden idea was born.

As we outlined in our document, we envision that a Utah Heritage Garden has the following purposes:

- 1) To teach the people of Utah about their unique and spectacular native plant heritage.
- 2) To show people that water-wise landscaping with Utah natives can be as beautiful and interesting as traditional European-style landscaping.
- 3) To help people discover how gardening with native plants can create a joyful sense of connectedness with wild nature.

- 4) To encourage people to care about the fate of native plants in the wild as well as enjoying them in the garden.

If the Utah Heritage Garden idea appeals to people, we as a society may be able to play a pivotal role, providing expertise as well as seeds or plants to many interested groups. Some of the services we might be able to offer include: a native plant propagation database and garden planning guide on our website, a series of hands-on workshops on responsible seed collection and propagation, a seed bank, and a corps of gardeners willing to propagate and provide plants. We might consider networking with garden organizations or perhaps with the USU Extension Master Gardeners program. Another possibility is to involve high school students in learning native plant propagation--several high schools in the state have greenhouse facilities. By establishing a series of demonstration gardens, we will show people how beautifully these plants perform and will teach people what to ask for when they go to local nurseries. This in turn will help the nurseries that specialize in providing native species.

As we proceed with this pilot project, we are already learning from our mistakes--hopefully we can help other folks avoid some of the pitfalls we have encountered. We believe this idea has tremendous promise, but we need the energy of many people. Anyone interested in helping with our demonstration garden, in learning more about the Utah Heritage Garden program-- or who has any good ideas on how we should proceed from here-- is welcome to contact me (801-423-2603 or semeyer@sisna.com).

Editor's Note:

This is the twentieth anniversary year of the Utah Native Plant Society. We will be featuring a few of the articles from the first editions of the *Sego Lily*. Next is a reprint from a letter from John Muir regarding his trip to the Salt Lake Valley.

EXCERPT: STEEP TRAILS

by John Muir

Chapter IX - MORMON LILIES

Letter dated: Salt Lake, July, 1877.

Lilies are rare in Utah; so also are their companions the ferns and orchids, chiefly on account of the fiery saltiness of the soil and climate. You may walk the deserts of the Great Basin in the bloom time of the year, all the way across from the snowy Sierra to the snowy Wahsatch, and your eyes will be filled with many a gay malva, and poppy, and abronia, and cactus, but you may not see a single true lily, and only a very few liliaceous plants of any kind. Not even in the cool, fresh glens of the mountains will you find these favorite flowers, though some of these desert ranges almost rival the Sierra in height. Nevertheless, in the building and planting of this grand Territory the lilies were not forgotten. Far back in the dim geologic ages, when the sediments of the old seas were being gathered and outspread in smooth sheets like leaves of a book, and when these sediments became dry land, and were baked and crumbled into the sky as mountain-ranges; when the lava-floods of the Fire Period were being lavishly poured forth from innumerable rifts and craters; when the ice of the Glacial Period was laid like a mantle over every mountain and valley -- throughout all these immensely protracted periods, in the throng of these majestic operations, Nature kept her flower children in mind. She considered the lilies, and, while planting the plains with sage and the hills with cedar, she has covered at least one mountain with golden erythroniums and fritillarias as its crowning glory, as if willing to show what she could do in the lily line even here. Looking southward from the south end of Salt Lake, the two northmost peaks of the Oquirrh Range are seen swelling calmly into the cool sky without any marked character, excepting only their snow crowns, and a few small weedy-looking patches of spruce and fir, the simplicity of their slopes preventing their real loftiness from being appreciated. Gray, sagey plains circle around their bases, and up to a height of a thousand feet or more their sides are tinged with purple, which I afterwards found is produced by a close growth of

dwarf oak just coming into leaf. Higher you may detect faint tintings of green on a gray ground, from young grasses and sedges; then come the dark pine woods filling glacial hollows, and over all the smooth crown of snow.

While standing at their feet, the other day, shortly after my memorable excursion among the salt waves of the lake, I said: "Now I shall have another baptism. I will bathe in the high sky, among cool wind-waves from the snow." From the more southerly of the two peaks a long ridge comes down, bent like a bow, one end in the hot plains, the other in the snow of the summit. After carefully scanning the jagged towers and battlements with which it is roughened, I determined to make it my way, though it presented but a feeble advertisement of its floral wealth. This apparent barrenness, however, made no great objection just then, for I was scarce hoping for flowers, old or new, or even for fine scenery. I wanted in particular to learn what the Oquirrh rocks were made of, what trees composed the curious patches of forest; and, perhaps more than all, I was animated by a mountaineer's eagerness to get my feet into the snow once more, and my head into the clear sky, after lying dormant all winter at the level of the sea. But in every walk with Nature one receives far more than he seeks. I had not gone more than a mile from Lake Point ere I found the way profusely decked with flowers, mostly compositae and purple leguminosae, a hundred corollas or more to the square yard, with a corresponding abundance of winged blossoms above them, moths and butterflyes, the leguminosae of the insect kingdom. This floweriness is maintained with delightful variety all the way up through rocks and bushes to the snow -- violets, oenotheras, wallflowers, ivesias, saxifrages, Smilax, and miles of blooming bushes, chiefly azalea, honeysuckle, brier rose, buckthorn, and eriogonum, all meeting and blending in divine accord. Two liliaceous plants in particular, *Erythronium grandiflorum* and *Fritillaria pudica*, are marvelously beautiful and abundant. Never before, in all my walks, have I met so glorious a throng of these fine showy liliaceous plants. The whole mountainside was aglow with them, from a height of fifty-five hundred feet to the very edge of the snow. Although remarkably fragile, both in form and in substance,

they are endowed with plenty of deep-seated vitality, enabling them to grow in all kinds of places — down in leafy glens, in the lee of windbeaten ledges, and beneath the brushy tangles of azalea, and oak, and prickly roses — everywhere forming the crowning glory of the flowers. If the neighboring mountains are as rich in lilies, then this may well be called the Lily Range. After climbing about a thousand feet above the plain I came to a picturesque mass of rock, cropping up through the underbrush on one of the steepest slopes of the mountain. After examining some tufts of grass and saxifrage that were growing in its fissured surface, I was going to pass it by on the upper side, where the bushes were more open, but a company composed of the two lilies I have mentioned were blooming on the lower side, and though they were as yet out of sight, I suddenly changed my mind and went down to meet them, as if attracted by the ringing of their bells. They were growing in a small, nestlike opening between the rock and the bushes, and both the erythronium and the fritillaria were in full flower. These were the first of the species I had seen, and I need not try to tell the joy they made. They are both lowly plants, - lowly as violets, -- the tallest seldom exceeding six inches in height, so that the most searching winds that sweep the mountains scarce reach low enough to shake their bells. The fritillaria has five or six linear, obtuse leaves, put on irregularly near the bottom of the stem, which is usually terminated by one large bell-shaped flower; but its more beautiful companion, the erythronium, has two radical leaves only, which are large and oval, and shine like glass. They extend horizontally in opposite directions, and form a beautiful glossy ground, over which the one large down-looking flower is swung from a simple stem, the petals being strongly recurved, like those of *Lilium superbum*. Occasionally a specimen is met which has from two to five flowers hung in a loose panicle. People oftentimes travel far to see curious plants like the carnivorous *darlingtonia*, the fly-catcher, the walking fern, etc. I hardly know how the little bells I have been describing would be regarded by seekers of this class, but every true flower-lover who comes to consider these Utah lilies will surely be well rewarded, however long the way.

Pushing on up the rugged slopes, I found many delightful seclusions — In moist nooks at the foot of cliffs, and lilies in every one of them, not growing close together like daisies, but well apart, with plenty of room for their bells to swing free and ring. I found hundreds of them in full bloom within two feet of the snow. In winter only the bulbs are alive, sleeping deep beneath the ground, like field mice in their nests; then the snow-flowers fall above them, lilies over lilies, until the spring winds blow, and these winter lilies wither in turn; then the hiding erythroniums and fritillarias rise again, responsive to the first touches of the sun.

I noticed the tracks of deer in many places among the lily gardens, and at the height of about seven thousand feet I came upon the fresh trail of a flock of wild sheep, showing that these fine mountaineers still flourish here above the range of Mormon rifles. In the planting of her wild gardens, Nature takes the feet and teeth of her flocks into account, and makes use of them to trim and cultivate, and keep them in order, as the bark and buds of the tree are tended by woodpeckers and linnets. The evergreen woods consist, as far as I observed, of two species, a spruce and a fir, standing close together, erect and arrowy in a thrifty, compact growth; but they are quite small, say from six to twelve or fourteen inches in diameter, and about forty feet in height. Among their giant relatives of the Sierra the very largest would seem mere saplings. A considerable portion of the south side of the mountain is planted with a species of aspen, called "quaking asp" by the wood-choppers. It seems to be quite abundant on many of the eastern mountains of the basin, and forms a marked feature of their upper forests. Wading up the curves of the summit was rather toilsome, for the snow, which was softened by the blazing sun, was from ten to twenty feet deep, but the view was one of the most impressively sublime I ever beheld. Snowy, ice-sculptured ranges bounded the horizon all around, while the great lake, eighty miles long and fifty miles wide, lay fully revealed beneath a lily sky. The shore-lines, marked by a ribbon of white sand, were seen sweeping around many a bay and promontory in elegant curves, and picturesque islands rising to mountain heights, and some of them capped with pearly cumuli. And the wide prairie of

water glowing in the gold and purple of evening presented all the colors that tint the lips of shells and the petals of lilies -- the most beautiful lake this side of the Rocky Mountains. Utah Lake, lying thirty-five miles to the south was in full sight also, and the river Jordan, which links the two together, may be traced in silvery gleams throughout its whole course.

Descending the mountain, I followed the windings of the main central glen on the north, gathering specimens of the cones and sprays of the evergreens, and most of the other new plants I had met; but the lilies formed the crowning glory of my bouquet — the grandest I had carried in many a day. I reached the hotel on the lake about dusk with all my fresh riches, and my first mountain ramble in Utah was accomplished. On my way back to the city, the next day, I met a grave old Mormon with whom I had previously held some Latter-Day discussions. I shook my big handful of lilies in his face and shouted, "Here are the true saints, ancient and Latter-Day, enduring forever." After he had recovered from his astonishment he said, "They are nice."

The other liliaceous plants I have met in Utah are two species of zigadenus, *Fritillaria atropurpurea*, *Calochortus Nuttallii*, and three or four handsome alliums. One of these lilies, the *calochortus*, several species of which are well known in California as the "Mariposa tulips," has received great consideration at the hands of the Mormons, for to it hundreds of them own their lives. During the famine years between 1853 and 1858, great destitution prevailed, especially in the southern settlements, on account of drouth and grasshoppers, and throughout one hunger winter in particular, thousands of the people subsisted chiefly on the bulbs of these tulips, called "sego" by the Indians, who taught them its use.

Liliaceous women and girls are rare among the Mormons. They have seen too much hard, repressive toil to admit of the development of lily beauty either in form or color. In general they are thickset, with large feet and hands, and with sun-browned faces, often curiously freckled like the petals of *Fritillaria atropurpurea*. They are fruit rather than flower — good brown bread. But down in the San Pitch Valley at Gunnison, I discovered a

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genuine lily, happily named Lily Young. She is a granddaughter of Brigham Young, slender and graceful, with lily-white cheeks tinted with clear rose. She was brought up in the old Salt Lake Zion House, but by some strange chance has been transplanted to this wilderness, where she blooms alone, the "Lily of San Pitch." Pitch is an old Indian, who, I suppose, pitched into the settlers and thus acquired fame enough to give name to the valley. Here I feel uneasy about the name of this lily, for the compositors have a perverse trick of making me say all kinds of absurd things wholly unwarranted by plain copy, and I fear that the "Lily of San Pitch" will appear in print as the widow of Sam Patch. But, however this may be, among my memories of this strange land, that Oquirrh mountain, with its golden lilies, will ever rise in clear relief, and associated with them will always be the Mormon Lily of San Pitch.

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Sego Lily

Newsletter of the Utah Native Plant Society

VOL. 21 No. 4

Jul/Aug 1998

CALENDAR OF EVENTS

**First and Third
Thursdays
5-9 PM**

Work on the Utah Heritage Garden during this growing season. Bring small hand shovels or garden tools and come to help on the first or third Thursday of each month.

**Wednesday, August 12
to Friday, August 14**

Tenth Wildland Shrub Symposium: Shrubland Ecotones. A Snow College symposium with regular sessions, poster sessions and field trips to the Great Basin Experimental Range and Salt Creek Canyon. Registration \$150 by May 8th, then \$175. Held at the Greenwood Student Center at Snow College in Ephram UT, they have an impressive schedule. For information call 435-283-7260 or 435-283-7261, or write GBEEC, 150 East College Ave, Ephram UT, 84627, or www.snow.edu/gbecc.

**Saturday, August 15,
9 AM, Albion Basin
Wildflower Walk**

Summer wildflower walk with Sherm Brough and Dick and Sue Hildreth, and a simplified new key for Albion Basin. Meet at the Parking lot at the bottom of Little Cottonwood Canyon at 9 AM. Bring lunch and a camera. Checklist provided.

**Saturday
August 29, 1998
9 AM**

Potluck Breakfast and Utah Heritage Garden Tour. We will be talking about and Showing off our native plant demonstration garden, literature, and the plants used for landscaping will be available. 1040 N 900 East, Provo

Native pharmacopoeia of the eastern Great Basin: A report of work in progress.

Janet Hugie Smith

In the study of man's adaptation to his environment, an important question that should be asked is – what did he do when he was sick and how effective was the treatment? The examination of disease and disease outcome is important because all societies face illness and injury, and most populations develop specialized behavior regarding health problems. Many anthropological studies of aboriginal medical practices have emphasized shamanism and supernaturalism, but there was a large area of primitive medicine that could be termed "rational therapy". In the eastern Great Basin, natural drugs utilized were crude animal, mineral or plant materials, but many were effective and suitable for their intended purposes.

Numerous plants were utilized medicinally by the aboriginal inhabitants of the eastern Great Basin. Although many of the plants are no longer used commercially because of newer and more effective drugs, both natural and synthetic, are now on the market, some are still important in modern medicine, and there are a number of plants the chemistry of which is not well understood.

Collections of about thirty plants were made with the help of Shoshone herbalists during the summer of 1972. Of these only about twenty are currently accepted as having some degree of therapeutic value. A society's ability to deal with disease seems to be dependent on three major factors: (1) the level of technological sophistication (2) the raw drug materials available in the environment, and (3) the types of diseases and injuries that are the most prevalent.

Successful treatment of most diseases requires accurate determination of the cause. Because of limited technology, aboriginal societies simply could not diagnose many illnesses. If the disease were severe, chronic or exotic, the cause was attributed to some supernatural or social agent and the afflicted person or his family sought the help of a shaman. If the cause of distress was obvious as in wounds, cuts, skin irritations, bruises, eye inflammation, etc. the treatment was empirical. Even when the problem was internal, successful treatment could be had if the disease was common and the symptoms clear cut. Specific plants became associated with specific sets of symptoms or injuries. Some plants with similar effects were used interchangeably for related problems and a few were effective for dissimilar problems.

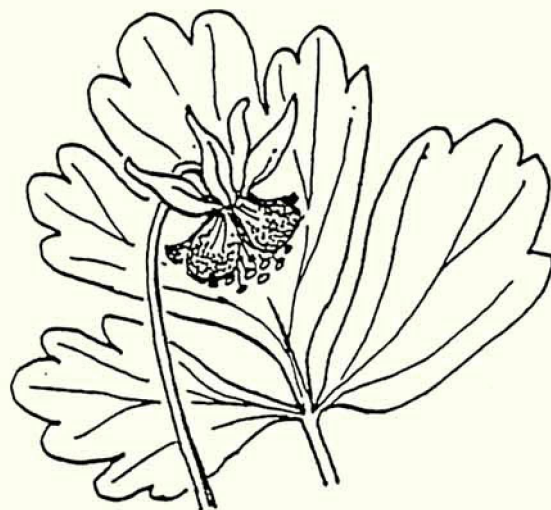
Those people living in the high mountain valleys or low mountain areas had access to more medicinal plants than those people living in high mountain forests, deserts, or marshy areas. However, there was exchange of information and plant materials among these peoples.

(The following few plants and their uses were among those collected on the Duck Valley Indian Reservation during the summer of 1972.)

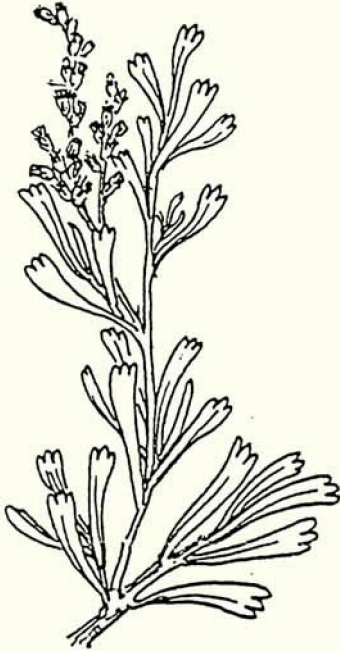
(1) Yarrow: *Achillea millefolium* The root was collected in the early summer and dried for use as a poultice on cuts, swellings, wounds or bruises. It was pounded between rocks then mixed with water to form a paste-like mass. This was applied to the afflicted area, allowed to dry, removed and another applied. Sometimes the tops and leaves were picked and made into a tea for stomach upsets. Yarrow contains the alkaloid achilleine which reduces the clotting time of blood.



(2) Columbine: *Aquilegia rormosa* The root was collected during the spring to use as a poultice on swellings, bites and boils. It was dried, pounded and made into a paste similar to yarrow.



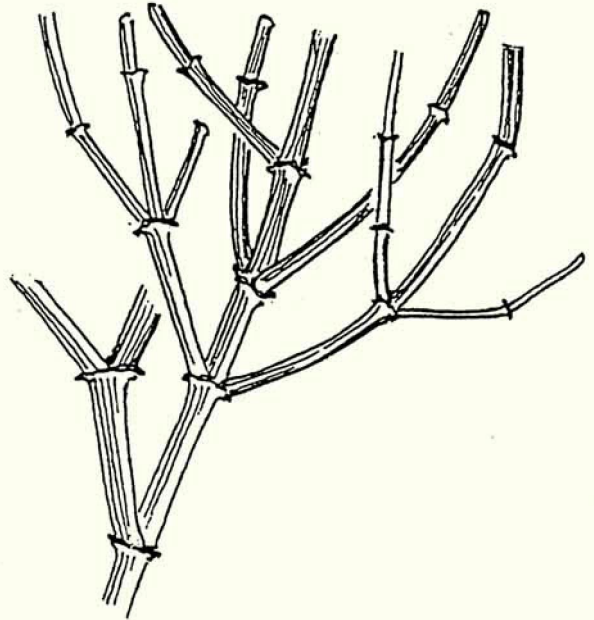
(3) Big Sagebrush: *Artemisia tridentata* Sage was commonly used throughout the Great Basin for colds and congestion. The leaves were gathered throughout the year and dried for teas. Sometimes they were used as a chest poultice being crushed and wrapped in a hot cloth for lung congestion. Green leaves were also wrapped in a cloth and used to stop external bleeding on both men and horses. Some recent experiments indicate that it may be useful in treating mouth and gum disorders such as pyorrhea.



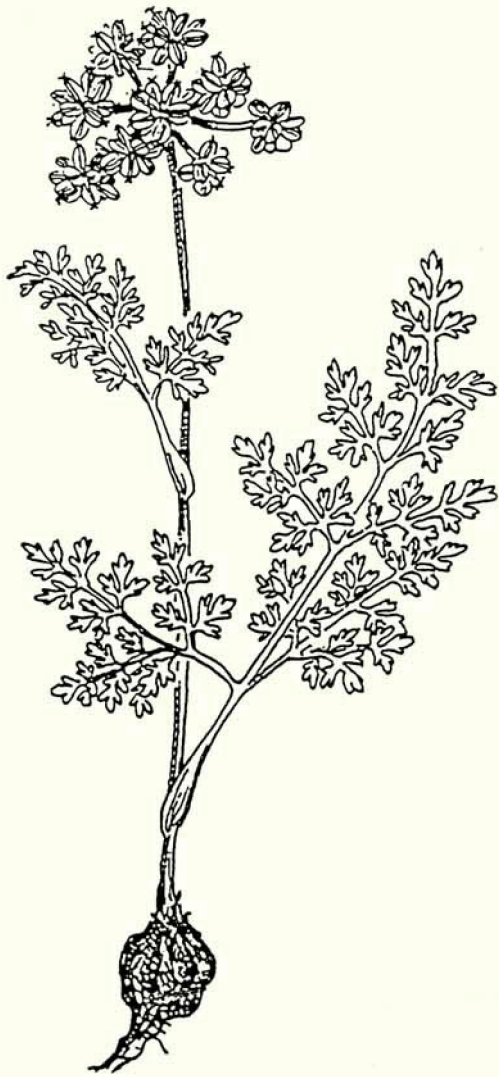
(4) Oregon grape: *Mahonia repens* The root was gathered during the summer, the outer bark peeled and the inner root mashed and dried. When needed it was soaked in water and the water used as an eyewash. The plant contains two alkaloids which reduce the inflammation of mucous membranes and are found in the commercial product Murine along with other ingredients.



(5) Mormon tea: *Ephedra* The branches of the plant were dried and made into a tea for stomach, bowel disorders and general "crummy" feeling. Pharmaceutical investigations on *Ephedra* are conflicting, but it seems clear that these species are not as physiologically active as those found in the Orient.



(6) Desert parsley: *Lomatium dissectum* This plant was one of the ones most widely used among the people of the Great Basin for both man and animals. The root was collected in the summer, cut into cross sections and dried in the sun. For colds and flu the dried pieces were ground into a powder for a tea. The ground root was also mixed with Tobacco and smoked for both head and lung congestion. Sometimes a piece of root was inserted into the nostrils for relief of headache or steeped in hot water for rheumatic pains. External washes were prepared for a variety of ailments ranging from dandruff to skin abrasions. Antibiotic studies on *Lomatium dissectum* compare its action roughly to that of penicillin in the complete inhibition of acid fast organisms including the tuberculosis bacteria.



(7) Curly dock: *Rumex crispus* The root was gathered in the summer and fall usually after the flowering parts had turned a deep red. Then was pounded and mixed with water to make a poultice for swellings, cuts, and sore muscles.



This was originally published in the first edition of the *Sego Lily*, 20 years ago.

by Janet Hugie Smith,
Great Basin Cultural Ecology, a Symposium
Reno, Nevada, 1972.

AN EYE-CATCHING POPPY

Nature Conservancy of Utah Acquires Critical Habitat Near St. George for Showy Endangered Species

The dwarf bear claw poppy (*arctomecon humilis*), one of Utah's most beautiful wildflowers, is also one of Utah's first rare plants to find its way onto the federal endangered species list. Its population has dwindled to just 7 small locations - all of them found in barren, gypsum-laced soils east and south of St. George. In May, following good water years, the showy white blossoms stand out brilliantly against the poor pastel soils in which few other plants can survive. The poppy is pollinated by ground-nesting bees that may be as rare as the plants themselves.

Long a worry to Utah's botanists, the population numbers have fluctuated greatly from year to year. The increasing threat by off-highway vehicles (OHV), motorized vehicles and mountain bikes (which destroy the plants themselves and compact the soil) has caused increasing concern for the species' ultimate survival. The Nature Conservancy of Utah has worked with the BLM to close the land to OHV use and fence one of the largest BLM populations, but continued OHV trespassing and fence cutting occurred at that site.

Since 1990, the Conservancy has been quietly working to purchase the only known poppy population occurring on privately-owned land. This 70-acre parcel was recently acquired for housing development by several local St. George entrepreneurs. Though the property was quickly platted and earthmoving was permitted, the owners were sympathetic to the poppy's plight and negotiated to sell off 14 acres of less valuable, steep

hillside property containing the majority of the rare dwarf bear claw poppy plants. With the generous assistance of the Willard L. Eccles Foundation, The Nature Conservancy of Utah was able to purchase this critical poppy habitat this past December.

This new Utah preserve will be immediately fenced to discourage additional OHV damage. It will be available to Utah botanists and researchers seeking to learn the secrets of this spectacular and vulnerable species in an effort to guarantee its survival.

REQUEST FOR HELP

We are a Forest Service research unit located in Bozeman that works on biological control of weeds. Before we can release a biological control agent against a weed, we must do extensive testing to determine what plant species may be at risk of attack. We like to include as many closely related native species in our host specificity tests as we can. We are currently trying to collect species for host specificity tests of biological agents for *Chondrilla juncea* (rush skeletonweed), a common weed in Idaho that has begun to invade Northwest Montana. We solicit your help in collecting plants/seeds of the following: *Crepis nana*, *Taraxacum ceratophorum* (horned dandelion), *Taraxacum eriophorum* (Rocky Mountain dandelion), *Taraxacum lyratum* (dwarf alpine dandelion), *Malacothrix torreyi* (Torrey malacothrix), and *Microseris nutans*. If you could collect any of these species, know of any populations where we could collect, or would like more information on our program, please contact: Wendy Bergstrom or Jennifer Birdsall, USDA Forestry Sciences Lab., 1648 S. 7th Ave., Bozeman, MT 59717, (406)994-1784.

Books from our friends in Oregon and Arizona

The ONPS and ANPS have been busy.

Conservation and Management of Native Plants and Fungi: Proceedings of an Oregon Conference

Edited by: Thomas N. Kaye, Aaron Liston, Rhoda M. Love, Daniel L. Luoma, Robert J. Meinke, and Mark V. Wilson. With a foreword by Reed F. Noss, Oregon State University. Native Plant Society of Oregon.

The management of native plants faces many challenges today, and the attention of many conservationists has recently expanded to include bryophytes, lichen and fungi. This book addresses this subject through the perspective of professional land managers, conservationists, and academic scientists from Oregon and neighboring states. Forty papers comprise the volume, which is broken into four themes representing conservation, restoration, ecology, and systematics. The book is the first of its kind for the conservation community in the Pacific Northwest; it is based on a symposium held 15-17 November 1995 on the Oregon State University campus. Although most papers have a regional focus, the book is pertinent to all students and professionals in the fields of botany and conservation biology.

296 pages; 113 illustrations 11 black and white plates, 51 tables, 6 appendices. Price: \$20 plus \$5 shipping and handling (\$2.50 shipping for each additional copy). Soft cover only. ISBN 0-9656852-0-9

For more information and abstracts of all papers in the book, visit our web site at: <http://www.teleport.com/nonprofit/npsoc/confproc.shtml> To order, send check or money order to: NPSO Conference Proceedings 804 Jefferson Avenue La Grande, Oregon 97850

Make check payable to: Native Plant Society of Oregon All proceeds from the sale of this book go toward the conservation and education programs of the Native Plant Society of Oregon.

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A special issue of *Desert Plants*, "Annotated Flora and Vegetation of the Tucson Mountains, Pima County, Arizona" was published in December, 1996, and can be ordered through ANPS which sponsored its publication. It features over 100 color plates. To order, mail \$10 to:

Arizona Native Plant Society
Box 41206, Sun Station
Tucson, AZ 85717

To receive a listing or to order any back issues, write to: *Desert Plants*, 2120 E. Allen Rd., Tucson, AZ 85719. All back issues (except for Vol. 4, Nos. 1-4. "Biotic Communities") are \$5.

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Newsletter of the Utah Native Plant Society

VOL. 21 No. 5

Sept/Oct 1998

CALENDAR OF EVENTS

Lichen classes
Oct 31, 10 AM to Noon

Dr. Larry St. Clair of BYU will teach a class, The Lichens of Utah, at Red Butte Garden and Arboretum Visitor Center. The cost is \$6 for garden members, \$8 non-members.

UNPS Board of Directors Meeting, 6PM, Nov 11th

The Board will meet at the Red Butte Garden and Arboretum offices in the conference room, 18A DeTrobriand in Fort Douglas. Call Dick Hildreth for information, 581-8936.

**ANNUAL MEETING
AND NEW WORLD
POTLUCK
Nov 13th, 6:30 PM**

The annual meeting and potluck will be held in the Sugarhouse Park Garden center on Nov 13th at 6:30 P.M. Bring your dish of new world food and a few of your best slides. The Garden center is on the south side of 21st So. at about 1450 east in Salt Lake City.

Goals and Objectives of the Utah Native Plant Society

Stanley L. Welsh
(Presented at opening session of Utah Native Plant Society)
30 September, 1978

Introduction

It seems necessary to evaluate the condition of our native plants, our resources, and our position before attempting to state potential goals and objectives for this society. The role of outlining the condition of the body politic generally lies with the ruling head of the organization, and it is thus foolhardy of me to provide such a state of the state address or the goals and objectives which might flow from such an analysis. Whatever qualifications I lack for these tasks, I will obscure by my ignorance and will walk with steadfastness into the lion's den. I will use as example and excuse the generations of politicians who have walked the battlefield in the sure knowledge that God will protect such fools. My presentation will include three main sections; a review of the nature of the flora of Utah as it has been influenced by the activities of our civilization, the development of botanical taxonomic thought and of botanical resources available, and finally of some of the current problems with which this society and its members might be concerned.

The Flora: Historical Perspective

That the flora of Utah is unique has long been known, not only to the few professional botanists who have worked to understand that flora, but also to a larger number of State and Federal workers, and to the numerous private persons with interest in our native plants. The study of that vast array of those evolutionary end products, our native species, allows for many possible approaches, as do the aspects of a multi-faceted jewel, and most of the approaches known in contemporary times have been employed to a greater or lesser extent, both the practical and the theoretical.

The comparison of our flora to a jewel of great beauty can be applied in yet another sense; i.e. as being representative of a national prize, equivalent in a real way to crown jewels. For the most part, however, the plant species of Utah have not been regarded or treated with great reverence or respect by the populace as a whole. The region was pioneered and settled by people of a most practical nature, dedicated to the idea that food, clothing, shelter, heat, and light were necessities. The land and its vegetation were exploited to provide the materials required for existence in this remote area with its perennial economic depression. Over-riding preoccupation with "making a living" precluded more than a passing interest in plants as a portion of our national heritage.

The plants were regarded to have been placed here for the use of man, either in place or after being removed to some more distant place. The natural vegetation was sometimes treated as a mere obstacle to economic development; the vegetation had to be cleared to provide arable land. Land quality was judged by its value for growing of agricultural crops, for construction of buildings, or for grazing. Lands suitable for growing of crops and for construction of dwellings and business establishments were to form the taxable base for local and state government. Grazing lands, which could not support even a modest tax levy, were not selected for private ownership and were to remain under Federal control. Lowlands adjacent to sources of water for irrigation were cleared and planted to introduce Old World crop plants, an action that stimulated the introduction of weeds - those camp followers of man. The first major retreat of indigenous flora had begun. Only about three percent of Utah came under irrigation and only

about an additional one and one-half percent of the state's 86,000 square miles were suitable for dry farm agriculture. To the four and one-half percent taken from the total for agricultural uses must be added other portions of the state, those intangible amounts cleared for the roads, railroads, canals, pipelines, fences, pole lines, and for the failures in agriculture.

That "hope springs eternal in the human breast" and that mankind is capable of expenditure of energy in monumental quantities is to be found in the cleared areas adjacent to tattered abandoned farmsteads, haunted by the ghosts of broken dreams, throughout the west. These are in areas, which failed to produce crops following the tremendous labor of clearing, construction of irrigation systems, and of planting. An idea was extant during the pioneering period that climatic improvements followed close on the heels of clearing and cultivation of the land. For whatever reason, hardly a portion of our great state is free from scars that serve as evidence of failures in agricultural attempts. Agriculturists, - farmers, ranchers, and others who grow crops (and weeds) - often yield to failure or to success with a stoic pessimism; conditions are bad now and are likely to get worse.

Because of the successful and unsuccessful attempts at agriculture, the nature of the indigenous vegetation prior to our occupation of the flat to gently sloping lands near streams is difficult to determine. We can get hints by searching throughout the cultivated areas for small plots, often in fence corners or in cemeteries, for a glimpse of what had been prior to tillage by European man. River bottoms and wet lands suitable for grazing came into private ownership and have undergone similar modification into cultivated regions. Grazing practices, utilization of wood for fire or lumber, establishment of canals, drainage modifications, construction of dams and reservoirs, and other uses dictated that much of the flavor of native plant communities would be lost or modified.

Coal and mineral exploration would place demands on the natural flora for timber, charcoal, and for space. The total acreage covered by natural vegetation would again be reduced and much of the remainder selectively modified. Roads and railroads, tramways, sluices, waste dumps, and buildings, smelters, and townsites would effectively replace the area occupied by native plants, and

would provide still more areas ideally suited to the weedy species, those plants of man's footprints.

Not all of the attempts to recover mineral wealth from the earth were successful either. Passions of the human kind are stimulated by thoughts of great wealth, led on by obvious successful examples of the paying kind. There is sufficient metallic stain in the rock outcrops of the state, and in its gravels, to cause generations of prospectors, those eternal optimists, to scratch at the land. Encouraged by the mining law of 1877, man-hours by uncounted millions have been poured into searches, which have produced waste dumps of gigantic proportions when taken in their entirety. Further countless millions of hours have gone into the scheming, dreaming, and planning. It is said that more ore has been mined in the minds of men "in their cups" than was ever produced in all actual mining. Undaunted by failures of previous prospectors to "strike it rich," each generation spawns a few more visionaries who are convinced that, in some way, all previous prospectors have overlooked a lode, which, when tapped, will yield great wealth. They point to those obviously successful prospectors of all generations to support their point of view. They do not consider the failures, only the successes, and discount the fact that most of those successes are no longer in operation (e.g. Tintic, Park City, Frisco, Newhouse, and many others). The view of the prospector of any age involves the idea that today is good and tomorrow will be better; prosperity is just around the corner.

Scars of other kinds mark our great land; those resulting from extraction of gravel, sand, clay, gypsum, salt, other earth products, coal, and oil. The end results of all of these extractive industries are scars of greater or lesser proportions.

Individuals, proprietors, partners, and companies have all been involved in exploitation of our resources. The larger the attempt at exploitation the more complete becomes the operation, and the more expensive. Dreaming is not the province of people as individuals alone; often dreams are shared by partners or even by great corporations. The corporate dream differs only in magnitude, and is for a profit based on efficient application of capital. The main difference between individuals and corporations involves the idea that the corporate stockholder does not often worry about how

exploitation is applied as much as whether there is a profit declarable as a dividend.

Dreams of the past have been dreamt, and capital has been applied, as indicated by roads, railroads, mine spoils, ash disposal areas, seismograph roads, drill pads marked by weld-signatured pipes, by producing wells, mines, factories, businesses, and governmental offices. Every structure and mark on the land gives evidence to the productivity of our landscape. Schools, churches, governmental agencies - indeed, each of us is dependent upon that productivity. We live upon the surplus provided by exploitation of our resources.

Native Plant Species

The first collections of plants taken from what is now Utah were collected by John C. Fremont during expeditions that penetrated this region in 1843 and 1845. Later came Howard Stansbury, in 1849-50, and Edwin O. Beckwith, in 1854. Beckwith had been second in command to Captain Gunnison who met death during the expedition. All these expeditions were financed by the United States Government, and their specimens were destined for deposit outside of Utah.

The collections of those workers were summarized by Elias Durand (1859. A sketch of the botany of the Great Salt Lake of Utah. *Amer. Philos. Soc. II. 11: 155-180*), who included a discussion of specimens collected by a Mrs. Jane Carrington of Salt Lake City. Reputedly, Mrs. Carrington was a Mormon, and perhaps the first Utahn to demonstrate an interest in Utah botany by making an actual collection. Her collections were communicated to Durand by Colonel Thomas L. Kane and are deposited with the Durand Herbarium in the Museum d'Historie Natutelle, Laboratoire de Phanerogamie, Paris. Specimens by the other early collectors are housed in herbaria in the eastern United States. Exploration of the Fortieth Parallel brought still another governmental expedition to Utah in 1869-70. Sereno Watson, sometimes accompanied by Amos Eaton, collected in the canyons of the Wasatch and Uinta Mountains during that period. The 1870's brought a surge of collecting within the state. Dr. C.C. Parry and Dr. E. Palmer took specimens from southwestern Utah. Captain F.M. Bishop, Lester F. Ward, and Mrs. Ellen Thompson (sister of John Wesley Powell)

collected in southern Utah as adjuncts or as parties to the Geological Survey of Powell. On the 17th of June 1879 there arrived in Salt Lake City a most unusual and energetic man, largely self-taught in botany, but with a classic education. Reared and educated in Iowa, this man, Marcus E. Jones, was to change the course of botanical study in Utah for all future time. From 1880 his activities centered in Utah even though he spent much time traveling and collecting in other parts of the West. At a time when plant communities were still largely unchanged, Jones systematically botanized the region and collected large species sets of plants, which he sold or exchanged with other interested amateurs or institutions.

Jones amassed a huge collection of plants, which was stored along with his printing press and library in a house on the avenues in Salt Lake City. As the pace of eastern botanists, led by Asa Gray, declined, that of Jones grew disproportionately large. Soon, Jones was to regard the botany of Utah as his own private domain, and he published new species and comments on contemporary botanists in his now famous "Contributions to Western Botany", a work printed on his own press on type set by him in his house in Salt Lake. He began work on the monumental treatment of *Astragalus* early on, and printed a summary monograph of the group in 1923.

Our first resident professional built a collection of plants unparalleled in his time. The University of Deseret had at least a part time botanist by the name of Orson Howard, and early on Jones collected with him. The Howard collection resided at the University, along with specimens taken by Captain Bishop in southern Utah. Jones worked, from time to time, in a collaborative arrangement with the University, and reputedly helped himself to whatever specimens he wished. His collection, along with at least some "taken" from the University of Utah was not to remain in the state. His complete collection, the most extensive early collection ever made, was sold to Pomona College at Claremont, California, in 1923.

Alice Eastwood later established resident botanist at the California Academy, trespassed on his domain in the 1890's, when she traveled with Alfred Wetherill through Grand and San Juan counties. A.O. Garrett, a teacher of botany at East High School and at the University of Utah, was tolerated with great deference by Jones. Marcus E. Jones was King, even though self-appointed.

The earliest existing institutional herbarium in Utah was founded by Garrett at East High School in 1905. His personal herbarium, which passed to the University of Utah upon his death in the 1940's, is the earliest herbarium of consequence to be housed in Utah.

Attempts were made, contemporaneously with Garrett's beginnings, to develop collections at Utah State and at Brigham Young Universities. Charles Piper Smith taught at Utah State in 1909 and a great expedition to Central America by persons from B.Y.U. yielded collections. These were stored in the furnace room at B.Y.U., and later were placed in the furnace. The still extant institutional herbaria at the larger Universities were founded in 1923 (BYU), 1931 (UTC) and 1935 (UT). Walter P. Cottam founded the herbaria both at the Brigham Young University and at the University of Utah. The remainder of the history of collections of the herbaria of Utah involves Walter P. Cottam and Bassett Maguire (of Utah State), their students, and the generations of students who followed them; Seville Flowers, Bertrand F. Harrison, Desma Hall, Arthur H. Holmgren, and others have worked to build the collections. By 1960 there were some 200,000 specimens available for study in the herbaria of the state. Currently, almost half a million specimens are housed in institutional herbaria.

Some Goals and Objectives

Increased impetus in study and collection of our state flora has been dictated by corollary increase in activities of all kinds within Utah. Never has the demand upon our resources been greater. We are called upon to develop water supplies, coal, oil, uranium, earth products, and practically every other resource at an accelerated rate. Each of these demands has placed a greater strain upon the existing plant communities of the state. Lands wild a generation ago are being penetrated at an ever-increasing rate, and for an ever-increasing number of reasons. Each of you know of specific actual or potential impacts which are directed towards further reduction of total native plant cover as the state moves towards the Twenty-first Century.

Protection of segments of the flora, has been dictated by Federal Law: The Endangered Species Act, International Convention of trade in Endangered Species, Environmental Protection Act.

State laws typically have not kept pace with the Federal laws. We are caught on the horns of an apparent dilemma, that protection of the environment is a necessary obstacle to economic expansion and development. The state and local governmental officials have tended to side with development and expansion in this apparently uncompromising battle.

Reasons for the existence of such a society as the Native Plant Society must revolve around its capacity to provide information, to serve as a sounding board, to provide reason, and to stimulate and encourage the formulation of knowledge. We can provide an arena for interaction where private, public, federal and institutional professionals and interested informed amateurs can meet to arrive at understanding.

Our goal in education must involve the perpetuation of native plant species and communities, whether by artificial propagation or by perpetuation in site. The flora of this state is incompletely known; the cadre of professionals has always been too small to survey it thoroughly. You can enlist in the task of aiding in the survey, of developing an appreciation for the aesthetics of our flora as a whole and in part. Species distributions must be plotted, and funding generated to enhance information availability and plant protection. Unique, rare, endangered and threatened plants must be identified, their distributions plotted and basic ecological requirements determined.

We must work with the state legislature in passage of laws which will enhance protection of the plants in the state, and which will give equal protection to species on state lands as to that protection now afforded only by Federal laws on Federal lands. A state list of unique species should be compiled, and these treated to protection, if not by law, then by appreciation and education. That the people of Utah are interested in protection and preservation of plants of the state is indicated by your presence here today. That we are not insensitive to the living heritage of our native plants is indicated by the great strides made, with much sacrifice, towards the goal of understanding the flora of the region. We are interested in preservation and understanding, not merely for the sake of those objectives, but to allow for a fuller appreciation of life and of living things as appurtenances to that fitful fever which marks the existence of each of us.

Editor's Note:

The previous piece was presented at the first meeting of the UNPS, and was also the text of the first *Sego Lily* 20 years ago. I feel it remains timely; the goals are still valid and current.

It ended with a request for articles – a request I now echo. I hope the *Sego Lily* can assist the decades-old goal of providing a forum and a sounding board, as well as disseminating information about Utah plants.

Please send submissions of all kinds to Larry Meyer, 2931 Tolcate Lane, Salt Lake City, UT, 84121, or e-mail meyer@med.utah.edu. Submissions in computer format are especially appreciated.

A New Rare Species of *Draba* at the Winter Olympics Site

by Therese Meyer

Recent surveys and genetic studies have identified a new species of mustard, informally called Burke's *Draba*, at the site of the men's downhill ski course at Snowbasin. When the small, yellow flowered plants were found clinging to the rocky crags at the top of the ski run, they were first thought to be a population of another rare mustard, *Draba maguirei*, which grows in the nearby Bear River Range. Forest Service employees, in particular, Wayne Padgett, began survey work to determine the range and population size of the plants. It quickly became clear that the plants were distinct from other populations in both form and habit.

Enzyme studies and cytological analysis (chromosome counts) by Dr. Michael Windham at Garrett Herbarium at the Utah Museum of Natural History, and DNA sequencing by Mark Beilstein, a graduate student in Biology at the University of Utah, further confirmed the distinction between the two groups of plants.

The chromosome counts, in particular, demonstrate evolutionary separation of this group into not just two, but three different taxa. *Draba maguirei* has two cytotypes, a high elevation taxon with a chromosome number of $n=16$, and a low elevation cytotype with $n=8$. The low elevation populations

of *D. maguirei* are sufficiently distinct from typical plants on Mt. Naomi to be recognized as a new variety. Plants from Snowbasin, and other localities in the Wasatch and Wellsville Mts., have a chromosome number of $n=10$. This difference in base number, along with DNA divergence, indicates that Burke's *Draba* is only distantly related to *D. maguirei*.

Population censuses have located only 10,000 plants of Burke's *Draba*. Up to five percent of these will be eliminated by construction at Snowbasin. One might wonder why the Endangered Species Act has not come into play in this situation. The ponderous pace of listing new species is not the only reason. Congress, at the behest of our Utah congressional delegation, exempted Phase I of the Snowbasin expansion for the Salt Lake Winter Olympics in 2002 from all National Environmental Protection Act (NEPA) provisions. Further development (i.e. Phases II and III) will be subject to NEPA.

The Forest Service and Red Butte Garden and Arboretum (as representatives of The Center for Plant Conservation) are working out a cooperative plan to rescue all the Burke's *Draba* plants which would be impacted by construction of the ski facility. Some of the rocky outcrops needed to be chipped off, and the plants in that area were removed to be housed at the Red Butte Garden and Arboretum greenhouse. In addition, the Forest Service made genetically representative seed collections from the site for seed research and plant conservation. It eventually may be feasible to reintroduce these seeds to appropriate sites in the vicinity of the original habitat.

Gardening with Natives **Four O'Clocks - *Mirabilis* spp.**

by Bob Wilson

The selection of flowering perennials native to northern Arizona that have the potential to make excellent landscaping plants is quite large. It was a struggle to choose just one for this column since I would like to talk about so many. Not being able to decide completely, I managed to narrow the choices down to just two this time, both four o'clocks in the genus *Mirabilis*. What makes these plants so

memorable to me is not just their natural beauty, but seeing how they endure adverse conditions. During last year's near-record drought, I kept a close eye on plants growing in the wild to see how they responded. Most plants limited their growth and bloom in response to this stress. The four o'clocks, however, brought forth more than their share, growing and blooming with abundance, doing even better than in years of average rainfall.

The two species I am referring to are the desert four o'clock, *Mirabilis multiflora*, and the wild four o'clock, *Mirabilis oxybaphoides*; both in the four o'clock family, Nyctaginaceae. A person encountering these for the first time and attempting to key them out might get frustrated, for with all the showiness of the flowers, technically they have no petals and the calyx provides the color.

The desert four o'clock is a large, spreading plant, capable of reaching 3-4' across and generally a little more than 1' tall. The large, glossy to glaucous leaves make it appear uncommonly lush in the dry habitats where it grows. One of the plant's nicest features are the blooms, which are bright magenta, 1" wide, funnel-shaped flowers. True to its name, flowers open in late afternoon and wither the next morning. These plants have an exceptionally long bloom period, usually starting in June around Flagstaff, and with successive flushes of flowers through the summer. In full bloom, this is a real eye-catcher.

The desert four o'clock occurs in Arizona between 2500' and 7000' elevation and is found from the Sonoran Desert up to the pinyon-juniper habitat. It commonly grows in sandy, cindery or rocky soils, which suggests it requires good drainage in cultivation. Its native range extends from northern Mexico to Utah and Colorado.

Unlike its robust relative, the wild four o'clock (*Mirabilis oxybaphoides*) is much more delicate. It produces slender upright or sprawling stems with sparse, dark green leaves. The flower is very similarly colored but smaller than the desert four o'clock, about 1/2"-3/4" wide. It also blooms in abundance, has a very long bloom season though it starts a little later in the season, and flowers that open around four o'clock.

Arizona Flora claims the wild four o'clock is rare in northern Arizona, a statement I would have agreed with prior to 1996. However, this is one plant that was much more successful during the drought. I found it blooming almost everywhere I went last summer. Its native range reaches from Utah and northern Arizona to Texas. In our area it occurs between 6000' and 8000', and is found in the ponderosa pine and pinyon-juniper habitat.

Both species can be cultivated similarly, will tolerate full sun to partial shade and need very little, if any, water. A well-drained soil seems more important to the desert four o'clock. Both are hardy to USDA zone 4. Though I cannot speak for their heat tolerance, the wild four o'clock probably would need additional water if grown at lower elevations.

The plants are easily grown from seed since they are neither dormant nor have a hard seed coat. Seeds on the desert four o'clock are quite large (3/16") and grow quickly, making them a good candidate for a school project. The four o'clocks are some of the truly magnificent native perennials, which can be enjoyed both in the wild and in the home landscape.

Bob Wilson is the owner of the Sinagua Nursery in Flagstaff and can be reached by e-mail at: botanybob@aol.com

Xeriscape Garden Update

Utah Valley Chapter had a potluck breakfast and work party in early September, which was a huge success. Over 100 people showed up to weed, tend and enjoy the garden. Many were from area schools. The garden is a demonstration of native plant use and xeriscaping techniques and in front of an elementary school. Work parties were regular events last summer, and we will announce their schedule for the spring. Congratulations to the Utah Valley Chapter!

Computer Based Plant Key Available For Utah Area

A new type of plant key has been created for the computer, and is now available in our area. Over the past four years Bruce Barnes has used XID Systems

software, developed by Richard Old, Ph.D. of Pullman, Washington, to create plant keys for all of the vascular plants of Oregon, Washington, Idaho, southern British Columbia, Montana, Wyoming and Colorado and Utah.

The following is a description of how the program works. To identify a plant, the user first selects from a menu of types of plant characteristics (such as leaves, stem, inflorescence, flower fruit). The user then selects those characteristics which best describe the plant to be identified. The computer eliminates from consideration all plants, which do not match those characteristics, and also eliminates all menu choices which would not help to distinguish between the remaining species. The user then goes to another menu and makes another selection, and so on. At any point, the user may ask the computer to analyze the remaining species and provide a list of the characteristics which are easiest to identify and will most effectively separate between the remaining species. The user may select from that list or go to a different menu. In addition, one may call up an alphabetized list of the remaining species (either common or scientific names), including the page numbers of references that describe the plants (such as *A Utah Flora*, *Intermountain Flora*, or *The Jepson Manual*). When all species are eliminated but one, the plant has been identified. The user may check it against the references listed on the screen, and may check for errors by calling up a list of the characteristics that were entered by the user.

With a little practice, identifying a plant takes one or two minutes. It usually takes only four to six entries to identify a species. This speed and simplicity is due to the computer identifying the species that has a particular combination of characteristics.

The traditional dichotomous keys we have all struggled with are a very ingenious system, given the limitations of pen and paper with large volumes of data. They also demand great skill to create and much practice and patience to use. A frequently frustrating experience with dichotomous keys is being expected to make a choice in the key when the necessary part of the plant (example: fruit or flower) is not present. In an expert system key, the user is simply asked to describe the features that are most obvious about the plant. If a plant

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characteristic cannot clearly be defined, such as whether a leaf is best described as lanceolate or linear, the user may tell the computer to include all species that have either description.

The keys include comprehensive data on each species in order to provide the user with the widest possible range of characteristics from which to choose, and they contain all vascular plants known to be in the regions as listed, including conifers, flowering plants, grasses and grass-like plants, and spore-bearing plants. Plant names are based primarily on the NRCS Plants Database.

Technical botanical terms are kept to a minimum, and help screens with definitions are provided for all menu items. Graphics with line drawings to accompany the definitions of terms (such as leaf shapes and inflorescence types) are available, and are a great help in clarifying definitions. Help screens also provide a description of the habitat and geographic range for each plant.

The keys are sold by geographic areas, such as SW Utah. The software they run in is available in DOS, Windows or MAC format. For prices and ordering information, one may contact Bruce Barnes at Flora ID Northwest, at 135 SE 1st, Pendleton, OR 97801, 541-278-2222(0), 541-2765547(H), 541-276-8405(Fax), or flora@ucinet.com, or may look it up on <http://www.ucinet.com/~floranw>.

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