



Sego Lily



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Glyptopleura marginata

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Some Special Dandelion Relatives

by William Gray

Ninety-nine percent of all members of the huge composite family (Asteraceae) are assigned to four main subfamilies, and most North American species to just three of those. Broadly speaking these are the aster-like (Asteroideae) thistlelike (Carduoideae) and dandelion- or chicory-like (Cichorioideae) plants. A couple of years ago I wrote a short article for *Sego Lily* about the renaming of 'our' Asters and now it's time for a little about some of our chicory-related plants. This time the focus is more an introduction to a group of less-familiar plants than to taxonomy.

The subfamily is most diversified in the Eastern hemisphere: dandelion, chicory, salsify and lettuce are familiar examples brought over from Europe as a source of salad greens and edible roots. They are all part of the chicory 'tribe' Cichoriae. However, the western US has many fine native examples of its own, which may carry names such as Desert Chicory, Desert Dandelion or Mountain Dandelion. I don't know of them being used as food, but some of their flowers are outstanding.

A typical attribute of this group is that flower heads contain only ray flowers. These develop into seed heads which can be spectacular aggregates of intricate little parachutes. Leaves are mostly or entirely basal with juice that is usually milky and somewhat bitter. Another characteristic, though not universal, is that they tend to flower early in the morning and be closed by early afternoon.

At a recent meeting of the Salt Lake Chapter of UNPS Steve Hegji asked us to send in a few photos that showed especially interesting or beautiful native plants. One I submitted aroused a lot of interest because of its striking appearance – and also because most in the audience had never seen, or even heard of it.

Chicory itself is familiar as a tall straggly plant with pretty blue flowers, common as a roadside weed. Its non-fluffy seeds are rarely even noticed. Close relatives in the Southwest form a small 'subtribe' named after a genus of rather inconspicuous plants including our Nodding Silverpuffs, *Microseris nutans*. I'll use the term *Microseris* subtribe instead of *Microseridinae*.

Asteraceae Flowers. Recall that in the composite family as a whole what seems like one large flower is actually a head of smaller flowers, surrounded by a cluster of

bracts known as an involucre. Individual flowers are of two main kinds, disk and ray. As far as corollas are concerned each disk flower has 4 or 5 petals fused into a lobed tube; in ray flowers the tube fails to close along one side and is flattened out to make what looks like a single large petal, more correctly known as a ligule. The small lobes may be more or less visible as separate teeth.

Plants of the Aster subfamily usually have both ray and disk flowers, those of the Thistle subfamily have only disk flowers, and those of the Chicory subfamily have only ray flowers in one or several series. In the *Microseris* subtribe which is our focus here the ligules can be large and showy with very obvious teeth. Oftentimes only the inner flowers are fertile while the outer ones serve to attract pollinators rather than reward them.

What about the calyx? Many families have soft green sepals but in composites the calyx develops instead into all sorts of little appendages that function as dispersal agents. Thistle-down and the fluffy parachutes of dandelions are familiar examples. Bristles, scales and awns are also common. 'Pappus' is used to describe this modified calyx structure in all its forms. Seeds are dry achenes to which the pappus is attached.

Figure 1a shows a flowering head of *Microseris nutans* while 1b shows a head of *Microseris (Uropappus) lindleyi* that has gone to seed; 1c is a close-up of achenes with a pappus of flattened shiny bristles, each with a slender awn. Sometimes the seeds with pappus are beautiful in their own right.

Microseris Subtribe About 20 genera are recognized, many of them occurring in the southwestern US. Two thirds of the genera are small with 5 or fewer species. Some are real desert plants with but a limited distribution in Utah – and they can be strikingly handsome!

Remarkably, almost all species of this subtribe found in the whole Intermountain Region also occur in Utah, with a concentration in the south and west parts of the state. Table 1 lists genera in the arrangement given by the European Distributed Institute of Taxonomy (EDIT). Their website is backed by a consortium of very up-to-date researchers, and Wikipedia is a great source for their current views on classification, with easy-to-navigate phylogenetic trees.

Cover photo by William Gray also appears uncropped on page 5.

<u>Genus</u>	<u>Common Names</u>	<u>Species</u>	<u>Intermountain^a</u>
<i>Agoseris</i>	Mountain Dandelion	14	5 (5)
<i>Microseris</i>	Silverpuffs	44	1 (1)
<i>Nothocalais</i>	Silverpuffs	4	1 (1)
<i>Uropappus</i>	Silverpuffs	3	1 (1)
<i>Chaetadelpha</i>	Skeletonweed	1	1 (0)
<i>Lygodesmia</i>	Skeleton Plant	9	2 (2)
<i>Malacothrix</i>	Desert Dandelion	20	5 (5)
<i>Atrichoseris</i>	Parachute Plant	1	1 (1)
<i>Stephanomeria</i>	Wire Lettuce	19	7 (5)
<i>Rafinesquia</i>	Desert Chicory	2	2 (2)
<i>Pleiacanthus</i>	Thorny Skeletonweed	1	1 (1)
<i>Prenanthes</i>	Brightwhite	1	1 (1)
<i>Glyptopleura</i>	Crustleaf	2	2 (2)

Table 1 *Microseris* subtribe in the Intermountain Region. This treatment is based on that of the European Distributed Institute of Taxonomy (EDIT), accessed via Wikipedia™ 3/13/2020. ^aNumber of species treated in *Intermountain Flora* with those recognized in *A Utah Flora* in parentheses; taxon names are from EDIT.

Flora of North America (FNA) and other authorities separate two more monospecific genera (*Anisocoma* and *Calycoseris*) from *Malacothrix*, both of which are native to the Intermountain Region. A brief description of several genera follows, with a portrait gallery in Figure 2.

Agoseris Our most commonly encountered members of the group are Pale Mountain Dandelion (*A. glauca*) and Orange Mountain Dandelion (*A. aurantiaca*). These are

plants of drier to moist sites in the mountains and foothills, rather than harsh deserts. Leaves are mostly basal while flower heads have a long narrow involucre. *A. aurantiaca* is illustrated. It is sometimes quite pinkish at high elevations.

Microseris This is the genus after which the subtribe is named, also the largest and most widespread. *Uropappus* and *Nothocalais* were separated from *Microseris* as a result of modern research.



Figure 1 Characteristic features of the *Microseris* subtribe. a Nodding Silverpuffs, *Microseris nutans*, flower head showing ligules with 5 teeth, Salt Lake Co., Utah; b, c Silverpuffs, *Microseris (Uropappus) lindleyi* seed head and close-up of achene with pappus, Cochise Co., Arizona.



Figure 2 A portrait gallery of the *Microseris* subtribe. a Orange Dandelion, *Agoseris aurantiaca* Salt Lake Co., Utah; b Smooth Desert Dandelion, *Malacothrix glabrata*, Kane Co., Utah; c Antelope Island Skeleton Plant, *Lygodesmia grandiflora* var. *dianthopsis*, Salt Lake Co., Utah; d Showy Rushpink, *Lygodesmia grandiflora* var. *grandiflora*, Emery Co., UT; e Scale-bud, *Anisocoma* (*Malacothrix*) *acaulis*, Mono Co., California; f Desert Chicory, *Rafinesquia neomexicana*, Inyo Co., California; g Parachute Plant, *Atrichoseris platyphylla*, Inyo Co., California.

Lygodesmia Thin stems give rise to the name Skeletonweed. Authorities differ as to how many species should be recognized. Rather than the nine indicated in Table 1 more conservative treatments include several as named varieties within *L. grandiflora*. Two of the more striking are shown in Figure 2. Variety *dianthopsis* is widespread in our foothills and comes in pink or white. Variety *grandiflora* is a gorgeous plant found in Pinyon-Juniper woodland. The genus used to include the spiny shrub now known as *Pleiacanthus*.

Malacothrix Intermountain Region boasts several species, the most distinctive of which is the Smooth Desert Dandelion (*M. glabrata*), with slender divided leaves and showy yellow flowers. Most other members of the genus are less conspicuous and can be hard to tell apart. Many authorities, including FNA keep two species apart as separate genera, *Anisocoma* (illustrated) and *Calycoseris*.

Atrichoseris The sole member of the genus is *A. platyphylla* which makes a fine show when Death Valley has a good Spring bloom. Known as Parachute Plant because the white flower heads seem to float above

inconspicuous stems. Basal leaf clusters are very robust, however.

Stephanomeria Flower heads are small while the stems are thin and wiry Hence the name 'Wirelettuce' (not illustrated). *Prenanthes* was formerly included here.

Rafinesquia Stunning as individuals and doubly so when a vigorous plant has a display of many flower heads. Inhabiting the Mohave Desert areas it is often set against a background of harsh rock or vivid sand.

Glyptopleura Two little gems enter Utah mainly in the extreme south and west. Holy Dandelion, *Glyptopleura setulosa* occurs here at the northern edge of its range which scatters from Arizona across to the Mohave Desert of Southern California. Its flowers are relatively huge, in some ways echoing small pincushion cacti such as *Pediocactus winkleri*.

And finally, the one that got me into writing this article, *Glyptopleura marginata*. Utah plants are at the eastern edge of the species range which is primarily along the California side of the Great Basin and Mohave Desert. Its vernacular names "Crustleaf" or "Carveseed" don't do



Figure 3 The planet's only two Carveseeds (*Glyptopleura*) are found in Utah. a Crustleaf or Carveseed, *Glyptopleura marginata*, Juab Co., UT, ligules may develop bright red as they shrivel and fade; b same, detail of seed to show pappus and carving; c Holy Dandelion or Largeflower Carveseed, *Glyptopleura setulosa*, Washington Co., UT.

anything to prepare one for its extraordinary appearance. Individual flower heads are not large or showy, nor do they rise much above the leaves. But those leaves are incredible – clamped to the ground in a tight mat, wildly undulating with white-encrusted margins. And the seeds are indeed carved and gnarly. A unique combination.

I have encountered each of these plants only once. In early June I hope to get back out to Utah's West Desert to look for Crustleaf. Even if we don't find it there are many interesting plants in that tough environment. We had wanted to offer this as a UNPS field trip, but that is not practical this year due to the COVID virus. Hopefully next.

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Salt Lake Chapter Report

by Cathy King

Because of the uncertainty of Covid-19, the UNPS Salt Lake Chapter has canceled the remaining scheduled meetings through June and postponed the presentations that were planned for those meetings, including Joel Tuhy's popular annual wildflower lecture. We are exploring other options to meet virtually, such as through Zoom or Google Meet and will keep you informed if that is what we decide to pursue in the fall.

The summer field trip schedule will be decided on an individual basis, but there won't be any that are scheduled by the SL Chapter. Even though it is safer to be outdoors, the temptation to cluster closely around a plant in a group is very hard to resist.

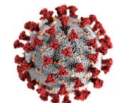
As disappointing as this is for all of us, we can still tie on a mask of some kind, grab a hiking stick and head out for a hike with someone from our own households if possi-

ble. If not that, there is always time that can be spent in your garden, either established or newly planted.

If you are not receiving the wonderful "Life Goes On" botanical emails from Bill Gray featuring photos of two plants every day from his extensive collection spanning many years and would like to get them, you can contact him at cyberflora80@gmail.com about being added to his email list.

And there are so many great books to catch up on about places to see in Utah so you will be ready to go when it is once again safe to travel the state (see the Plant Identification Resource link in this issue page 11 developed by Marc Coles-Ritchie). Check out the unps.org website and read some of the old issues of the *Sego Lily* in the archive, there are amazing articles dating back to 1978.

Someday this will be a distant memory. We are fortunate to have so many good plant friends to help us get through it together.



Range expansion in Utah of *Cyperus michelianus* (L.) Delile

by Tony Frates

Of the nine species of *Cyperus* (most commonly referred to as Flatsedge or Nutsedge) currently known to occur in Utah, only one (*Cyperus michelianus*) is considered an exotic introduction. That species was not known to occur in the Americas until 2009 (with an interesting Utah connection), and some ten years later, is now known to occur over a wider range in Utah.

Taxonomy and historical distribution

Within the Cyperaceae family (grass-like monocots referred to most commonly as Sedges), the genus *Cyperus* comprises the second largest genus after *Carex*. There are different estimates in the number of worldwide species ranging from 600 to 900. They are herbaceous plants with medicinal and other attributes including seeds and tubers that are consumed by birds and mammals (including us). They also have a tendency to grow aggressively.

Cyperus leaves are mainly basal and 3-ranked (spiraling the lower stem in a cycle of three that from above appear as three columns). They typically also have several (commonly 2 to 4) long, umbellate involucreal leaves or bracts that are often lax due to their length that greatly exceed the inflorescence. In cross section, the leaves are corrugated. Their culms (stems) are triangular to rounded (but typically always triangular in cross section at the base of the plant) and solid. The inflorescence consists of several to many spikelets that are usually flattened and arranged in either spicate or capitulate clusters (spikes). Each flower on the spikelet is subtended by a scale (or glume) which are almost always in two rows. The perfect flowers have 1-3 stamens and achenes are produced in the scale axils.

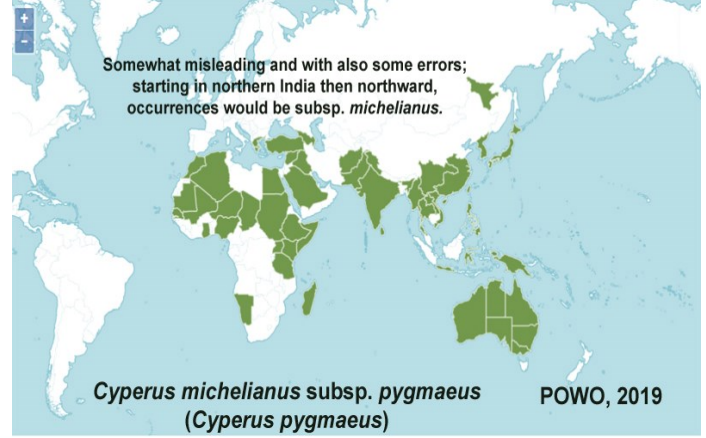
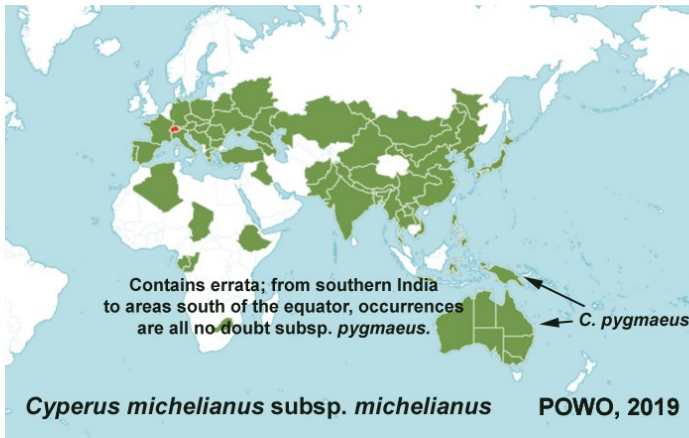
Plants in this genus are typically found in more tropical and warmer temperature places than in Utah. Nonetheless, currently there are nine known species that occur in Utah, with eight of those considered native (Frates, 2016).

First named as *Scirpus michelianus* in 1753 and later moved to *Cyperus* in 1813*, *Cyperus michelianus* (Michel's Flatsedge) has a very extensive Old World range that has been treated in the floras of Pakistan, India, China, Israel and others. A closely related species, *C. pygmaeus* (Dwarf Flatsedge), also hails from the Old World and has sometimes been included as synonym, and also as a subspecies, of *C. michelianus*. The two species have somewhat overlapping ranges, with *C. pygmaeus* occupying a more southerly distribution (see maps).

C. pygmaeus has at least somewhat flattened spikelets with 2-ranked scales (that can be difficult to see) compared to the more ovoid spikelets and spirally arranged imbricate scales of *C. michelianus* with somewhat different glumes. Their habit and flowering times are similar from mid- to late summer to early fall. The *Flora of Pakistan* mentions that the northern *C. michelianus* meets the southern *C. pygmaeus* in Pakistan and in Northern India, with *C. pygmaeus* solely occurring in southern India, southern Pakistan and Sri Lanka (eFloras, 2008). Both of these floras treat them as two separate species. POWO (Plants of the World Online) instead treats *C. pygmaeus* as a subspecies under *C. michelianus*.

In China, *C. michelianus* is reported from near sea level to 300 meters in wet places at water/river margins and in paddy fields. The *Flora of Pakistan* reports it from alluvial river shores as well as rice fields.





Both species are annuals that have capitate heads and are low growing, usually prostrate (but can also be tufted). Because of their similarity in appearance, they have often been confused with one another in their native ranges, but are highly distinctive when compared to our native *Cyperus* species. (In North America, *C. squarrosus* has sometimes been misdiagnosed as *C. michelianus*.)

Found in North America:

The first positive identification in the Americas of *C. michelianus* was a specimen collected in Uintah County, Utah by the venerable Sherel Goodrich on September 23, 2009 (S. Goodrich #27731) at an elevation of about 4,655 ft. (1,419 m). At that time, this species was not known to occur in North America and hence it was not included in the *Flora of North America* treatment (Tucker, 2003).

Goodrich (an expert in many Utah plant families including the Cyperaceae) commented, “I lost hair I did not have trying to identify this. Good thing to be able to send specimens to others more acquainted with specific groups of plants. Gordon C. Tucker gets credit for the identification.” (S. Goodrich, personal communication, November 20, 2019).

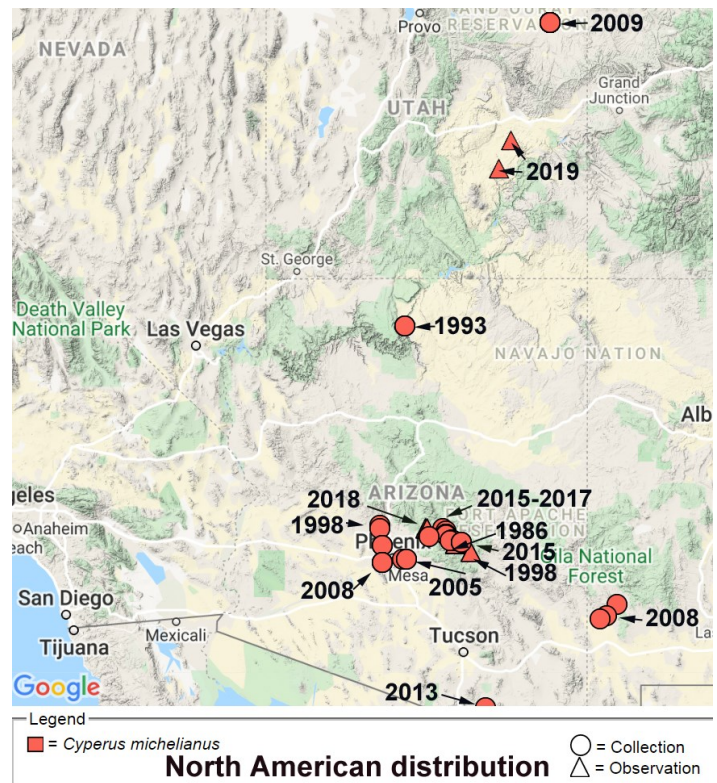
Upon review of materials sent to Dr. Tucker, the following notation was included by him on the Goodrich specimen: “To my knowledge, this is the first record of this species in North or South America. It is a distinctive species, originally classified as *Scirpus* because of the spirally arranged floral scales.”

The location of the Goodrich specimen was on the floodplain of the Green River near Ouray, growing on sandy bars and banks with *Cyperus erythrorhizos*.

One insightful discovery often leads to more. Misidentification of early collections were to be expected since the species was not included in any North American floras.

Arizona-based Cyperaceae expert Max Licher first became involved with the species following a collection made on September 27, 2010 by ASU's Liz Makings at a location in Tempe, Arizona near the campus (E. Makings #3542). After further research in 2014, Licher and Makings realized, with Dr. Tucker's help, that some earlier Arizona specimens previously placed under *pygmaeus* were in fact *C. michelianus*. And that in turn led to further botanical investigations.

The approximate locations of currently known North American occurrences are outlined in the accompanying North America distribution map including the year observed or collected. Currently *C. michelianus* is known from three western states: Arizona, New Mexico, and Utah. A specimen collected on October 10, 1993 by L.E. Stevens in Grand Canyon National Park along the





Cyperus michelianus along the Green River at Keg Spring Canyon (about 13 miles north of Evan Wolf's observation on iNaturalist) in Emery County, Utah observed in late 2019. Photo credit: Allison Melton

Colorado River at an elevation of almost 2,000 ft. lower than the Goodrich specimen was determined by Licher to be this species. Other specimens collected in southern Arizona mainly between 1998 and 2009 were also in 2014 annotated to this species by Licher and Makings. A specimen originally assigned to *C. squarrosus* collected in 2013 was in 2018 annotated by Makings to be *C. michelianus*.

The oldest specimen collected in North America currently identified as this species was obtained by G. Clifton at Theodore Roosevelt Lake (roughly 80 miles northeast of Phoenix) on August 27, 1986, and that specimen was annotated by Licher in 2016 probably after he also visited that area and made more collections of it there in late August and September of 2015, and then again in 2016 and 2017.

Licher also in 2016 annotated specimens collected in southwestern New Mexico in July through September of 2008 along or near the Gila River. *C. michelianus* has been as obscurely known from New Mexico as it has from Utah. The New Mexico location makes sense in that the distribution of the species in southern Arizona for the most part follows the Gila River (and its drainages), which runs the entire length of southern Arizona from east to west to starting in southwestern New Mexico and emptying into the Colorado River near Yuma for a total distance of some 650 miles.

2019 observations expand its range in Utah

Since Sheryl Goodrich's 2009 collection, the species has remained unknown from Utah until last year when two separate new observations were made.

Evan Wolf, an ecologist, noted seeing many large patches growing on fully exposed sand bank and bars along the Green River between Mineral Bottom and its confluence with the Colorado on a canoe trip, and reported one of those sightings on iNaturalist with a date observed of October 14, 2019 in Wayne County (the Green River serves as the border between Wayne and San Juan Cos. at this location).

Not long after I noticed Wolf's observation, I received an e-mail out of the blue from Ryan Beam of the Center of Biological Diversity attaching a picture submitted for identification on behalf of Center staff member Allison (Alli) Melton. It was also clearly *C. michelianus* and the date of observation was late in the year along the Green River to the north of Wolf's sighting at Keg Spring Canyon and at about a distance of 100 to 200 meters from the river in Emery County (there the river represents the border between Emery and Grand Cos.).

Melton also commented, "In the spring we floated the section immediately below what we did in the fall (and where/when we found this plant), and did not observe a single instance. I wonder if its a species that becomes apparent after water recedes - so maybe it wouldn't be observable in the spring, but it is in the fall? Places where I saw it were those that were inundated with that water in the spring, like sand bars and mouths of canyons/outlets."

This comment makes perfect sense. The species is an annual and it likes to grow long muddy/sandy shorelines of rivers and lakes and potentially other areas with sufficient moisture. It won't likely be noticeable in the spring but not instead until late summer and then into early fall. It is ideally suited for areas that are initially flooded and then starts to get a foothold as the water recedes.

With these new observations, at least four more counties can be added to its distribution to Utah, and a new species added to Island in the Sky District of Canyonlands National Park. The currently known distribution of the species in Utah is Emery, Grand, San Juan, Uintah and Wayne along the Green and Colorado river drainage systems. Naturalists should especially be on the lookout for this species from mid-August to early October.

Many botanists have floated the stretch of river between Green River, Utah and the Confluence. It is curious that it is only now showing up there. The fact that it becomes



Cyperus michelianus, Uintah County, Utah near Ouray. Photos credit: Sherel Goodrich

conspicuous only later in the year may be one reason that it hasn't been observed before now. As an annual, it will also show up somewhat randomly at different places each year. In checking other *Cyperus* specimens along the Green River, I was unable to find any that had been previously misidentified that might instead be this species (but, not all specimens are yet available on-line).

Tamarisk removal projects could also be helping to make more habitat available for sand bar loving species, which is a good thing (although unfortunately *C. michelianus* is not considered to be native species).

Native or exotic?

The fact that this species did not show up in the western United States until 1986 is one factor that tends to argue against its nativity. New species are being discovered all of the time, so why couldn't this be something that was therefore simply newly discovered in North America? Most *Cyperus* species grow aggressively and even in its native range in the Old World, it has been accidentally spread and become a problematic weed. In the case of this particular group of plants, if it was truly a circumboreal species, we should be seeing it in many more locations than where it has so far been identified, and much sooner. The fact that some of these areas have been regularly visited for a long time (including the area where Goodrich first found it in Utah) and it is just now showing up indicates a high level of suspicion that somehow it has been introduced in an unnatural way.

In Arizona, Licher notes, "Where I have seen it around Lake Roosevelt, along Tonto Creek and the Verde River, it has appeared in abundance, much like an invasive. However, it has also occurred with *Cyperus odoratus*, *Cyperus erythrorhizos*, and *Cyperus difformis*, also in abundance. The first two of these are considered native here, while *C. difformis* is considered to be exotic." In

upcoming Cyperaceae treatment updates for Arizona and New Mexico, Licher indicates that it will also be treated as an exotic (M. Licher, personal communication, November 18, 2019).

Goodrich suspects that it was introduced from Eurasia by waterfowl (Goodrich, 2014). The plant spreads via seeds and probably tubers. *C. michelianus* seeds have been found in the digestive tracts of dabbling ducks in Europe (Green, 2016).

Once established in the Colorado River system, the seeds could be easily transported over long distances by ducks, geese and other birds. But how did it get here from the eastern hemisphere?

Long distance seed dispersal by birds has been increasingly well-documented (for example, Viana, 2016). Dispersal via transcontinental flights by birds may sound far-fetched but new research is showing that some bird species can sleep in mid-flight including Frigatebirds (Rattenborg, 2016) that are capable of ocean crossings, and that some species such as the Common Swift can fly for as long as 10 months without touching land. The Alaskan Bar-Tailed Godwit makes 8,000 mile trips in about eight days from Alaska to New Zealand. If *C. michelianus* arrived here from a long distance seed dispersal event unaided by technology, then a strong argument could be made that it came to North America naturally.

Transcontinental dispersal would more likely occur however by airplane and commercial shipping containers with ultimate destinations in Phoenix or Las Vegas, or other accidental introductions that could occur in numerous ways. Our modern transportation networks are now very efficient in spreading viruses as well as exotic species.

There is also an historical possibility involving early Spanish exploration and occupation on the Baja

California Peninsula and adjoining areas. Spanish missions were built between 1728 and 1840. By 1768 (with settlement on the peninsula long before that time), multiple sources place Spanish Colonial horses very close to where the Colorado River empties into the Gulf of California. There is historical and macrofossil evidence that the now widespread, naturalized weed *Erodium cicutarium* invaded California from Baja California, having established itself in the Santa Barbara area several years before the first California mission in San Diego in 1769 (Mensing, 1998). Fodder for livestock may have been how *E. cicutarium* initially arrived in North America, but from there it seems to have spread quite effectively on its own (in Utah it was amazingly found by the Stansbury expedition in northern Utah in the vicinity of the Great Salt Lake in 1850).

Cyperus michelianus could have also been easily brought in initially with livestock fodder on Spanish ships. But if so, why did it take so long for us to notice that it was here?

A somewhat parallel case that lends credence to the idea that *C. michelianus* is an exotic Old World introduction to North America, and also that it has likely been here for a long time but was just slow to spread, involves *Cyperus fuscus* (a species that will likely also be eventually found in Utah). The Eurasian *C. fuscus* is in the same subgenus as *C. acuminatus* (which does occur in Utah) with spikelets in digitate clusters and scales that are at least in part a distinctive purplish-brown, and which is often semi-prostrate to prostrate in habit. It grows in habitats similar to *C. michelianus*. It was first discovered in 1877 in Massachusetts. Its initial occurrences on the Atlantic seaboard were associated with ballast sand and wharves suggesting an introduction from achenes in ship ballast water carried over by European ships. In 1938 it was identified as occurring in California (central to coastal; one specimen places it there in 1896) and over time became known from Connecticut, Maryland, Nebraska, New Jersey, Pennsylvania, South Dakota and Virginia as well as in Canada (Ontario, Quebec). Its spread however has been slow. In late 1997, it was first found on the mudflats of the Missouri River in two adjacent counties in Missouri. A 1981 collection by Jerry Tiehm from western Nevada (in Lyon Co.) identified originally as *C. acuminatus* was annotated to *C. fuscus* by 1998. (For most of the foregoing, see McKenzie, 1998; also Tucker, 2003). Tiehm collected it, as it turns out, as early as 1975. More recently, Tiehm has been involved in making many more collections of *C. fuscus* in Carson City (formerly Ormsby), Churchill, Douglas, Lyon and Washoe Cos. (Consortium, 2020). It no doubt spread to western Nevada from California via waterfowl, but it would also appear that

the seeds of *Cyperus* species can also be easily transported long distances via river and stream flows.

Final comments

It does seem reasonable to conclude that *C. michelianus* is not a naturally occurring species in North America. It will no doubt be found in more places in Utah along the Green and Colorado rivers, and in more places in Arizona along the Colorado and Gila rivers (including in New Mexico). Whether or not its initial introduction was from the Gulf of California, it should be expected in northwestern Mexico including Baja California.

In a European study, *C. michelianus* was one of about 20 plants in the genus *Cyperus* found to be a C4 (carbon fixation) species. C4 species evolved in response to water stress and are better able to reduce water loss as a result of transpiration. In that study, C4 Cyperaceae were correlated with temperature and aridity but not precipitation (Pyankov, 2010). This photosynthetic method gives *C. michelianus* an advantage in more arid environments such as ours and may partly explain why it has been able to very successfully colonize here.

Native or not, this species is likely here to stay.

Acknowledgments: Special thanks to Max Licher and Sherel Goodrich, and also to Mary Barkworth, Jim Solomon, and Gordon Tucker in tracking down and confirming the correct author name for *C. michelianus*, and to the taxonomists, collectors and naturalists who have contributed to our knowledge about this and other *Cyperus* species in North America.

*The 1813 publication corresponds to *Cyperus michelianus* (L.) Delile. Its 1827 publication is related to *Cyperus michelianus* (L.) Link. Unless the original publication was invalid, the publication by Delile would take precedence. Various references identify the authors differently. The correct author name reference is (L.) Delile (G. Tucker, personal communication, April 24, 2020). *C. pygmaeus* Rottb. was published in 1773.

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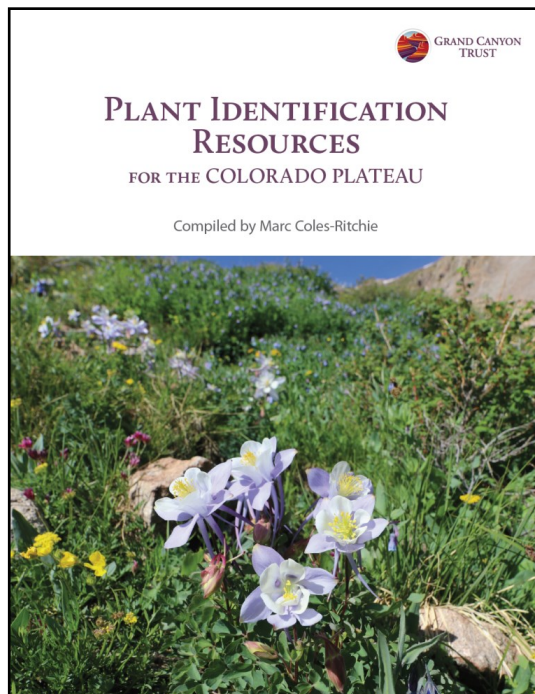
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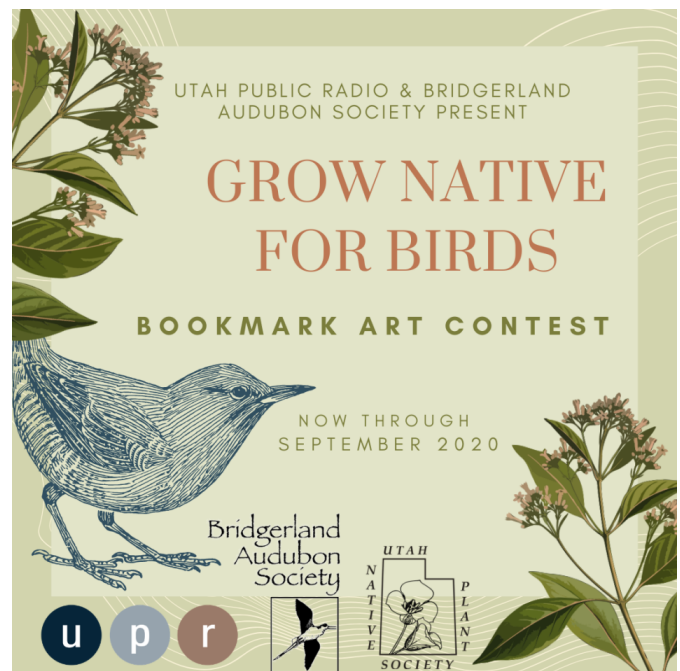
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Marc Coles-Ritchie guide for plant identification can be found here: https://www.grandcanyontrust.org/sites/default/files/resources/Plant_Resource_Guide.pdf



The Utah Native Plant Society is a co-sponsor in the "Grow Native for Birds" bookmark art contest at Utah Public Radio. Go to the <https://www.upr.org/post/grow-native-birds-bookmark-art-contest> for details.

Utah Rare Plant Meeting Report

by Cathy King

The annual Utah Rare Plant Meeting was held again this year in the Swaner Forum at the Natural History Museum of Utah on Tuesday, March 3, 2020. Over 90 participants from a well represented background attended, including universities, government agencies, environmental consultants and contractors, non-profits, conservation groups, herbariums, UNPS members, artists, suppliers, horticulturalists, botanic gardens, and more.

The fourteen presentations covered a range of subjects with an emphasis on rare plants including *Eriogonum soredium*, *Lepidium ostleri*, *Pediomelum pariense*, *Lepidium barnebyanum* and *Phacelia argylensis*. There were several presentations focused on habitats such as riparian, fens, and forests; two featuring pollinators and native bees; also some agency updates, an exciting penstemon book preview and a presentation on ponderosa pine as a rare tree along the Wasatch Front.

It was rounded out with two excellent posters, one on the *Penstemon scariosus* complex and the other growing *Astragalus holmgreniorum* for seed. The Garrett Herbarium had a table display with herbarium specimens.

A highlight of the conference was the presentation of the Utah Native Plant Society Lifetime Achievement Award to Pat and Noel Holmgren for their enormous contributions to Utah botany and the completed works of the



Intermountain Flora. They were both present to accept the award and then gave a presentation with an overview of their experiences researching and writing the *Intermountain Flora*.

Many thanks to the presenters and participants and to all the volunteers that organized the meeting. The Garrett Herbarium and the Natural History Museum of Utah is generous to sponsor our meeting on an annual basis. Paul Mulder at The Museum Cafe does a wonderful job with the food.

A special recognition and appreciation plaque was given by UNPS to the Garrett Herbarium for its support in hosting the meeting for so many years.

The meeting has already been scheduled for next year, so be sure to save the date, Tuesday, March 2, 2021. We hope to see you all again then.



Lepidium ostleri and *Penstemon scariosus*. Photos by inveterate plant explorer/photographer, Andrey Zharkikh.

Utah Rare Plant Meeting Agenda

March 3, 2020

Natural History Museum of Utah

Salt Lake City

8:00	? Registration & Breakfast
9:00	? Welcome & Announcements
9:10	The ecology of calcicole endemism on hydrothermally altered limestone in the San Francisco Mountains, Utah, USA. Susan E. Meyer, Alyson DeNittis, & Kody Rominger
9:30	Population genetics of <i>Pediomelum pariense</i>, a rare Utah plant native to Kane and Garfield Counties. Ashley N. Egan
9:50	Utah Rare Plant Program 2019 In Review. Mindy Wheeler, Meghan McCormick, Garrett Billings & Benjamin Gibbons
10:10	U.S. Fish and Wildlife Service, Utah Field Office Updates. Jena Lewinsohn

10:30	? 20 minute break
10:50	The Uinta Basin Railway: A Threat to Rare Plants. Ryan Beam & Tony Frates
11:10	Monitoring of Rare Plant Populations and Ungulate Use in Alpine Communities of the Tushar Mountains, Fishlake National Forest, Utah. Heather Shipp, Steve Flinders & Loreen Allphin
11:30	Pinyon and Juniper Forests through a Cultural Lens: Listening to Traditional Ecological Knowledge. Kamran Zafar
11:50	Intermountain Flora. Patricia & Noel Holmgren
12:00	? Poster Introductions & Community Announcements

12:20	? Lunch (with pre-registration) -- 1 hour 20 minutes
1:40	Unauthorized bee collection on the Uinta-Wasatch-Cache National Forest. Patricia Winn
2:00	Fighting for flowers: the dangers of commercial honeybee permitting on public lands. Thomas Meinzen
2:20	The Heart of Penstemon Country: A Natural History of Penstemon in the Utah Region. Mikel R. Stevens, Stephen L. Love & Tony McCammon

2:40	? 20 minute break
3:00	Riparian Plant Communities of Southern Utah National Parks. Sarah Quistberg
3:20	Inventory of Fens, Botanically Unique Wetland Ecosystems, on Forest Service Lands in Utah. John Proctor
3:40	Ponderosa Pine at a Rare Plant Meeting??? Bill Gray, Blake Wellard & Mitch Power

Posters	
Understanding the <i>Penstemon scariosus</i> complex. Mikel R. Stevens, Robert L. Johnson, Lindsey M. Meservey, Jason M. Stettler, Chris D. Anderson, Matthew D. Robbins, Leigh. A. Johnson, Nathan J. Ricks & Kevin M. Farley	
Growing an endangered species, <i>Astragalus holmgreniorum</i>, for seed. Bettina Schultz, Susan Meyer, Alyson DeNittis & Kody Rominger	

2020 Utah Rare Plant Meeting Presenters

(No photo available for Patricia Winn, USFS)



Susan Meyer
USFS



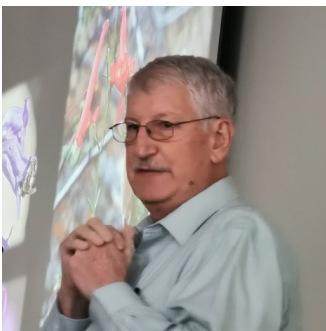
Thomas Meinzen
Grand Canyon Trust



Bill Gray
Garrett Herbarium



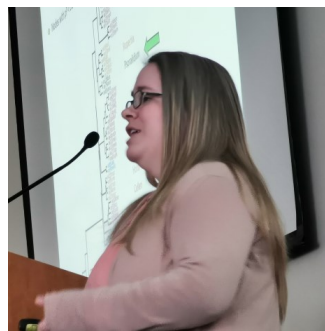
Kamran Zafar
Grand Canyon Trust



Mike Stevens
BYU



Jena Lewinsohn
USFWS



Ashley Eagan
UVU



Garrett Billings
URP



Heather Shipp
BYU



Sarah Quistberg
NRCS



John Proctor
USFS



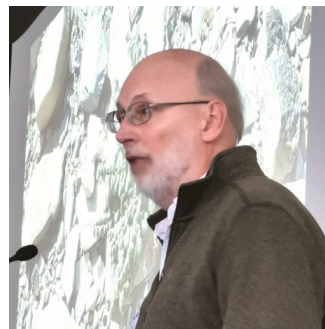
Ryan Beam
CBD



Pat and Noel Holmgren
NYBG



Benjamin Gibbons
URP



Tony Frates
UNPS



Mindy Wheeler
State of Utah URP

Reprinted from *The Durango Herald* article Saturday, March 14, 2020

Gulliford's Travels: A column for the Durango Herald

Go Ask Alice: A Famous Botanist Studied the Southwest

by Andrew Gulliford

The American West has always had extraordinary women, but few of them have stopped to pick the flowers. For Women's History Month it is important to remember Alice Eastwood. This Canadian-born, 1879 Denver high school graduate was a determined young woman who not only picked the flowers, she named them. In turn she had plants named after her. She explored the Southwest when single women were supposed to be home, married, and raising a family. Instead she made enormous contributions to botany and plant science in her 94 years, and she did it all with grit and grace.

In California, Alice Eastwood named 125 new plant species. The genera *Aliciella* and *Eastwoodia* were named for her. In her lifetime she wrote 310 scientific articles, named 395 plant species, and had 17 species named for her. At age 68 on a botany trip in California she walked 20 miles the first day and ten miles on day two. Eastwood officially retired at age 90.

It was Alice reading in the Denver Public Library on July 31, 1891 who met Gustaf Nordenskiöld, a young Swedish scientist suffering from tuberculosis. She told him of cliff dwellings recently discovered near Mesa Verde and of her friends the Wetherills from Mancos who could guide him. He took the train to Mancos and would become one of the first Southwestern archaeologists to study Ancestral Puebloans sites at Mesa Verde, map them, and write a book about them. They worked together from 1891-1895.

As for Miss Eastwood, she became an early paleoethnobotanist. She helped identify plants unearthed in Wetherill excavations at prehistoric sites in Mesa Verde after first visiting Mancos Canyon on July 14, 1889. She helped study Ancestral Puebloans by understanding the plants they had used. She worked with Richard Wetherill at Cliff Palace in Mesa Verde, and with his brother Al she had one of the great adventures of her life.



Alice Eastwood, one of America's most famous botanists, shares her perpetual smile with the camera. Despite her frilly bonnet, she was camp-hardened by years of fieldwork and in her 60s she could still walk 20 miles in a day. She retired from the California Academy of Sciences at age 90. Photo courtesy the Wetherill Archives, Canyons of the Ancients National Monument.

Alice taught at East High School in Denver for 11 years. Because of her wise real estate purchases in Denver and Durango, she retired at age 31 to spend the rest of her life botanizing. Regional botanist Al Schneider told me, "The properties were bought as investments and when sold returned her sufficient money to feed her flower frenzy."

She became well known in Colorado and far beyond and helped start botanical collections now at the Denver Museum of Nature and Science. She gave 1,400 plant specimens to form the nucleus of the University of Colorado herbarium including 17 species which she named from Montezuma County.



A relaxed Alice Eastwood poses for her portrait. She named 125 new plant species. Two new genera of plants were named after her including Eastwoodiae. *Erythranthe eastwoodiae* or Eastwood's monkey flower, is found in hanging gardens in Bears Ears canyon country. Photo courtesy the Wetherill Archives, Canyons of the Ancients National Monument.

By 1892 Eastwood had become co-curator in San Francisco at the California Academy of Science's herbarium. She would travel the West finding and identifying new plants. Eastwood edited *ZOE: A Biological Journal* and in 1892 she published "Notes on the Cliff dwellers" where she wrote, "Corn, squash and beans were the chief crops; the walnuts now and then discovered were probably from further south with the cotton which has been found on the pod, spun into thread, and woven into cloth . . . seashells have been found matted in the hair of the dead . . . willow twigs fastened together something like the slats of Venetian blinds formed the

wonka's Botany Flashback

Alice Eastwood's (1859-1953) collecting trip to Utah is well documented. She wrote general notes of the trip in *ZOE, A Biological Journal*, Vol. III in 1893. Additionally, in Vol. IV of 1893, she provided a list of the 141 species she collected on the trip from May 24 to June 3, 1892. Many of these collections remain in herbariums across the country today and can be easily accessed and searched digitally through the Intermountain Region Herbarium Network.

Among the 141 species collected in Utah in 1892 were five species that she thought were new to botany and she described them completely in *ZOE*, Vol. IV. Two of these include *Penstemon utahensis* and *Caesalpinia repens* and have met the test of time.

An intrepid collector, Alice returned to Utah many times, collecting herbarium specimens of which there are records in 1891, 1892, 1895, 1896, 1898, 1918, 1933, 1938, and 1941. The first known specimen she collected in Utah was *Balsamorhiza sagittata* in Salt Lake County in May of 1891, likely near the Denver & Rio Grande railroad tracks.

Prior to meeting Al Wetherill in Thompson Springs of 1892, she spent two weeks collecting in the Grand Junction area with Alida Platt Lansing (b. 1868), a fellow Denver botanist who was in charge of the Colorado botanical exposition for the 1893 Chicago World's Fair. It was near the Colorado River outside of Grand Junction that Alice collected what would become *Astragalus wetherilli*. She sent the sample to Marcus Jones for determination. Alice made this note about the plant: "Collected at Grand Junction, Colo., May, 1892, by Miss Alice Eastwood, and dedicated to Mr. Alfred Wetherill by request."

She then went to Thompson Springs on May 24, 1892 to meet Al Wetherill and the two of them spent ten days together collecting plants in Utah ending up in Mancos, Colorado and for collecting in the Mesa Verde area. She returned once again to the Grand Junction area to collect more specimens.

We have written about Alice Eastwood's 1933 trip to Salt Lake City in an earlier issue of the *Sego Lily*, 2018 41(2) in the *wonka's Botany Flashback* column.



The Wetherill brothers from the Alamo Ranch at Mancos enjoyed Alice Eastwood's company on their excavations at Mesa Verde before it became a national park in 1906. As the Wetherill brothers dug up ancient sites, she was one of the first paleoethnobotanists identifying plants used by the Ancestral Puebloans. Photo courtesy the Wetherill Archives, Canyons of the Ancients National Monument.



Alice Eastwood utilized Al Wetherill as a guide for expeditions into southeast Utah and the Bears Ears and once ran out of food but refused to stop "botanizing." Al was amazed that this refined and scientific female researcher spent days in the saddle and cheerfully used camp gear from his "regular cowboy's layout--a greasysack outfit." She named several plant species after him. Al is in the middle of the photo. Photo courtesy the Wetherill Archives, Canyons of the Ancients National

outside cover, the coffin of these prehistoric people."

Always an astute observer, she noted, "Coarse grass with stiff stems, *Oryzopsis cuspidate*, was tied into bundles to make brushes, probably for their hair. The wild tobacco, *Nicotiana attenuate*, is common near their homes and in the cañons where their houses stand like statues in the rocky niches the wild fruits are more abundant than elsewhere, leading to the belief that to some extent they were cultivated."

Alice Eastwood letters and documents in the Wetherill Archives at the Canyons of the Ancients National Monument Visitor Center in Dolores make clear that one of her finest collecting trips occurred across southeast Utah in 1892. She wrote about it in *ZOE* and began, "It was my good fortune the past year, toward the end of May, to travel on horseback through a part of the Great American Desert that has been but little explored." Al Wetherill met her at Thompson's Spring as she stepped off the Denver & Rio Grande Railroad into a sea of sagebrush and a treeless plain.

An inveterate explorer, she invented her own type of dress with a split skirt so she could ride horseback and not go side-saddle. She was prepared for anything, unlike other male adventurers who got off at the same

weathered railroad station where with a four-horse wagon it was 1.5 days south to Moab, two more days to Monticello, and another few days to Bluff.

Fifteen years later in 1907 an archaeological team disembarked at the same station and a squeamish young man asked the agent if he could use the urinal. "Urinal! My god, man," shrieked the agent as he swept the room with an open palm. "Right outside that door is 40,000 acres and not a tree on it," wrote Neil M. Judd in his memoirs.

Alice Eastwood had no such qualms, including traveling with a married man. Her epic journey with Al Wetherill meant riding to Monticello a "Mormon settlement at the foot of the Blue Mountains," down Montezuma Canyon to the San Juan River and then McElmo Creek and the Montezuma Valley to Mancos. They would run out of food, but nothing stopped Alice from botanizing. She wrote, "It was the period when vegetation was most luxuriant, and the earth was gay with flowers."

Eastwood impressed everyone. In his autobiography Al Wetherill remembered, "She would stop to pick, or examine, some strange or rare specimen of plant that cropped up in protected places or in new territory." As for accommodations, he admitted, "We had a regular cowboy's layout—a greasysack outfit. That meant limited camping equipment, a couple of saddle blankets, and a canvas covering for the pack. Grub was bacon,



A chance meeting at the Denver Public Library between Alice Eastwood and the tubercular Gustaf Nordenskiöld forever changed southwestern archaeology. Eastwood told Nordenskiöld about the ruins at Mesa Verde and he came to map, photograph, and excavate them. As part of his mapping he named and numbered kivas in Cliff Palace. His black paint can still be seen. Author photo.



Alice Eastwood was one of the few white women to explore Mesa Verde before it became a national park. She worked with the Wetherill brothers identifying plants during their excavations at Cliff Palace and wrote about it in *Zoe* for the California Academy of Sciences. Though she was a pioneering botanist in the park, few National Park Service rangers giving Cliff Palace tours mention Eastwood or her accomplishments. Author photo.

oatmeal, salt, sugar, coffee, and flour and baking powder.”

Along the way she turned down an offer of marriage from a Mormon widower. Because she had to prepare and dry all her plant specimens, she wasn't prepared for a Utah wind that blew apart her samples. “She just sailed into those papers and specimens and got them all safely packed and tied in their proper places with no loss that I could see. Most of them were pretty green

and had not blown far,” Wetherill reminisced.

She collected in Court House Wash, now in Arches National Park, and in Comb Wash and Butler Wash in Bears Ears National Monument. She named several species after Al including *Oreocarya wetherilli*. But if her gumption and perseverance were often tested in the field, the ultimate challenge came in 1906 in San Francisco during the city's epic earthquake. She thought nothing about herself or her possession; instead, she saved plant specimens from the California Academy of Sciences. She hurried into the crumbling building to climb five stories of twisted railing on destroyed stairs to retrieve 1,497 type specimens.

Running into a damaged building, fires erupting down the block, she retrieved the Academy's historical records and irreplaceable botanical specimens by her quick thinking and by hiring a team and wagon to haul them to safety. “My own destroyed work I do not lament, but it was a joy to me while I did it, and I can still have the same joy in starting it again,” she wrote in a letter re-printed in *American Women Afield* (Texas A&M University Press). “All my pictures and books are gone and many treasures that I prized highly; but I regret nothing for I am rich in friends and things seem of small account.”

In her lifetime she would re-build the Academy's collections to 300,000 specimens. I'll think of this amazing woman this spring as I hike in the canyons of Bears Ears looking for *Erythranthe eastwoodiae* (Eastwood's Monkeyflower) that appears in seeps and springs. What a long life she lived at the intersection of archaeology, anthropology, botany, and the Old West becoming the settled West we now know. Alice Eastwood dedicated her life to science, and she enjoyed every moment of it. We should be grateful for her adventurous, pioneering spirit.

For help with this column the author would like to thank botanist Al Schneider from Lewis, CO. For more information about Alice and photos of Eastwood's Monkeyflower see Schneider's website at <http://www.swcoloradowildflowers.com>.

Andrew Gulliford is an award-winning author and editor and a professor of history and environmental studies at Fort Lewis College. He can be reached at gulliford_a@fortlewis.edu.

Your Membership

Your membership is vital to the Utah Native Plant Society. It is important that your information is correct and up to date for notifications and the delivery of The Sego Lily newsletter.

Any questions about your membership, Contact Tony Stireman, tstireman@gmail.com.

Here comes summer... It is time to consider another issue of the Utah Native Plant Society *Sego Lily* which relies mostly upon articles from the society's membership. Please submit articles of your native plant stories and photos from hikes and field trips, conservation activities... whatever might be informative and interesting to fellow members.

The *Sego Lily* editors can use most any text format for articles (PDF is often difficult). Photos are always best submitted in original resolution and as individual files separate from text. You can indicate desired positioning within a document. We are looking forward to hearing from you. For submissions and/or questions: newsletter@unps.org or cathy.king@gmail.com.



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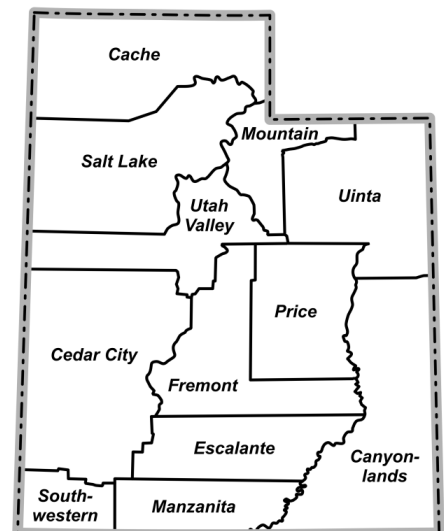
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The *Sego Lily* is a quarterly publication of the Utah Native Plant Society, a 501(c)(3) not-for-profit organization dedicated to conserving and promoting stewardship of our native plants.

UNPS Chapter Map



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