



VOL. 15 NO. 1

JAN / FEB 1992

CALENDAR OF EVENTS

- Jan. 13** **Cache Chapter Meeting.** Ron Lanner, featured speaker.
Monday Meet at the Intermountain Herbarium, Utah State University, Logan, Utah, 7:00 pm.
- Jan. 22** **UNPS Board Meeting.** Granite Park Jr. High, Room B-17. Wednesday, 6:30 pm.
- Jan. 22** **Salt Lake Chapter Meeting.** To be announced. Watch for your blue card. 7:30 pm.
- Feb. 10** **Cache Chapter Meeting.** To be announced.
- Feb. 26** **UNPS Board Meeting.** Granite Park Jr. High, Room B-17. Wednesday, 6:30 pm.
- Feb. 26** **Salt Lake Chapter Meeting.** "Endangered Plants of Utah" by Ben Franklin. Granite
Wednesday Park Jr. High, Room B-17, 7:30 pm.

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TONY GROVE 1991

Sharon Coons

Never let Jo Stolhand overhear you say you have taken detailed notes on a field trip. (Little did she know it would take me until now to find and decipher them.) Still, the memories of meadows and trailsides abloom with wildflowers have brightened the gray November day upon which I am writing this.

In July, a large group of wildflower lovers were led by Dr. Leila Shultz, curator of the Intermountain Herbarium in Logan, on the annual wildflower walk in the area around Tony Grove Lake. On the way to the lake, Dr. Shultz stopped at a dry hillside adjoining the road to Tony Grove to point out an Owl Clover (Orthocarpus sp.), which grows in only a few places in Logan Canyon and is under consideration as a new species. The Owl Clover was growing in an area of low sagebrush (Artemisia arbuscula), Snowberry (Symphoricarpos oreophilus), Senecio and Tarweed, a small yellow flower that smells like asphalt.

The slope north of the lake appeared dry at first glance, but was wet enough to include a number of plants often seen on the edge of marshy areas and in subalpine meadows scoured out by glaciers. Among them was Valerian (Valeriana edulus), well known in herbal medicine as a sedative (its root is a source of valium), Yellow Monkeyflower (Mimulus guttatus) of the Figwort family, Bog Orchids (Habenaria dilatata), and Elephanthead (Pedicularis groenlandica) which was first discovered in Greenland. Dr. Shultz pointed out that the elephant trunk curves against the back of the bee's body and the stigma sticks to the back of the bee, thus insuring cross pollination. There was also Scrophularia lanceolata looking like an Easter bunny in a basket, and Jacob's Ladder (Polemonium) with its offensive scent to attract flies for pollination. Nearby was Colorado Columbine (Aquilegia caerulea) which is blue in most parts of its range, but white in Utah, the result of selection by pollinators. In Utah this columbine is pollinated by the crepuscular Sphinx Moth.

Amongst the Sweet Grass (Melicha bulbosa), its bulb-shaped swelling a source of carbohydrates, we viewed a large number of other wildflowers. Also on the hillside were Microsteris, Yarrow (Achillea millefolium), growing shorter than usual due to root competition, Twinberry (Lonicera involucrata), an Indian source of ink for painting dolls, Geraniums both white and pink (G. richardsonii and viscosissimum), Larkspur (Delphinium occidentale), Alpine Butterweed (Senecio sp.), Blue Penstemon (Penstemon cyananthus), Shrubby Cinquefoil (Potentilla fruticosa), Glacier Lily (Erythronium grandiflora) in fruit, Indian Paintbrush (Castilleja sp.), Sweet Cicely (Osmorhiza occidentalis), Wild Flax (Linum kingii), Scarlet Gilia (Gilia aggregata), Bluebells (Mertensia ciliata), Green Gentian (Frasera speciosa), Serviceberry (Amelanchier alnifolia), Stickseed (Lappula sp.), Wild Rose (Rosa nutkana),

Buckwheat (Eriogonum heracleoides), Golden Aster (Helionurus), and Chokecherry (Prunus virginiana).

At the top of the slope where the trail ran through Mountain Ash (Sorbus scopulina), Douglas Fir (Pseudotsuga menziesii), and Limber Pine (Pinus flexilis) toward Mt. Naomi, my attention was temporarily diverted by a passing Audubon group, who reported seeing a nesting pair of Three-toed Woodpeckers about a quarter of a mile up the trail. After a short detour to search for these birds, I rejoined the group on the trail around the lake.

Tony Grove is a glacial cirque lake, lying beneath an overthrust belt in a contact zone between Fishlake Limestone and Susan Peak Quartzite. Some of the interesting plants pointed out by Dr. Shultz along the trail were a spiny edged fern (Pilea palustrichum), Clematis, Pennyroyal (which makes a good tea), Elderberry, False Solomon's Seal (Smilacina), Buffaloberry (Shepherdia canadensis), Heartleaf Bittercress (Cardamine cordifolia), a mustard with a white flower, Brook Saxifrage (Saxifraga odontoloma), Monkshood (Aconitum columbianum), Baneberry (Actaea), Chlorocrambi hastatus, an unusual mustard, Alum Root (Heuchera parvifolia), Anemone, and Purple Penstemon (P. whippleanus).



Baneberry

I lingered after most of the group had left to try to repeat the tour for Kathy Anderson who had had another commitment that morning. It was a good review for me, and a quiz for her since she'd just finished Dr. Schulz's Vascular Plants class at the Teton Science School. (She passed, easily, a good recommendation for the class!) Those who came in the morning and didn't camp out the night before missed a delicious Dutch oven dinner by Brent Shipley, topped off with Jo Stolhand's mouth-watering Dutch oven rhubarb cobbler (with enough left over for lunch), together with a native plant salad. Those who left earlier than Kathy and I missed the sight of a large bull moose striding out of the lake into a group of bathers and dispersing them from "his" lake, then majestically returning to swim in peace in the middle of the lake.

GETTING INVOLVED

Jo Stolhand
UNSP President

What is faster than a speeding bullet, more verbose in a dead language than in English, and able to leap tall mountains in a single bound? A field botanist. Who among us has not fantasized living the life of a botanist, roaming hill and dale in search of the illusive new species, or, at the very least, a new location of a sensitive species? And then, somewhere closer to reality, we see ourselves sitting down in a meadow of wildflowers, opening the Utah Flora and becoming totally overwhelmed attempting to identify every species within a three foot radius. So how would one of us neophytes ever luck into finding a new species, or even help save a rare species from extinction?

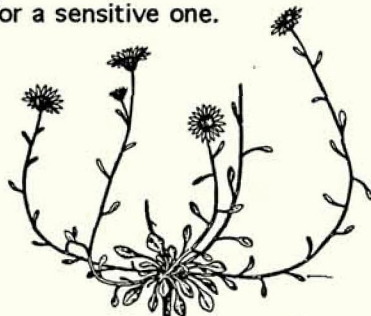
Here is a tip, though hardly credible, coming from someone who never discovered anything. **Narrow your field.** We can't be an expert on everything so pick a smaller scope in which to become proficient.

Select a Family or Genus

If you know every member of a genus or family known to be in Utah, then you will recognize something that is different. I, myself, might choose the genus *Oenothera* (Evening Primrose) and eventually expand into the entire family of *Onagraceae*. The large four-petalled blossoms never fail to stop me in my tracks to admire their beauty while the distinctive four-lobed stigma make the Evening Primrose readily identifiable. Beside, they are also very photogenic for the early-riser.

On the other hand, I would probably steer clear of the *Compositae*. This is a personal bias to which most amateurs relate. However, once, I came this close..... it was a field trip in southern Utah and I was following Michael Windham, curator of the Garrett Herbarium, up a streambank. It was late in the season but there were still some white daisies blooming. Not wanting to get involved I kept moving, but Michael stopped to identify them: *Erigeron kachinaensis* (Kachina Daisy), not a new species, but a new location for a sensitive one.

ERIGERON KACHINENSIS



Select a Habitat

My one problem with selecting a genus like *Oenothera* is that with few exceptions they don't grow where I choose to spend my free time. I really like the high mountains. So another alternative to consider is to become an expert on a specific habitat (e.g.. Riparian, Hanging Garden, Sub-Alpine, Desert, Foothill, etc.).

If you like geology, choose a geological formation and learn the plants that grow there. Utah's numerous endemic sensitive species are often tied to a geological strata and this suggests that geology could be the key to finding a new species. You can spend winters pouring over geological maps looking for new territory to explore at the first sign of spring.

PRIMULA MAGUIREI



Monitoring

If the above don't appeal to you, how about monitoring? You won't find a new species to carry your name into the eternities but you might help save a sensitive one. Perhaps there is a listed plant near where you live or one you pass by in your travels a couple of times during its growing season that you would like to keep tabs on. Maybe it blooms later one year than the last, or there are suddenly fewer plants or, oh, no, a bulldozer is plowing a road through their habitat.

Monitoring could also include watching for changes within a specific habitat. Pollution, re-routing of water, drought, the growing hole in the ozone layer, grazing, RV use, all take a toll on plants. Some are more sensitive than others. If you have a favorite spot, keep track of changes and write them down.

The chances of any of us finding a new species are akin to our chances of winning the Publishers Clearing House Sweepstakes. The chances of your careful observations being of value are infinitely greater. Get involved and record your observations.

ARCTOMECON HUMILIS



Experiences, Anyone?

Through the year I will try to find non-professionals who have become involved and knowledgeable in a specific area such as suggested in the above article to write personal experiences of their studies. If you are one of these people or know of such a person we want to hear from you.

GENERAL CULTURAL SUGGESTIONS for GROWING NATIVE PERENNIALS

Marv Poulson

SELECTION

While flower color and form are usually the major criteria for choosing perennials, good foliage and growth habit offer an equally pleasing dimension. Many perennials have short blooming periods but their distinctive foliage maintains interest in all seasons. Every plant should be studied as much for its qualities of texture as for its flower.

In planning for a perennial garden, keep in mind that contrast and gradation are both important to textural effects. Using bold plants in the foreground and fine-textured ones in the background can create an illusion of depth, making even a confined area seem more spacious.

SOIL

Soil enhancement is probably more important for perennials than for annuals or woody shrubs since herbaceous perennial roots are generally finer and grow close to the surface. Unlike annuals, perennials have a long year-to-year life that means soil conditions usually include a rich medium that allows good drainage for vigorous root growth.

After-care is most important, especially for perennials. Maintaining the soil quality requires light mulching (but not covering the crown of the plant) and good aeration (don't walk on the soil needlessly). For many perennials, soil compaction will result in death as the available air in the root zone is diminished. This is where light mulch that is scratched-in is of particular value. Some plants, like many orchids and primroses, deteriorate quickly in compacted or poorly drained soil.

PLANTING

Patience and thoroughness are strong attributes for any gardener in nurturing his beds. After soil preparation, a little extra care in planting will pay dividends later with healthy, vigorous and beautiful plants. Starting out right will make a big difference and having the discipline to "do it right—the way we know it should be done" will save a lot of grief later. The adage "haste makes waste" holds true when planting.

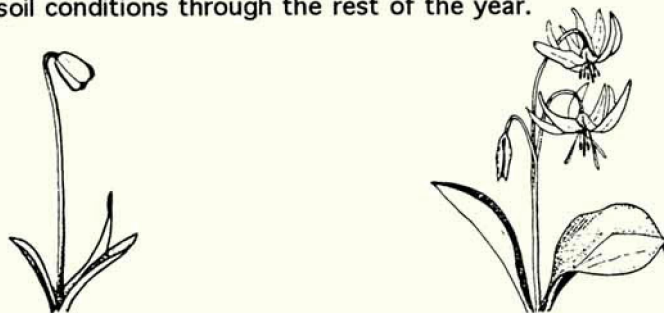
A general rule of when to plant considers when the soil is right or when a rain can be expected. For most perennials, fall offers a very favorable opportunity. For those plants that bloom in later summer, early spring is a good time—tender plants, later spring.

Remember, don't walk on the soil when it is wet and walk on it as little as possible when it has been aerated. When you must walk on the soil to reach the plant, use a single path rather than compacting the entire area.

Often it helps to mark new plantings so they don't get trampled or "weeded out" by mistake. Labeling sticks, protective stakes or cone-shaped screen covers serve very effectively.

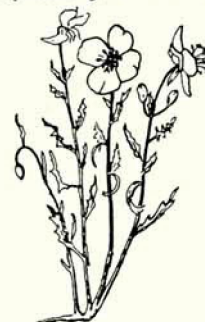
WATER

Native perennials generally do not like their feet kept wet. However, some plants such as camas lilies and glacier lilies do best when plenty of water is available early in the season followed by predominantly dry soil conditions through the rest of the year.



Most perennial plants that are readily available (both natives and exotics) need only a moderate supply of moisture punctuated by mild dryness. Some plants, in fact, will thrive even when the ground is allowed to become quite dry for long periods and will not do well without drought periods. These include penstemons, cacti, and desert evening primroses. Plants in this group are very easy to grow, especially if we avoid over watering.

Desert Evening Primrose



Perennials that need lots of water are frequently harder to care for and less available because fewer people are willing to devote the effort necessary for the plants to thrive. Such plants are usually reserved for special gardens. Water loving or water tolerant native perennials that may be of interest include bog orchids and primulas. Contrary to some myths, most native ferns do not tolerate overly wet conditions. They like shaded, rich, light soils that drain well and hold enough water to stay damp, but not wet.

PEST CONTROL

One of the most effective preventives in the perennial garden is good house keeping. Keep the lower story of the garden cleaned up. Dead leaves, twigs and all excess soil around roots make for ideal insect nesting places. Keeping the garden cleaned up naturally leads to a more attractive landscape that actually allows the beauty of the plants to be more visible.

In addition to tidy maintenance, attentive observation of individual as well as general garden conditions will go a long way to keeping problems in check. This is especially true when an extra measure of "sensitivity" on the part of the gardener is thrown in. Knowing your plants and recognizing when they are healthy and conditions are healthful offers an effective method of comparison when things are not right.

PRUNING

Most woody perennials should be pruned in winter or early spring. Standard pruning methods are applicable with woody stemmed perennials. As with most shrubs, natives can be stimulated by proper pruning. Cleaning out dead and dying or weak material is most important for perennials. Many have a thick, even congestive, habit of growth while others grow new twigs as older twigs die.

Some tender herbaceous and woody perennials must not be trimmed until danger of frost is past because the tops of the plant serve to protect the lower parts and the roots. Some herbaceous perennials never die back completely, keeping a basal rosette all year. Others start new basal growth almost as soon as the past season's growth dies back. Again, depending on the hardiness of the plant, clean away the dead stalks and leaves as soon as practical.

Of course, removing dead leaves or unwanted new growth can be on-going, especially after the resting period during cold and wet weather. Though it might seem a good idea to leave such debris as a natural compost or mulch, the problem lies in the long time it would take for the dead material to become part of the soil. Until the late stages of composting, insects and disease have a good home very close to the plant--presenting a constant threat.

FERTILIZING

An adequate supply of nutrients throughout the growing season is important for healthy growth and maximum attractiveness. Even native plants need to be fed. Most Utah soils have an adequate supply of most nutrients. The most important material we must provide is extra nitrogen. Applying a good slow release formula or individual feeding with conventional fertilizers through the season will help maintain the vigor of all garden plants. While most plants will thrive on such a general feeding schedule, some require more or less because they grow best under wet conditions or in dry places. Constant wetness speeds the leaching of nutrients while dry conditions can prevent rapid up-take or movement of these vital materials in the soil.

The alkalinity of our soils tends to block some nutrients from being readily available to plants. Iron chlorosis is in this category. Iron deficiency is probably the most commonly seen nutrient problem in our otherwise well nourished garden plants. Symptoms are a tell-tale yellowing of the foliage with darker green along the veins. This can be treated by adding an iron supplement like Sequestrian 138 to the soil in the very early spring (before the growing season begins) or as a foliar spray when symptoms appear. The soil remedy has a more lasting effect, the spray usually only one season.

WEEDING

Keeping competing plants from invading garden areas seems to be a constant battle. Some cultural practices can help keep weeds at bay. Dense planting is

a very useful method if you can afford to buy enough plants to cover the ground. The idea is to crowd out or shade out weeds. The method works well in many situations and is commonly used in annual flower beds, accounting for the weed free nature of well planted petunia beds.

Mulching is another useful method of natural weeding. By covering the soil between desirable plants with an organic mulch like leaf mold or ground tree bark, weeds are put at a disadvantage since the mulch tends to shade young seedlings, and also cools the soil, reducing root growth and retarding early top growth and blooming (this is not necessarily bad). Synthetic mulches such as plastic sheeting are sometimes used effectively, with different effects. While weeds are shaded out, the ground tends to warm under plastic which can stimulate root growth of other plants (those you want). This can get them started earlier in the season because of the extra soil warmth.

OBTAINING NATIVE PLANTS

Plants grow naturally all around us, sometimes seemingly in great abundance. Our native vegetation maintains a communal-like balance between individual species and between individual plants. While they thrive under these conditions, disruptions can make it very hard for them to survive. This is why digging natives from the field and expecting them to perform in the garden usually becomes a disappointing experience as the plants wither and die.

Fortunately for the plants and gardeners, native plants are becoming much more available from nurseries. Modern methods of growing native plants for sale in nurseries do not involve digging plants in the wild. Container grown plants are much easier to transplant successfully and begin their new life in the garden with a running start.

There is a surprising variety of native plants commonly available in nurseries and more come on the market each year.

FOUR SOURCES OF NATIVE PLANTS AND OTHER INTERESTING PERENNIALS

THE SISKIYOU RARE PLANT NURSERY
2825 Cummings Road
Medford, Oregon 97501

The nursery sells retail* only, and specializes in "alpenes and other dwarf, hardy plants for the woodland and rock garden", including growing natives of the West and exotics from throughout the world. Plants range in price for \$1.50 to \$22.50 for Trost's dwarf birch (*Betula alba*) ("to see it is to want it") with most plants in the \$2-\$4 range.

Several Utah Natives are available from Siskiyou that are available nowhere else. Their plants have the advantage over collected plants of being nursery grown, and will undoubtedly survive more reliably. For a copy of their inspiring catalog, contact the Nursery.

FOREST FARM NURSERY
990 Tetherow Road
Williams, Oregon 97544

Forest Farm has a number of Utah plants listed in their catalog and is always interested in acquiring new plant materials and ideas. They will even custom grow plants for you in quantities of 25 or more if you let them know at least a year ahead.

Their plants are available in tubing size and priced from \$1.75 to \$3.95. The Forest Farm catalog has loads of information on planting, maintenance, attracting birds and butterflies, and other interesting native plant info. The catalog is free, and once you are on their mailing list, you receive yearly updates.

WEDDLE NATIVE GARDENS
3589 G Road
Palisade, Colorado 81526
(303) 464-5549

Many native plants are available at Weddle Gardens that are not available any place else. A personal visit to the nursery is well worth the trip since the best way to purchase your stock is to take a weekend ride over to Grand Junction (in early May for best selection). Weddle Gardens grows most of their stock from seed, and specializes in selected blue columbines.

Weddle's carries the old standby trees, shrubs, ground covers and perennials as well as some more unusual items.

BITTERROOT NATIVE GROWERS, INC.
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CITIZEN FORESTERS NEEDED TO PROVIDE TREE CARE

Do you have an interest in helping maintain Salt Lake's urban forest? Would you like to learn how to use a giant pole saw? Learn about the importance of a tree's Branch Mark Ridge? The newly established Citizen Forestry Program will enable you to learn these things and more! After completing a five hour training course, this volunteer program will allow you to participate in regularly scheduled low maintenance street tree care projects in Salt Lake. For training information, call the Urban Forestry Office at 972-7818.

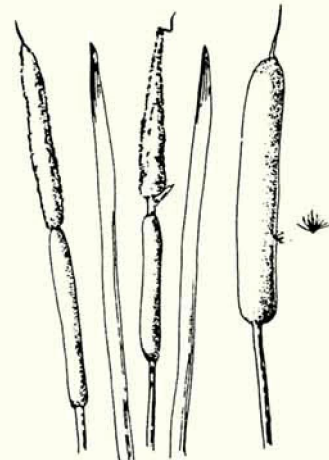
Salt Lake Chapter Meeting

PREHISTORIC INHABITANTS

Andy Boyack
UNPS Fieldtrip Chair

We are curious about the people that lived in the Great Basin in prehistoric times. What can we learn about them? The Utah Department of Archeology is searching for answers by studying debris accumulated in west desert caves inhabited by prehistoric people after the last Ice Age and during the shrinking of Lake Bonneville. Kevin Jones, Assistant State Archeologist, described the excavation and findings of prehistoric Great Basin caves at the UNPS chapter meeting October 23.

Floating Island Cave near Wendover contained deposits indicating occupancy off and on over a period of 7000 years. Findings indicated that pine nuts were the main food staple. The gathering and processing of the nuts may have been similar to that of the Navahos whose ancient methods are being perpetuated by people like Hazel Sudal. Other sources of food were the plants and their seeds growing in and around marshes, cattails, reeds, grasses and pepperweed which grows in the salty ground along the shores of Great Salt Lake. The Great Basin apparently had few big game animals but many bones of small animals were found in the caves.



Cattail

The State Archeology Department has conducted experiments to determine the time and energy required to collect seeds and compared the results with the caloric values of the seeds themselves. Pine nuts and grasshoppers yielded a good return for the effort. Peppergrass seed yielded a negative return.

The time frame of these inhabitants of the caves predates the Anasazi and Fremont cultures and is probably contemporaneous with the time Lake Bonneville was disappearing.

PEDICULARIS

POLLINATION ECOLOGY

Ron Taylor

The Pollination Ecology of Pedicularis on Mount Rainier,
(Taken from Macior, L.W. 1973). American Journal of
Botany 60: 863-871).

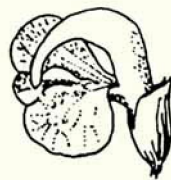
The genus Pedicularis of the figwort family (Scrophulariaceae) includes some of the most attractive and structurally complex wildflowers of Washington. As is typical for the family, the petals are fused at the base to form a tube (the corolla tube) separating about mid-length into an upper and lower lip. The upper lip (galea), which contains the stamens, is hood-shaped or elongated into a narrow beak. The lower lip is shorter and consists of 3 spreading lobes. The floral configuration of most species is highly individualistic, having bilaterally symmetrical (or asymmetrical) arrangement and shape of parts. Successful pollination of species such as elephant's head, with its intricately designed flowers, attests to the ingenuity of bumblebees.

In his study on Mount Rainier, Macior examined the pollination ecology of six species: Pedicularis bracteosa (bracted lousewort), P. contorta (coiled-beak lousewort), P. groenlandica (elephant's head), P. ornithorhyncha (bird's beak lousewort), P. racemosa (ram's horn pedicularis) and P. rainierensis (Mt. Rainier lousewort). All are pollinated by 3-5 species of bumblebees and none sets seed in the absence of pollinators. Flowers of the six species can be grouped into two types. The first type, represented by P. bracteosa and P. rainierensis, has a long nectar-containing corolla tube and a short hood-like galea. The second type, including the other four species, has a short, nectarless corolla tube and the galea is elongate, forming a beak or rostrum. The stigma protrudes slightly beyond the galea.

The foraging behavior of bumblebees differed markedly with flower configuration and pollinator caste. Long-tongued queens and large workers foraged upright for nectar in P. bracteosa and P. rainierensis. In these louseworts, the stigma contacted the bee in the head-thorax crevice, a location from which residual pollen cannot be groomed. Smaller workers unable to reach the nectar foraged for pollen, grasping the galea with their mandibles and entering the flower inverted. They then scraped pollen from the anthers concealed in the galea. In this case, the stigma contacted the bee between the leg insertions of the thorax, another location from which pollen cannot be groomed. Pedicularis bracteosa is especially important as a nectar source for early spring foraging queen bumblebees.

On P. contorta, P. ornithorhyncha, and P.

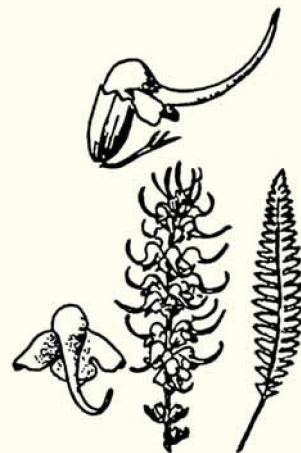
racemosa, all pollinators foraged only for pollen while grasping the edge of the galea and hanging inverted. The lower lip provided some support for larger bees. Pollen was released from anthers contained within the galea by rapid wing vibrations and was groomed into the bee's corbiculae (pollen sacs). However, some pollen was trapped in the midventral groove of the thorax and, naturally, the stigma extending from the galea initially contacted the bee at this location.



Pedicularis racemosa



Pedicularis bracteosa



Pedicularis groenlandica

Pollination of elephant's head required unusual behavior. In this case the bumblebee straddled the rostrum ("elephant's trunk") which curved around the side of the bee, the tip with extended stigma making contact between the thorax and abdomen. Pollen was again released by vibrations, the galea thus flopping around and scattering pollen over the bee's body, most being groomed into corbiculae, some persisting on the side of the abdomen where initial stigmatic contact occurs.

Macior considered the nectarless condition to be a derived adaptation to vibrating behavior of bumblebees. This ensures that other, less effective pollinators cannot compete for floral rewards. For example, occasionally megachile bees and hummingbirds visited the two nectar-containing species. Bumblebees tended to "major" on one of the species of Pedicularis, which they recognized by shape and color, avoiding others, even though several species were observed within the foraging range of individual bees. This was especially true of nectarless species. Finally, Macior suggested that the coadaptive interaction between differentiating floral structure and bumblebee behavior was instrumental in reproductive isolation and, ultimately, speciation in the genus.

Reprinted with permission from Douglasia, Newsletter of the Washington Native Plant Society, Vol. III, No. 2, Spring, 1982.

Editor's Note: According to A Utah Flora, Pedicularis species found in Utah are: bracteosa, centranthera, contorta, groenlandica, parryi, procera, and racemosa.

UNPS SEGO LILY
c/o Jo Stolhand
Utah Native Plant Society
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Salt Lake City, UT 84152-0041

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PUBLICATIONS

Waste of the West: Public Lands Ranching by Lynn Jacobs. 602 p., 1000 photos, drawings, cartoons, charts, graphs and maps. \$28.00, postage and handling included. The author says, "Waste of the West explores step by step a remarkably sordid, unjust, cruel, wasteful, and destructive situation--the obscure and secret world of public lands ranching. Forget your cowboy movies, your Western novels, your romantic ranching fantasies, and find out what *really* goes on out there in the vast rural West. This book is an education, an expose, and a call to action." This book is an easy-reading, complete account of public lands ranching and its influence for the general reader, specialist, or activist with chapters on the historic and contemporary situations; environmental, economical, political, and cultural/social/personal impacts; animal welfare, global livestock production; ranching justifications /myths, alternatives, and future. It includes many ideas for activism, a contact list, complete statistics, inspirational quotations, a 500 item bibliography, and a thorough index. Order from and make checks payable to Lynn Jacobs, P.O. Box 5784, Tucson, AZ 85703. (602-578-3173)

CALL FOR PAPERS

Papers on topics related to **IDAHO FLORISTICS** are being solicited for the Idaho Academy of Sciences Meeting on March 26-28, 1992 for paper session(s) to accompany the *Boone Symposium on Idaho Botany*. Send abstracts to Dr. Eric Yensen or Dr. Don Mansfield, Dept. of Biology, Albertson College of Idaho, 2112 Cleveland Blvd., Caldwell, ID 83605 by March 7, 1992.

Dr. Arthur Cronquist of the New York Botanical Gardens will give the public keynote address.

Membership Application

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Pam Poulsen, treasurer,
Utah Native Plant Society
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 information down and mail it with payment for the category of membership.)



VOL. 15 NO. 2

MAR / APR 1992

CALENDAR OF EVENTS

- March 9**
Monday
7:00 pm
Cache Chapter Meeting. "Plants of the Green River Formation" by Buddy Smith and "Purshia subintegra" by Robert Fitts. Logan City Meeting Room in the Logan Public Library.
- March 25**
Wednesday
7:30 pm
Salt Lake Chapter Meeting. Ty Harrison will present a slide show on "Edible Plants" and share some favorite recipes. Granite Park Junior High Media Center, 450 East 3700 South, Salt Lake City.
- March 31-
April 3**
Southwestern Regional Rare and Endangered Plant Conference, Santa Fe, New Mexico.
- April**
Cache Chapter. No meeting this month.
- April 8-9**
Open House at the Intermountain Herbarium at Utah State University in Logan, Utah. Open house will be held on Wednesday, April 8, from 9:30 to 11:00 am, and on Thursday, April 9, from 5:30 to 7:30 pm.
- April 22**
Wednesday
7:30 pm
Salt Lake Chapter Meeting. Kathy Devitt of Lake Mountain Farms will give a slide presentation on "Wildflower Carpet." Granite Park Junior High Media Center, 450 East 3700 South, Salt Lake City.
- May 2**
Saturday
8:00 am
UNPS Nature Day at Yellow Fork County Park west of Herriman. This 7,000 acre park is one of the best kept secrets in the country. There will be volunteers from colleges and universities, government agencies and nature clubs to lead walks or answer questions. Cub scouts can sign off nature requirements. Join the Volksmarchers for a 10 K walk. Bring your lunch and spend the day. Yellow Fork is reached by passing through Herriman and then continuing on the High Country Estates. The entrance is in High Country Estates. Since parking space is limited, bus transportation is being arranged from near the LDS Chapel in Herriman. Call Dave Okelberry at 968-6190 if you wish to volunteer or need more information.
- May 4**
Monday
Cache Chapter Meeting/Fieldtrip. "Wildflowers of the Foothills", an evening walk with Dr. Richard Shaw. Meet at First Dam in Logan Canyon at 6:00 pm.

- May 22-24** **Utah Museum of Natural History Field Trip to Kodachrome Basin.**
 Fri. - Sun. Explore the geologic setting and endemic flora of the Kodachrome Basin region. Instructors Frank DeCourten, Geologist and Mike Windham, Botanist. For more information, call the museum at 581-4887.
- May —** **Utah Native Plant Society Fieldtrip** sponsored by the Cache Chapter to see the endangered Primula maguirei. More details in the May-June issue of The Sego Lily.
- Summer** **Natural History of Alaska Field Classes** taught by John Wenger, a natural history instructor with the University of Alaska. Backpack/raft the Yukon Riverk, Denali Parks or Arctic National Wildlife Refuge. \$465-865 for 9-14 days. Contact John Wenger at 6038 East 12 Ave., #10, Anchorage, AK 99504. John is a past president of the Alaska Native Plant Society.
- July 18** **UNPS Fieldtrip.** "Sub-Alpine Flowers of the Uintas" led by Jo Stolhand. Trip limited to 8-10 participants. This day hike involves some off-trail hiking, e.g. talus slopes and boulder hopping. It is not a strenuous trip but is approximately 8 miles long at a higher altitude. Contact Jo at 521-0069 to reserve a space.
- August 7-8** **UNPS Mushroom Fieldtrip to Boulder Mountain** lead by Dr. Brent Palmer. Camp Friday/Sat. at Barker Reservoir. \$10 for adults and \$5 for children will get you dinner Friday night, breakfast Saturday morning, and a mushroom fry mid-day Saturday. Experts on hand include Dr. Kent and Vera McKnight, Dr. Frank Anderson, and Ardean Watts.

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The Sego Lily is published six times a year by the Utah Native Plant Society, Incorporated, as a non-profit organization under the laws of the State of Utah. Contributions to the newsletter are welcomed and should be sent to co-editors, Jo Stolhand and Janet Williams, P.O. Box 520041, Salt Lake City, UT 84152-0041. Please state whether articles have been published elsewhere and require publisher's permission. The editors reserve the right to edit as needed and to select suitable articles for publication. Calendar items of interest to our membership are requested.

DYEING WITH NATIVE PLANTS

Jo Stolhand
UNSS Board Chair

Shellfish, insects, minerals and plants have been used from earliest times to dye fibers, according to Kristen Johnson, who spoke to the Salt Lake Chapter of the UNPS in January. Kris collects plant material to dye her hand-spun wool and has an enviable collection of sample cards of hand-dyed wool.

Kris carries a plastic shopping bag to collect plants. Most of her collecting has been on vacant lots or from neighborhood yards. Because a substantial volume of leaves, flowers, or roots is needed for each dye bath, it would not be ethical to wipe out a small stand of wildflowers growing along a hiking trail. The one exception is Dyer's Woad, *Isatis tinctoria*, an introduced species that has become a real nuisance weed in Utah. Introduced for its dye potential, you are encouraged to pick flowers, seeds and leaves of this plant in great quantity.



ISATIS TINCTORIA L. Woad.

Few of the natural dyes are substantive dyes, those which do not require a mordant. Plant material which has tannin (e.g. onion skins, sumac, oak galls, and many barks and roots) are substantive dyes. A mordant changes the structure of protein in wool so

that dyes will adhere to it. These mordants affect the final color of the dye process, also. The five most common mordants which Kris uses and showed samples of are:

1. Alum--not the alum used for pickling, this is the most common mordant
2. Chrome--useful for achieving golden and warm brown colors
3. Copper Sulfate--changes yellow-greens to greens
4. Tin--brings out reds and brightens colors
5. Iron--darkens or deepens colors

Changing the pH of the rinse water or the dye bath also affects the color of the end product. Acids such as vinegar redden the dye while an alkaline additive such as baking soda brings out blues. An example of this was yarn dyed with the fruit of Oregon Grape, a dark blue color, as one would suspect. Kris treated some of her sample to an alkaline after-bath and got a beautiful green color. Oxalic acid may also be used to obtain pink colors.

Some of the native plants which are used for dye material include Chickory, Dock, Sagebrush, Oak Galls, Juniper, Goldenrod, Mormon Tea, Mullein, Lichens, Mushrooms, Horsetail, Yarrow and Paintbrush. But still the most versatile and plentiful is Woad. Use the yellow flowers of Woad for yellows and golds, the seeds for greens and greys, and the first year leaves for pinks or blues.

May you find a rainbow at the bottom of your dye-pot.

Cache Chapter Meeting

THE BIRDS AND THE TREES

Robert Fitts
Cache Chapter Secretary/Treasurer

The library floor was covered with pine seeds. Cache Chapter UNPS enjoyed a wonderful January evening with Ron Lanner's presentation on dispersal of Whitebark Pine seeds by Nutcrackers. These birds carefully bury the seeds in the ground to be eaten later. They diligently collect and hide more seeds than they usually eat, and by doing so give the next generation of Whitebark Pines a good start on life.

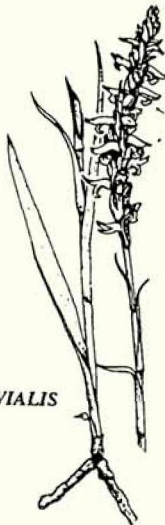
Unlike the cones of pines with winged seeds which open their cone scales and release their offspring to the wind, Whitebark Pine cones don't ever fully open and the large wingless seeds must be pecked out. The cone scales have evolved to be easily broken off by the symbiotic bird partners. The graceful, upward sweeping branches of Whitebark Pine provide perfect perches for the hungry birds.

Nucifraga, the nutcrackers, is the only bird genus which has developed a pouch under the tongue. A 140 gram bird was found carrying 30 grams of pine seeds in its swollen neck!

The seeds are buried about half an inch beneath the soil surface in places that look good to the bird. Often they come back and move the seeds to another location. How do they know where the seeds are? They find the seeds even after snowfall. When you see a Pinus albicaulis or Whitebark Pine standing tall in a forest or dwarfed on an alpine slope, remember the birds and the trees.

ORCHID PUT ON 'THREATENED' LIST

SPIRANTHES DILUVIALIS



LILL Wright

Writer, Salt Lake Tribune

Victimized by land developers, water managers, flower collectors and grazing cattle, a small cream-colored orchid which grows along Utah riverbanks is in danger of extinction.

To ward off its demise, the U.S. Fish and Wildlife Service has added the Ute Ladies' Tresses to its list of "threatened" species. There are now roughly 6,000 Spiranthes diluvialis left in the country--half of them in Utah.

"If you put all the population in one area, you probably wouldn't cover five acres," said Jim Coyner, a member of the Utah Orchid Society. "They are extremely rare."

Added Larry England, botanist with the Utah office of the U.S. Fish and Wildlife Service: "If it's lost, there would be no other. It has a cultural value in that regard."

Reprinted from The Salt Lake Tribune, Jan. 22, 1992.

SURVEY OF GRAND GULCH PRIMITIVE AREA FOR ERIGERON KACHINENSIS

Loreen Allphin

Graduate Student, BYU

During the summer 1991 field season, I surveyed several of the canyons near the Grand Gulch Primitive Area of southeastern Utah in search of populations of the rare species, *Erigeron kachinensis*. Populations of the Kachina daisy were found in Arch Canyon, White Canyon, and the North Fork of Fish Canyon.

The kachina daisy grows in association with other species of plants. The most commonly associated species are: *Aquilegia micrantha*, *Calamagrostis scopulorum*, *Zigadenus vaginatus*, and *Cirsium calcareum*. The Kachina daisy grows in saline soils in alcoves and seeps in the canyon walls, ranging anywhere from 5400 to 6800 in elevation. However, the Kachina daisy will only grow where there is an adequate amount of moisture and sunlight to support it.

Even when conditions are met, some areas still do not support the Kachina daisy. For example, McLloyd's Canyon contained a pool surrounded by *Aquilegia micrantha*, *Calamagrostis scopulorum*, *Zigadenus vaginatus*, *Mimulus eastwoodii*, etc. It received much sunlight and was very moist. All conditions were met, yet there were no Kachina daisies. This was also the case in Snow Flat Spring Canyon, Upper Owl Creek, and Upper Texas Canyon. A possible explanation for this could be that the seeds of the Kachina daisy have not yet reached these areas.

Four populations of Kachina daisies were found in a branch of Arch Canyon. These populations are located in the first major drainage from the north just west of Hotel Rock. The first population in this southwest facing drainage contained about 5-10 Kachina daisies at about 5426 feet elevation. These daisies were growing in a wet seep alongside the species *Calamagrostis scopulorum*, *Zigadenus vaginatus*, and *Cirsium calcareum*.

The next population was found about half the way up the drainage in another very wet site at about 5650 feet elevation. This site was fairly well shaded, which may account for the larger than usual leaves on the Kachina daisies. This, too, was a small population consisting of only 10 plants with the same associated species as represented in the previous population.

The remaining two populations were located near the rim of the canyon between 5800 and 6000 feet. These, too, were growing in very moist sites. These upper sites in Arch Canyon contained a total of 100-150 Kachina daisies, some of which were hanging in inaccessible crevices and ledges on cliffs and pour-offs. These populations contained only minimal amounts of soil and competitive vegetation.



ERIGERON KACHINENSIS

Three populations are located in White Canyon south of the boundary of Natural Bridges National Monument. The first population found was in a southwest facing alcove at about the 5800 feet contour line. This population was inaccessible; however, the daisies could be viewed with binoculars. The daisies were growing with what appeared to be *Calamagrostis scopulorum*, and *Aquilegia micrantha*. There appeared to be 75-100 daisies on the outer edge of this moist alcove.

The next population was located further down canyon around a bed in the canyon wall. It, too, was located on the southwest facing wall of the canyon, but this population was not in an alcove. It existed in a shallow seep at the same contour line as the first population. This population contained a maximum of about 100 daisies growing in only minute amounts of soil along the wet seep.

The third population was located still further down White Canyon at the same elevation and facing the same direction. The population existed in a seep with a slight overhang. Water could be seen and heard dripping nearby. The population contained about 100-150 daisies intermixed with a thick stand of *Calamagrostis scopulorum*.

Several populations were found in the North Fork of Fish Canyon and its many branches. The first main population was found just up the North Fork from where Fish Canyon branches into the North and South Forks. This population was found by a pour-off with a small waterfall and a deep, green pool of water. The daisies were growing around this pool which faces south and southwest. This population contained 200-300 Kachina daisies at 5750 feet elevation. Five solitary daisies

were seen growing near a running spring in the canyon bottom down from the first population.

Since the pour-off above the pool was impassable, the upper end of the North Fork was surveyed at a later date. Many populations were found in that upper end of the North Fork and its branches. Populations were found along seep lines in the canyon walls and at pour-offs and along streams in the canyon bottoms, as in the Salvation Knoll branch. Elevations ranged from 6000-7000 feet. Populations averaged 100-200 daisies each. The majority of the populations grew along the west facing wall, but some were found on the east facing walls of the branching canyons. More populations are to be expected further down Fish Canyon where there is enough moisture and adequate soil to support them.

Editor's Note: This project received \$1000 in 1991 from UNPS to help fund Loreen's research. An additional \$1000 has been granted for 1992. We are proud to be able to contribute to research on native plant species. Proposals for such projects are actively solicited by UNPS.

In addition to her survey, Loreen has also maintained a monitoring project on 600 plants of this species in 6 different populations (100 plants per population) in Natural Bridges National Monument. She plans to complete a master's thesis on the Kachina Daisy by the end of 1992. She will develop two papers: 1) Community and Habitat Relations of the Kachina Daisy, and 2) Demography of the Kachina Daisy.

UTAH NATIVE PLANT SOCIETY RARE PLANT MEETING

Ben Franklin

UNPS Endangered Plants Chair

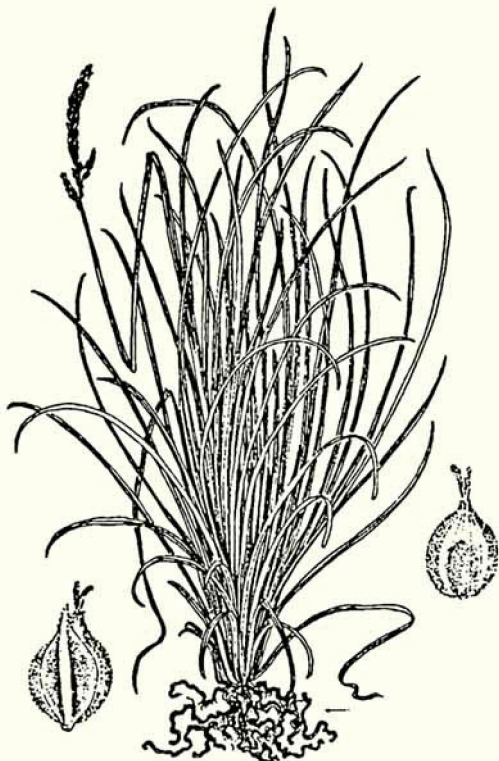
On the 29th of October the annual UNPS Rare Plant Meeting was held at the Utah Department of Natural Resources Building in Salt Lake City. The purpose of the meeting was to review the current U.S. Fish and Wildlife Service Notice of Review (21 February 1990 Federal Register). The result of this review would be a revised list of plants to be recommended to the U.S. Fish and Wildlife Service for the upcoming Notice of Review publication in 1992.

For those who may not be aware, the Notice of Review is a list of "category 2 status" plants. Category 2 status implies that there is some evidence of vulnerability for a plant, but that the U.S. Fish and Wildlife Service does not have enough substantial information to support a proposal to list that plant as either Endangered or Threatened. A plant will remain on this list until sufficient information is available for that plant to be elevated to either Endangered or

Threatened or lowered to category 3c, a status that implies there is no evidence of vulnerability. The UNPS Rare Plant Meeting is a gathering of individuals who evaluate current information on present category 2 status plants and make determinations as to whether a plant's status should be elevated, lowered, or remain the same. Plants recommended as additions to the list are also evaluated and added or not.

The following individuals were present to assist with the revision:

<u>Attendee</u>	<u>Position/Agency</u>
Lori Armstrong	Graduate Student Brigham Young University
Duane Atwood	UNPS Rare Plant Chair Botanist, U.S. Forest Service
Paul Baker	Division of Oil, Gas and Mining
Ron Bolander	Botanist, State Bureau of Land Management
Ben Franklin	UNPS Rare Plant Chair; Botanist Utah Natural Heritage Program
Dave Gardner	UNPS Photography Chair
Jim Holland	Botanist, National Park Service
Ron Kass	Botanist (private consultant)
Leila Shultz	Curator, Intermountain Herbarium
Frank Smith	Botanist (private consultant)
Bob Thompson	Rare Plant Botanist, Manti- La Sal National Forest
Joel Tuhy	Coordinator/Ecologist, Utah Natural Heritage Program



CAREX SPECUICOLA

The meeting resulted in a revised list that was provided to the U.S. Fish and Wildlife Service as UNPS's recommendations for changes and additions to the 1992 Notice of Review. On 15 November a subsequent meeting was held with Larry England of the U.S. Fish and Wildlife Service. At this meeting the list was again revised. The following is the final revised list that at this date has already been sent to Washington:

Summary of Changes

<u>Species</u>	<u>Previous Category</u>	<u>Proposed 1992 Status</u>	<u>State Range</u>
<u>Allium passeyi</u>	3c	2	UT
<u>Arabis</u> sp. nov. (Gray Knolls, Unitah Co.)	2+	3b	UT
<u>Aster kingii</u> var. <u>kingii</u>	2	3c	UT
<u>Astragalus desereticus</u>	2	1	UT
<u>Astragalus holmgreniorum</u>	2	1	AZ, UT
<u>Astragalus lentiginosus</u> var. <u>chartaceus</u>	2	3c/3b	CA, CO, ID, OR, UT, WY
<u>Astragalus lentiginosus</u> var. <u>pohlii</u>	3c	2	UT
<u>Astragalus lentiginosus</u> var. <u>scorpionis</u>	-	2	NV, UT
<u>Carex haysii</u>	-	2	UT
<u>Carex specuicola</u>	LT	LT	AZ, UT
<u>Castilleja parvula</u>	2	2	UT
<u>Chrysothamnus nauseosus</u> var. <u>iridis</u>	-	2	UT
<u>Cymopterus acaulis</u> var. <u>higginsii</u> (= <u>Cymopterus higginsii</u>)	2	2	UT
<u>Cypripedium fasciculatum</u>	3c	2	CA, CO, ID, MT, OR, UT WA, WY, Canada
<u>Draba sobolifera</u>	3c	2	UT
<u>Erigeron cronquistii</u>	2	2	ID, UT (add ID)
<u>Eriogonum humivagans</u>	S	3b	UT
<u>Gilia tenuis</u>	-	2	UT
<u>Gutierrezia petradoria</u>	2	3c	UT
<u>Heterotheca jonesii</u>	2	3c	UT
<u>Ivesia shockleyi</u> var. <u>ostleri</u>	-	2	UT
<u>Lesquerella tumulosa</u>	2	1	UT
<u>Lomatium graveolens</u> var. <u>clarkii</u>	-	2	UT
<u>Mentzelia argillosa</u>	3c	2	CO, UT
<u>Musineon lineare</u>	2	3c	UT
<u>Parrya rydbergii</u>	2	3c	UT
<u>Pediomelum aromaticum</u> var. <u>tuhyi</u>	-	2	UT
<u>Penstemon acaulis</u>	3c	2	UT
<u>Penstemon atwoodii</u>	2	3c	UT
<u>Penstemon crandallii</u> var. <u>atratus</u>	-	2	UT
<u>Penstemon idahoensis</u>	2	2	ID, UT (add UT)

<u>Penstemon nanus</u>	3c	2	UT
<u>Penstemon uintahensis</u>	2	3c	UT
<u>Phacelia utahensis</u>	3c	2	UT
<u>Potentilla angelliae</u>	-	2	UT
<u>Primula domensis</u>	2	1	UT
<u>Proatriplex pleiantha</u> (= <u>Atriplex pleiantha</u>)	2	2	CO, NM, UT
<u>Schoenocrambe suff- rutescens</u> (=Glauco- carpum suffrutescens	LE	LE	UT
<u>Selaginella utahensis</u>	2	3c	NV, UT
<u>Sphaeralcea janeae</u>	-	2	UT
<u>Thelesperma caespitosa</u>	-	2	UT, WY
<u>Viola franksmithii</u>	-	2	UT
<u>Viola lithion</u>	-	2	NV, UT
<u>Xylorhiza cronquistii</u>	2	2+	UT

+ Possibly extinct

LT = Listed Threatened

LE = Listed Endangered



CYCLADENIA HUMILIS VAR. *JONESII*

SEEKING, FINDING, AND EXTRA REWARDS

Marv Poulson

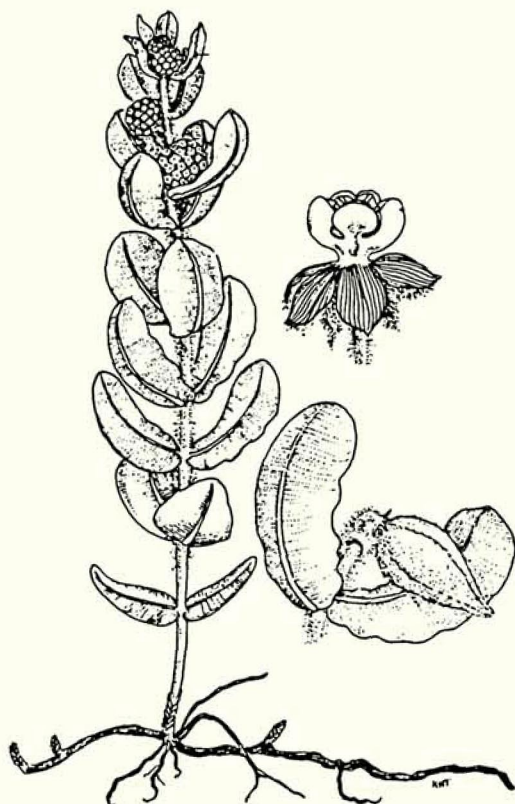
It came on gradually about 20 years ago. Quite innocently I began collecting a few 29 cent house plants, rekindling a childhood interest. Such naive beginnings gave no warning of where the green path would lead. After all, traipsing around the outback in search of friendly cactus is a very long way from the small tropical friends I enjoy in the living room.

Cactus have come to hold a dear place for me. The flowers alone tantalize my gaze whenever I have the pleasure of their beauty. Certainly the geographic search for yet unmet cactus holds many side benefits: new country, other new plants, new people, new geology.

Cactus comprise a primarily American plant family growing from northern Canada to Patagonia near the southern extreme of South America. One exception grows in southern reaches of the Old World (Africa). Though the most familiar cactus hail from dry land regions, many species flourish only in moist tropical zones. The Christmas cactus is the most recognized of these jungle cactus.

Cactus concentration in North America centers in the arid region of the border states of the U.S. and Mexico. At least one native cactus occurs in every state in the U.S. except Hawaii, Alaska, Vermont, New Hampshire and Maine. In these states, cactus may have been introduced and are now naturalized, growing wild.

The most cactus occur in the dry Southwest. The states here rank from 1 to 7 in the country for the largest number of cactus species and varieties. The states in the region rank as follows: Arizona 1st,



ASCLEPIAS WELSHII

Texas 2nd, New Mexico 3rd, California 4th, Utah 5th, Nevada 6th, and Colorado 7th. It is easy to see why the geography of cactus distribution makes finding them all the more interesting.

Sixty-seven different cactus appear in Utah and the Canyon Country region. Of these, nearly a quarter survive in restricted habitat locations large enough to support only a few plants, making the survivors very rare. For these, almost any disturbance threatens extinction. The most significant factor affecting where cactus grow is the diversity found in exposed geology and soil types. These habitats may cover large areas that exhibit an overall character, offering suitable growing conditions for a selection of plants. On the other hand, micro-habitats sequestered in small recesses offer unique settings for specialized plant adaptation.

Strict conformity to growing conditions spares some species from extermination by man. Cactus growing in out-of-the-way places, in pockets of special soil, poor for agriculture, or in a dry areas impractical to irrigate, escape some human impacts. Often the soil makeup is so extreme the collectors even pass it by as being an improbable habitat for cactus. When plants grow on unusual soils, they seldom become popular in cultivation. This is because they cannot live long in ordinary soils or potting mixtures.

Identifying and studying most cactus has no seasonal limit. But for aesthetic enjoyment and delightful observing weather, spring and early summer offer ideal conditions. It is in April that cactus begin blooming and take on the most robust stature. Rare cactus such as Pediocactus winklerii and Sclerocactus wrightae swell and bloom with compact, pale colored flowers. The Winkler cactus is a true miniature growing to about the diameter of a half dollar and Wright's fishhook attains a size like a small barrel with a dense mass of long spines. About 45 days later the most abundant Sclerocactus parviflorus (Benson) can be found blooming in the same area where Echinocereus triglochidiatus var. melonocanthus blooms during May with abundant claret-colored flowers.

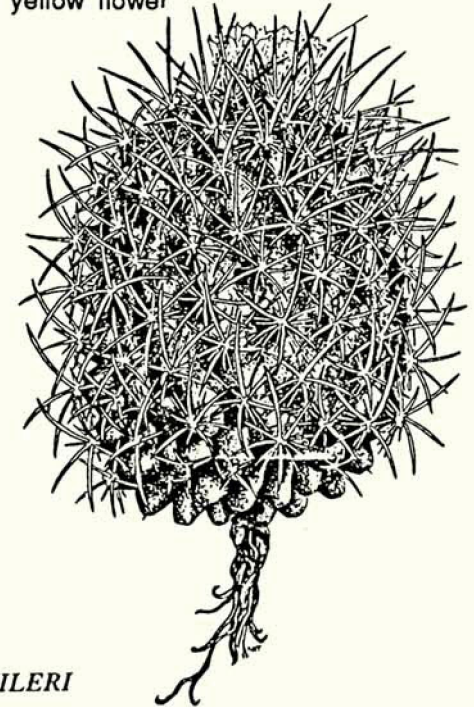
Also in May, large specimens of Sclerocactus parviflorus (Benson) commonly dot the alluvial fans along the road east of Moab. Further along, the rare Echinocereus triglochidiatus var. inermis, the spineless hedgehog cactus, seems to hide beneath the junipers on hills east of town.

If you prefer mountain foraging, the early blooming Pediocactus simpsonii can be found flowering later in May atop the East Tavaputs Plateau of eastern Utah. This pleasant little spiny ball may be found at the highest altitudes of our cactus, though the smallish, fragile pricklypear, Opuntia fragilis, sometimes grows at higher altitudes in the central plateaus to Canada.

Beginning in May and continuing into early summer, many different prickly pear and cholla cactus bloom in shades from lemon to crimson with greens and pinks in-between. These colorful wonders can be found throughout the region from St. George, where the long

hairy spined Opuntia erinacea var. ursina flourishes, to the diminutive sand cholla Opuntia pulchella which thrives at the feet of the Deep Creek Mountains.

Where the Mojave Desert reaches our range--in the St. George area--the largest concentration of different cactus species and the greatest abundance of individual plants in the region occur. This hot desert habitat results from lower elevations combined with the similarity of land forms in adjacent cactus-rich areas of Arizona and Nevada. This natural corridor for plant migration allows "hot desert" species to reach our otherwise "cold desert" range. From April well into June, many cactus that only reach the state in this southwestern corner begin blooming. The earliest to show color include the threatened Pediocactus sileri, largest of the genus, and Coryphantha vivipara var. desertii with a pale yellow flower



PEDIOCACTUS SILERI

The most common early blooming small barrel-like cactus to be found near St. George is Neolloydia johnsonii--the pineapple cactus--growing to 12 or 15 inches tall and topped with large, rich, pink flowers. The largest cactus in the State is the big barrel-like Ferrocactus acanthodes var. lecontei which has thick, long spines and blooms with a yellow crown of narrow flowers in May.

Many cactus species in the Canyon Country are growing near their northern range extremes making them comparatively rare in the region. These include all of the cholla (Cylindropuntia) except Opuntia pulchella; the Desert Ball Cactus (Coryphantha vivipara var. desertii), and the hot desert prickly pears. Such range extensions demonstrate significant ecological adaption.

Enjoyment of cactus in their natural surroundings satisfies both human aesthetic needs and the survival requirements of these remarkable plants. So if you like seeking out plants like I do, try questing for a few cactus and find the many rewards along the way.

SAVING ENDANGERED PLANTS WHILE STOPPING GRASSHOPPERS

Kurt W. Gutknecht

Editor, *Utah Science*

Agricultural Experiment Station

Utah State University

When grasshoppers pillage rangelands, the fate of the dwarf bearclaw poppy and the silver pincushion cactus might hang in the balance.

Insecticides used to control grasshoppers may be the problem. The poppy, the cactus and dozens of other plants in Utah such as toad-flax cress and Jones cycladenia are on the brink of extinction. Insecticides that decimate pollinators along with grasshoppers could mean the irretrievable loss of these species.

Researchers are trying to determine which of these threatened and endangered plants depend on insects for pollination. If so, it may be necessary to protect them when insecticides are applied to control grasshoppers, perhaps by creating a "buffer zone" around known plant populations.

The problem is that no one knows how many of these species rely on pollination to reproduce, and, if they are pollinated, how they are pollinated, says Vince Tepedino, research entomologist with the Bee Biology and Systematics Laboratory (Agricultural Research Service) at USU. And it isn't easy to find out.

Simply getting to the plants can be difficult. Some isolated populations are reached only by backpacking to a remote site and camping there for several weeks. Once there, researchers spend hours on end hunkering over plants, mimicking natural pollination and snagging and identifying every insect that visits the flowers.

Since 1988, researchers have been scrutinizing about 20 of the 40 plant species in Nebraska, Colorado, Utah, Arizona and New Mexico that are listed as threatened or endangered. Many of these species are found on federally owned land where insecticides are occasionally applied to control severe grasshopper infestations. (In Utah where the Bureau of Land Management and the Forest Service administer almost 60 percent of the land, 17 plant species are listed as threatened or endangered.)

Each species must be studied for 2 to 4 weeks to determine the type of pollination involved (plants can be self pollinated, cross pollinated, or a combination of the two methods) and, if cross pollinated, which insects or others organisms are responsible.

It's painstaking, tedious work. Determining the type of pollination involves four or five treatments, each of which must be repeated 15 to 20 times, in which flowers are caged to exclude pollinators and grains of pollen are transferred by hand from the anthers to stigmatic surfaces. Some plants have such tiny reproductive parts that they must be pollinated under a microscope, no mean feat while hunched over a small plant in the middle of rangeland, forest, or

desert.

Plants may present nectar or pollen several times a day, so the insect visitors that are lured to these plants must also be sampled several times a day. "The only way to be sure that all potential pollinators have been collected is to sample when all insects are active, which is usually from sunrise to sundown," Tepedino says. Night collection may be required for a few night-blooming plants.

"Surprisingly, almost all of the 20 species that we have studied so far are pollinated by insects or other organisms such as hummingbirds," Tepedino says. That was unexpected because insect visitation is generally considered to be density dependent; that is, the greater the number of plants of a species, the more insects they should attract.

Theoretically, as the number of these plants dwindled, there should have been a decline in the number of insects that pollinated these plants, thus creating selection pressure for self-pollination. Plants might also become less showy as their ability to attract insects becomes less important.

"This doesn't seem to be happening," Tepedino says.

What will happen if fewer pollinators visit plants? No one knows for certain, but it probably won't augur well for the plants. The detrimental effects depend on several factors, including the proportion of pollinators removed, the effectiveness of pollination, the seed bank in the soil, and the life span of a plant.

"We're not talking about sudden elimination but a gradual decrease in recruitment. Short-lived perennials might hang on for decades while long-lived perennials might not be affected for hundreds of years. The situation would be much more critical for annuals and biennials, such as the few remaining clay phacelia found near Spanish Fork," Tepedino says.

The study is part of a larger integrated pest management project to find better and safer ways to control grasshoppers. The project involves several federal agencies and departments, and universities in several states. Those involved in the USU research are entomologist Terry L. Griswold, and graduate students Susan Geer, William Bowlin, Sedonia Sipes and Robert Fitts.

The findings may aid the survival of the Uinta Basin hookless cactus and the last chance townsendia, two of the plants in Utah listed as threatened and endangered. Few people know of these plants. The plants' relative obscurity reflects the fact that their precarious existence doesn't conflict with human activity, including, it is hoped, grasshopper control.

Reprinted from Utah Science, Vol 52, Number 3, Fall 1991.

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

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ATTENTION

UNPS is currently accepting proposals for funding projects in education, research, utilization and preservation of native plants. Submit proposals to UNPS c/o Pam Poulsen or Jo Stolhand, P.O. Box 520041, Salt Lake City, UT 84152-0041.

DUES ARE DUE

Most UNPS memberships come due in March. Please check your mailing label for date of renewal. Your dues are used to fund important research and preservation projects, as well as this newsletter. We value your support and concern for the native plants of Utah.

CITIZEN FORESTERS PROVIDE TREE CARE

Do you have an interest in helping maintain Salt Lake's urban forest? Would you like to learn how to use a giant pole saw? Learn about the importance of a tree's Branch Bark Ridge? The newly established Citizen Forestry Program will enable you to learn these things and more! After completing a five hour training course, this volunteer program will allow you to participate in regularly scheduled low maintenance street tree care projects in Salt Lake. For training information, call the Urban Forestry Office at 972-7818.

Membership Application

☐ New Member ☐ Renewal ☐ Gift

Name _____

Street _____

City/State _____

Zip _____ Phone _____

If Gift, from: _____

Check membership category desired:

- ☐ Student/Senior\$ 5.00
☐ Individual\$ 10.00
☐ Family\$ 15.00
☐ Supporting\$ 30.00
☐ Corporate\$ 30.00 and up
☐ Life\$250.00

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

Please enclose a check, payable to Utah Native Plant Society, and send it to:

Pam Poulsen, treasurer,
Utah Native Plant Society
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 information down and mail it with payment for the category of membership.)



VOL. 15 NO. 3

MAY/JUNE 1992

CALENDAR OF EVENTS

- May 2**
Saturday
8:00 am to
2:00 pm
UNPS Nature Day at Yellow Fork County Park west of Herriman. This 7,000 acre park is one of the best kept secrets in the country. There will be volunteers from colleges and universities, government agencies and nature clubs to lead walks or answer questions. Cub scouts can sign off nature requirements. Join the Volksmarchers for a 10 K walk. Bring your lunch and spend the day. Yellow Fork is reached by passing through Herriman and then continuing on to High Country Estates. The entrance is in High Country Estates. Since parking space is limited, bus transportation will be provided. Park at the LDS Chapel in Herriman. Call Dave Okelberry at 968-6190 if you wish to volunteer or need more information.
- May 4**
Monday
Cache Chapter Meeting/Fieldtrip. "Wildflowers of the Foothills", an evening walk with Dr. Richard Shaw. Meet at First Dam in Logan Canyon at 6:00 pm.
- May 11**
Monday
6:30 pm
Evening Flower Walk to find the elusive **Steershead**. Meet in the parking lot at the mouth of Big Cottonwood Canyon.
- May 14**
Thursday
6:30 pm
Evening Flower Walk to see the **Sego Lily**, our Utah state flower, in bloom, and other flowers of the foothills. Meet at the entrance of Red Butte Gardens. Andy Boyack, fieldtrip chair.
- May 22-24**
Fri. - Sun.
Utah Museum of Natural History Field Trip to Kodachrome Basin. Explore the geologic setting and endemic flora of the Kodachrome Basin region. Instructors Frank DeCourten, Geologist and Mike Windham, Botanist. Fee: \$150.00 includes meals and instruction. Transportation not included. For more information, call the Museum at 581-6927.
- May 27**
6:30
UNPS Board Meeting. Granite Park Junior High Library, 450 East 3700 South, Salt Lake City.
- May 27**
Wednesday
7:30 pm
Salt Lake Chapter Meeting. "Field Survey Process" by Wayne Padgett, U.S. Forest Service Ecologist and Botanist, Wasatch Cache Forest, will explain how field surveys are done, what areas are being looked at this season, and how UNPS members can be involved. Granite Park Junior High Library, 450 East 3700 South, SLC.

- May ____**
CANCELLED **Utah Native Plant Society Fieldtrip** sponsored by the Cache Chapter to see the endangered Primula maguirei. The Primula bloomed unexpectedly early this year and the opportunity to see it in bloom is past.
- June 10**
Wednesday
6:00 pm **Fieldtrip to Lone Peak State Forest Nursery.** Meet at the Nursery, 14650 South Prison Road, Draper, to tour facilities. Lone Peak Nursery is raising plants for reforestation, land reclamation, and water filtration projects.
- June 17**
Wednesday **Evening Flower Walk** to find the **Blue Camas** in Pleasant View, Utah. Meet at 6:30 at the home of Pam Poulsen, 642 North Center Street, SLC, and we'll carpool from there.
- June 25-26**
Thurs./Fri. **Threatened and Endangered Plant Species Fieldtrip to the Wasatch Plateau** Please note that these dates are corrections of the dates given on the blue cards. This outstanding fieldtrip will be hosted by Bob Thompson of the Manti-LaSal National Forest and led by Duane Atwood (USFS) and Ben Franklin (NHP). See article this issue for details.
- June-July** **No Salt Lake Chapter meetings for these months.**
- July 18** **UNPS Fieldtrip.** "Sub-Alpine Flowers of the Uintas" led by Jo Stolhand. Trip limited to 8-10 participants. This day hike involved some off-trail hiking, e.g. talus slopes and boulder hopping. It is not a strenuous trip but is approximately 8 miles long at a higher altitude. Contact Jo at 521-0069 to reserve a space.
- July 18**
Saturday
9:30 **Nature Conservancy Sponsored Albion Basin Day Hike** led by native plant expert Mike Alder. See Wasatch wildflowers in the glorious alpine setting. Indian paintbrush, lupines, monkey flowers and columbines will blanket the meadows and hillsides. Bring lunch, a camera and questions to the Albion Basin parking lot at 9:30 am. Space limited. Please reserve your spot by calling Ronda Kershnik at 531-0999.
- August 1, 2**
Sat., Sun **Brian Head: Geology & Flora of the High Plateaus.** Utah Museum of Natural History Field Class within the Markagunt and Pausaugunt Plateaus of SW Utah to observe first hand the geology and wildflowers of this high plateau country. Recent lava flows, evidence of faults, ancient lake beds, and unique meadow and forest vegetation will be explored. Vehicles will be provided for the two days of touring. Participants are responsible for their own food and accommodations: camping or motels. Instructors: Frank DeCourten, Geologist and Asst. Director, UMNH, and Michael Windham, Director of U of U Garrett Herbarium. 581-6927.
- August 7-8**
Friday/Sat. **UNPS Mushroom Fieldtrip to Boulder Mountain** lead by Dr. Brent Palmer. Camp at Barker Reservoir. \$10 for adults and \$5 for children will get you dinner Friday night, breakfast Saturday morning, and a mushroom fry mid-day Saturday. Experts on hand include Dr. Kent and Vera McKnight, Dr. Frank Anderson, and Ardean Watts.
- Sept. 12-13**
Sat./Sun **Museum of Natural History Fieldtrip to Utah's San Rafael Swell** led by Sally Cole, Archeologist specializing in rock art, Frank De Courten, geologist, and Michael Windham, botanist. The group will camp in remote areas surrounded by the splendor of the Colorado Plateau desert, and will explore the natural phenomena of the area via short hikes to specific localities. Fee: \$352.00 includes daily van transportation in the Swell (or from UMNH in SLC), all meals and instruction. 581-6927.
- Summer** **Natural History of Alaska Field Classes** taught by John Wenger, a natural history instructor with the University of Alaska and past president of the Alaska Native Plant Society. Backpack/raft the Yukon River, Denali Parks or Arctic National Wildlife Refuge. Contact John Wenger at 6038 East 12 Ave., #10, Anchorage, AK 99504.

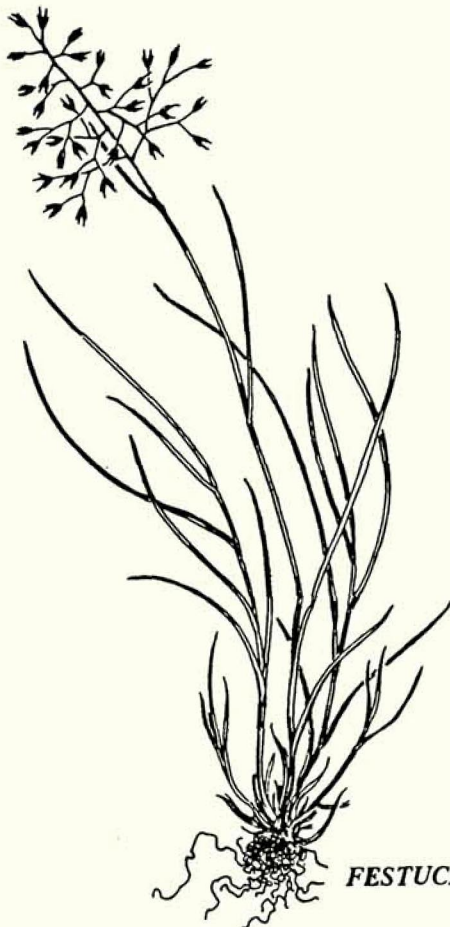
T & E Plant Species Fieldtrip WASATCH PLATEAU

Despite advertising to the contrary, the Threatened and Endangered Plant Species Fieldtrip is **June 25 and 26**, a Thursday and Friday. The outing will be hosted by Bob Thompson from the Manti-LaSal National Forest. Duane Atwood, district botanist for the National Forest Service and Ben Franklin, botanist from the Utah Natural Heritage Program will be the leaders and instructors. This is a great opportunity to see country you may never have seen and identify plants that are seldom seen.

Participants should meet at the Tucker Rest Area, (near the site of the Clay Phacelia) in Spanish Fork Canyon. The Rest Area is between Thistle and Soldier Summit on Highway 6. Meet at 10:00 am Thursday morning, June 25. Those wishing to join the group Thursday night will find them at the Gooseberry Ranger Station northeast of Fairview, Utah.

This trip to the Wasatch Plateau will include Joe's Valley and the proposed Scad Valley Botanical Area. Plants of special interest are Astragalus montii, Silene petersonii and possibly Festuca dasyclada.

Bring your own food and camping gear. Be sure to call Jo Stolhand at 521-0069 to reserve your space and obtain updates and more information.



FESTUCA DASYCLADA

PHACELIA ARGILLACEA (Clay Phacelia)

Kimball T. Harper
Lori Armstrong

Introduction

This report addresses objectives and findings of a Challenge Cost Share (CCS) agreement between the Uinta National Forest (UNF) and Brigham Young University (BYU). The primary objective of this agreement was for BYU to search, through field surveys, for additional populations or potential habitat of Phacelia argillacea Atwood (the clay phacelia) and to evaluate searched lands for compatibility of abiotic and biotic components with possible future introductions of the clay phacelia. Currently, known populations occur only on private lands, though existing clay phacelia sites are close in proximity to UNF lands and similar geologic substrate exists on these lands. Known populations of the species were monitored during the course of this study.

Phacelia argillacea Atwood was listed as federally endangered in 1978 and maintains that listing in the 1990 Federal Register (U.S. Department of the Interior). Due to obligations under section 2 of the Endangered Species Act of 1973 and section 2670 of the Forest Service Manual (concerning Endangered, Threatened, and Sensitive species), UNF would have primary concern for protection of the clay phacelia, if located on the Forest. Further, Section 7 of the Endangered Species Act mandates all Federal agencies to conserve listed species, ensure continued existence of listed species, preserve essential habitat and ensure adequate cooperation and assistance in conservation efforts.

History

The clay phacelia was initially collected by Marcus E. Jones in 1883 at a locality recorded as Pleasant Valley Junction, in Wasatch County, Utah. The species was collected by Jones a second time in 1894 at Clear Creek (later named Tucker) near Soldier Summit, Utah County, Utah. Later knowledge and collections of the species was not acquired till 1971 when N.D. Atwood rediscovered the Clear Creek population. All of these specimens were initially identified as belonging to the closely related species Phacelia glandulosa Nutt. However, further examination of the collections revealed enough morphological differences between the Spanish Fork Canyon populations and P. glandulosa elsewhere, specifically herbage pubescence and seed excavations, to warrant elevation of the Spanish Fork Canyon populations to species status.

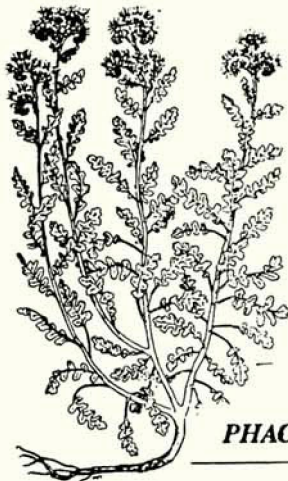
Additional searches for P. argillacea revealed an extension of the original Tucker population (small site) across Hwy 6 to the southwest approximately 200 yards (main site) in 1980 and a new population (upper and lower Water Hollow-Garner Canyon population) about 5 miles distant from Tucker in 1989 (Franklin and

Tuhy 1989). The Water Hollow-Garner Canyon population was extended to include two additional sites in 1990, one located in a canyon between the upper and lower site and the other across the canyon from the lower site.

Known populations of the clay phacelia occur in the Douglas Creek and Gordon Gulch members of the Green River Formation. Plants at the smaller Tucker population grow mainly on a fine textured clay derived from a poorly consolidated shale member of the formation. The main site plants are growing on a moderately steep slope covered with flat slabs of lithified shale. The Water Hollow-Garner Canyon population occurs mainly on a fine textured reddish-brown clay with some plants occurring on a layer of grey-white, small fragmented shale above the reddish-brown clay.

The clay phacelia occurs in open spaces in pinyon-juniper and mountain brush communities at elevations between 6,500 and 7,000 feet.

Although *P. argillacea* was not found on UNF and in the area surveyed, there is the potential that the species would survive there should it be introduced at an appropriate site. Results suggest that such an introduction might produce a viable population. Whether transplantation of seedlings or direct seeding would be the preferred method of introduction can only be established by experimentation.



PHACELIA ARGILLACEA

Identification and protection of potential habitat patches on UNF land should be considered. Our survey of the area revealed a large acreage of land which could be potential *P. argillacea* habitat. Potential habitat sites could be characterized by such variables as a high percentage of bare soil, slope averaging 70% with a SE to SW aspect, shallow soil depth and a vegetative cover consisting largely of *Amelanchier alnifolia*, *Bromus tectorius*, *Cynoglossum officinale*, *Eriogonum umbellatum*, *Juniperus osteosperma*, *Marrubium vulgare*, *Mentzelia laevicaulis*, *Oenothera caespitosa*, *Quercus gambelii* and *Stipa hymenoides*.

Editors Note: UNPS participated in this Challenge Cost Share agreement and helped provide funding for this study.

UNPS Saddened by Death of Prominent Botanist ARTHUR CONQUIST

Arthur and Doris Holmgren

It was Sunday afternoon, the 22nd of March, when Dr. Kaye Thorne, Curator of the Brigham Young University Herbarium, called from her home in Provo, Utah to give me the tragic news that Art Cronquist had suffered a fatal heart attack while seated at a desk in the Herbarium studying specimens of *Mentzelia*.

Our son, Dr. Noel H. Holmgren and his wife, Dr. Patricia K. Holmgren--co-authors of the same treatise of *Flora of Intermountain West* as Dr. Cronquist was working on at the present time, had the unhappy task of notifying Art's wife Mabel. The following Wednesday, Mabel received the sad news that their son John, a respected philosophy professor at Cal State Fullerton, died of an apparent heart attack while traveling to a conference in Oregon.

We have been on the phone several times with Mabel recalling many pleasant times in past years in their home and in ours. Noel and Pat, who live within minutes of the Cronquist home in White Plains New York, have spent time with Mabel, hoping to bring some comfort to a strong and courageous woman.

The New York Times carried the following obituary in the March 24, 1992 edition:

"**CRONQUIST--Arthur.** The Board of Managers and staff of the New York Botanical Garden mourn with great sadness the sudden loss of our Senior Scientist, colleague, friend and supporter. His career at the Garden spanned five decades and seldom does one scientist have such a broad impact in his field. Dr. Cronquist's pioneering work in systematic botany, research and writings have had worldwide influence. His dedication and commitment to the Garden were exemplary and his contributions will be remembered by us all. Our sincere condolences to his wife Mabel, and his family. A memorial service will be held at the Garden on May 5."

Art was born March 19, 1919 in San Jose, California. His early years were spent near Portland, Oregon. He received his bachelor of science degree in 1938 and master of science two years later from Utah State University in Logan. In 1944 he earned his PhD. from the University of Minnesota in Minneapolis.

Art published 16 major works and numerous research papers in the past five decades. A few weeks ago I received a prized gift from Art. It was the second edition of *Manual of Vascular Plants of the Northeastern United States and Adjacent Canada*, commonly called "The Green Bible." To add to the value of my copy the title page has in Art's hand "For Art Holmgren, 54 years after our first field trip, Art Cronquist."

Many species are named in honor of Art. One that immediately comes to mind is *Erigeron cronquistii*

Maguire. This Cronquist Daisy is a Cache County endemic.



ERIGERON CRONQUISTII

Art received numerous honors, including the 1985 Asa Gray Award from the American Society of Plant Taxonomists, the 1986 Linnean Medal for Botany from the Linnean Society of London, and an honorary doctorate from Utah State University in 1987. Art also served two terms as president of the American Society of Plant Taxonomists, the Botanical Society of America, and the Torrey Botanical Club.

Art is survived by his wife Mable Allred Cronquist, a native of Hyrum, Utah, a daughter, Elizabeth Lynn Crowe of Morrison, Colorado, and four grandchildren.

Art, your many friends in many countries will miss you.

Encouraging Landscapes That Thrive On LESS WATER

Kurt W. Gutknecht
Editor, Utah Science

For the second driest state, we have some mighty wet landscapes. Fortunately, that's changing.

There's been a slow but steady increase in the popularity of water-conserving landscapes in the state, a change prompted by the drought and encouraged by several cities and water districts, says Larry Rupp, USU horticulturist. Still, interest in water-conserving landscaping, called xeriscaping, in Utah lags behind that of many neighboring states.

Rupp has been studying the water requirements for transplanting native plants in mid-summer, thus extending the normal "window" for transplantation (dormant woody plants are usually transplanted in spring and fall) and increasing the feasibility of using these plants in low-maintenance landscapes. With modest irrigation, container-grown silver sagebrush, curly-leaf mountain mahogany, rubber rabbitbrush, red-stemmed dogwood, and chokecherries survived transplantation in July. Only oceanspray failed to

survive on a site where soil and other conditions at the site were far more favorable than on rangelands.

Ironically, Rupp says more is known about the water requirements of native plants than of plants traditionally used in landscaping. Rupp is summarizing research on the water requirements of woody plants for the U.S. Bureau of Reclamation so the agency can identify drought-tolerant species and promote their use in water-conserving landscapes.

A lot is being done in the state to slake the thirst of landscapes.

Park City is developing a demonstration xeriscape garden and offers substantial rebates on water hookup fees to homeowners and businesses that plant approved drought-tolerant landscapes. The Salt Lake City Water Reclamation Division has hired an engineering firm to assist in a freeway irrigation demonstration project using reclaimed waste water. This effluent is now simply dumped into the Great Salt Lake. As long as effluent isn't directly applied to foliage, the nutrients it contains should benefit plants, Rupp says, resulting in highway beautification without affecting current water supplies.

The Metropolitan Water District of Salt Lake City is establishing a drought-tolerant landscape at one of its storage sites. Rupp notes that water districts are in the incongruous position of encouraging actions that reduce demand for water, thus reducing potential income. However, as demand for water along the Wasatch Front threatens to outpace supplies, it doesn't appear that xeriscaping will seriously erode the income of these utilities.

Water utilities in some areas of California in the grip of a 6-year drought have offered hefty incentives to encourage water conservation, including a free exchange of water-conserving toilets for water-hogging johns that required several gallons of water per flush. (The old toilets can be dumped in the ocean to construct artificial reefs or crushed and used in road construction.

California is also in the forefront of a water-conservation program in which water audits conducted on commercial and large-scale landscapes ensure the efficient use of water.

While water-conservation efforts in Utah have so far been voluntary and low key, Rupp thinks xeriscaping and other water-conservation tactics are "on the verge of taking off in the state. And we are in a good position to learn from the successes and failures of other states. Our primary goal is to promote the wise use of water in landscaping so that we can maintain aesthetically pleasing and enjoyable landscapes even if there are water shortages."

A shortage of water could spur interest in native plants and increase demand for the services of trained horticulturists. Rupp says residents of the state could reap considerable benefits from both trends.

Reprinted from Utah Science, Spring 1991, Volume 52, Number 1.

GARDENING for CONSERVATION

David R. Longland
New England Wild Flower Society

"Acts of creation are ordinarily reserved for gods and poets, but humbler folk may circumvent this restriction if they know how. To plant a pine, for example, one need be neither god nor poet; one need only own a shovel. By virtue of this curious loophole in the rules, any clodhopper may say: Let there be a tree --and there will be one. If his back be strong and his shovel sharp, there may eventually be ten thousand. And in the seventh year he may lean upon his shovel, and look upon his trees, and find them good."

Aldo Leopold, "Pines Above the Snow,"
A Sand County Almanac.

However deliberate or accidental, we humans have been manipulating biodiversity in New England for a long, long time. As we consider strategies for protecting our wild plant diversity in New England, we remember that virtually all the flora of our region exists and "succeeds" in its present state, largely as a consequence of our activities. The ebbing and flowing migrations, introductions, and extirpations of most of our native plants and all of our naturalized exotics are a complex ecological reaction to the fiddlings of our own kind.

The Native Americans' use of fire to continually open up new browsing habitat for deer and other game meant that much of the "natural" environment was in a constantly changing state of natural succession. In this way, they "managed" a high degree of habitat and species diversity.

Enter the Europeans, who viewed all wilderness as either a threat or a resource. Lumber harvest for building, and mainly for heating, virtually cleared the region's forests by the arrival of the twentieth century. The discovery and exploitation of coal and petroleum for heating relieved the demand for cordwood, which allowed the forests to regenerate across New England. Now, we are 80% forested.

The twentieth century population explosion and resulting "improvement" of land for business and residence, and the ongoing introduction of invasive alien species have altered, consumed, or displaced habitats and eco-diversity as never before.

There have, however, been less spectacular incidents of another, perhaps more creative, kind of fiddling going on in the realm of horticulture. The idea of "naturalistic gardening" emerged in nineteenth century England as a reaction against the loss of wilderness in the age of industrialization. Some innovative gardeners were beginning to experiment with wild plants in their own gardens, applying their knowledge of ecological processes in their horticultural pursuits. In New England, Will Curtis and Minot Pratt were interesting cases in point.

Curtis was successful in using horticulture to

simulate "habitats" for native plant cultivation. In essence, he was an early pioneer of *conservation horticulture*. For example, in 1938, by incorporating chunks of concrete, old marble slabs, and tufa rock, Curtis modified 100 square feet of wetland at Garden in the Woods to accommodate three plants of spreading globe flower (*Trollius laxus*)--extremely rare and localized in New England. In the mid-forties, Curtis rescued several clumps of climbing fern (*Lygodium palmatum*) from a natural area now flooded by the Quabbin Reservoir. Climbing fern is another extremely rare wetland species which he re-established permanently in a new, miniature habitat-garden with minor, horticultural alterations. Today, half a century later, these rare treasures thrive as prolific colonies in these same, man-made habitats. The success of these naturalistic gardens was attributable to three facts: 1) Curtis was experimenting with small, manageable plots of ground, which could be developed and continually **maintained** within the bounds of his limited **resources**. 2) By choosing **appropriate settings**, the habitat simulations amounted to little more than minor alterations to existing sites--that is, the most fundamental conditions, such as water table and soil moisture, were already provided by nature. 3) As a professional landscapist and naturalist, Curtis had **technical knowledge** of ecological requirements of plants and their habitats.

Minot Pratt, an enthusiastic nurseryman and naturalist of the 1800s, introduced into Concord's wild lands a number of non-indigenous wildflowers and ferns. Such introductions were and are typically controversial because of the many ecological disruptions caused by **alien** introductions. But Pratt's introductions were **natives** long established in other parts of the same floristic region, primarily New England.

Today, a century later, around 12 species of "Pratt's flora" have become established as self-perpetuating populations--now as permanent as any of the "indigenous" Concord flora. Why did these introductions succeed? Pratt simply applied his knowledge of habitat conditions and horticultural requirements, having grown these same species as garden subjects for years in his own nursery. While not all of his experiments met with success, enough colonies have survived to demonstrate that the "natural" distribution of native plants can be altered or expanded without the harmful ecological effects normally associated with exotic introductions. Whereas Will Curtis brought the wild into the native plant garden, Minot Pratt a century earlier brought the native plant garden into the wild.

Much to the frustration of botanists concerned about "genetic provenance" and ecologists worried about destabilizing biological systems, many such manipulations have already been imposed upon our flora over the decades and centuries. This becomes important background for today's leading edge conservation strategies of reintroduction, restoration, and management of disappearing plant species. Intentional manipulations, informed by the wisdom gained from our

previous errors, can be ecologically restorative and creative. In time, conservation strategies—borrowing from gardening know-how—should enable us to manage habitats for maximal natural diversity.

The difference between bringing the garden into the wild, and bringing the wild into the garden, may become purely academic in the long-term preservation of native plant life. With good research and careful planning, wild preserves will someday be managed as bioregenerators—"Conservation gardens"—with the potential to restore natural diversity.

Reprinted with permission from the Newsletter of the New England Wild Flower Society, Spring 1992, Volume 8, No. 1.

A BASIC COMPOST PILE

Robert Fitts
Utah State University

Yard trash is a real problem at our landfills and such materials can be easily be composted and used to improve the soil in your yard.

The basic compost pile consists of sources of nitrogen with other materials mixed in. Green plant material such as grass clippings and manure are the usual sources of nitrogen. Dead leaves, sawdust, wood chips and small prunings from a hedge can be mixed in. The nitrogen source will help the microbes get a good start at decaying other organic matter which keeps the pile from matting down and allows some air to circulate so the microflora can work quickly. The pile will decompose faster if turned over weekly, kept slightly moist, but not wet, and covered to keep the moisture in.

Sticks will decompose in a year if covered with leaves, sawdust, or straw. If the mixture is kept humid, wood rotting fungi will fill the stack in no time with white mycelia. Some people even inoculate their piles with *Stropharia* mushrooms.



Adding organic material to the soil increases its ability to hold moisture and nutrients and the microbial activity releases more nutrients into the soil. Beneficial microflora around plant roots help protect the plant from pathogens and consume harmful substances such as glyphosate (Roundup) and 2-4-D.

GETTING INVOLVED

Julia Fonseca
Arizona Native Plant Society

In response to your article, "Getting Involved" [by Jo Stolhand in Jan/Feb 1992 Sego Lily] I offer my experience as a non-professional:

I got involved with one plant species called the Arizona willow (Salix arizonica) because it is an endangered riparian plant and thus combines two areas of interest to me, namely 1) conservation of biological diversity and 2) hiking and learning about riparian areas.

In roughly a year and a half I have learned quite a bit about the plant and its habitat, and the Endangered Species Act as well. I found out that the U.S. Fish and Wildlife Service, which administers the Act, has needlessly delayed protecting the plant, and the Forest Service, which "manages" the habitat, has done nothing on-the-ground to conserve the plant. I am now a party to a lawsuit against the Interior Department (of which USFWS is a part) which seeks expedited listing of hundreds of plants, including the Arizona willow.



A new project I hope to undertake this year is a map of biotic communities of the uplands of a local nature preserve. This will force me to learn those familiar shrubs and grasses that I tend to overlook otherwise.

Other activists in the ANPS I know include a probation officer who has identified nearly 1000 species in a canyon that he likes to hike in, and a teacher who photographs and identifies Arizona flowers as a hobby. She identifies every flower and takes care to produce images which show features vital in keying out that species.

A TRIBUTE TO THE AMATEUR IN BOTANY

Herbert G. Baker
Professor of Botany
University of California at Berkeley

Note: If we define a professional botanist as a trained person employed in an educational or research institution, then there are several sorts of amateurs in botany. There are those whose background consists of formal training in botany but who are working in other fields, and there are those whose botanical knowledge is largely self-gathered. There are those of independent means who expend their energies in botanical research, and others who must work for a living and yet use all of their free time for botany. In both economic groups there are qualified people interested in occasional forays into the realm of botanical investigation.

All of these types of amateurs have provided significant contributions—contributions that sometimes have been overlooked in our society's orientation toward the value of affiliation with institutions, and the value of work that is compensated by money. We wish to encourage all amateurs to continue or initiate their work. (Editor, UW Arboretum Bulletin).

Although I have been a professional botanist for forty years, I feel very much more in tune with the amateur botanist than you might expect. I have a personal reason to believe that amateurs do good science because I myself had only two years of formal college education--and did my PhD research without a major professor--in the London University system that allows so-called "External Degrees" to be earned while one is working full-time in unrelated employment. Also, thanks to World War II and the subsequent hard times in Britain, my wife and I grew up as researchers in an environment where expensive equipment was out of the question. Consequently, we have always tried to keep the equipment necessary for our research as simple as possible, and to be economical as we can be in operating expenses.

On this basis, we believe that amateurs could contribute much more to plant science than they do at present. And we feel that they only need encouragement. In some respects, amateurs are hardly less well-placed to do research than professionals.

In academia, administrative work and innumerable committees take up much of the so-called "research time," and professionals stay productive only to the extent that they work evenings and weekends, and take vacations in botanically-determined places. Thus, in reality, the amateur has almost as much time available for research as the professional.

Here I see a big difference between the Botanical Society of America (to which I have belonged for 23

years) and the Botanical Society of the British Isles. This is not just a matter of numbers of members. The two societies have about equal numbers of members (between two and three thousand) even though the population of the British Isles is only about a quarter of that of the USA. The difference is that the Botanical Society of America is almost entirely made up of professionals, in institutions, whereas the Botanical Society of the British Isles is an amalgam of professionals and amateurs who are often very competent. I will return to this matter of membership in botanical societies later.

But how did this apparently greater emphasis on amateur botany in the United Kingdom come about? Perhaps we can get some insight by looking at the historical features of British botany.

In Britain, the 18th and 19th centuries were formative times. While botany was becoming established as a science in Europe, there were few professional botanists except for apothecaries, who produced their own supply of properly identified drug plants. Other botanists were amateurs, in the sense that they were not paid for work with plants. Some were independently wealthy, such as Sir Joseph Banks, whose influence was felt widely in the 18th and 19th centuries. His dedication to botany was such that he could never be considered a dilettante. Banks was the self-sponsored leader of a botanical team on Captain James Cook's first voyage to the South Seas, in HMS Endeavour. This voyage, from 1768 to 1771, was of enormous scientific and geo-political importance. Sir Joseph Banks was a great figure in British botany for many years afterwards. Since he was the fortunate possessor of great wealth and excellent political contacts, in addition to his own botanizing, he provided financial and organizational assistance for many other collectors in their overseas activities.

He was President of the Royal Society for many years and his herbarium and library were presented to the British Museum, where they served as part of the foundation of its comprehensive collections. For a while Banks was Honorary Director of the Royal Botanic Gardens at Kew--when they were literally Royal Gardens. The Australian genus Banksia is named after him. He also travelled to Iceland and to Newfoundland (but I'm sure the Newfoundland Banks were not named after him).

Charles Darwin was a man in independent means--at least after the voyage of the Beagle, but few other persons have had such an impact on biology--evolution, breeding systems, pollination biology, plant physiology, the study of insectivorous plants and much more. Except for his thinking about the early stages of evolution by natural selection, all his ideas were worked on during the years he spent at home in Down House, in Kent. With his shyness and his illness, he could never have survived in the rat-race which we suffer today in the academic world.

Darwin succeeded as a scientist partially because he had money enough to publish. This can prove to be a

But I hope I have made it clear that a great deal of solid botany was contributed by these amateur botanists of the centuries gone by.

Much of the development of botany in the domesticated British landscape was of a sort that could be duplicated in the New World, but I suggest that it has not yet developed as fully here because people have been busier combatting and controlling nature, and have not had as much time to study it in a relaxed and abstract way. But anyway, conditions are much more equivalent today. In North America, as in Britain, there is a sizeable segment of the population that wants to get out and observe nature. For them, The New Naturalist series of books is published very successfully in Britain and in the United States. This series was begun during World War II, and it caters at a high standard to the public that is interested in the natural world.

And in North America amateurs continue to contribute significant information on pteridology and on the study of other non-flowering plant groups.

But it has to be admitted that at the turn of the century, professional botany moved rather quickly away from the taxonomic and floristic emphases that prevailed in Victorian times. Laboratory and experimental work involved plants of which the amateur had never heard. Microscopes, both optical and, more recently, of the electron varieties, have made fashionable the studies of fine structure and molecular biology that are beyond the amateur's easy understanding. Extremely expensive equipment for observation, recording or experimentation, and computer facilities for the processing of accumulated data have become apparent necessities. In the university libraries, to which the public is usually not admitted, there has been an accumulation of massive amounts of biological literature written in a jargon that only the initiated can comprehend.

How on earth can the amateur contribute in these circumstances? Well, first of all, I should say that the amateur can still contribute significantly along lines that are traditional but are capable of improvement and expansion. We could do very well with a mapping of the North American flora, at least on a series of local bases. This might be analogous to the production of the Atlas of the British Flora, which was compiled by the activity of many amateurs and groups of amateurs, each taking responsibility for a square ten kilometers on a side. The information was then brought together by an experienced professional.

Now, under the eyes of professionals, amateur botanists in Britain are making surveys of variation within individual taxa. For example, a survey of the black nightshade (Solanum nigrum) complex is being undertaken with supervision from the Cambridge University Botanical Garden. Pollination biology is another area where the amateur can perform valuable research. We are getting away from just the study of individual species and their pollinators, and are realizing the importance of treating the subject in an ecosystem context.

There are also some extra opportunities that were not available previously. For example, the University of California has set up a University Research Expeditions Program and a similar scheme is operated by the Center for Field Research on behalf of the Earth Watch Institute. Members of the public volunteer for expeditions to various parts of the world. These expeditions are designed to provide information for the research program of particular professional researchers who will lead the expedition. The volunteers thus have an opportunity to satisfy the urge to participate in research and, as part of the preparation for the expedition, they receive some technical training. I think this is an excellent idea, but I would suggest that it would be still more beneficial if the volunteers could put the training they have received to good use in more individual efforts when the expedition is over. It should be more than a memorable experience.

And we have to remember that some of our amateurs of the future will already have received graduate training. Many of these botanists could productively use laboratory and library facilities, if these could be made available. How can their needs be accommodated? One feature of the Botany Department at the University of California at Berkeley has been the appointment of qualified amateurs as unpaid Research Associates. Two of these who have brought their expertise to the department are Marion Cave, expert in cytotaxonomy and embryogeny (particularly of the Liliaceae), and Laura-May Dempster, an authority on Galium, bedstraw. Opening up the laboratories, the common rooms and the libraries in this way could be further augmented by letting the empty spaces in classrooms be occupied by qualified auditors.

Botanical garden programs can be, and are being, improved as far as public instruction is concerned. Dr. Rober Ornduff is doing this at Berkeley, and the University of North Carolina at Chapel Hill is providing an example in the excellent programs initiated by Dr. Ritchie Bell. Dr. Bell has been particularly successful in mobilizing amateurs to note cases of native plants being menaced by development, and as a last resort, to transplant them.

The equipment problems need not be as serious as it seems to be to some people. Even in a home laboratory there is plenty of good botanical research that can be carried out with simple equipment, aided by what Barry Tomlinson has called "a good eye." And miniaturization and drastic reduction in the prices of computers have put the statistical treatment of data back in the realm of the possible for the amateur.

The chemical botanist R. Darnley Gibbs of McGill University used an admirable series of simple tests for groups of chemicals in plant material--some, for phenols, being as simple as pressing a lighted cigarette on leaves for 3 seconds, or dipping the leaves in hot water and noticing the coloration produced around the damaged area. This simple test for cyanogenesis from glycosides can be very important for those who would

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c/o Janet Williams
Utah Native Plant Society
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study the interactions of plants and herbivores. Irene Baker used a variety of simple spot tests and chromatographic techniques for sugars, amino acids, lipids, phenolics and alkaloids in nectar. In this way, large-scale preliminary surveys can be made, so that other researchers with more sophisticated equipment can follow up on selected taxa.

As to the needs of amateurs for a forum in which to discuss their findings, appropriate societies are necessary. In Britain, the BSBI provides the link between professionals and amateurs, and regional societies in North America such as the Torrey Botanical Club, have long accepted amateurs as members. The California Native Plant Society is primarily devoted to the practical preservation of the native flora of California. These amateur botanists are alert to the danger that weeds may pose to the native flora, and they will form task-forces to go out and root them up. This is understandable because California does seem to attract some of the grossest weeds—like Pampas grass (*Cortaderia jubata*) from South America and several kinds of broom (*Cytisus*) from Europe. Similarly, members of the Washington Native Plant Society have been instrumental in revegetating with native species certain disturbed areas in the national forests. But even with the negative qualities of introduced weeds, the careful study of the success of these plants may be very rewarding scientifically and practically—and I believe it should be encouraged.

So I appeal to biology departments and botanical societies such as our own to open up their facilities to a greater extent to qualified amateurs, and to sweep away the distinction between amateur and professional.

Reprinted from the UW Arboretum Bulletin (Fall 1982) with special thanks to Art Kruckeberg and the Washington Native Plant Society.

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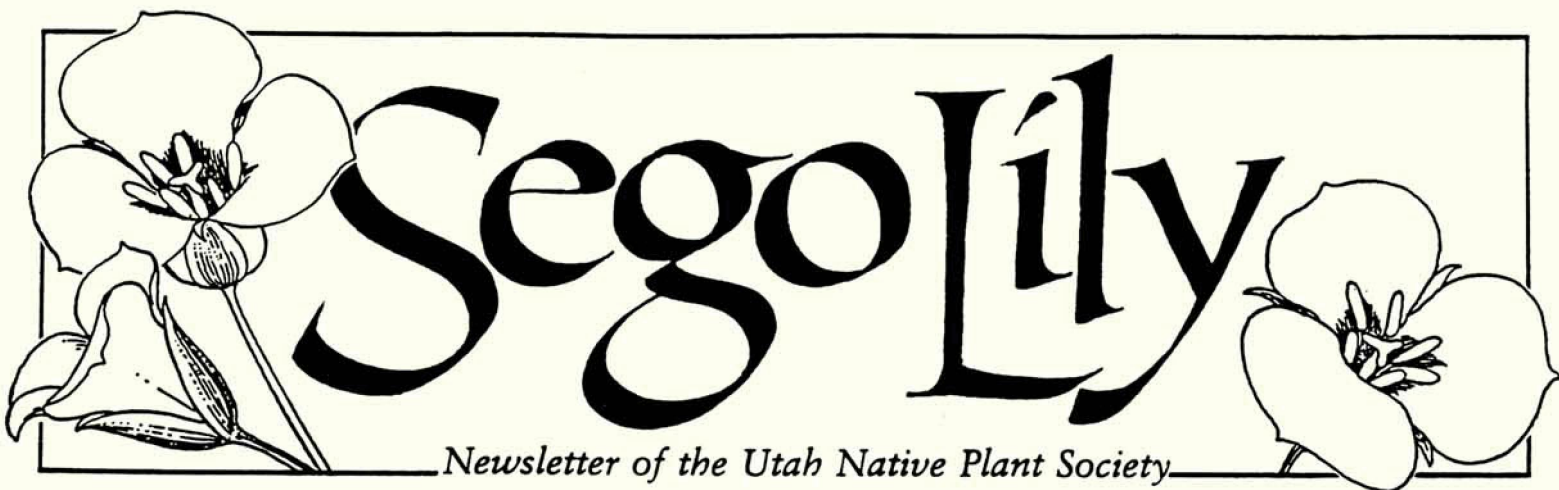
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VOL. 15 NO. 4

JULY / AUG 1992

CALENDAR OF EVENTS

June-July No Salt Lake Chapter meetings for these months.

July 18 **UNPS Fieldtrip.** "Sub-Alpine Flowers of the Uintas" led by Jo Stolhand. Trip limited to 8-10 participants. This day hike involved some off-trail hiking, e.g. talus slopes and boulder hopping. It is not a strenuous trip but is approximately 8 miles long at a higher altitude. Contact Jo at 521-0069 to reserve a space and get details.

July 18 **Nature Conservancy Sponsored Albion Basin Day Hike** led by native plant expert Mike Alder. See Wasatch wildflowers in the glorious alpine setting. Indian paintbrush, lupines, monkey flowers and columbines will blanket the meadows and hillsides. Bring lunch, a camera and questions to the Albion Basin parking lot at 9:30 am. Space limited. Please reserve your spot by calling Ronda Kershnik at 531-0999.

August 1, 2 **Brian Head: Geology & Flora of the High Plateaus.** Utah Museum of Natural History Field Class within the Markagunt and Pausaugunt Plateaus of SW Utah to observe first hand the geology and wildflowers of this high plateau country. Recent lava flows, evidence of faults, ancient lake beds, and unique meadow and forest vegetation will be explored. Vehicles will be provided for the two days of touring. Participants are responsible for their own food and accommodations: camping or motels. Instructors: Frank DeCourten, Geologist and Asst. Director, UMNH, and Michael Windham, Director of U of U Garrett Herbarium. 581-6927.

August 7-8 **UNPS Mushroom Fieldtrip to Boulder Mountain** led by Dr. Brent Palmer. Camp at Barker Reservoir. \$10 for adults and \$5 for children will get you breakfast Friday and Saturday mornings, dinner Friday night and a steak and mushroom fry mid-day Saturday. Experts on hand include Dr. Kent and Vera McKnight, Dr. Frank Anderson, and Dr. Al Tail. See article this issue for map and specifics.

Sept. 11-13 **First Annual National Public Lands Grazing Conference** at Boise State University, Boise, Idaho. Registration \$25. Write Vicky J. Heintzman, Rest the West, P.O. Box 10065, Portland, Oregon 97210 for further information.

PADGETT ON WASATCH-CACHE TES

Andy Boyack
UNPS Fieldtrip Chair

Wayne Padgett, ecologist for the Wasatch-Cache National Forest defined TES and described the activities of the Forest Service in relation to it at the May 27th meeting of UNPS Salt Lake Chapter.

In 1973 Congress passed the Threatened and Endangered Species Act, the purpose of which was to protect plant and animal species from extinction. Enforcement of the law has led to widespread study and classification of threatened and endangered species, TES for short. Simply put, an endangered species is one that is in danger of extinction, and a threatened species is one that could become endangered. The Forest Service has added another classification--sensitive species--those species whose population or habitat is on a downward trend. Sixteen plant species are listed for the Wasatch-Cache Forest. Primula maguirei and Musineon lineare are two that the Society has observed on field trips in Logan Canyon. Parrya rydbergii is another that the Society observed at 11,000 feet on Leidy Peak on a Uinta field trip.

Wayne remarked that a new threat to the Primula maguirei has recently developed--rock climbers. Rock climbing clubs have begun using the cliffs in Logan Canyon for climbing practice.

An apparent new species of violet has been recently discovered in Logan Canyon by a botanist from Utah State University. Its discovery is so new that it has not yet been named, and almost nothing is known of the habitat range. For the time being it is being called Viola smithii for the discoverer.

Wayne told us that the Forest Service is implementing field studies of sensitive plants and suggested that the Society, either as a group or individually, could help. One project would be the Viola smithii in Logan Canyon and another might be the examination of projected logging sites for sensitive or T and E plants in the Uintas.

A few of the other sensitive plants on the Wasatch-Cache Forest that Wayne mentioned were Draba maguirei, (Maguire Draba), Penstemon uintahensis, (Uinta Beardtongue), Spiranthes diluvialis (Ute Lady's tresses), and Cypripedium fasciculatum, (Brownie Ladyslipper).

THE SEARCH FOR THE BROWNIE LADYSLIPPER

Andy Boyack
UNPS Fieldtrip Chair



The Brownie Ladyslipper (Cypripedium fasciculatum), TES listed as sensitive, has been found by members of the Utah Native Plant Society in old growth lodgepole pine stands in the eastern Uintas. Does it occur in similar forests on the north slope of the Uintas, specifically in proposed logging areas? This is the question Wayne Padgett, ecologist for the Forest Service, asked at our UNPS meeting in May. So we organized a field trip to help him find the answer.

Friday night, June 19, we camped in the forest of lodgepole pine near China Lake on the north slope of the Uintas. The following morning Wayne broke out several maps and aerial photos showing the areas of interest and picked out several we could search in a day's time. Most of the areas we could reach by car, although one area in particular required a mile and a half hike.

The areas we searched consisted of tracts of old growth lodgepole pine interspersed with areas of second growth pine where logging had occurred probably 30 to 40 years ago. The forest floor of the old growth timber was fairly open. Pine needle duff and scattered Arnica plants just starting to bloom covered the ground. The second growth areas contained trees 10 to 20 feet high and lots of dead wood logging slash, downed trees, branches, and stumps in places so thick one wonders how the original logging crews were able to maneuver. Here we found wild currant bushes and strawberry plants in blossom. Fleabane daisies were in bloom everywhere.

A conspicuous flower in the meadows near the campsite was Hoods Phlox which formed compact clumps a foot in diameter covered with pure white flowers. Glacier Lilies and Spring Beauty as well as many other spring flowers were in bloom. It was typical high elevation spring for this country. Our campsite was at nearly 9000 feet.

We did not find the Brownie Ladyslipper despite our thorough search, nor did we find any other ladyslipper or orchid. Better luck next time.

Many thanks to Wayne Padgett and the Wasatch-Cache National Forest for this rare field trip.

FIELDTRIP TO LONE PEAK NURSERY

Jo Stolhand
UNPS Board Chair

The first filtration pond had just been planted with sedges the day a few members of UNPS toured the Lone Peak Nursery. Runoff from the nursery will pass through the ponds where sedges will absorb nitrates from fertilizer and chemicals from sprays leaving clean water to be reused or put back into the irrigation system. Glen Beagle and John Justin explained how they would be able to measure impurities in the water as it entered the pond and as it left. They will experiment a little with the sedges to see which work best in absorbing chemicals, and how rapidly they reproduce.

The Lone Peak Nursery grows almost 50 species of plants, many of them natives. They have trees for reforestation (the USFS is their major buyer), sagebrush (especially the Hobblecreek variety which deer prefer), and now sedges for riparian restoration. Plants are offered in tublings or bare-root. Tublings are grown in greenhouses with special lighting to maximize growth and then moved to a shaded structure to prepare them for planting. Bare-root plants are grown in fields, harvested and stored in special refrigerators at exacting temperature and humidity.

The Lone Peak Nursery is manned by inmates from the Utah State prison. These same inmates make up the fire-fighting, trail building and planting crews, the Flamingoes.

The progressive nature of the nursery and enthusiasm of its directors were appreciated by those attending the tour.

BIRDING IN YELLOW FORK CANYON

Dorothy Egan

A delightful surprise met the six birders from Audubon (Jeanne LeBer, Ray Smith, Larry Castle-Fericks, Edie Trimmer, June Ryburn, Dorothy Egan) who participated in the UNPS Nature Day on May 2 in the lovely little canyon in the southwestern part of the valley. The riparian habitat, along with pinyon-juniper forest, produced much more variety in birds than most of us had expected. It was a perfect day and the birds

were in full voice, if not always in full view. On our leisurely walk of about two hours to the end of the road, we heard and/or saw about 22 species, as follows: solitary vireo, yellow warbler, black-capped chickadee, scrub jay, western peewee, red-tailed hawk, chipping sparrow, blue-gray gnatcatcher, Oregon junco, rufous-sided towhee, green-tailed towhee, rough-winged swallow, turkey vulture, western flycatcher, yellow-rumped warbler, orange-crowned warbler, white pelican (high up, on a breakfast run to Utah Lake from their breeding island in the Great Salt Lake), mountain bluebird, rock wren, mourning dove, pine siskin, and black-chinned hummingbird. Further time and exploration would undoubtedly have produced other species. It was unanimously decided that Audubon should plan to include this little "oasis" in future birding trips for groups, and that cross-country skiing in the winter might also turn up some interesting sightings.

MONT E. LEWIS BOTANICAL AREA (SCAD VALLEY) MANTI-LASAL NATIONAL FOREST PRICE RANGER DISTRICT

Bob Thompson
Specialist in Botany
Manti-LaSal National Forest

The Scad Valley Botanical Area has been proposed as the Mont E. Lewis Botanical Area by the Utah Nature Conservancy.

Scad Valley lies within the north portion of the Joe's Valley Graben. It is drained by Scad Valley Creek, which empties into the Left Fork of Huntington Canyon.

The meadow is well watered with springs arising along the contact with the escarpment along its eastern edge. It is a fair-sized meadow and contains some unique and rare plant species.

In the past, Scad Valley was a natural gathering area for grazing livestock, thus the name. As a result, the meadow was reduced to a very poor condition. The name "Scad" is not very complimentary.

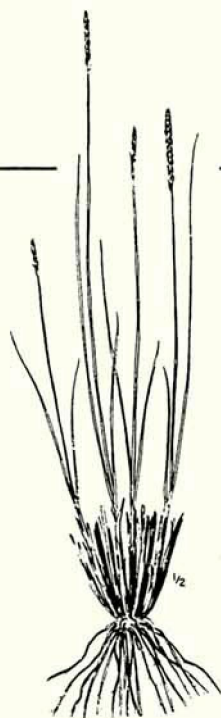
Regardless of the area's past condition and heavy uses, many plant species have survived and with them a number of species that are rare or new on the Wasatch Plateau, or even to the state. See Table I.

The Scad valley Site is known to several eminent botanists who endorse its protection. The Utah Native Plant Society also has voiced support for the establishment of the area.

Table 1. Rare or New Vascular
Plant Species found within the
Scad Valley Botanical Area

Scientific and Common Name	Family	Occurrence and Significance in the BA
<i>Carex microglochin</i> None	Cyperaceae	One of two collections ever made in Utah
<i>Carex scirpoidea</i> var. <i>curatorum</i> False Bulrush sedge	Cyperaceae	One of six stations in Utah outside the Uinta Mtns.
<i>Gentiana prostrata</i> Moss gentian	Gentianeae	One of the five stations in Utah outside the Uinta Mtns Very rare on the Wasatch Plateau.
<i>Kobresia simpliciuscula</i> None	Cyperaceae	One of the three stations in Utah; the other two are in Uintas
<i>Ranunculus acriformis</i> Sharp buttercup	Ranunculaceae	One of the five stations in Utah; all on the High Plateaus
<i>Polygonum viviparum</i> Alpine bistort	Polygonaceae	Circumboreal; found in seven Utah counties; about 25 collections have been made in the state.
<i>Thalictrum alpinum</i> Artic meadowrue	Ranunculaceae	One of the five collections in Utah outside the Uintas; otherwise circumboreal. Very rare on the Wasatch Plateau.

Kobresia



Carex scirpoidea



UNPS T&E Plant Fieldtrip WASATCH PLATEAU-- And MORE

Janet Williams
Sego Lily Co-editor

An eager group of plant enthusiasts met Thursday morning, June 25, at the Tucker Rest Area in Spanish Fork Canyon under the leadership of Bob Thompson, Specialist in Botany for the Manti-LaSal National Forest and Ben Franklin, botanist for the Utah Natural Heritage Program and UNPS Rare and Endangered Plants Chair, for a look at plant communities on the Wasatch Plateau, with special attention to TES plants. Stan Anderson, Range Conservationist for the Forest, joined us for the day.

Our first stop was the site of the Clay Phacelia, Phacelia argillacea. A climb over a rather high fence and up a steep clay slope was rewarded with specimens still in blossom. Cages marked plants that are being studied by Lori Armstrong (see article in May-June issue.) This plant has made a remarkable comeback since a sheep herd was bedded on the site for four days a few years ago and virtually wiped out the population. The following year there was one flowering plant, then a small number a year for a couple of years, and now a good sized population has been blooming. About 90% of the existing population of this plant is at this site. Four acres have been fenced, with the work done by a prison work crew, to protect it. The Phacelia is the continuing object of study, including the discovery that there is a high degree of similarity with Phacelia glandulosa found in Peons Basin, Colorado, an oil shale area contiguous with Utah.

Returning to the rest stop, we took the Clear Creek road into the Manti-LaSal Forest, working our way up eventually to Skyline Drive, with stops at various plant communities to discover the species associated with each. For example, in the Englemann Spruce-Alpine Fir community there are fifty to sixty associated plants, among them Hackelia floribunda, Penstemon subglabra, Penstemon watsonii, Penstemon pulchellum, Valerian occidentale, Fragaria vesca, Scrophularia lanceolata, Delphinium nelsonii, and Carex hoodii. This area had been set back by logging and grazing but was coming back. Noticeable nearly everywhere on the plateau was the bright yellow-orange Sneezeweed, Helenium hoopesii. As might be expected, livestock don't utilize this poisonous plant and it is abundant.

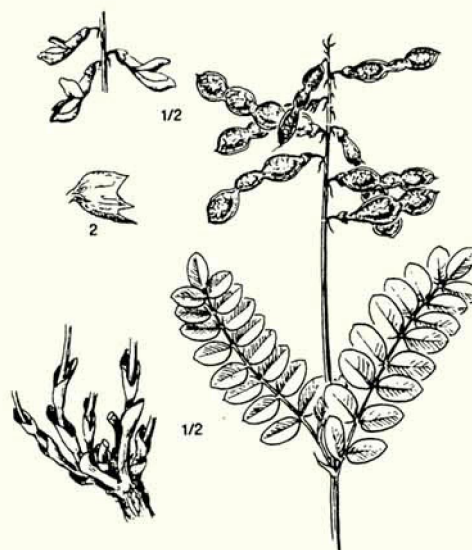
At noon we had lunch on top of the plateau with unparalleled views in every direction. Afterward we examined some experimental plots for grasses. There have been serious problems with range grasses, due principally to beetles and cows. Perry Plummer set up some plots to monitor the success of various species.

The most tolerant grasses appear to be Slender Wheat and Smooth Brome.

A light rain fell at our stop at a riparian area to observe that plant community but did not deter us in our interest.

Late afternoon found us at the Gooseberry Campground where we spent the night. Evening and morning were spent enjoying the birds of the area, as well as the plants. Many interesting species were seen, but the purple martins and black swifts eluded us.

Friday morning we were joined by Charles Jankiewicz, Price District Ranger, and Leland A. Matheson, Supervisory Range Conservationist, Price District, and were greeted with specimens of Hedysarum occidentale var. canone, a Category 2 sensitive plant which grows near the road going to Huntington collected by Bob.



Hedysarum occidentale

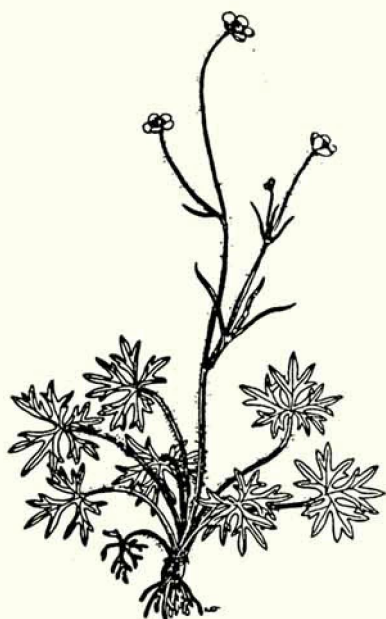
Overcast skies threatened rain but we drove to 10,000 feet to see an area invaded by Veratrum californicum. Overgrazing created the conditions for the Veratrum to take over and now three experimental methods are being employed in an effort to control it: plowing, spraying with a herbicide (Round-up) and mowing. Also abundant in the area due to overgrazing is Tarweed, Madia glomerata. When this plant flowers it smells like fresh asphalt, becomes sticky, and turns black. It creates a thick mat, takes the moisture out of the soil and nothing else can compete. There are a large number of seeds of this species in the soil bank due to a strategy in which some seeds mature while others "rest" for a long time. One consequence of this is many burrowing rodents who come for the rich harvest of available seeds. By late summer all the plants dry up leaving bare ground. Efforts are aimed at revegetating the area.

Our next stop was at the Huntington Reservoir where on Aug. 8, 1988, a nearly intact mammoth skeleton was discovered where it had been buried for 10,000 years. The area had been extensively glaciated.

Pouring rain sent us down the canyon to a covered pavillion at Bear Creek for lunch. Consultation with people at Joe's Valley confirmed that it was raining there as well, making the road to Skad Valley impassable and cancelling the plans for the afternoon to visit the proposed Mont E. Lewis Botanical Area (see article this issue) and Joe's Valley. Extending thanks to Bob Thompson and the other Forest personnel are attendees Mary and Leo Dahl, Frances and Martin Harris, Brent and Emily Arnold, Emma, Dave and Carissa Gardner, Dorothy Egan, June Ryburn, and Janet Williams.

Due to late breaking news concerning a possible sighting of the rare *Iris pariensis* in Kane County, the Gardners, and Dorothy, June and Janet accompanied Ben Franklin to join Larry England, U.S. Fish and Wildlife botanist, and his wife Corky, for a search of the Paria country to try to find the iris.

Enroute we visited the site of the endangered Autumn Buttercup near Panguitch, and Welch's Milkweed at the Coral Pink Sand Dunes. Dave Gardner took the opportunity to photograph the plants preparatory to drawing them for our next UNPS wildflower poster featuring rare and endangered plants.



RANUNCULUS ACRIS VAR. *AESTIVALIS*

Many thanks to Ben Franklin for this extended tour and also to Larry England for the ensuing Kane County search. (See following article.)

Late Breaking News:

IRIS PARIENSIS MAY BE FOUND

Janet Williams

Adding to the excitement of the TES Fieldtrip this year was the news that *Iris pariensis* was apparently sighted in bloom on the West Clark Bench area of Kane County earlier this spring, although it was not reported until the last week in June.

Rick Fridell of the Non-Game Dept. of the Utah Division of Wildlife Resources was covering the area in his search for wildlife. He had seen a "Wanted" poster printed by Dr. James Waddick of the American Iris Society in Kansas City and posted in the general vicinity asking people to watch for this plant. It is known from only one herbarium specimen and has not been seen since it was collected. Ben Franklin had specifically searched for it this year on the East Clark Bench where it had been collected, but had not found it.

Rick came upon the plant in bloom on wet sand on several sites in runoff areas and recognized it from the "Wanted" poster. Not realizing how very rare it was and how long it has been since it had been seen, he didn't report it to BLM until recently. BLM then quickly reported it to Larry England of the U.S. Fish and Wildlife Service. He and Ben Franklin of the Utah Heritage Program made immediate plans to search for it. Delayed slightly by the TES Fieldtrip, Ben and other UNPS participants joined Larry at the BLM Paria Office on Saturday and made plans for the search. After conferring with Rick on Friday, Larry and his wife Corky had made a preliminary attempt to find it with no success.

Saturday the group mounted a search, joined in the afternoon by Rick Fridell, Todd Esque of the BLM Dixie Resource Area, and about ten volunteers from the Student Conservation Volunteer Association who are helping with the desert tortoise study in the St. George area. Again we were unsuccessful in locating a trace of the plant. It is a small species, perhaps 6 inches tall, but it was hoped that some dry capsules would be noticeable above the rather grasslike leaves.

Corky England offered consolation for our unsuccessful attempt with a delicious dutch oven dinner of chicken, broccoli, mushrooms, and potatoes with pineapple upside-down cake for dessert. Carissa Gardner was her chief helper and proved to be an excellent cook and companion.

The group disbanded with the hope of finding the lovely, elusive species next spring when it blooms again.



GRAZING AND FIRE MANAGEMENT FOR NATIVE PERENNIAL GRASS RESTORATION IN CALIFORNIA GRASSLANDS

John W. Menke

Dept. of Agronomy and Range Science
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Introduced, alien annual grasses and forbs native to southern France, Spain, and Portugal present a formidable obstacle to restoration and enhancement of native perennial grass populations in California foothill and valley grasslands. Their immense seedbanks regularly stock sites with ten thousand or more plants per square meter. Their diverse set of plant growth forms and phenologies cause fierce resource competition for light and water beginning soon after fall germination and often continuing for the entire growing season. Rosette-forming forbs such as filaree (*Erodium* spp.), can block emerging perennial grass seedling growth rates. Later in the growing season, tall alien annual grasses such as wildoat (*Avena* spp.) and ripgut brome (*Bromus diandrus*) shade out shorter-statured perennial grass seedlings and out-compete for most of the soil water resources before summer.

Specialized alien species exist for nearly every temporal and spatial resource opportunity' (niche). For example, summer annual weeds capitalize on abnormally high late-spring rainfall and runoff to swale sites that have heavier textured soils. In the case of yellow star thistle, seeds can remain viable on the soil surface or in litter for up to eight years. These alien competitors evolved during thousands of years of heavy grazing and periodic drought in southern Europe, and thus have many adaptations to compete successfully against our native perennials under present grassland conditions in California. The aliens' capability for producing some seed under the most adverse grazing disturbances and weather regimes assures their survival. To restore native prairie in California, strategies are needed to reduce the competitive edge of alien species. Once perennials become established they are very strong competitors. I will discuss here some promising approaches which have recently been investigated.

Historically in California, minimal efforts have been made to reestablish native perennial grasses on grassland sites. Range managers emphasized the introduction of alien perennial grasses such as *Phalaris*, *Dactylis*, *Agropyron*, *Oryzopsis*, and *Ehrharta* spp. as part of chaparral vegetation type conversions to grassland where alien annual grass competition is low. Grazing and fire management alternatives were not investigated. No thorough investigation has been made of the forage value and grazing tolerance of any native perennial grasses in California. Use of an ecological

basis for designing a management scheme was largely ignored and new methods of time-controlled grazing were not available when perennial grass establishment trials were previously attempted in the 1950s and 60s. Too often intense grazing practices such as season-long continuous grazing, know to be tolerated by alien plants, and sometimes an emphasis on close seasonal grazing needed to maintain seeded introduced annual clovers, e.g., subclover (*Trifolium subterraneum*) and rose clover (*T. hirtum*), in grass dominated communities, led to unsuccessful grazing prescriptions for natives. In the past, little effort has been devoted to designing a grazing management plan, where prescriptions would first be practiced for one to three years to establish a stand, and specialized grazing systems would later be used to maintain and improve a new stand. Some new grazing systems described by Allan Savory and his holistic resource management (HRM) schemes are potentially applicable here.



Grazing as a Restoration Tool

Studies have been conducted on grazing and fire management on grassland at the University of California (UC) Hopland Field Station and at the Jepson Prairie, (owned by The Nature Conservancy and managed by the US Natural Reserve System.) Through their studies of purple needlegrass (*Stipa pulchra*) Menke and his students Ahmed, Fossum, and Langstroth provide guidelines for a native perennial grass management prescription. Herbivory and periodic fire are natural and necessary processes in grassland. They remove litter, recycle nutrients, stimulate tillering, and reduce seedbanks of competitive annual plants. Management of native perennial grasses requires strategic application of grazing and fire to accomplish the restoration goal—

increasing the abundance of native perennial grasses. Restoration treatments must: 1) enhance the vigor of mature perennial grasses, thereby increasing their longevity; b) promote clonal fragmentation of decadent, over-mature plants into multiple, vigorous daughter plants; and c) encourage native grass seed production and increased seedling establishment success.

Time-controlled, short-duration, high intensity sheep or cattle grazing for several days in early spring removes substantial amounts of alien annual plant seed while it is still in inflorescences and opens up the sward canopy to allow light to penetrate to young, short-statured seedling perennials. This grazing event must be timed to allow perennial grass regrowth, flowering and seed set before spring soil moisture is exhausted. It must be intense enough to graze off the grass inflorescences of most alien annual grasses. The result is increased live crown cover for mature perennial grasses, reduced decadent dead-center growth forms in bunchgrasses, and improved light availability to tiller bases which promotes basal bud activation and new vegetative and reproductive tiller formation. These perennial grass responses constitute what managers term improved plant vigor.

Summer or 'dormant-season' high-intensity livestock grazing is a second alternative treatment to increase the abundance of native grasses. Accumulation of dead stem bases due to lack of fire and grazing causes self-shading of newly emerging tillers on bunchgrass and the formation of decadent plants over time. This commonly occurs on land protected from grazing for several years or in pastures grazed continuously at light to moderate intensity where animal distribution problems are common and many perennials are left ungrazed most years. High intensity grazing in either spring or summer removes dead stem bases, litter or 'thatch' build-up uniformly over a management unit. Livestock 'hoof action' or trampling puts dead material in contact with decomposer bacteria and invertebrates in the soil which speeds nutrient recycling and litter turnover. So long as the high-intensity grazing is infrequent, perennial grass plant carbohydrate metabolism is not severely disrupted and plants are maintained in the community. Allowing at least one month to six weeks spring growth after grazing when soil moisture is not limiting is a critical element of the grazing prescription. Spring grazing should be timed to maximize seed removal from alien grasses.

Summer grazing should occur in mid-summer near maximum plant dormancy, realizing that most native perennials do not become fully dormant on California valley and foothill sites. Summer grazing does not reap the added benefit of alien annual plant seed removal like that for spring grazing, therefore it is a second choice alternative. It may be applied prior to summer burning to reduce fire intensity. Prescribed grazing constitutes the primary component of the first phase of a perennial grass restoration program; prescribed fire is the second component.

And Prescribed Burning

J. Bartolome and his students at UC-Berkeley have studied spring burning effects and have found that prescribed burning in late spring reduces alien annual plant seed production, and the resulting size of the seedbank, and increases perennial grass seedling establishment due to litter removal and lowered competition. Burning in late spring when seeds are still contained in the inflorescence reduces annual plant density and competition with perennial grasses the following year. Substantial density reductions in annual grasses with flammable caryopses (seeds) is a primary objective of summer burning. Results to date indicate that summer burning stimulates perennial bunchgrasses to fragment into two or more, vigorous daughter plants. However, some consideration needs to be given to the fuel loading before burning. On productive sites where aboveground biomasses can reach high levels (>2,500 kg/ha), some previous grazing or mowing is necessary before summer burning to avoid high (twenty percent or more) mortality of mature perennial grasses due to high fire intensity. A one to three percent mortality rate on decadent perennials can be expected with summer fire but because of fragmentation a higher density of vigorous individuals will be present post-fire. Total reliance on burning as a management tool is questionable since liability from potential fire escapes, smoke restrictions, and time required to get permits makes burning as a management alternative difficult to implement in many situations.

Once target density goals for native perennials are reached, more frequent grazing and practical (economic) use of the forage resource will be possible depending upon the objectives for the landscape. So long as adequate time for post-grazing regrowth is provided for most years, established native perennial grasses are resilient to grazing. Grazing restrictions and infrequent, high-intensity, short-duration grazing will be needed every few years to establish cohorts of seedling perennials to increase or maintain the desired native plant population.

While fire causes a reduction in seed production by perennial grasses the first year post-fire, the effect is gone by the second or third year after a fire. Although some perennials are lost in the fire, the benefits from greater native grass seedling establishment makes up for this loss. Overall there is a net benefit from periodic burning. Literature from other grassland research and our own data indicate that volatilization of nitrogen and sulfur exceeds sixty percent of the above-ground standing crop of these nutrients, so very frequent burning should be avoided. Since the time required for the composition of alien annual species to return to a pre-fire status is about three years, burning every third or fourth year is recommended.

While more costly artificial reseeding and other plant establishment procedures (plugs) are possible, prescribed grazing and burning are useful tools to restore or maintain the abundance of native perennial grasses in California grassland where remnant

populations are present, where managers take the long-term view, and where large acreages are involved. Certainly, reseeding permits goals to be reached more rapidly. Newly seeded native grass stands need grazing and burning treatments beginning the second or third year following establishment to reduce the same light and water competition factors discussed above for mature stands.

Seeding of competitive annual grasses such as ryegrass (*Lolium multiflorum*) in a mixture with perennials should be avoided if the primary objective is to establish native perennial grasses. Once perennials have become established, seeding of annual clovers may be a compatible option for livestock producers, but the competitive effects of these annuals on native perennial grass seedlings is unknown and needs to be studied before it is applied on a large scale.

Benefits of Perennial Grasses

Perennial grasses lengthen the grazing season and increase green forage availability, they have greater capacity to stabilize surface and sub-soils once established, they hold nutrients more tightly and recycle them more efficiently than annuals, they are less flammable than alien annuals, and they help to build soil organic matter, thereby increasing site fertility and sustained productivity. Additionally, they present a more aesthetically pleasing textured landscape appearance and increase the biodiversity of the flora and associated fauna. Unfortunately, perennial grasses are slower than many alien annuals in establishing themselves, growing soil-stabilizing root systems, and providing general soil protection. Where little or no annual plant seedbank exists some seeding of annual grasses may be necessary to gain immediate soil protection; however, this practice will reduce perennial grass establishment success.

The ideas presented in this paper were developed while doing field research supported by The Nature Conservancy, The Public Service Research and Dissemination Program at UC Davis through funding from the Hewlett Foundation, and the UC Division of Agricultural and Natural Resources, Experiment Station.

Reprinted from Fremontia, a Journal of the California Native Plant Society, Vol. 20, No. 2, April 1992.

Editor's Note: "A Tribute to the Amateur in Botany" by Herbert G. Baker (reprinted from the University of Washington Arboretum Bulletin) will be continued in the Sept/Oct issue of The Sego Lily. The first installment was published in the May/June issue.



EPHEDRA VIRIDIS Coville

Betty Larson

Northern Nevada Native Plant Society

This well-known desert shrub is a member of the Pinophyta (Coniferophyta), the cone-bearing gymnosperms, characterized by having ovules that are not enclosed in an ovary. All of the Pinophyta are woody plants with scaly to needle-like leaves (with the exception of the ginkgo tree, an Asiatic tree, occasionally cultivated in our area, which has fan shaped leaves).

Only two subdivisions of the Pinophyta are Nevada natives: The Pinaceae (the pines), and the Gneticeae (which includes the ephedras), differentiated from the pines by having jointed stems, leaves reduced to scales and no resin. The single family, Ephedraceae, with about 15 species in the southwest, is the only representative of the Gneticeae in our area.

All of the ephedras are shrubs with a broom-like appearance, superficially suggesting the horsetails, Equisetum, and, in fact Ephedra is the ancient name for the horsetails, used by Pliny, a Roman naturalist and writer living in the first century A.D.

The green ephedra (E. viridis) has leaves reduced to small bracts, or scales along the stems and at the stem joints. These erect and many branching stems are photosynthetic and bright yellow-green, giving this shrub its specific name, viridis.

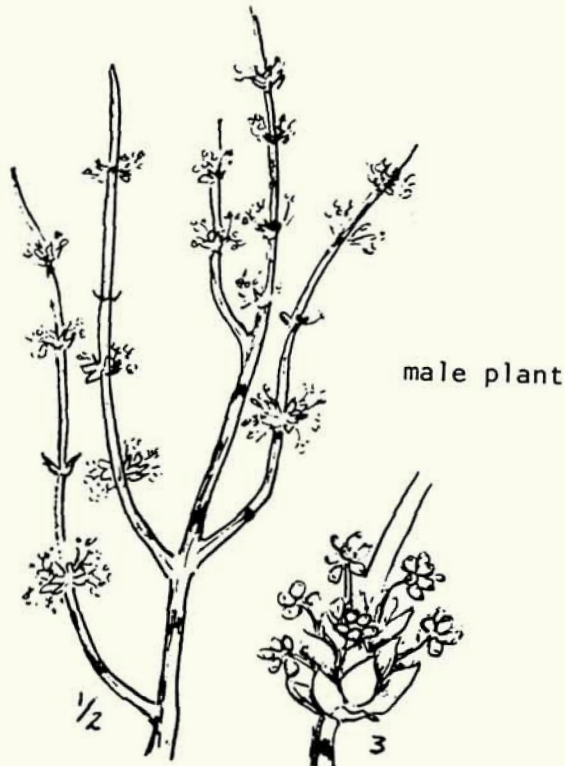
This ephedra is typically dioecious, thus usually producing its staminate (male) and ovulate (female) cones on different individuals, although occasionally both will occur on the same shrub. The whole structure of the staminate cone with its calyx-like perianth surrounding the stamens gives almost the appearance of an angiosperm flower, whereas the ovulate cone with its fleshy bracts surrounding the ovules at its tips reveals the relationship to the pines. Both forms are often paired or even numerous at the nodes and stem joints. The seeds formed in the ovulate cone are paired, brown in color and with three chambers.

Green ephedra is widespread in dry rocky places, mostly from 4000 to 7500 ft. elevation. It can be distinguished from E. nevadensis by its brighter green color, its nearly fastigate and numerous branches, and by the sessile or short-pedunculate ovulate cones. The greyer and coarser E. nevadensis is usually found below 4500 ft elevation.

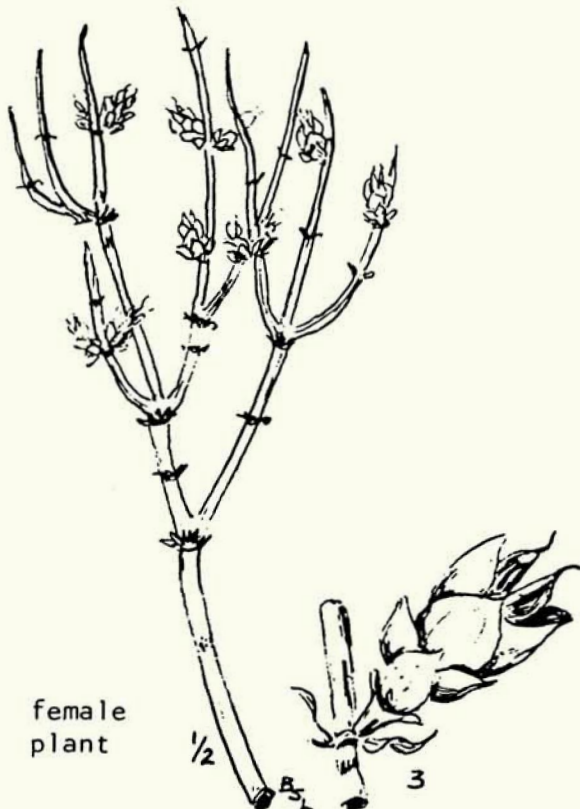
The ephedra's common names of Mormon, Mexican, or Brigham tea are derived from its used as a tonic, slightly pungent beverage, made from its dried stems and flowers by the early Mormon settlers. However, the Chinese used some species of Ephedra medicinally for more than 5,000 years, extracting its anti-depressant and anti-congestion drug, ephedrine, from the entire woody plant. It was also reportedly used by the western Indians and early settlers to treat syphilis. In fact, Sereno Watson used the name E. antisiphilitica

(when he first collected it) for the plant which he later named *E. nevadensis*. *E. antisiphilitica* is a different plant, it is known from Texas and Oklahoma.

Editor's Note: In *A Utah Flora* Welsh lists the following species as present in Utah: *Ephedra fasciculata*, *Ephedra nevadensis*, *Ephedra torreyana*, and two varieties of *Ephedra viridis*, var. *viridis* and var. *viscida*.



EPHEDRA VIRIDIS Coville -- by Betty Larson



THE DIXIE RESOURCE AREA MANAGEMENT PLAN

WHAT'S HAPPENING?

The Dixie Resource Area is in the process of revising and updating a land use plan called the Resource Management Plan (RMP). The Management Situation Analysis (MSA) prepared in 1988 for the Dixie Resource Area is being utilized and updated to include additional data on ACECs, wild and scenic rivers, and habitat categories for the desert tortoise.

The planning area covers all public lands within Washington County except for those located north of the Dixie National Forest Ranger District which are administered out of the Beaver River Resource Area.

HOW COULD THIS AFFECT YOU?

If you are a public land user, you may find that how you use public lands may change after the RMP is completed. To give you an idea of what may change, here are some of the topics to be covered in the RMP:

- Air Quality
- Areas of Critical Environmental Concern
- Cultural and Historic Sites
- Easements and Rights-of-Way
- Fuelwood and Post Harvesting
- Livestock Grazing
- Mineral Use and Management
- Off-Highway Vehicle Use
- Recreation Management
- Riparian Management
- Soil Management
- Vegetation Management
- Visual Resource Protection
- Water Quality
- Wildlife Habitat Improvement

As more uses and resources are discovered, more conflicts occur. The RMP looks at alternative ways to balance both new and traditional uses on public lands.

STEPS IN THE PROCESS:

The planning and reviewing process has taken several years to complete. A revised copy of the document available for public distribution is expected later this year. This article is an early notification that copies will be mailed to interested parties.

WHAT CAN YOU DO?

Public involvement and support is an important step in the process and opportunity will be given for specific comment and discussion of your concerns at public meetings. These meetings will be announced in the Daily Spectrum. If you would like to receive a copy of the updated Resource Management Plan, please reply immediately asking for one. Write:

David Everett, Dixie Resource Area,
Bureau of Land Management,
225 North Bluff St, St. George, Utah 84771

MIRROR LAKE PLANT LIST

Scientific Name	Common Name	Family
<i>Angelica roseana</i>	Angelica	Apiaceae
<i>Ligusticum tenuifolium</i>	Small Ligusticum	Apiaceae
<i>Lomatium</i> sp.	Biscuitroot	Apiaceae
<i>Achillea millefolium</i>	Yarrow	Asteraceae
<i>Agoseris aurantiaca</i>	Mountain Dandelion	Asteraceae
<i>Anaphalis margaritacea</i>	Pearly Everlasting	Asteraceae
<i>Antennaria alpina</i>	Alpine Pussytoes	Asteraceae
<i>Antennaria rosea</i>	Pink Pussytoes	Asteraceae
<i>Arnica chamissonis</i>	Chamisso Arnica	Asteraceae
<i>Arnica latifolia</i>	Broadleaf Arnica	Asteraceae
<i>Arnica</i> sp.	Arnica	Asteraceae
<i>Artemesia ludoviciana</i>	Western Mugwort	Asteraceae
<i>Cirsium arvense</i>	Canadian Thistle	Asteraceae
<i>Erigeron</i> sp.	Fleabane Daisy	Asteraceae
<i>Rudbeckia occidentalis</i>	Western Coneflower	Asteraceae
<i>Senecio crassulus</i>	Thickleaf Groundsel	Asteraceae
<i>Senecio fremontii</i>	Mountain Butterweed	Asteraceae
<i>Senecio triangularis</i>	Arrowleaf Groundsel	Asteraceae
<i>Taraxacum laevigatum</i>	Homed Dandelion	Asteraceae
<i>Mertensia ciliata</i>	Mountain Bluebells	Boraginaceae
<i>Arabis</i> sp.	Rockcress	Brassicaceae
<i>Cardamine cordifolia</i>	Heartleaf Bittercress	Brassicaceae
<i>Descurainia</i> sp.	Yellow Mustard	Brassicaceae
<i>Thlaspi montanum</i>	Candytuft or Alps Pennycress	Brassicaceae
<i>Campanula rotundifolia</i>	Harebells	Campanulaceae
<i>Arenaria congesta</i>	Head Sandwort	Caryophyllaceae
<i>Arenaria</i> sp.	Sandwort	Caryophyllaceae
<i>Cerastium arvense</i>	Field Chickweed	Caryophyllaceae
<i>Cerastium beeringianum</i>	Bering Chickweed	Caryophyllaceae
<i>Lychnis apetala</i>	Apetalous Campion	Caryophyllaceae
<i>Silene acaulis</i>	Moss Campion	Caryophyllaceae
<i>Silene</i> sp.	Silene	Caryophyllaceae
<i>Stellaria jamesiana</i>	James Starwort	Caryophyllaceae
<i>Pachystima myrsinites</i>	Mountain Lover	Celastraceae
<i>Sedum lanceolatum</i>	Stonecrop	Crassulaceae
<i>Sedum rhodanthum</i>	Rose Crown or Pink Stonecrop	Crassulaceae
<i>Gaultheria humifusa</i>	Wintergreen	Ericaceae
<i>Kalmia polifolia</i>	Bog Laurel	Ericaceae
<i>Vaccinium scoparium</i>	Grouse Whortleberry	Ericaceae
<i>Trifolium</i> sp.	Clover	Fabaceae
<i>Vicia americana</i>	Vetch	Fabaceae
<i>Frasera speciosa</i>	Green Gentian	Gentianaceae
<i>Gentiana calycosa</i>	Explorer's Gentian or Mt. Bog Gentian	Gentianaceae
<i>Swertia perennis</i>	Alpine Bog Swertia	Gentianaceae
<i>Geranium richardsonii</i>	White Geranium	Geraniaceae
<i>Geranium viscosissimum</i>	Pink or Sticky Geranium	Geraniaceae
<i>Phacelia hastata</i>	Phacelia	Hydrophyllaceae
<i>Phacelia</i> sp.	Phacelia	Hydrophyllaceae
<i>Hypericum formosum</i>	St. John's Wort	Hypericaceae
<i>Alium</i> sp.	Wild Onion	Liliaceae

MIRROR LAKE PLANT LIST, p. 2

Erythronium grandiflorum	Glacier Lily	Liliaceae
Nuphar polysepalum	Yellow Pond Lily	Liliaceae
Veratrum californicum	False Hellebore	Liliaceae
Zigadenus elegans	Mountain Deathcamas	Liliaceae
Epilobium alpinum	Willowherb	Onagraceae
Epilobium angustifolium	Fireweed	Onagraceae
Habenaria dilatata	Bog Orchid	Orchidaceae
Spiranthes romanzoffiana	Ladies Tresses	Orchidaceae
Orobanche uniflora	Naked Broomrape	Orobanchaceae
Ipomopsis (Gilia) aggregata	Scarlet Gilia	Polemoniaceae
Phlox sp.	Phlox	Polemoniaceae
Polemonium foliosissimum	Jacob's Ladder	Polemoniaceae
Polemonium viscosum	Sky Pilot	Polemoniaceae
Eriogonum umbellatum var. porteri	Sulphur-flowered Buckwheat	Polygonaceae
Oxyria digyna	Mountain Sorrel	Polygonaceae
Polygonum bistortoides	Western Bistort	Polygonaceae
Rumex sp.	Dock	Polygonaceae
Lewisia pygmaea	Least Lewisia	Portulacaceae
Claytonia lanceolata	Spring Beauty	Portulacaceae
Claytonia megarrhiza	Spring Beauty	Portulacaceae
Dodecatheon alpinum	Shooting Star	Primulaceae
Primula parryi	Parry's Primrose	Primulaceae
Chimaphila umbellata	Pipsissewa	Pyrolaceae
Aconitum columbianum	Monkshood	Ranunculaceae
Aquilegia caerulea	Colorado Columbine	Ranunculaceae
Aquilegia flavescens	Yellow Columbine	Ranunculaceae
Caltha leptosepala	Marsh Marigold	Ranunculaceae
Ranunculus adoneus	Buttercup	Ranunculaceae
Thalictrum fendleri	Meadow Rue	Ranunculaceae
Potentilla sp.	Cinquefoil	Rosaceae
Ivesia gordonii	Gordon's Ivesia	Roseaceae
Potentilla fruticosa	Shrubby Cinquefoil	Roseaceae
Mitella pentandra	Miterwort	Saxifragaceae
Ribes montigenum	Gooseberry Current	Saxifragaceae
Saxifraga odontoloma	Brook Saxifrage	Saxifragaceae
Saxifraga rhomboidea	Diamondleaf Saxifrage	Saxifragaceae
Castilleja applegatei	Sticky or Pine Paintbrush	Scrophulariaceae
Castilleja rhexifolia	Paintbrush	Scrophulariaceae
Collinsia parviflora	Blue-eyed Mary	Scrophulariaceae
Mimulus lewisii	Lewis (Pink) Monkeyflower	Scrophulariaceae
Mimulus sp.	Yellow Monkeyflower	Scrophulariaceae
Pedicularis racemosa	Sickletop Lousewort	Scrophulariaceae
Pedicularis bracteosa	Towering Lousewort	Scrophulariaceae
Pedicularis groenlandica	Elephant Head	Scrophulariaceae
Penstemon sp.	Penstemon	Scrophulariaceae
Penstemon whippleanus	Whipple's Penstemon	Scrophulariaceae
Veronica americanus	Speedwell	Scrophulariaceae
Valeriana occidentalis	Wild Heliotrope	Valerianaceae
Viola sp.	Blue Violet	Violaceae

NOTE: Please bring this plant list with you if attending "Sub-Alpine Flowers in Uintas" Fieldtrip on July 18.

OF RIVETS AND TORTOISES

Steve Johnson

Washington County Habitat Conservation Plan
Steering Committee

If you've done much flying lately, you know all too well how much time is spent in the plane while it remains earthbound. Imagine sitting on such a plane, looking out of the window, watching two people kneeling out on the wing, busily doing something. You are startled to see that they are removing **rivets** from the wing of **your** plane! Right about then, the pilot clicks on the PA system and says that there is no need to worry about those few rivets being removed. "The plane has **way** more than it needs to fly," he chortles.

As in the example of the plane, people all over the planet are busy removing rivets, but the earth's rivets are living species of plants and animals. There is no shortage of people who will tell us that, much like the pilot of our imaginary plane, there is no need to worry, that the earth can still function without many of its species. Today, we are losing the earth's legacy of life at a pace that has never been seen before in the 4.5 billion years that our planet has been circling the sun.

However, there is something that **can** be done. In Utah's Washington County, some folks are working hard to prevent the loss of at least seven of those "rivets" that help keep the earth a living planet. In January of 1991, a 15-member, county-appointed committee was formed to resolve present and future conflicts between the growth of the county and the survival of seven species protected by the Endangered Species Act.

Scott Hirschi, one of Washington County's Commissioners, was a keen observer of problems caused in Las Vegas by the needless conflict between growth and the preservation of the desert tortoise. He was determined to address the issue in a proactive fashion. He moved quickly to put together a broad coalition of interest groups and went to work. Since its inception, The Steering Committee has met 24 times in its effort to create a Habitat Conservation Plan, and it expects to have a draft plan ready by the spring of 1992.

The purpose of the Habitat Conservation Plan is to resolve as many conflicts as possible between the legal activities of people and federally listed species. If successful, the plan can permit the "taking" of threatened or endangered species, provided such taking is "incidental to, and not the purpose of, carrying out otherwise lawful activities." In order for the plan to be approved by the U.S. Fish and Wildlife Service, Washington County's Steering Committee must guarantee the survival of the listed species in question. In the long term this can only be done by conservation measures that preserve and protect adequate habitat for all seven species.

...Despite what seems to be a better-organized attack

on the Endangered Species Act in 1992, few knowledgeable people expect the Endangered Species Act to be weakened. Instead, there is a large coalition of citizen groups preparing to push for a **broadening** of the Act to require federal agencies to take a proactive, multi-species, ecosystem approach to preventing species from becoming threatened or endangered.

While the main focus of Washington County's Habitat Conservation Plan will be the desert tortoise, it will also include the bald eagle, peregrine falcon, woundfin minnow, **dwarf bearclaw poppy**, **silver pincushion cactus**, and the Virgin River chub. By addressing seven species, Washington County is, in effect attempting to take an ecosystem approach, and is thus ahead of what may be coming nationally.



PEDIOCACTUS SILERI

In addition to the above seven species already listed, Washington County has 27 more plants and animals listed as "Category Two" species. This means that they could be listed in the near future. When compared to the rest of the nation, this County may have more such species than any other area in the United States. While this is obviously a cause for concern, it should also be seen as an opportunity.

By taking action to preserve its wildlife legacy, Washington County has a chance to set itself apart from all of the other tourist and retirement destinations. Make no mistake—people love wildlife and actively seek it out when given an opportunity. By taking aggressive actions to preserve what nature gave us, our wild native plants and animals will give back to southern Utah far more than the effort and funding required for their protection.

By the way, our imaginary airline pilot was right. No one, not even the engineer who designed it, can tell us precisely how many rivets are needed to keep that plane in the air. How then can we ever look at a vastly more complex earth and predict how many of the planet's "rivets" can be removed before it can no longer support life? Even if we could make such God-like predictions, who would want to exist on an earth that contained only humans and those living things they must have to eat?

*Reprinted from Southern Utah Wilderness Alliance,
Spring 1992, Vol. IX, No. I.*

PROTECT THE ENDANGERED SPECIES ACT!

Julia Fonseca
Arizona Native Plant Society

Congress will soon consider reauthorizing the nation's strongest environmental protection law, the Endangered Species Act (ESA). This time, however, an unprecedented coalition of local governments and business and industry groups is lobbying for weakening the Act. The ESA's "listing" provision is their primary target.

"Listed" species are those protected by the Act. The ESA required that the decision whether to list a species as threatened or endangered be based solely upon scientific data. Critics of the ESA would like to see this decision taken out of the hands of scientists.

For instance, Congressman James Hansen (UT) has introduced a "Human Protection Act" which would eliminate the requirement that listing decisions be based solely on scientific data and would prohibit protection if the potential economic benefits to society do not outweigh potential economic costs.

The "Wise Use" movement advocates amending the ESA to prevent listing "non-adaptive species such as the California condor, and endemic species lacking the vigor to spread in range." Others recommend that voluntary protection agreements replace listing.

Glen Thurow, Professor of Politics at University of Dallas, argues that the ESA gives too much power to environmentalists because they can petition the government to list species and can sue when they disagree with its actions. (This, of course, overlooks the equal right of commodity interests to sue or petition for delisting species, as they have already done with the grizzly, wolf, and other troublesome species.)

In reality, the listing process has not been abused by either environmentalists or extractive industries so much as by the federal government itself. Due to political pressures, the Fish and wildlife Service--the agency responsible for maintaining a scientifically credible list--has been extremely reluctant to protect endangered species at all. For instance, approximately 670 plant species that were first proposed for listing in 1976 are still waiting to be listed. According to the Council on Environmental Quality, some 9000 U.S. plant and animal taxa may actually be at risk of extinction, but only 620 currently receive protection under the ESA.

While species are waiting for protection, their numbers may decline, and management and recovery costs increase. Between 1975 and 1990, when it was finally proposed for listing, one population of the Kau Silversword in Hawaii shrank from over 1000 plants to 20. The Peters Mountain Mallow in Virginia and at least three species in Puerto Rico were not listed until their total populations dropped to less than 10!

Some groups have sued the government to encourage listing of those species being held hostage by Washington politics. The Sierra Club Legal Defense Fund sued on behalf of the California Native Plant Society and thus won an agreement to add nearly 200 taxa of California endemics to the endangered species list. A similar lawsuit benefitted nearly 200 rare Hawaiian plants.

I am currently one of several plaintiffs in another suit which seeks listing of an additional 600 or so plant and animal species. The outcome of this suit will be moot, however, if the ESA is sufficiently weakened.

WHAT YOU CAN DO: Write your Senators and Representatives. They need to hear about the need to maintain a scientifically credible list.

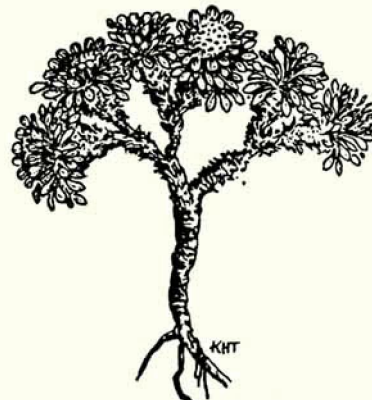
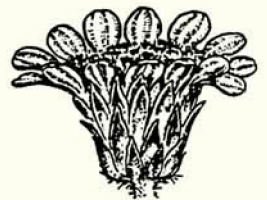
Support HR 4045, the Studds EAS reauthorization bill.

Oppose HR 3092, Hansen's "Human Protection Act."

T. APRICA RECOVERY PLAN

The U.S. Fish and Wildlife (USFW) has recently formulated a recovery plan for Townsendia aprica, the Last Chance Townsendia. It is now being circulated to government agencies and the public for comment. We feel that our readers may be interested in the major steps of the plan and what would constitute a recovery.

T. aprica is listed as threatened and recovery would delist the species. Currently there are estimated to be 5,000 plants in an approximately 5 by 30 mile band running through Emery, Sevier and Wayne counties. Delisting would be possible if new populations are discovered or if existing populations increase in numbers to a viable population level.



Townsendia aprica

Introduction

The Last Chance *Townsendia*, *Townsendia aprica* Welsh and Reveal was listed as a threatened species on August 21, 1985. This species has been given a recovery priority of 5C which indicates it is a species with a high degree of threat and a low recovery potential that may be in conflict with economic activity.

Habitat and Limiting Factors

The surface geology in the area of the distribution of *T. aprica* is very diverse with a wide variety of soils with unusual soil chemistries. The soil characteristics of *T. aprica* habitat have very high alkalinities and a very fine silt texture. These soils effectively form "islands" of suitable habitat within a "sea" of unsuitable geological substrates with their resultant soil types. *Townsendia aprica* is limited by its very restrictive habitat and its small populations are vulnerable to any event which could cause the local extirpation of one or more of its isolated populations. It is possible that some population reduction has taken place as a consequence of coal mining, oil and gas development, livestock trampling, and road building.

Threats

Realized and potential threats to *T. aprica* stem primarily from mineral and energy development, road building, and livestock trampling. Oil and gas exploration, drilling, and production, and coal mining, are past, existing and potential threats to the habitat of *T. aprica*. The majority of the populations of *T. aprica* are underlain by coal seams, some of which could be strip mined. The potential for wholesale decimation of *T. aprica* populations from coal mining operations is a significant potential threat. Trampling from off-road vehicles and livestock is a localized threat in some areas. The recent improvement of the Hogan Pass Road required design modification to avoid impacting *T. aprica* and its habitat. The demographic stability of the various populations of *T. aprica* is not known, some of the smaller populations may be at population levels too small to ensure their long term survival. The effect of natural factors such as disease, parasitism, grazing by native species, natural erosion, and vegetative competition, on the viability of the species population is not known.

The USFW lists the following criteria and actions needed in the Last Chance *Townsendia* Recovery Plan:

Criteria

1. Maintain a documented total population of 30,000 *T. aprica* individuals for 5 consecutive years.
2. Maintain 20 populations of at least 500 individuals each, which have been demonstrated to be at minimum viable population levels.
3. Establish formal land management designations for these populations which provide long term, undisturbed habitat for *T. aprica*.
4. Ensure that *T. aprica* and its habitat is protected from loss of individuals and environmental degradation of its habitat.

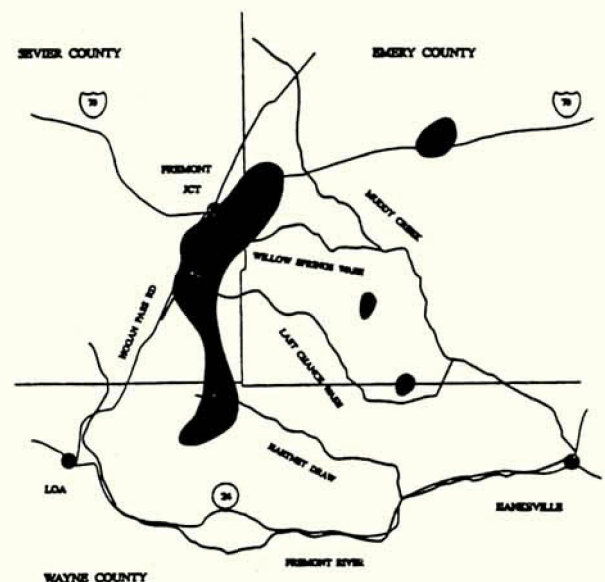
Actions

1. Control activities (mineral development, off road vehicle use, road building and livestock impact) which affect the habitat of *T. aprica*.
2. Inventory suitable habitat for *T. aprica* and determine with a reasonable degree of accuracy its population and distribution.
3. Establish and conduct minimum viable population studies on *T. aprica* populations.
4. Conduct research on the biology and ecology of *T. aprica*.
5. Determine the horticultural requirements and establish garden populations of *T. aprica*.
6. Evaluate the need for the introduction of artificial populations into suitable habitat.
7. Establish formal land management designations which would provide for long term, undisturbed habitat for *T. aprica*.
8. Develop public awareness, appreciation and support for the conservation of *T. aprica*.

Education is a vital part of the recovery process. The cooperation of the public is essential in the ultimate success of the above recovery measures. This can be started with educational programs such as pamphlets and audio-visual programs for use in schools and groups interested in conservation. The introduction and maintenance of *T. aprica* in recognized botanical gardens will assist in both public education of the significance and importance of this species and provide for a reserve of seeds and plants for reintroduction into the wild should wild populations be lost. The Fish and Wildlife Service with assistance from public and private conservation groups and land managing agencies will be primarily responsible for this activity.

Editor's note: The Last Chance *Townsendia* takes its popular name from a stream running through the area of its type location.

PRESENT DISTRIBUTION OF
TOWNSENDIA APRICA



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

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Book Review

DIET FOR A NEW AMERICA

by John Robbins

Reviewed by Dorothy Egan

Although this book was published in 1987 and many of you may already have read it, I just recently learned about it. Since reading it I agree with one of the quotes about it—"One of the most important documents of the 20th Century"—and feel it is a must read for every American adult! The subtitle reads "How your food choices affect your health, happiness and the future of life on earth" and this is not too strong a statement about the information it provides.

The author, John Robbins, was the intended heir to the Baskin-Robbins empire and fortune, but refused to accept it because he could not, in good conscience, advertise and make money from a product that was responsible for so many problems! (Including, by extension, over-grazing on public lands.) After much study, he found answers to many of the questions about the major cause for most of our serious modern diseases and learned the "secrets" that those behind the "Great American Food Machine" and even our government don't want us to know. This is an eye-opening expose that should make every individual angry and wanting to see that the necessary changes in our society are made. Since our future may depend upon it, I hope you'll take time to read this inspiring message.

(I will be happy to lend my copy to interested persons. Call Dorothy Egan at 277-6988.)

Membership Application

☐ New Member ☐ Renewal ☐ Gift

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Street _____

City/State _____

Zip _____ Phone _____

If Gift, from: _____

Check membership category desired:

- ☐ Student/Senior\$ 5.00
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- ☐ Family\$ 15.00
- ☐ Supporting\$ 30.00
- ☐ Corporate\$ 30.00 and up
- ☐ Life\$250.00

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

Please enclose a check, payable to Utah Native Plant Society, and send it to:

Pam Poulsen, treasurer,
Utah Native Plant Society
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 information down and mail it with payment for the category of membership.)



VOL. 15 NO. 5

SEPT/OCT 1992

CALENDAR OF EVENTS

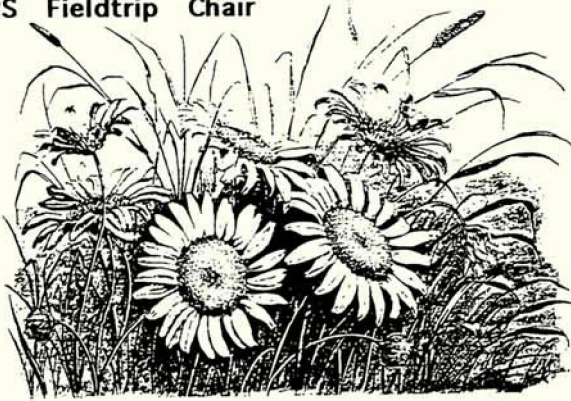
- Sept. 11-13** **First Annual National Public Lands Grazing Conference** at Boise State University, Boise, Idaho. Registration \$25. Write Vicky J. Heintzman, Rest the West, P.O. Box 10065, Portland, Oregon 97210 for further information.
- Sept. 12-13** **Museum of Natural History Fieldtrip to Utah's San Rafael Swell** led by Sally Cole, archeologist specializing in rock art, Frank De Courten, geologist, and Michael Windham, botanist. The group will camp in remote areas surrounded by the splendor of the Colorado Plateau desert, and will explore the natural phenomena of the area via short hikes to specific localities. Fee: \$352.00 includes daily van transportation in the Swell (or from UMNH in SLC), all meals and instruction. 581-6927.
Sat./Sun
- Sept. 19** **The Fish Springs National Wildlife Refuge 2nd Annual Open House.** Enjoy general tours, a native plant tour, birding tours, wildlife movies, duck stamp sale, air boat rides, Indian history, Pony Express history, food concessions, conservation group information booths and environmental games. For additional information call the Refuge at 831-5353 (522-5353 from Salt Lake City exchanges) from 7:30 am to 4:00 pm.
Saturday
10am-6pm
- Sept. 23** **Salt Lake Chapter Meeting, "Ferns"** by Dr. Michael Windham, Director of the Garrett Herbarium, Utah Museum of Natural History. Granite Park Junior High Library, 450 East 3700 South, Salt Lake City.
Wednesday
7:30 pm
- Oct. 7** **UNPS Annual Meeting. "New World Potluck."** Turkey and drinks will be provided. Please bring a New World appetizer, side dish or dessert. Call Pam Poulsen (581-3744) if you need ideas and information on New World foods. We are hoping for a surprise visit from a mystery guest from the past. Red Butte Gardens.
Wednesday
6:00

UPCOMING

- Nov. 18** **UNPS Annual UFO (Unidentified Flowering Objects) Slide Show.** Sort through your slides and bring your unlabeled 'wonders' for identification by our experts.
Wednesday

UINTAS FIELD TRIP

Andy Boyack
UNPS Fieldtrip Chair



We met at 9:00 am July 11 at Crystal Lake in the Uintas for a memorable field trip with Jo Stolhand as our able leader.

The route Jo laid out led northwest around Crystal Lake through forests of Engelmann Spruce skirting the west side of Mt. Whitney. Here were Fleabane Daisies and Mountain Bluebells, Whipple's Penstemon, Elephant-head, Pearly Everlasting and pink and white Pussytoes to name a few of the flowering plants. It was interesting to compare Pussytoes and Pearly Everlasting which look somewhat alike to an amateur until seen side by side.

The trail led upward and eventually came out into meadow land on the northwest side of the mountain where we found four-petaled Shooting Stars, Bog Orchid, Miterwort and Monkshood along the many streams. Here Jo abandoned the trail and let us upward across areas of bare glacier-smoothed rock, to the base of the mountain talus slopes. We then skirted around the mountain hemmed in by talus slopes above and dense woods of Subalpine Fir below. Incidentally, stands of Subalpine Fir offer excellent shelter from the frequent Uinta rainstorms as one of our number was happy to discover. In the little meadows along the way we found Blue-eyed Mary and mats of Bog Laurel with many little pink flowers showing. An excellent example of Parry's Primrose was found growing in the shadow of a huge boulder.

Jo finally led us down off the scree slopes and found a trail. At a camping spot along the trail an abandoned campfire was still smoking. The three Forest Service people with us took time to thoroughly douse the fire with water from the adjacent lake and remove trash that had been left at the campsite.

The trail took us around the mountain past many small lakes and back to the Crystal Lake trailhead where we had started. We had made a circuit completely around Mt. Whitney. More than fifty species of plants were found in bloom indicative of the equivalent season, at this elevation of 9500 feet, of late spring or early summer.

Our thanks to Jo for a really excellent trip.

MUSHROOM HUNT 1992

Jo Stolhand
UNPS Board Chair

"One person's mushroom is another person's toadstool," remarked one of the hunters Friday evening concerning the edibility of a certain mushroom. It was listed as "edible, choice, use caution." What may be edible for one person can cause gastric discomfort in another.

After a few hours of hunting fungi (broadly including mushrooms, lichens and slime molds) our hunters turned their treasures over to the experts: Dr. Kent McKnight and his wife, illustrator Vera McKnight, Dr. Frank Anderson, and Dr. Ardean Watts. The picnic table was covered with mushrooms packaged in wax paper. They looked at gills, scales, stalks and rings. They tested for stains and texture. They checked color on the caps, spores and stalks. Eventually about 90 species of fungi were labeled.

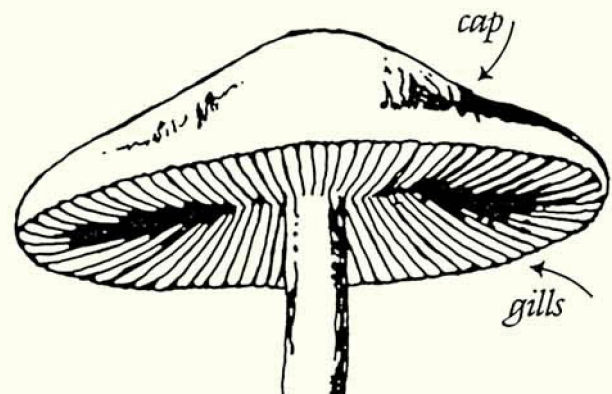
Barker Reservoir on the Aquarius Plateau was the scene of the 1992 Utah Mushroom Hunt. Rain off and on throughout the week probably contributed to the success of the hunt and did not hamper activities. Participants went collecting on Friday and Saturday.

Dave Okelberry did a great job of managing matters on the Salt Lake City end, while our host, Dr. Brent Palmer of Cedar City, organized all the details of the trip from that part of the state. Dr. Al Tait, another botanist from Southern Utah State University, and his son Eric cooked all the sumptuous meals. The food was great and (thankfully) plentiful because almost everyone returned for seconds, thirds...

It is with a real sense of appreciation that UNPS thanks all of those who contributed to the success of the Mushroom Hunt. It was heartening to hear all of them planning next year's foray as though organizing, feeding and identifying the collections of a hundred participants had been no major hurdle.

The next issue of The Sego Lily will contain anecdotes from the mushroom hunt participants and also the official species list.

We hope to see you next year in August near Gooseberry Reservoir on the Wasatch Plateau.



INSTRUCTIONS FOR COLLECTING SEED

Seed collecting time is upon us again - we hope that members across the country have been watching as plants bloom and begin to set seed, and have already collected seed of some early-blooming species.

A note too late for this year perhaps but to be remembered for next is that seed of most spring ephemerals should not be allowed to dry out and should be stored immediately in moist sand in plastic bags and kept refrigerated. Once dry, many fail to germinate.

In that seed ripens at different rates depending on the weather (the hotter and drier the summer, the more quickly seed sets and ripens) use notes kept from previous years as a reference as to when to watch for seed from specific species, but give allowance for weather conditions. Monitor closely the plants from which you wish to collect, especially if the plant in question is one which expels its seed rapidly upon ripening.

Try to let seed ripen fully before collecting, as not all seed will continue to mature after being picked. One useful method of collecting seed which is nearly ripe but not quite, is to tie a piece of netting loosely over the seed head - light and air can pass through to continue the maturing process, and when the seed is ripe, the netting traps the seed, preventing it from escaping.

Once collected and dried, seed must be cleaned, a sometimes time-consuming, but definitely relaxing activity. Sieves or a series of screens with varying sizes of mesh work well to sift out the chaff and let the smaller seeds fall through; one member suggested using a rolling pin to crush the hard outer casings of some seeds, then picking out the seeds. Butterfly milkweed (*Asclepias tuberosa*) pods can be picked just as they begin to split, dried for a few days, and before the seeds have loosened up, they can be pulled away from the fluff before it reaches the 'fly-away' stage.

A very effective way to clean berries or seeds with a pulpy covering is to place them in the centre of a square of burlap (approx. 25 cm x 25 cm) gathering the sides up and tying with a piece of string, making a small pouch with the berries inside. Then, under running water, rub and squeeze the pouch - the roughness of the burlap removes the pulp from the seed and the water washes away the juice. These little pouches can then be hung up to dry for a day or two, and when opened contain perfectly cleaned seeds and dried bits of pulp. The seeds should be allowed to dry in the open for a few days more before storing in an airtight container in the fridge.

Seed collecting and stratifying instructions are now available from the seed exchange (see address below) for \$1 each and a self-addressed, stamped business-size envelope. Basic instructions for collecting seed are:

- Mark location of plants from which you wish to collect seed when they are in bloom.
- Most seed takes a month to six weeks to ripen from time of bloom.
- Pick no more than 10% of the seed.
- As seed is picked, record name and location of plant, growing conditions, and date collected on the bag you put the seed into.
- Clean seeds with pulpy coatings before drying.
- Dry seed in open containers for 10 days to two weeks.
- Store seed in airtight containers in the fridge, with original information recorded on each container.
 - botanical name of plant
 - location of plant
 - date picked
 - wild collected or garden grown

C.W.S. Seed Exchange c/o Gail Rhynard,
125 Golfview Avenue,
Toronto, Ontario, Canada M4E 2K6.

Reprinted with permission from Wildflower, North America's Wild Flora Magazine, Summer 1990. Subscribe through The Canadian Wildflower Society, 75 Ternhill Crescent, North York, Ontario, Canada M3C 2E4.

WILDFLOWER SEEDING TECHNIQUES

Few people can argue about the beauty of a successful wildflower garden. The colors and fragrances of wildflowers make them a popular gardening choice wherever they are grown.

There are many different ways to establish wildflowers, but each method involves the same essential elements—soil preparation, weed control and even distribution of seed.

Before the first seed is planted, it is necessary to prepare the soil correctly. This involves working the soil so it retains water, but still has good drainage, and is broken up enough to insure good seed-to-soil contact. If the soil is not hard-packed, it should be tilled very lightly (about 1/2 inch), only enough to break up the surface.

Tilling deeply often enables wildflowers to grow well, but it has the disadvantage of bringing up many weed seeds that have lain dormant in the soil. Once these seeds are exposed to light, air and water, they may germinate and grow quickly, compounding the problem of weeds.

If the area to be planted is hard-packed, deep tilling is usually necessary. This can be done with a plow, rototiller or spade, depending on the size of the area. In this case, weed control is even more important.

The control of weeds is always a critical part of a

successful project. The Wildflower Group of American Seed Trade Association recommends eliminating as many weeds from a plot as possible before wildflower seeds are planted. This can be accomplished by frequent tilling or spraying with a general herbicide such as Roundup prior to planting. After planting, hand-pulling or spot-spraying are the best techniques to use.

Although both soil preparation and weed control are essential factors to be considered, no less important is the even distribution of seeds. Commercial contractors have developed several innovative and successful ways of distributing wildflower seed.

Hydromulching or hydroseeding, generally used on large residential sites and on commercial property, is perhaps the most effective of all methods. With this technique, a mixture of fertilizer, seed and wood fiber mulch are forcibly expelled to distribute these materials to hard-to-reach areas. The mulch holds the seed in place until rainfall facilitates germination and establishment of seedlings.

A drill seeder is another machine used by commercial contractors to distribute seed. This device creates a small furrow in the ground, drops seed into the furrow, and covers it. The drill seeder is often followed by a cultipacker, which firms the soil around the seed.

For the homeowner, there are two methods generally recommended for wildflower seed distribution. The first is simply broadcasting seed by hand.

To facilitate even distribution, first mix the seed with an equal amount of sand, dry sawdust, cornmeal or vermiculite. This not only makes seed easier to sow, but also allows seeds of varying sizes and weights to be evenly mixed and distributed. To make sure that the entire area is covered evenly, broadcast half of the seed mixture over all of the planting area, walking in an east-west orientation. Broadcast the remainder of the mixture walking north-south, again covering the entire area.

A cyclone spreader is an inexpensive, effective device useful for spreading wildflower seeds. Cyclone spreaders come in many different sizes, and their costs vary accordingly. Small plastic spreaders can be purchased at a local hardware store for under \$10.00. Cyclone spreaders distribute seed much more evenly than hand broadcasting. Use a technique similar to that described above for hand seeding.

There is not a "right" or "wrong" method of establishing wildflowers. Each site will be different, and each situation presents its own challenges. The most successful projects, however, always consider these three major factors: soil preparation, weed control, and distribution of seeds.

The key to your successful wildflower project is in choosing the methods best suited to your particular needs, thereby insuring a glorious display of colorful wildflowers. For more information, contact the American Seed Trade Association, 1030 15th Street, N.W., Washington, D.C. 20005-1593.

Natives Flourish at Cabin Plaza —But Not in Nurseries

Interview with Esther Truitt Henrichson
Head Designer, S L Temple Gardens

The log cabin at Cabin Plaza, one of the earliest homes built in Salt Lake City, was transplanted from its original location to across the street from Temple Square, between the Museum of Church History and the Art and Family History Library.

Black locust trees were the number one street tree in Salt Lake, and Lombardy poplars were *the* Mormon tree in Utah; they were planted as windbreaks. Here the poplars are understoried with Dutch clover instead of grass, because lawn mowers didn't come here until about the 1880s. Hollyhocks could be transplanted easily and were a bit of 'home.' We have various fruit trees and bushes, such as an old Pippin apple tree, serviceberry and golden currant bushes.

We also have perennials such as Rocky Mountain zinnia, Rudbeckia, prairie coneflower, mountain mahogany, columbine, thimbleberry, firecracker penstemon...The pioneers would drive their wagons up into the mountains, dig up native plants and plant them around their homes.



We want the Fremont poplars [*planted toward the rear and sides of the cabin*] to get very large and cascade over the entire plaza. They were very difficult to find. We waited three years to get them, and when they arrived, they were ugly, scrawny trees. Although they're native plants, they're being grown in nurseries as exotics.

Where did you get the native plants you've used at the Cabin Plaza?

Except for the poplars, all our materials came from NPI, a Salt Lake Company which is now defunct. Nobody is filling the gap. Utah nurserymen treat native plants as exotics. They need to start growing them, and they aren't!

I want to get *Juniperus osteosperma* in here; it's the juniper native to this area. Not one nursery has it; I've called everyone. I could go dig it up, but that's illegal.

UTAH JUNIPER



Is this because there's not enough demand for natives?

The demand for natives is growing and will continue to grow. Besides, I think some day we're going to find ourselves in a situation where we'll have to use more native and adapted plants that don't require a lot of water. Plants with high water requirements cost more money, more time, more energy.

I still advocate reserving parts of the yard for lawns and flower gardens. The thrust of landscaping needs to be really low-maintenance, though, because we can't keep going the way we are. I'm not saying you have to take a whole yard and landscape it with drought-tolerant natives, but choose certain areas where you're willing to do that. It will free up money, time and energy to grow those gorgeous plants that do need lots of water. We can have our cake and eat it, too.

We're looking at what appears to be a sego lily, the state flower of Utah, on the north side of the cabin.

The sego lily needs the worst soil and some absolutely specific conditions like cold winters, wet springs, very arid summers. It's hard to duplicate that type of microclimate, so it's almost impossible to transplant sego lilies. Melbourne Wallace, who breeds day lilies in Alabama, gave us a day lily called 'Sego Lily,' which he bred for us to plant here. It's our substitute for the real thing.

We've received a lot of criticism about the Cabin Plaza. Many people don't see it as beautiful. But some see it as the greatest beauty.

*Reprinted with permission *from Rocky Mountain Landscape Plus, July 1991.*

GETTING A HANDLE ON PRONOUNCING SCIENTIFIC NAMES

Larry Mellichamp

UNC Charlotte Botanical Gardens
Botany Dept., Charlotte, NC

Whythesolongnames? Whatever your reaction to the preceding "word" is probably your reaction to Latin names of plants. Did you try and figure it out, or did you just take one look and say: "not for me!"

Scientific names can, of course, be difficult to pronounce and understand, especially if you don't use them every day. You probably accept that the two-part name of each plant—a genus and a species name—is a necessary component of botanical science and that they are widely used and understood by professionals; but you hesitate to use a name when you want to talk with someone because you are afraid you'll say it wrong. Take heart, you are not alone.

Just remember, Linnaeus began using this binomial nomenclature in 1753, not because he wanted to make things harder for you, but because Latin was the language of science and medicine (as well as religion and other fields) at the time. Believe me, his two-part name for each species was a great simplification over the multi-word phrase names used earlier (sometimes involving a dozen or more Latin words, literally a mini-description of the plant). Today, Latin allows knowledgeable people around the world to communicate about plants, no matter what their native tongue, and without the confusion of common names.

Actually Latin names are not as difficult to pronounce as you might think. After all, most of the vowel sounds are similar to those in English words (that is, with long i and e); and you can think back to Latin names you already know when trying to say a new one, such as the familiar *Rosa*, *Tulipa*, *Astilbe*, *Geranium*, *Hosta*, *Spiraea* (remember this one for later!), *Salvia*, *Sedum*, *Lobelia*, *Cyclamen*, *Crocus*, and many more.

There are long or short "a's," "u's," etc., and enunciation is controlled by these sounds. The other thing you can do is break the word into syllables, just as you would an English word, putting a vowel between two consonants and trying to sound them out. English has a great many difficult words and pronunciations, so we shouldn't let the fact that a Latin word looks different give us the notion that it is more troublesome to pronounce. I get more variations on "Mellichamp" than most Latin names I hear people trying to pronounce.

Latin names still give us problems just because they are usually so unfamiliar. How do you learn to correctly pronounce a strange scientific plant name? That question is analogous to asking someone how to get to Chapel Hill. You ask three different people and you will get three different answers. It all depends on

where you are coming from, how well you can remember details, your past experience, how much time you have, and whether you can practice. My advice is that you ask three experienced people, and take the best two out of three pronunciations. Much of the way people say Latin names depends on their experience—how they first heard it pronounced. You can apply various rules of Latin pronunciation, but there will always be variations and differences of personal preference.

There are two ways of pronouncing Latin: the so-called original Roman way, practiced by Latin scholars; and the modern adaptation more-or-less to the speech people use today. We tend to "englishize" Latin words to make them easier for us to pronounce; and since not all scientific names originally come from Latin, we have to "Latinize" these words to fit our way of talking. For example, the genus name for pine is *Pinus*. In strictly correct Latin you would say *PEA-noose*; whereas, we tend to say *PIE-nus*. The latter is certainly easier to remember. [In this article, capitalizing a syllable indicates it's the one to stress.]

I encountered frustration as an undergraduate student taking my first systematic botany course where we had to identify wild species using the Guide to the Flora of the Carolinas in the late sixties at UNC Charlotte. I had not paid much attention to pronouncing scientific names before, but I did not hesitate to try. As usual, you learn much more from your mistakes and I learned a lot! My first eager effort was to pronounce *Cardamine* (spring cress) as "CARD-amine" by referring back to the more familiar word "histamine." You wouldn't think of saying "hist-AM-in-ee", but that is exactly how you pronounce *Cardamine*. **One of the rules of Latin is to pronounce as many syllables as you can, by pronouncing every vowel.** So that extra "e" on the end gets pronounced. There are significant exceptions, as we'll see, but that is a good rule to start with. Practice on: *Silene*, *Chelone*, *Anemone*.

The second rule of pronunciation requires you to break the word into syllables, which can be a feat in itself, and then to emphasize the third from the last (the antepenultimate) syllable, unless you know better. That is, you have to decide which syllable to put the emphasis on. Thus *Cardamine* would be pronounced "car-DAM-in-ee," not "car-da-ME-knee." There are many family examples you can recall such as kris-ANTH-e-mum (*Chrysanthemum*), LIL-e-um (*Lilium*), ah-NEM-on-ee (*Anemone*), del-FIN-ee-um (*Delphinium*), PRIM-you-la (*Primula*), ger-AIN-ee-um (*Geranium*), and cam-PAN-you-la (*Companula*). See how funny they would sound if you put the emphasis on the second-from-last syllable.

There are plenty of exceptions to this rule, though, both familiar and unfamiliar. Try Rho-do-DEN-dron, Cor-e-OP-sis, Hi-BIS_cus, Ver-BE-na, and Por-tu-LA-ca. See how these would sound if you tried to enunciate the third from last syllable. **The rules are: There are as many syllables as vowels; words of**

two syllables are stressed on the first; three or more syllables, on the next-to-the-last (penultimate) if the vowel in this syllable is long; if the vowel is short, accent may be on the third from last (antepenultimate). How many of the above names follow the rules?

So, how do you know which is the correct way on an unfamiliar name? You don't, until you hear someone pronounce it and then accept it for yourself as sounding right. Take the evening primrose genus for example, *Oenothera*. I learned to pronounce it "een-oh-THEAR-ah," but was shocked to later hear a British botanist say "ee-NOTH-er-ah." Which is correct? The third from the last syllable would be in keeping with the rules, but here in America most experts emphasize the second from last in this case. There are many examples of this. Is it just tradition, or what? Perhaps it has to do with making the words sound more like they would as ordinary English words. I recently worked with a high school student on tree identification. He had taken three years of Latin and he pronounced plant names somewhat differently from me; he was applying rules that I didn't even know. We almost had a breakdown in communication.

To be continued next issue.

Reprinted from Northern Nevada Native Plant Society Newsletter, Vol. 18, No. 4, May 1992.

LEARN THE GENDER of your GENERA

Ken Chambers
Native Plant Society of Oregon

The generic names of plants are derived from classical Greek and Latin, and in those languages there are three genders—feminine, masculine, and neuter. Nouns are the names of things; in Greek and Latin, every "thing" must be a "she," a "he," or an "it". To the ancient Romans, for example, each tree was a feminine "she" (arbor), each shrub a masculine "he" (frutex), and each stone a neuter "it" (saxum). Modern languages that are derived from or related to Greek or Latin usually retain masculine and feminine gender for a great many nouns which, in English, have become neuter. In German, for example, every plant has a feminine root (die Wurtzel), masculine stem (der Stamm), and neuter leaf (das Blatt). French treats the stem as masculine (le tronc) and the root and leaf as feminine (la racine, la feuille).

Memorizing the genders of nouns is, to me, one of the hardest chores when learning a foreign language. In English we have done away with most of the gender-labeling of nouns, and nearly every object that is not

evidently a male or female animal is considered to be of neuter gender (and hence an "it"—the root, the stem, the leaf). Of course, a cow is still "she" and a bull "he," and sailors may affectionately refer to their ship as "she."

Because English has only the vestiges of gender-specific nouns, we may not realize how important gender is to the scientific naming of plants. Every plant has a two-word Latin name consisting of a "generic name" and a "specific epithet." As in the Latin language itself, each genus name has a particular gender, either feminine, masculine, or neuter. When you learned the name *Rhododendron macrophyllum* for the common rhododendron, you may not have realized that the final two letters of the species epithet, **-um**, are a clue to the gender of the generic name. The word *Macrophyllum* is an adjective meaning "large leaved" in Latin, and the **-um** ending is a neuter suffix in the nominative case; therefore, *Rhododendron* must be a noun of neuter gender. The grammatical rule being followed here says that **an adjective must agree in gender with the noun it modifies.**

For species epithets that are adjectives, the most commonly seen suffixes are the feminine **-a**, the masculine **-us**, and the neuter **-um**. Also quite common is the suffix **-is**, indicating either feminine or masculine, versus **-e** indicating neuter. Generic names of trees offer good examples of the feminine gender; with few exceptions (e.g., *Acer*, neuter gender), all genera of trees are feminine, even if their names end with the seemingly masculine suffix **-us**. Note the feminine endings on the specific epithets of Pacific yew, *Taxus brevifolia*, red alder, *Alnus rubra*, and western larch, *Larix occidentalis*. Generic names of shrubs and herbs, however, can be masculine, feminine, or neuter; no easy rules allow you to tell which is correct in a given case.

I might as well admit that my interest in this "problem" was stimulated by the discovery that I have consistently been using the wrong gender for two common plant genera in Oregon: devil's-club (*Oplopanax*) and woodland-star (*Lithophragma*). For both genera, the spelling of the specific epithets is incorrect in nearly all the floras and reference books for Oregon! *Oplopanax*, which "the books" say has neuter gender, is actually masculine; hence the plant's name must be spelled *Oplopanax horridus* (not "*horridum*"). *Lithophragma* has almost universally been considered to be feminine (standard references use feminine species epithets like "*parviflora*," "*tenella*," "*affinis*," etc.), but it is actually a neuter name. This means that we must change the spellings of all its epithets to a neuter form. A complete list of *Lithophragma* species in Oregon therefore becomes: *L. affine*, *L. bulbiferum*, *L. campanulatum*, *L. glabrum*, *L. parviflorum*, and *L. tennellum*. In 1963, the monographer of this genus, R.L. Taylor, pointed out that, because the Greek stem-work *phragma* (meaning fence or wall; compare "diaphragm") has neuter gender, the generic name *Lithophragma* (a compound word

meaning "stone wall") must also be neuter, not feminine. The error goes back to 1840 when John Torrey and Asa Gray first published the genus name and assigned feminine gender to it. The usage went against the classical (i.e., ancient Greek) gender of the word, and therefore it must now be corrected. Dr. Taylor's discovery has unfortunately been mostly overlooked in botanical works published since 1963.

A useful review of guidelines for assigning gender to generic names was published recently by Bruno Manara (Taxon 40:301-308, 1991). He echoed the advice given in the International Code of Botanical Nomenclature (1988, Article 76), that "A generic name retains the gender assigned by its author, unless this is contrary to botanical tradition." The "unless" is a very big exception, however, because "botanical tradition" is considered to extend back to the writings of the ancient Greeks and Romans! This is what determines *Lithophragma*, a compound name containing the Greek neuter stem-word *phragma*, cannot be feminine in gender as was previously thought.

Readers should be aware that not all specific epithets are adjectives agreeing in gender with the generic name. Some epithets based on personal names (e.g., *Dodecatheon hedersonii*, *Penstemon barrettiae*) have a suffix such as **-i** or **-ae** indicating possession (genitive case), irrespective of the gender of the genus. Other species epithets are nouns rather than adjectives and are called "substantive epithets." For these, the gender of the epithet is independent of the generic name. Examples in the Oregon flora include *Berberis aquifolium* (the epithet is an old out-of-use generic name, not an adjective. *Arctostaphylos uva-ursi* (same origin as above), and *Sidalcea hirtipes* (the epithet is a noun meaning "hairy foot").

As an exercise in identifying genders, here are three examples of Oregon plant genera, with samples of specific epithets and their translations:

Amsinckia intermedia ("intermediate;" the **-a** ending shows that the genus name has feminine gender)

Amsinckia menziesii ("of menzies;" the **-i** ending is the genitive [possessive] case in Latin and is masculine because Dr. Archibald Menzies was himself of male gender)

Amsinckia lycopsoides ("resembling Lycopsis," a genus of *Boraginaceae*; the **-oides** ending shows that the epithet is a substantive which need not agree in gender with a genus)

Mimulus guttatus ("spotted;" the **-us** ending shows that the genus name has masculine gender)

Mimulus washingtonensis ("from the state of Washington"; the **-ensis** ending is masculine)

Delphinium trollifolium ("with the leaves of Trollius," a genus of *Ranunculaceae*; the **-um** ending shows that the genus name has neuter gender)

Delphinium viridescens ("becoming green;" the **-ens** ending marks the epithet as a participle [a verb form], spelled the same regardless of gender)

Delphinium occidentale ("western;" the **-e** ending is neuter)

A TRIBUTE TO THE AMATEUR IN BOTANY

Herbert G. Baker
Professor of Botany
University of California at Berkeley

Note: This is the conclusion of the article begun in the May/June 1992 issue of this newsletter.

In the 19th century, among the well-to-do, there was a romantic movement in relation to nature. This contrasted sharply with the grim aspects of Victorian life for those without wealth--the very long working hours in the factories or the Industrial Revolution, child labour, strict moralizing and harsh discipline from the family and from society. The surprising thing is that, even in the smoky industrial cities of northern England, some working class people managed to find the time to join in the appreciation of nature. In the latter part of the 19th century there were field clubs centered around particular public houses or taverns in the industrial cities.

Some members of the working class made significant botanical contributions to the study of local floras and of plant biology. Outstanding among these was Thomas Belt whose father had run a nursery. He was born in Newcastle-upon-Tyne and he joined the gold rush to Australia in 1851. After that, this largely self-instructed man became a prospector or manager of gold mines successively in Australia, Brazil, Nicaragua, Russia, Canada, and the United States. Belt is most famous for his book The Naturalist in Nicaragua, published in 1874, in which he shows that he had read and appreciated Darwinian evolutionary principles and followed them in describing nature. In this book he described the mutualistic interaction between pugnacious ants and acacias, whereby the acacias reward the ants that protect them from herbivores. The plants provide extra floral nectar and protein-rich food bodies (Beltian bodies) on the tips of the leaflets. Belt also correctly described the true story of the leaf-cutting ants of the American tropics and their use of the excised bits of leaves as a medium on which to grow a nutritious fungus. He noted that introduced trees such as a citrus were more frequently attacked by the leaf cutting ants than trees native to Nicaragua, and he hypothesized that this was due to the native trees having been naturally selected for chemical protection from the ants.

Not bad for 1874!

Thomas Belt also published a number of papers on the geology of the countries in which he worked. And, to me, it is a sobering thought that when he died in Denver in 1878 at the age of 45 he had accomplished more as an amateur with very little time for botanizing than most of us have achieved in much longer professional careers.

I could expand this paper indefinitely by quoting examples from the European mainland of amateurs who have left indelible marks on botany through dedicated work. No one should forget Gregor Mendel, the geneticist, even though in his time people forgot him.

Gulielma Lister was an amateur in the sense that she was of independent means, but certainly botany was her life work. Daughter of the naturalist Arthur Lister, she edited and revised his monograph The Mycetozoa (slime molds) twice during her career. She was sought after as a botanical illustrator and kept extensive field notebooks of drawings and watercolors which are now housed in the British Museum. In 1904, when the Linnaean Society was opened to women, she was elected as a "fellow." She was active in both the British Mycological Society and the Essex Field Club, and served as president in both these organizations.

More recently in Britain, some of the most productive amateurs have also been busy in their non-botanical professions.

George Claridge Druce was a pharmacist who compiled county floras and did pioneering work on topographic botany, greatly enlarging the picture that had begun to be formed in the 19th century. It was Druce who transformed a faltering Botanical Exchange Club into the Botanical Society and Exchange Club--and helped build up a cadre of topographic botanists who subsequently founded the Botanical Society of the British Isles. Druce was elected Mayor of Oxford where the University finally gave him an honorary degree. The University now possesses his herbarium as a reward.

The most knowledgeable recent student of the British flora, J.E. Lousley (who was very careful about seeing that his name was spelled correctly) was a bank manager. He was father to many of the current team projects of the Botanical Society of the British Isles.

All of these people contributed to making field botany an activity that could be indulged in by any interested person.

In 20th century Britain it became common for a middle class household to possess at least a book on flower identification. My parents, who were school teachers, knew the names of all the common wild flowers in our part of Sussex, and this was not considered at all unusual. The great standby at home was Flowers of the Field, first published in 1851 by a clergyman school-teacher, the Reverend C.A. Johns. This book ran through at least 29 editions, up until the 20th century!

Incidentally, the system of plant classification used by Johns was Linnaeus' "Sexual System" although Victorian prudery was apparent in his total avoidance of that term for it. He also pandered to the niceties in all editions by referring to the submerged animal traps of bladderwort (Utricularia) as air-bladders, ostensibly serving a flotation function for the stem. Butterwort (Pinguicula) is similarly excused from being a horrible carnivore, and sundew (Drosera) doesn't appear in the book at all.

But I hope I have made it clear that a great deal of solid botany was contributed by these amateur botanists of the centuries gone by.

Much of the development of botany in the domesticated British landscape was of a sort that could be duplicated in the New World, but I suggest that it has not yet developed as fully here because people have been busier combatting and controlling nature, and have not had as much time to study it in a relaxed and abstract way. But anyway, conditions are much more equivalent today. In North America, as in Britain, there is a sizeable segment of the population that wants to get out and observe nature. For them, The New Naturalist series of books is published very successfully in Britain and in the United States. This series was begun during World War II, and it caters at a high standard to the public that is interested in the natural world.

And in North America amateurs continue to contribute significant information on pteridology and on the study of other non-flowering plant groups.

But it has to be admitted that at the turn of the century, professional botany moved rather quickly away from the taxonomic and floristic emphases that prevailed in Victorian times. Laboratory and experimental work involved plants of which the amateur had never heard. Microscopes, both optical and, more recently, of the electron varieties, have made fashionable the studies of fine structure and molecular biology that are beyond the amateur's easy understanding. Extremely expensive equipment for observation, recording or experimentation, and computer facilities for the processing of accumulated data have become apparent necessities. In the university libraries, to which the public is usually not admitted, there has been an accumulation of massive amounts of biological literature written in a jargon that only the initiated can comprehend.

How on earth can the amateur contribute in these circumstances? Well, first of all, I should say that the amateur can still contribute significantly along lines that are traditional but are capable of improvement and expansion. We could do very well with a mapping of the North American flora, at least on a series of local bases. This might be analogous to the production of the Atlas of the British Flora, which was compiled by the activity of many amateurs and groups of amateurs, each taking responsibility for a square ten kilometers on a side. The information was then brought together by an experienced professional.

Now, under the eyes of professionals, amateur botanists in Britain are making surveys of variation within individual taxa. For example, a survey of the black nightshade (Solanum nigrum) complex is being undertaken with supervision from the Cambridge University Botanical Garden. Pollination biology is another area where the amateur can perform valuable research. We are getting away from just the study of individual species and their pollinators, and are realizing the importance of treating the subject in an ecosystem context.

There are also some extra opportunities that were not available previously. For example, the University of California has set up a University Research Expeditions Program and a similar scheme is operated by the Center for Field Research on behalf of the Earth Watch Institute. Members of the public volunteer for expeditions to various parts of the world. These expeditions are designed to provide information for the research program of particular professional researchers who will lead the expedition. The volunteers thus have an opportunity to satisfy the urge to participate in research and, as part of the preparation for the expedition, they receive some technical training. I think this is an excellent idea, but I would suggest that it would be still more beneficial if the volunteers could put the training they have received to good use in more individual efforts when the expedition is over. It should be more than a memorable experience.

And we have to remember that some of our amateurs of the future will already have received graduate training. Many of these botanists could productively use laboratory and library facilities, if these could be made available. How can their needs be accommodated? One feature of the Botany Department at the University of California at Berkeley has been the appointment of qualified amateurs as unpaid Research Associates. Two of these who have brought their expertise to the department are Marion Cave, expert in cytotaxonomy and embryogeny (particularly of the Liliaceae), and Laura-May Dempster, an authority on Galium, bedstraw. Opening up the laboratories, the common rooms and the libraries in this way could be further augmented by letting the empty spaces in classrooms be occupied by qualified auditors.

Botanical garden programs can be, and are being, improved as far as public instruction is concerned. Dr. Rober Ornduff is doing this at Berkeley, and the University of North Carolina at Chapel Hill is providing an example in the excellent programs initiated by Dr. Ritchie Bell. Dr. Bell has been particularly successful in mobilizing amateurs to note cases of native plants being menaced by development, and as a last resort, to transplant them.

The equipment problems need not be as serious as it seems to be to some people. Even in a home laboratory there is plenty of good botanical research that can be carried out with simple equipment, aided by what Barry Tomlinson has called "a good eye." And miniaturization and drastic reduction in the prices of computers have put the statistical treatment of data back in the realm of the possible for the amateur.

The chemical botanist R. Darnley Gibbs of McGill University used an admirable series of simple tests for groups of chemicals in plant material--some, for phenols, being as simple as pressing a lighted cigarette on leaves for 3 seconds, or dipping the leaves in hot water and noticing the coloration produced around the damaged area. This simple test for cyanogenesis from glycosides can be very important for those who would

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study the interactions of plants and herbivores. Irene Baker used a variety of simple spot tests and chromatographic techniques for sugars, amino acids, lipids, phenolics and alkaloids in nectar. In this way, large-scale preliminary surveys can be made, so that other researchers with more sophisticated equipment can follow up on selected taxa.

As to the needs of amateurs for a forum in which to discuss their findings, appropriate societies are necessary. In Britain, the BSBI provides the link between professionals and amateurs, and regional societies in North America such as the Torrey Botanical Club, have long accepted amateurs as members. The California Native Plant Society is primarily devoted to the practical preservation of the native flora of California. These amateur botanists are alert to the danger that weeds may pose to the native flora, and they will form task-forces to go out and root them up. This is understandable because California does seem to attract some of the grossest weeds—like Pampas grass (*Cortaderia jubata*) from South America and several kinds of broom (*Cytisus*) from Europe. Similarly, members of the Washington Native Plant Society have been instrumental in revegetating with native species certain disturbed areas in the national forests. But even with the negative qualities of introduced weeds, the careful study of the success of these plants may be very rewarding scientifically and practically—and I believe it should be encouraged.

So I appeal to biology departments and botanical societies such as our own to open up their facilities to a greater extent to qualified amateurs, and to sweep away the distinction between amateur and professional.

Reprinted from the UW Arboretum Bulletin (Fall 1982) with special thanks to Art Kruckeberg and the Washington Native Plant Society.

Membership Application

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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 information down and mail it with payment for the category of membership.)



VOL. 15 NO. 6

NOV / DEC 1992

CALENDAR OF EVENTS

Nov. 18
Wednesday
7:30 pm

Salt Lake Chapter Meeting. UFO Night--Unidentified Flowering Objects. Bring slides and photographs of flowers you have been unable to identify and let our experts help you. Please limit your slides to ten for the first round and we can project more as time allows. Please note new meeting place: **Utah Department of Natural Resources**, 1636 West North Temple, Salt Lake City, Utah. Easy access from I-215 or North Temple.

December

Salt Lake Chapter. No meeting this month. Have a happy holiday.

December

"Evergreen Christmas" Purchase a living Christmas tree and then donate it to **TreeUtah** and they'll plant it in a city park or cemetery. The cost of your tree is tax deductible and they'll come to your home and pick it up. Call TreeUtah at 363-5900.

NOTICE

New Meeting Place for UNPS. Beginning with the November meeting, the Salt Lake Chapter will meet at the Utah Department of Natural Resources at 1636 West North Temple, Salt Lake City. Easy access from I-215 or North Temple.

NOTICE

Newsletter Co-Editor Sought. This is an excellent opportunity for someone with good typing and editing skills to make a contribution of time and energy to the Utah Native Plant Society and in return receive a house and have full use of a Mac computer with 80 meg hard drive and a laser printer. Contact Jo Stolhand at 521-0069 if you are interested.

NOTICE

The Utah Native Plant Society will have funding available in 1993 for study, education or conservation of native plants. Please submit proposals to UNPS, P.O. Box 520041, Salt Lake City, UT 84152-0041.

PLATEAU PLANTS

--FRAGILE FLORA

Canyon country visitors often seek spectacular views of canyons, rimrocks and stone arches. But those who take a closer look at the land underfoot will notice extraordinary communities of life unlike that found anywhere else on earth.

An unusually large number of endemic species occur on the Colorado Plateau - the result of diverse habitats including rivers and streams, rocky cliffs and isolated mesas, sand dunes, grasslands, upland forests and alpine tundra. Several of Utah's most threatened plants still eke out a fragile existence on the Plateau, clinging to canyon alcoves or sandy niches, vulnerable to the onslaught of recreational visitors who are often unaware of the threat they may pose.

The alcove rock daisy (*Perityle specuicola*) may be the rarest Plateau plant of them all, with less than 300 plants occurring in only six known locations. In mid-July to late September, its tiny yellowish blooms peer out from the hanging garden communities it inhabits. Another canyon-dweller, the alcove bog-orchid (*Habenaria zothecina*), stands out because of its unusual (in the plant world) green flowers. It was often consumed by Indians during times when other food sources were scarce.

Although not trained as botanists, it didn't take prospectors long to figure out that the selenium-laced soils so satisfying to plants such as the globally-rare Isely milkvetch (*Astragalus iselyi*) also marked the presence of the uranium ore they feverishly hunted. Scientists wonder if the plant will have survived the mining boom of the 1950s, only to fall victim to the tourism rush of the 1990s.

And in an arid land where the sharp spines of cactus are a common hazard for the careless desert hiker, the scarlet flowers of the federally endangered spineless hedgehog cactus (*Echinocereus triglochidiatus* var. *inermis*) signal a more friendly plant, minus any menacing spikes.

In studying Utah's portion of the Colorado Plateau as an ecosystem targeted for protection, researchers have determined that nearly 80 percent of all the plant communities present in the larger Plateau ecoregion, exist here. Saving these communities means preserving a representative sampling of what characterizes natural diversity in the entire Colorado Plateau province.

Reprinted with permission from Basin, Range & Rimrock, Newsletter of the Great Basin Field Office of the Nature Conservancy, Fall 1992.

WINDHAM ON FERNS

Andy Boyack
UNPS Fieldtrip Chair

Recent years have brought about increasing numbers of studies of the fern division of plants, according to Dr. Michael Windham, curator of the Garrett Herbarium of the University of Utah. He was speaking at a regular meeting of the UNPS. Dr. Windham has been particularly involved with studies in Arizona and Utah, studies in which many new species have been discovered or assigned. One of Dr. Windham's checklists showed 21 species not listed in Utah Flora. The list shows 12 families of ferns and fern allies and 67 species in Utah.

Ferns are vascular plants and can usually be identified from their characteristic fronds. Fern allies are such plants as scouring rushes and horsetails. What really makes ferns different from other plants is their life cycle, according to Dr. Windham, a cycle termed "alternation of generations." A layman might describe the process thusly. Ferns plants produce spores for reproduction. Spores are seeds of a sort. But the seeds don't grow into ferns, they grow into gametophytes which are called the haploid generation, referring to their chromosomes. These then produce gametes which are either male or female. The male gametes (sperm) are attracted to the females (ova), possibly due to the female "perfume" and they mate, resulting in the growth of a fern. This is the diploid generation and is the dominant generation in ferns. Fern plants are asexual. They are able to carry on the life cycle, however, through "meiosis", a process in which specialized diploid cells divide to form haploid cells which become spores and give rise to the second haploid generation.

Dr. Windham is looking for the following ferns which are not presently found in Utah:

Cheilanthes eatonii - there is an old record of this species from Grand Canyon and Marble Canyon.

Astrolepis - a new genus described by Dr. Michael Windham from neighboring states. Dr. Windham speculates this fern might be found in the Beaver Dam Mountains of southern Utah.

Woodsia neomexicana - Dr. Windham believes this fern might be found on Elk Ridge in the Four Corners area.

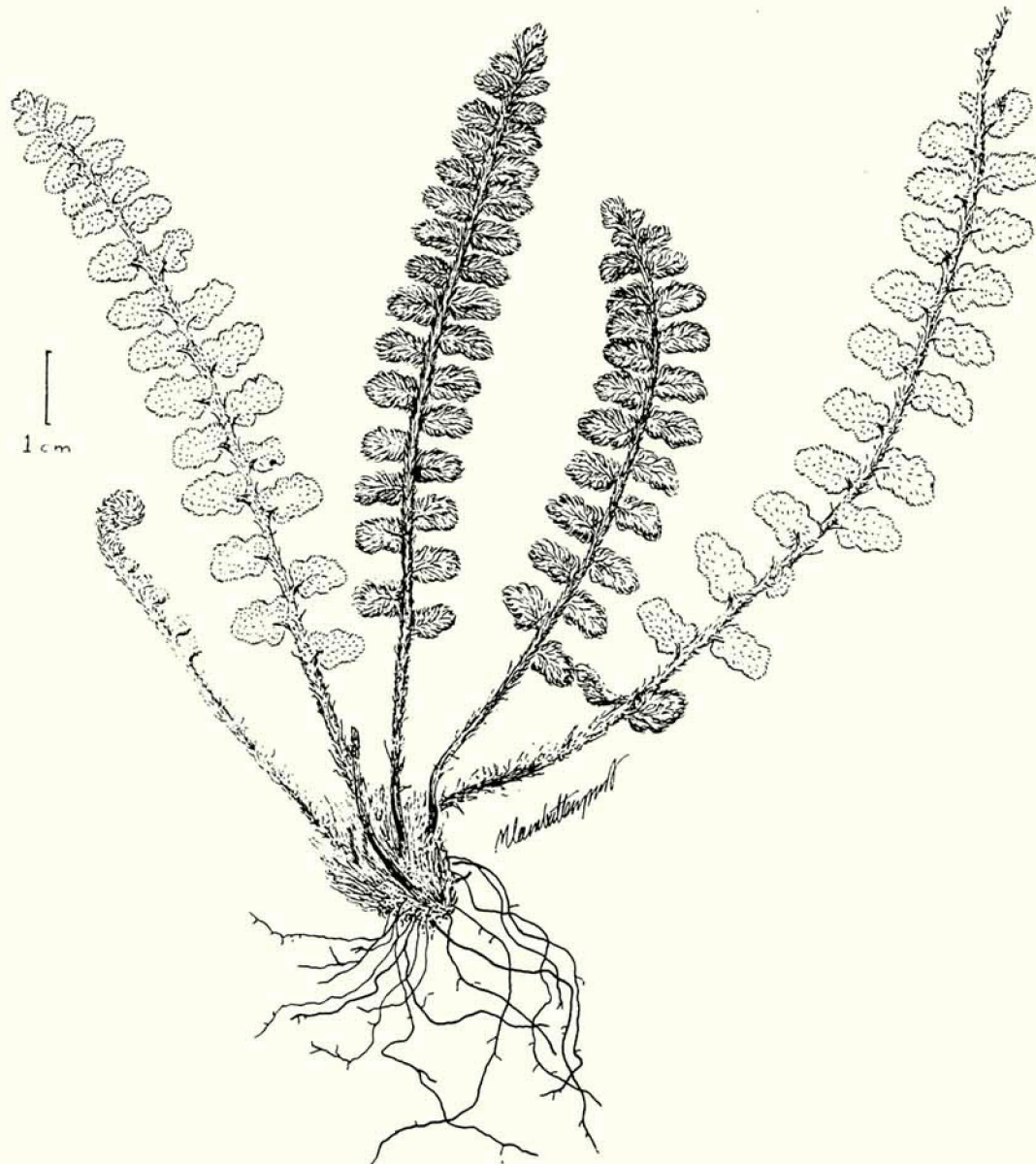
If you see these ferns, or those listed below, please report their locations to Michael Windham at the Garrett Herbarium:

Uncommon Utah Ferns

Botrichium paradoxum - Aquarius Plateau
Athyrium americanum A. Distentifolium var.

americanum) - Tony Grove, rare in Uintas.
Gymnocarpum dryopteris - Tusher Mountains
Polystichum krukebergii - Raft River Mountains

Asplenium adiantum-nigrum - Zion National Park
Polypodium glycyrrhiza - Zion National Park



Astrolepis integerrima was found and named by Michael Windham.
Drawing of *Astrolepis integerrima* by Marlene Lambert-Tempest.

OUR DINNER WITH JOHN

Pam Poulson
UNPS State President

John Muir (aka Steve Archibald) stopped by our annual New World pot luck dinner and business meeting on Wednesday, Oct. 7, for dinner and a fireside chat.

Although cold weather drove the event inside, our group was warmed with dinner, then enthralled by stories of Mr. Muir's childhood experiences. The plucky, graying man rocked in the darkness beside a kerosene lamp. He told us that his father was a rigid, religious man and that it was actually his mother and maternal grandfather who taught him the love of nature.

Muir apparently first made his money as an innovative inventor. Later, he traveled extensively and ended up living in his cabin hideaway in Yosemite Valley. Muir became a vital player in the development of the National Park system, bending the ears of President Theodore Roosevelt, sparring with Gifford Pinchot (father of the U.S. Forest Service).

The delicious pot-luck dinner of roast turkey, nachos, hot potato salad, pumpkin cookies, corn bread, and other New World dishes was provided by club members. Certainly, more than the turkey got stuffed! Ratification of 1993 officers and discussion and selection of a new meeting place was completed during the business meeting that followed dinner. The officers for 1993 are as follows:

1993 Officers and Committee Chairs

Chairman of the Board.....	Pam Poulson
State President.....	Brent Shipley
State President Elect.....	Dave Gardner
State Treasurer.....	Andy Boyack
Newsletter Editors.....	Jo Stolhand
	Open
S L Chapter President.....	Joan Livingston
Secretary.....	Pam Poulson
Cache Valley Chap. Pres.....	Chris Friess
Cache Valley Sec./Treas.....	Robert Fitts
Membership Comm. Chair.....	Pam Poulson
Fieldtrip Comm. Chair.....	Open
Horticulture Comm. Chair.....	Open
Seed Committee Chair.....	Dick Page
Endangered Plants.....	Ben Franklin
Comm. Chairs.....	Duane Atwood
Education Comm. Chair.....	Dave Okelberry
Conservation Comm. Chair.....	Open
Photography Comm. Chair.....	Dave Gardner
Board Members at Large.....	Leila Shultz
	Kaye Thorne
	Dick Hildreth
	Wayne Padgett

Steve Archibald is a creative teacher at the Edith Bowen Experimental Elementary School at U.S.U. in Logan. He makes learning fun and interesting for his students by impersonating famous people--with stage setting, costume, and voice. We found out about him from folks at the U.S. Forest Service who utilize his talents at their summer campfire programs. Steve is available for a small fee to cover his expenses. For an amazing evening of learning that you will never forget, call Steve at 753-8488 (home) or 750-3085 (work).

VOLUNTEERS SPRUCE UP SHELTER

Residents of Villa Maria, a transitional shelter for pregnant women, will feel a little more at home, thanks to several community volunteers who recently teamed together to landscape the grounds of one of Salt Lake's newest homeless shelters.

Villa Maria, located in west Salt Lake, was recently purchased and remodeled through collaborative efforts by several area agencies, including Salt Lake Redevelopment Agency, Utah Nonprofit Housing, Utah State Division of Community and Economic Development, and Catholic Community Services. Prior to renovation, the home had been boarded up and vacated for several years. Local nurseries and the Utah Native Plant Society donated hundreds of dollars worth of trees, shrubs, flowers, sod, wildflower carpet, and fencing to make the home and its surroundings more pleasant for residents and staff.

"It is amazing to see the difference that plants can make," said Jean Tau'a, project coordinator. "Because of the generosity of the donors and volunteers, the women will be able to enjoy a quiet, peaceful, park-like surrounding that most never have had access to before."



Volunteers included Bill Wagner, a member of the Utah Native Plant Society, who designed the landscaping plans and supervised the project; Rob Rogalski, from LDS Hospital Grounds Service who assisted with planning and landscaping, and several employees from Intermountain Health Care under the direction of Suzanne Clow, coordinator of Women's Services for LDS Hospital. Several residents of St. Mary's Home for Men tilled the soil prior to landscaping and assisted with laying sod.

"Prior to Villa Maria, there were no services that catered to homeless pregnant women over 18," said Tau'a. "Sometimes single women are deserted by their families due to pregnancy, leaving them with no other resources. Homeless pregnant women come from all socioeconomic backgrounds. There is no stereotype."

Villa Maria was established in January of 1992 exclusively to serve the needs of homeless pregnant women in the Salt Lake area and assure the delivery of healthy babies. Support services, such as counseling and referral to community social and medical resources, are provided. Staff work closely with each resident to help them regain self-sufficiency, find new jobs and homes for themselves and their children. The shelter is designed to house four women. Plans are in progress to expand the service to house additional women with dependent children. Villa Maria is operated by Catholic Community Services and serves all women in need, regardless of race, religion, or other factors.

Reprinted from Park Record, July 2, 1992.



Western Hemlock
Tsuga heterophylla (Raf.) Saff.
A very tall tree with flattened
leaves. Female cones are larger
than male cones.

THE AGE OF ECOLOGICAL RESTORATION

Vaughn Lovejoy
TreeUtah

"The ethical imperative should therefore be, first of all, prudence. We should judge every scrap of biodiversity as priceless while we come to understand what it means to humanity. We should not knowingly allow any species or race go extinct. And let us go beyond mere salvage to begin the restoration of natural environments, in order to enlarge wild populations and stanch the hemorrhaging of biological wealth. There can be no purpose more enspiriting than to begin the age of restoration, rewaving the wondrous diversity of life that still surrounds us."

Edward O. Wilson
The Diversity of Life

I recently had the opportunity to fly in a small plane to the airport outside of Bryce Canyon. I was awed by the view of the changing mosaic of autumn colors. The various shades of brown to tawny reddish-orange of the Gambel oak appeared in large irregular patterns down to the very mountain floors. In other parts of the state they are found as low as 3300 feet. The auburn to crimson red of the Bigtooth maple illuminated the streamsides down to about 4500 feet and the hillsides to 5000 feet. At some elevations the colors of the oak and maple were indistinguishable.

We live in such an extraordinary landscape; each mountain range between here and the Sierra Nevada mountains is home to a unique community of plants and animals. We are just barely beginning to understand and appreciate the dance of biological diversity that has ebbed and flowed across the Great Basin in the last forty thousand years.

For instance, if I had been flying to Bryce Canyon in autumn about twenty thousand years ago, I would have viewed a drastically different landscape. The browns and reds of oaks and maples would be absent, replaced by the greens of Limber and Bristlecone pines. The shoreline of Lake Bonneville extended up the foothills to somewhere between 5100 and 5200, while alpine glaciers crept down the mountain valleys to as low as 9200 feet. In that cooler climate, extensive forests of Limber and Bristlecone pines covered the foothills and the rocky islands down to as low as 6,000 feet.

But my thoughts were not so much on what the landscape looked like twenty thousand years ago as I flew over this incredible country; my mind was reeling as I attempted to envision what biologists are saying our landscape will look like in as little as two hundred years if the current projections of global warming



develop. If there is only a modest gain in global temperature of 2 degrees centigrade, the Gambel oak will not be able to survive below 4900 feet, the Bigtooth maple below 6100 feet. Most of our forest trees are currently adapted to grow above 7500 feet; in two hundred years, with global warming of 2 degrees centigrade, this range would shift upward to about 9100 feet. This would mean a tremendous loss of surface area available to support some of our biologically richest ecosystems. In all likelihood the majority of the remnant groves of Bristlecone and Limber pines, now only found at timberline with no room to move upward, would be pushed into extinction. This kind of habitat loss could precipitate the extinction of many of our currently threatened songbirds, butterflies and a host of other attendant species.

If the global temperature increases 3 degrees centigrade, we will be in a climate that our planet has not experienced in the last hundred thousand years. A global rise in temperature to just 4 centigrade degrees higher would put us into a climate that our plant's ecosystems have not been adapted to in the last forty million years. I sat in silence as the implications slowly began to sink in about what these changes could mean for life on our planet.

As the urban forests along the Wasatch Front came into view on the return flight, I found myself hoping that if we could turn a desert shrubland into an urban forest, then maybe we could find the courage and wisdom to begin the age of ecological restoration. Global warming is just one of the threats to the diverse web of life. Another immanent threat is the on-going loss and fragmentation of our natural ecosystems. We must break free of the historical processes and institutional limitations that hold us in paralysis. We must put aside our past differences and find a way to prevent this massive hemorrhaging of the Earth's life support system. As a project coordinator for TreeUtah, I have witnessed the beginning of new partnerships between major corporations, small businesses, public land agencies, schools, churches and environmental groups, to plant trees. I hope these new partnerships can lead the way to find the shared vision necessary to reweave the wondrous diversity of life that still surrounds us.

"Ecosystem management for native diversity...is a complex set of forces: conservation biology, gap analysis, a biodiversity protection network, new forestry, restoration of damaged lands, interagency cooperation, local and regional planning, an endangered ecosystems act, administrative partnerships, scientific advocacy and education, and grassroots culture at large...Dr. David Johns, a professor and activist living in Portland, Oregon, offers these words: 'We need to grasp the necessity of moving beyond the choices offered by the powers that be; only by pushing beyond the limits of what is acceptable to the existing political-economic order can constraints on ecological-political

choices be transcended.' This cannot happen without broad-based public participation and support...The biodiversity crisis has given us a lucid definition of who 'the people' are'; we are inextricably joined with the rest of life on Earth. The connection is more than momentary. For even as the biodiversity crisis provides the insights with which to create ecosystem management today, it points beyond the present toward what kind of people we may become tomorrow."

R. Edward Grumbine

Ghost Bears: Exploring the Biodiversity Crisis

In his beautiful use of the metaphor of Columbus's discovery of the New World, Barry Lopez alludes to this necessity of understanding and transcending our historical and political limitations, to rediscover who we are:

"In a sense we lie there with them. It is our privilege to know what the landscape is actually like—its people, its animals. But we are like them, I think, because we too feel ourselves on the verge of something vague but extraordinary. Something big is in the wind, and we feel it. And we feel, with them, the weight of Columbus's authority, his compelling political and ecclesiastical power. And we sense our own reluctance, our lack of objection, before it. His vision, however mad or immoral, is forceful. Even if we see him as a man flawed like other men—his megalomania and delusion, his uncommon longing for noble titles—we are inclined to see that he got us across the literally uncharted ocean, and that takes a kind of genius. It puts us, somehow, in his debt. It leaves room to forgive him, even to believe in his worthiness. If this search for gold should produce a holocaust, we say to ourselves, well, then, we might take only a little, something for our children, a poor wife waiting at home. And be done with the man. Who can fight the conviction that is in Columbus? Who can deny his destiny? Life is short. Let someone in authority take him to task.

We lie in the ships with those men, I think, because we are ambivalent about what to do. We do not know whether to confront this sea of troubles or to stand away, care for our own, and take comfort in the belief that the power to act lies elsewhere.

It is this paralysis in the face of disaster, this fear before the beast, that would cause someone looking from the outside to say that we face a crisis of character. It is not a crisis of policy or of law or of administration. We cannot turn to institutions, to environmental groups, or to government. If we rise in the night, sleepless, to stand at the ship's rail and gaze at the New world under the setting moon, we know we are thousands of miles from home, and that if we mean to make this a true home, we have a monumental adjustment to make, and only our companions on the ship to look to.

We must turn to each other, and sense this is possible."

Barry Lopez

The Rediscovery of North America

There is so much to learn together and to do together, and time is of the essence. It is estimated that every hour three species somewhere on our planet are slipping into extinction. Please join TreeUtah and help us begin the Age of Restoration.

TreeUtah
P.O. Box 11506
Salt Lake City, UT 84147-0506
(801) 363-5900

Christmas Plant Lore

Kathy Geier-Hayes

Few holidays are as closely associated with plants as Christmas. Holly, mistletoe, and the scent of an evergreen tree all remind many of us of the holiday season. Many of these plants are ingrained as part of our celebration because they have been a part of Christmas as long as there has been Christmas; in fact, many of these plant traditions are older than Christmas. Most uses are based on early pagan practices which have merely persisted as the Church would allow.

In 336 A. D., the Church assigned December 25th as the birthdate of Christ. No one knew the actual date and a great deal of speculation and mysticism was used to arrive at this date as well as a little political savvy (historians now believe that Jesus was born sometime between May and October 7 B.C - 5 B.C.). Throughout the "conversion" of the masses from paganism to Christianity most Church leaders recognized that they could not persuade the people to convert if they did away completely with popular traditions, so the Church attempted to supplant the pagan rituals with sacred rituals. The selection of December 25th by the Church appears to have been an attempt to turn the celebration of several secular feasts, which occurred near the end of December and the beginning of January, into a more sacred celebration. Four major events were celebrated from December 17 to January 1:

Saturnali - the remembrance of the "Golden Age";

Sigillaria - the Feast of Dolls when children were showered with toys;

Brumalia - the celebration of the solstice;

Kalendae Januarii - the special feast of Child-hood and Youth (rebirth) when gifts were given to everyone.

As long as the Church could endow celebration traditions with sacred meaning, the people were allowed to practice them.

The significance of evergreen boughs at Christmas time dates back to the Saturnalia. The Romans used the boughs to decorate their homes as an offering of winter hospitality to the spirits that haunted the forests; if they were kind to the spirits, the spirits would be kind to them in the following year. Though the early Church allowed many of the original traditions to remain in place, later Church officials forbade the use of greenery as a dangerous, pagan custom. Decorating with evergreen boughs again became popular in the 16th century. However, it was considered foolhardy to bring the boughs in before Christmas Eve since once in the house, the mischievous spirits might create an uproar. The spirits revered the Christ child, and by placing the boughs on Christmas Eve, one could hope that the Christ Child would appear before the spirits were able to organize their merriment.

Holly and ivy were also very commonly associated with paganism; holly was the talisman for men and ivy the symbol of women. In England, it was traditional for a maiden to protect herself from goblins on Christmas Eve by placing a berried holly sprig under her bed. The Church eventually assigned very sacred meaning to holly. With its prickly leaves and blood red berries, holly came to represent the Crown of Thorns worn by Christ.



For many years, holly and ivy were always used together. Early tradition espoused that whoever in the household brought in the most of their symbol during the holiday season (holly for men, ivy for women) should rule the house for the next year. Eventually, however, the two become antagonists. While holly became associated with life and immortality, ivy was associated with death and mortality. Eventually, ivy was kicked out of the house during the Christmas season while holly was given a place of honor. This parting of the ways may have been exacerbated by the Church; holly was eventually considered very sacred while ivy never gained a foothold in Christmas custom.

Other traditionally popular plants have lost favor at Christmas over the years. Rosemary was once considered one of the most important (and sacred) of all Christmas decorations. The odor of rosemary was thought to be very offensive to evil spirits, and the possessor of a sprig could consider themselves well protected. According to legend, rosemary acquired its fragrance when the swaddling clothes of the infant Jesus were laid on the plant to dry. The color of rosemary, which was originally white, changed to blue when the Virgin Mary, fleeing from Herod with Joseph and the baby, laid her blue cloak on a rosemary. For some unknown reason, use of rosemary fell out of favor during Victorian times.

Christmas trees have always had a place of honor in most Christian houses. Though pagan religions honored trees as symbols of eternal life, Christmas trees came about out of Christian sentiment. The earliest story of Christ's association with trees comes from George Jacob, a 10th century Arabian geographer who described a miraculous event. On the night Jesus was born, all trees, even those weighed down by snow and ice, burst forth into bloom. From that, it became popular to force branches of hawthorn and cherry to bloom at Christmas. In wealthy households, whole trees were moved indoors for the festivities, and there was a great deal of rivalry as to who displayed the biggest tree. The use of evergreen trees started in Germany with a German folktale. The story goes that one lonely, bitterly cold Christmas Eve, a cold, hungry child appeared at the door of a German forester. He was warmly welcomed and treated with the best the meager household could offer. The next morning the family, roused by a choir of angels, found that they had entertained the Christ Child. As a gift for the hospitality, he took a fir twig, planted it in the ground, and said "I have gladly received your gifts, and here is mine to you; this tree will never fail to bear fruit at Christmas and you shall always have abundance."

Eventually, naturally blooming trees were replaced by artificially decorated trees in Germany, and it was here that the Christmas tree began to come into its own. The "modern" Christmas tree is ascribed by some to Martin Luther, who, on a Christmas Eve, was entranced by the wonder and beauty of a starry night sky. As a tribute, he set up a tree illuminated with candles to represent the heavens from which Christ came, for his children. The first mention of decorated Christmas trees was from Strassburg in 1604. The popularity of decorated trees spread from there throughout Germany and eventually throughout Europe. Christmas trees made their debut in Paris in 1840, and Queen Victoria set up a tree in Windsor Castle in 1841. Early emigrants from Germany and England introduced the custom of Christmas trees in America. In 1925, at noon on Christmas Day, the famous General Grant Giant Sequoia was designated as the Nation's Christmas Tree. However, the lighting of the Christmas tree in Washington D.C. has supplanted its importance.

While the set-up of Christmas decorations was traditionally done on Christmas Eve, the removal was determined by local customs and beliefs. The disposal of Christmas plant material was another ritual in itself. Decorations were never tossed willy-nilly into the yard to decompose or set out with the garbage. While some were carefully saved, or in some parts of Europe burned in sacred burnings, (or in other areas never burned), most were used somewhere in the household.



Though many of the plants that we associate with Christmas have come to us through popular legends and folklore, some are merely utilitarian. For example, few homes are without a poinsettia at Christmas. Poinsettias have become popular only because of their red and green color. To provide some significance for poinsettias, the Junior League developed a story about a little orphan girl, Maria, who was invited on Christmas Eve to the cathedral with some friends. She hesitated to go, having nothing to offer the Christ Child as a gift, but her friends assured her that they would find something on the way. Along the road they found a plant and gave it to Maria to take, telling her that even the humblest gift given with love is beautiful. Maria was upset about having to take a simple weed, but she gathered some and they went along. At the church she laid the dried, brown stems in front of the nativity at the altar, offering them with love and respect. As she turned to go, the dead stems turned green and the upper leaves changed to a beautiful scarlet. The humble plant had changed into the miracle flower, the Flower of the Nativity.

Enjoy your holiday traditions and have a safe and happy holiday and New Year!

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GETTING A HANDLE ON PRONOUNCING SCIENTIFIC NAMES

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Botany Dept., Charlotte, NC

Note: The following is the continuation of an article begun in the last issue of The Sego Lily.

Two examples of mispronunciation that hurt my ears the most involved *Crassula* and *Clematis*. These are very common generic names, and frequently used. The "correct" way is to emphasize the antepenultimate syllable in both: CRASS-you-la (not crass-OO-la) and CLEM-a-tiss (not cle-MA-tiss). Think about it.

Before we get too far away from the British style, let me point out another difference upheld by the Atlantic Ocean (but often heard in Canada). It is the pronunciation of "ch" as a hard "k" versus a soft "ch" as in "church." Americans tend to prefer the hard sound. Thus in Britain you will hear *Chioanthus* (fringe tree), *Cheilantes* (hairy lip fern), and *Chenopodium* (pigweed) with a "ch" sound as in "chutney"; while we in the states would be more familiar with "ch" as in "chiropractor." But then we tend to say *Chaptalia* (sun bonnets) and *Chelone* (turtle head) with a soft "ch" (as in chapstick and cheese). Where is consistency? Makes things harder, doesn't it?

These two rules take care of many ordinary pronunciations. But here are additional cases you will encounter. Many species are named after people. There are two situations: generic names and specific names. It would be nice if we could pronounce the Latin plant name so as to preserve the name of the person being commemorated. Sometimes that works well, as in *Lobelia* (after the 17th Century herbalist O'Obel), *Tradescantia* (after 17th Century royal gardener John Tradescant), and *Sarracenia* (after 18th Century Quebec botanist Michel Sarrasin). But what about our silverbell tree, *Halesiaca*? It was named after the Rev. Stephen Hales, yet we usually say it hal-EES-cia, rather than HALES-ee-ah. And beautiful garden perennial Stoke's aster; some say stoke-EES-cia, rather than STOKES-ee-ah. Would people like to know about Dr. Jonathan Stokes? Or would they even know what name you were saying? When you say the words the way they look, you often lose something.

Similar variations concern the hard and soft pronunciation of the "ti" of such genera as *Stewartia*, *Tradescantia*, and *Sabatia*. We say stew-ARE-tee-ah (or stew-ART-sha), and trad-es-CAN-tee-ah (or trad-es-CANT-sha), but sa-BAIT-she-ah (or sa-BAIT-sha); can the "ti" go either way in every case? Or should we try and preserve personal names?

The second situation deals with species names

ending in i or ii, like *Senecio smallii*, *Lilium grayi*, and *Sarracenia jonesii*. Those i's are added to Latinize a non-Latin word and they should be pronounced, both of them. Thus: SMALL-ee-eye (not just SMALL-eye), GRAY-eye (The "y" counts as one "i"), and JONES-ee-eye (not Joan-ESS-ee), as I have heard. Here preserving the person's name, with one or two "eye" sounds added, should be the rule. The tendency among inexperienced people is to pronounce only one "eye."

Sometimes, given alternative ways of emphasizing syllables, you would want to preserve a component of the name that refers back to a structure for which the name was chosen to reflect. For example, in the white-top pitcher plant, *Sarracenia leucophylla* (the species name means "white leaf") should be pronounced lew-co-PHILL-ah to preserve the Latin word "phyll" that means leaf (rather than saying lew-COPH-ill-ah as the antepenultimate Latin rule would have). And in another example, the genus of filmy fern *Trichomanes*, so-called because it has a hair-like, or trichome-like, central vein in the spore capsule, should be pronounced trike-OHM-an-knees, rather than trike-oh-MAIN-ees.

Now for the important exception I alluded to earlier: when NOT to enunciate every vowel. There are plenty of examples in Latin, just as in English, of diphthongs, a double vowel pronounced together as one. The most important diphthong in Latin names is "ae," though you will find plenty of examples of "eu" (*Eupatorium*), and "oe" (*Coelogyne*—here you do pronounce all of the latter vowels: sea-LODGE-eye-knee, a tropical orchid).

The first place you encounter "ae" is in plant family names: *Asteraceae*, *Rosaceae*, *Geraniaceae*, etc. The "ae" is pronounced invariable as a long "e," as in "bee." (The classical Roman pronunciation would be a long "i," as in "eye.") So, as-ter-A-see-ee and ger-ain-ee-A-see-ee. All family names end in -aceae, which is pronounced -A-see-ee (not A-see-ah), but as if it is written "a-c-e" and given the pronunciation of those exact letters.

There are countless examples of generic and species names with the "ae" diphthong: enchanter's-nightshade, *Circaea* (sir-SEE-ah); *Chamaecyparis* (came-ee-SIP-ah-rus); and hawthorne, *Crataegus* (krat-EE-gus). Do not be confused by the occurrence of "ea," which is NOT a diphthong normally, in such genera as New Jersey Tea, *Ceanothus* (see-ah-NOTH-us) and chestnut, *Castanea* (cass-TAIN-ee-ah), not (cass-tan-EE-ah. As a self quiz on this rule, try to pronounce the family of climbing fern: *Schizaeaceae*.

[By the way, all family names are plural, and should be accompanied by plural verbs. For example: The *Schizaeaceae* are a family of ferns.]
(Answer: sky-zea-A-sea-ee).

I hope this brief lesson has helped. I'm sure you will know more examples, exceptions, and variations than I have listed here. I realize it is tedious to try and put in writing the pronunciations of words and syllables, but if you are interested, you will spend many hours reading and trying to learn them.

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c/o Janet Williams
Utah Native Plant Society
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