



# NATIVE PLANT SOCIETY OF NEW MEXICO NEWSLETTER

November/December 1992

Volume XVII Number 6

## FLORA NEOMEXICANA A Rare Splash of Autumn Color

Robert Sivinski, NM Forestry and Resources Conservation Division

When you hear the designation "endangered" for a plant species, you hardly expect to find it flowering in such numbers that it literally paints the landscape. This is the case with the rare *Helianthus paradoxus* (puzzle sunflower) at Bitter Lake National Wildlife Refuge near Roswell. In good years, this sunflower lines the shores of the refuge impoundments with thick bouquets of bright yellow flowers. To see this rare splash of autumn color, just drive the loop road through the refuge during the last two weeks of September. All the sunflowers in the salt marsh and along the riparian edge of the ponds are the puzzle sunflower.

This unique annual sunflower is a wetland or riparian plant. It is our only New Mexico sunflower that needs water saturated, alkaline soils during the growing season. Therefore, it is only found in salt marshes and bogs around alkaline seeps and springs. The puzzle sunflower occurs with other wetland/riparian species such as *Distichlis spicata* (saltgrass), *Spartina pectinata* (prairie cordgrass), *Muhlenbergia asperifolia* (scratchgrass), *Allenrolfea occidentalis* (picklebush), *Suaeda depressa* (seepweed), *Polygonum lapathifolium* (knotweed), *Limonium limbatum* (marsh-rosemary) and *Eustoma exaltatum* (catchfly gentian). There are two other similar looking sunflower that also grow in the vicinity, but not in the wetlands. They are *Helianthus annuus* (annual sunflower) and *Helianthus petiolaris* (prairie sunflower). The puzzle sunflower differs from the first by having strongly three-nerved, lanceolate, rather than ovate/cordate leaves. It also has narrow, less hairy phyllaries on the flower head. The prairie sunflower has lanceolate leaves, but differs from the puzzle sunflower by the ciliate fringe

on the central pales that gives the dark eye of the flower head a whitish-hairy center.

Only a decade ago, the puzzle sunflower was thought to be extinct. The original description of this species by Charles Heiser in 1958 is based on a single population near Fort Stockton, Texas and a historical 1851 collection somewhere on the Rio San Jose in west-central New Mexico during the Sitgreaves expedition. The Texas population was subsequently plowed up by a highway construction project, and no one could relocate the New Mexico plants. Fortunately, another large population was located along Leon Creek, just north of Fort Stockton. This population is now protected by The Nature Conservancy's purchase of the Diamond Y Ranch which contains most of the Texas plants. In 1980, it was found again in New Mexico by Gerald Seiler, but this time on an irrigation ditch near the town of Dexter in Chaves County.

Last year I went to Dexter to relocate Seiler's plants. I found a large population (several thousand plants) in a small, spring-fed valley 3 miles north of the town. This must have been the population source for the irrigation ditch waifs found by Seiler. After a few days of fruitless searching for other populations in Chaves County, I decided to end my trip by taking a spin around the salt marshes at the Bitter Lake Refuge. I hit the puzzle sunflower bonanza. The ponds at the refuge are spring-fed, and the original spring must have had a population of puzzle sunflower. When the levees were built, the new ponds created several linear miles of riparian habitat, and the sunflower spread out across the refuge. Also, during September 1991, Charlie McDonald (U.S. Fish and Wildlife Service Botanist) found the puzzle sunflower while taking a Sunday stroll through the Rio San Jose Box just above its confluence with the Rio Puerco. Finally, 140 years after its original collection at the Rio San Jose, Charlie had relocated this elusive, west-central New Mexico population.

So, why is this plant considered to be endangered after all its original populations and more have been found? Mainly, because its habitat is in trouble. Springs and seeps in the desert southwest are not only rare habitats, but they are being sucked dry by agriculture and urban development at a very rapid rate. It does not matter if there are ten or ten million puzzle sunflower plants at a spring wetland. Once the water stops flowing, all the plants are gone - forever. In Pecos and Reeves Counties, Texas, irrigation pumping has lowered the groundwater

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levels by 120-150 meters in many places. Almost all of the springs in these west Texas counties have dried up in the last 50 years (Jackie Poole, Texas Natural Heritage Program). What will be the fate of the New Mexico Pecos River Basin springs when farmers begin converting to ground water pumping to make up for the Pecos River water that the Texans won back from us in their latest lawsuit?


Another threat to this habitat is the invasion of salt cedar. As a salt marsh becomes a little drier, salt cedar proliferates and crowds out all the native vegetation, including the puzzle sunflower. Cattle are also not adverse to eating this plant. Much of the Rio San Jose looks like perfect puzzle sunflower habitat, but the plant is restricted to a few alkaline seeps on the sides of canyon walls. It was probably much more common in New Mexico before all the springs and riparian areas were hammered by livestock.

The puzzle sunflower is an especially important genetic stock for our agricultural sunflower. Agronomic researchers have already released


a cultivar with puzzle sunflower genes that resist salt damage during germination and seedling establishment. This is a critical characteristic for sunflower crops on the world's arid farmlands where continued irrigation causes the soil to become more saline or alkaline over time. Who can tell what else will be obtained from this plant, if we can save it from extinction. In the mean time, this is a rare plant that anyone can visit in one of its last and best refuges. It is well worth the trip to Bitter Lake to see this bright golden sunflower on a warm autumn day. You may be among the last generation to look upon it.

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The Newsletter is published six times per year by the Native Plant Society of New Mexico. The Society is composed of professional and amateur botanists and others with an interest in the flora of New Mexico.

Articles from the Newsletter may be reprinted if fully cited to author and attributed to the Newsletter.

Membership in the Native Plant Society of New Mexico is open to anyone supporting our goals. We are dedicated to promoting a greater appreciation of native plants and their environment, and to the preservation of endangered species.

Members benefit from chapter meetings, field trips, publications, plant and seed exchanges and a wide selection of books available at discount.

We encourage the use of suitable native plants in landscaping to preserve the state's unique character and as a water conservation measure.

We maintain a register of business and professional people who are members and can supply information and services related to native plants. To be added to this roster or to request information, contact the Membership Secretary.

**Schedule of Membership Fees**

Dues are \$10.00 annually for individuals or families. "Friends of the Society" include organizations, businesses, and individuals, whose dues of \$25.00 or more provide support for long range goals. To join us, send your dues to Membership Secretary, 443 Live Oak Loop NE, Albuquerque, NM 87122

**Newsletter Contributions**

Please direct all contributions for the newsletter to Tim McKimmie, editor.  
**Deadline for the next newsletter is Dec. 1**

**Advertising Schedule**  
Approved advertisements will cost \$40 per year.

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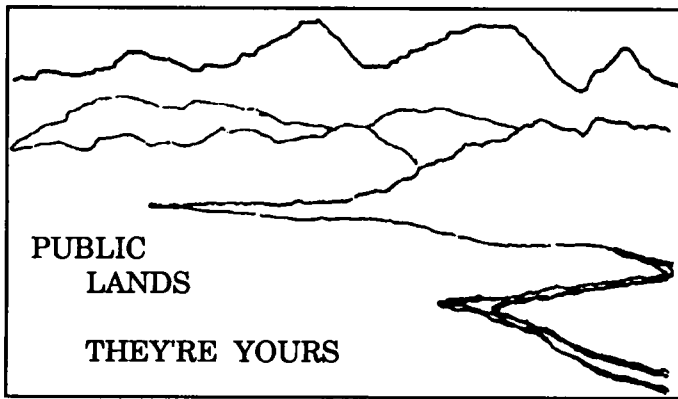
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## AGAVES OF NEW MEXICO

by Ted Hodoba

reprinted from NPSNM Newsletter May/June 1987

Across southern New Mexico in the spring and summer months, the agaves send up some of the most amazing flower stalks in the plant kingdom. Agaves are also called century plants due to the mistaken belief that they require one hundred years or more to flower. Actually, flowering may begin after only ten years. Other names for agaves include maguey and mescal, the latter also the name of a distilled liquor in Mexico. A further refined liquor made from the agave is tequila. The name mescal also gave its name to the Mescalero Apache, who utilized the agave as an important food source by roasting the wild mescal heads.

Six agave species are found in New Mexico. Agave lechuguilla is found across the southern border roughly from the Rio Grande east to the southeastern corner between 3,000 and 7,500 feet in elevation. Considered to be a primary indicator plant, Agave lechuguilla has one of the largest ranges of any agave, extending into central Mexico. This is one of the smaller agaves, but also one of the most plentiful, forming large colonies along limestone ridges. This plant is also found along the canyon slopes in the Guadalupe Mountains and in the Carlsbad National Park. Flowers appear in June and July.

Another small agave similar to Agave lechuguilla is Agave schottii, which is found in the extreme southwestern corner of the state in the Peloncillo Mountains above 3,000 feet in elevation. It has small yellowish green to green rosettes. The tubular flowers appear in May and are pollinated by bees and bats. Like A. lechuguilla, Schott's agave forms dense plant colonies.

Our largest agave is Agave palmeri found in the woodlands and grasslands of southwestern New Mexico between 3,000 and 6,000 feet in elevation. The long, lanceolate leaves are used for fiber by the Indian tribes in the area. The tall flower stalks shoot up 18 feet in June and July. While hummingbirds and other birds are attracted to the flowers, night-flying bats of the genus Leptonycteris are the primary pollinators of Agave palmeri.

The last three agaves are closely related in the group Parryanae. Agave gracilipes is found in the Guadalupe Mountains above 3,600 feet. It is the smallest of the Parryanae and is very similar to Agave neomexicana. In certain areas, this plant is found in the same habitats as A. lechuguilla and A. neomexicana. A. gracilipes has apparently crossed with A. lechuguilla; however, it has not crossed with A. neomexicana, as A. gracilipes blooms in the

fall whereas A. neomexicana blooms in the spring.

Agave neomexicana is medium sized between A. gracilipes and A. parryi and is found in south-central and southeastern New Mexico from 5,000 to 7,000 feet. This species was the primary mescal used by the Mescalero. Flowers appear in May.

The largest of the Parryanae, and the agave found at the highest elevation, Agave parryi is found in the southwestern corner of the state from 5,000 to 8,000 feet in elevation. In addition, A. parryi is found further north than any other agave. This large species', (second in size only to A. palmeri), gray-green leaves are the widest of our native species. Also known as mescal, this plant was important to various Apache tribes in the area. Agaves are among the easiest plants to grow in the landscape and are among the most drought tolerant native plants. They prefer full sun, good drainage, and lean soil. In the landscape they make dramatic accent plants, especially A. palmeri and A. parryi. Agave lechuguilla and A. schottii are better suited to the desert garden where they can spread freely. A. gracilipes and A. neomexicana are good choices for smaller gardens. Agaves should not be planted near walkways or other activity areas where the large spines may be injurious. The spines may be clipped from the plant without harming the plant.

Most agaves offered for sale are collected from the wild. This depletion of the wild populations is unnecessary as agaves start easily from both seeds and offsets. Collect seed in late summer or fall, sow them in half potting soil and half sand in spring, summer, or indoors anytime. Water generously and keep moist and warm until seeds germinate. After germination, allow the soil to dry out between waterings. Offsets can be cut away from the parent plant's base. Allow them to dry for three or four days and pot them up in any potting soil suitable for cactus.

All native agaves are hardy in the southern part of the state and as far north in the Rio Grande Valley as Albuquerque. A. Parryi is one of the hardiest agaves known and should be tried throughout the state up to 8,000 feet. A large agave used in landscaping in southern New Mexico is not a native. Agave Americana is from central Mexico. Reaching a gigantic size and with a flower stalk equally large, this species grows under the same conditions as our native agaves. For more information, Howard Scott Gentry's book *Agaves of Continental North America* is the definitive work. Agaves have been used for food, fiber and drink, but we can also appreciate them for the living sculptures that they are.

## NEW Wildflower Poster

The Native Plant Society of New Mexico and artist Niki Threlkeld will soon present the new poster *New Mexico Wildflowers: Summer & Fall*. This poster which complements *New Mexico Wildflowers: Spring and Summer*, will be available in early December. The centerpiece is a rufous hummingbird feeding on *Penstemon barbatus*. We are having 7,000 posters printed and donating 1000 to the NM Dept. of Education for distribution to the schools.

Mail order posters will cost \$8 each to NPS members (include \$4 for handling and mailing tube (1-4 posters)) and will be available from Ellen Wilde, 110 Calle Pinonero, Santa Fe, 87505. They will also be available from chapters. For local information contact Jean Dodd (Alamogordo, 434-3041), Bob Reeves (Las Cruces, 523-1806), Bev Grady (Albuquerque, 275-0798), or Ellen Wilde (Santa Fe, 982-1406).



# CALENDAR

## OTERO

7 Nov. Potluck, Seed Exchange and Annual Business Meeting. Noon, Hanawalt home. Bring a chair, calendar, and ideas for 1993. Call Hanawalt's or Jean Dodd for directions.

## GILA

8 Nov. Chiricahua Mtns. Depart WNMU Fine Arts Lot at 8 am. Bob O'Keefe 388-5101

19 Nov. Annual Elections and Business Meeting. Carter House 7 p.m.

Dec. Potluck to be announced. Call Deb Swetnam 388-3086

## ALBUQUERQUE

no report

## SANTA FE

18 Nov. Robert Dewitt Ivey, "Plants of Gray Ranch and other remote areas of New Mexico". 7:30, Evans Science Bldg., Rm 122, St. Johns College

Dec. No meeting, Happy Holidays!

## LAS CRUCES

11 Nov. Pot Luck Dinner. Bring your favorite dish and eating utensils.

2 Dec. Planning Meeting for 1993. 7:30 Ag. Bldg. Rm. 190

## CARLSBAD

no report

## THE NATIVE PLANT SOCIETY OF NEW MEXICO: A SHORT HISTORY

Our Native Plant Society (NPS) began in 1976. The first meeting was held in Santa Fe but the new members hailed from around the state. Meetings continued to be held in Santa Fe until 1978 when the society was split into two chapters, Santa Fe and Las Cruces. By 1980 two additional chapters were added, Albuquerque and Southcentral (consisting of members from Carlsbad, Roswell, Alamogordo, Tularosa, and Ruidoso). There were 175 members by this time compared to about 475 today. The first state meeting was held in 1980, also the year that *A Flora of New Mexico* was published.

Plant sales were frequently held during the early years of the NPS, more so than today it seems. Wilderness issues were also a prominent concern of the NPS. In 1981 a new chapter was formed in Los Lunas, called the Glenn Niner chapter. The Otero-Lincoln chapter was also formed that year.

In March of 1982 the first special issue of the NPS Newsletter was dedicated to the Endangered Species Act which was up for reauthorization (as it is again in 1992). The only other special issue was the Nov./Dec. 1991 issue on landscaping with native plants. The Newsletter by the way was begun in 1976 when the NPS began. The use of a volume number was not begun until 1980, however, and volume 1 was assigned to those issues. You are reading volume 17 now though, because the editor in 1981 wisely chose to change that volume to number 6.

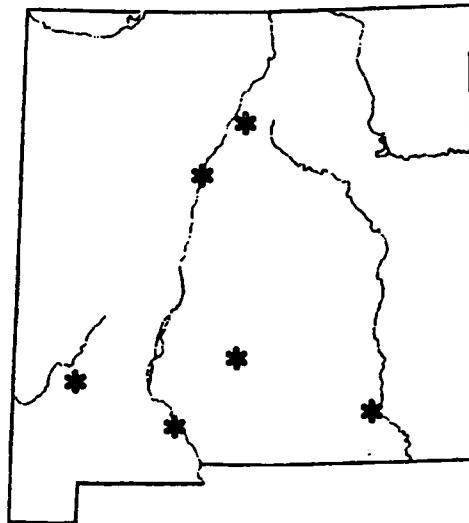
By 1985 the Glenn Niner chapter had been absorbed by the Albuquerque chapter and the Southeastern chapter transformed into the Chaves County chapter. The newly formed Lea County chapter (1986) lasted only one year. By 1987 the Chaves chapter also ceased.

If you're trying to keep track then, by 1987 the NPS consisted of four chapters, Otero, Las Cruces, Santa Fe, and Albuquerque. It was in this year that the NPS really shined in holding the Southwestern Native Plant Symposium in Albuquerque. This was an impressive meeting with over 30 speakers, 5 tours, a poster session, panel discussions, and exhibits. The 129 page published proceedings provides a record of that event.

In 1988 the Gila Chapter was formed. In that same year the Bosque Project was begun to provide native landscaping to visitor areas at the Bosque del Apache. Our newest chapter, from Carlsbad, formed in 1991. We also released our Wildflower poster in that year. Our dues, by the way, began at \$6 in 1976 and were increased to \$8 in 1983 and \$10 in 1991. There are too many people who have served our membership in 17 years to mention names. Many of the original members are still active. 1995 we will be our 20th year. What can we do to celebrate?

TM

### 1992 Native Plant Society of New Mexico



Local Chapters



## CHAPTER REPORTS

### Otero - Jean Dodd

Unfortunately Otero had to cancel the Timberson trip because of heavy rain. The 8-8 edible native potluck at Claypools in Bent (formerly Bill Mayfield's place) turned out to be an extraordinary event. Several days before the potluck the Claypools found that they had to go to California to be with Betty's sister. They told us to go ahead with our plans and to pick plums, apricots, and pears, too. A wonderful neighbor greeted us upon our arrival and everything was ready as if the Claypools were actually there. Along with food for the potluck some members brought produce from their gardens to share so people went home with a lot of good things to eat. The menu included raspberry leaf tea; strawberry leaf tea; black beans; raspberry salad; blue corn muffins with apples and nuts; water cress and cream cheese sandwiches; calabicitas(squash,etc.); cookies with lemon cream,cactus jelly, and pecans; wild rice, prickly pear and peach salad; mesquite jelly and zuchini bread; fruit; pumpkin cheesecake with a mesquite meal crust; lamb's quarters; wild grape jelly; purslane salad,Anasazi beans; and chicken cooked with marjoram, thyme, and sage. Following the potluck Clay Garrison took us over to his place of work at the Mescalero greenhouses where he showed us the watering system for seedlings. Seeds are collected from the Reservation and grown in the greenhouses as part of a reforestation program. A still large supply of tree seedlings were being held for planting as soon as the rains begin and the crews can go out and plant them. A number of experimental methods are being tried to improve the survival rate of the seedlings which are stepped on by cows, eaten by deer, or dug up by other animals.

Jean and Bill Heflin of Albuquerque presented a slide show on penstemons for the Otero Chapter 8-28-92. Bill took most of the pictures while Jean studied the penstemons over the entire state from alpine to desert with grasslands and forests in between. "The Beautiful Beardtongues of New Mexico-A Field Guide to New Mexico Penstemons" by Erma Pilz and Jean Heflin will not be reprinted and the second edition will not be out for about two years so get your copy of the first book while you can. The amount of time and effort Jean and Bill have spent looking for penstemons in all kinds of places and terrain is indeed impressive. Penstemons tend to sit around and interbreed which often makes identification extremely difficult.

On our field trip 8-29 in the mountains around Cloudcroft, especially Karr Canyon,unfortunately we found very few penstemons in bloom. A few weeks before the trip masses of penstemons must have been in bloom judging from the number of plants we saw gone to seed. The maples had started to turn red and the aspen were getting ready to change to yellow. We did see white violets, cosmos, lots of skyrockets(Phlox Fam.*Ipomopsis aggregata*), harebells(Bellflower Fam.-*Campanula rotundifolia*), baneberry with red berries (Buttercup Fam.-*Actae arguta*, Mountain spray (Rose Fam.-*Holodiscus dumosa*),Jacob's Ladder (Phlox Fam.-*Polemonium foliosissimum*) blue,Pearly everlasting, buckwheats, beautiful 4 o'clocks (*Oxybaphus comatus*),and asters in many colors. Our new member from Ruidoso brought her mother who is visiting from

Germany and she spotted a large patch of little purple gentians,probably *Gentiana heterosepala*, that looked like the ones she is used to seeing in Europe. The statuesque monument plant had gone to seed but was still impressive. Green gentian,*Swertia radiata*. Similarly the very tall cocklebur was very large, partly blooming and partly gone to seed. The leaves,(reminiscent of rhubarb leaves),for next year's plants were abundant in the area.

### Santa Fe - Nancy Daniel

7-26-92

This trip took us along route 144, north of Espanola to Chicoma (or Tschicoma) Mountain. The views of the surrounding mountains were spectacular. The flowers were beautiful and abundant. We listed over 100 species. There were no less than 85 species in bloom. There were currants, strawberries and raspberries to eat. And, if all this wasn't enough, Ethnobotanist, Phyllis Hughes was along to inform us! The following is a greatly abbreviated sampling of the plants we saw coupled with Phyllis' useful knowledge.

The attractive lavender flowers of *Cleome serrulata* didn't give a clue to their utilitarian uses. Yet, the Navajo's combined the ground seeds with corn to make dried cakes that provided sustenance through harsh winters. They also used the tops and leaves to make a yellow/green dye for their rugs. This plant, known commonly as Bee Plant, also makes the black paint used on some Indian pottery. The Pueblo Indians boil the entire plant to a thick, black paste and dry it in the sun. When the painted clay is fired, the characteristic shiny black patterning of the Pueblo pottery shows-off just one of the uses of *Cleome serrulata*. *Croton texensis* was used by the Indians and Spanish as an insecticide. *Monarda menthaefolia* (Oregano de La Sierra) is well known for its hearty flavoring in soups and beans. The common names of *Prunella vulgaris* ('Heal-All' in America and Europe, 'Self-Heal' in England) say it all. While the name, Hag's Taper, conjures images of witches, the *Verbascum thapsus* is purported to have medicinal properties. And, the Romans dipped these long tapers of Woolly Mullein in oil and used them as torches. This report is far from complete, but can not be concluded without a mention of the *Calochortus gunnisonii* in full bloom and our thanks for the comprehensive, four page plant list that accompanied this trip.

8-9-92

Thanks to Sean Houtman for a well choreographed trip to Rowe Mesa. This extensive mesa allowed us to meander through meadows of grasses and flowers, areas of Pinon and Juniper (*Juniperus monosperma*) and Ponderosa and Rocky Mountain Juniper (*J. scopulorum*) and for the grand finale, we contemplated the history of a solitary Pinon that was four to six centuries old. Patterns of yellow (*Gutierrezia sarothrea*, *Hymenoxys richardsonii* and *Senecio longilobus*), white & pink (*Erigeron* species), red (*Castilleja integra*) and maroon (*Ratibida columnifera*) gave the impression of sweeping communities of color through the sprawling, grassy fields. Tucked within these meadows and the occasional groups of *Quercus gambeli* or *Lycium pallidum* were: *Bahia dissecta*, *Gaillardia pulchella*, *Liatris punctata*, *Linum vernale*, *Monarda pectinata*, *Penstemon virigatus*, *Phlox nana* and *Verbena* species, to mention a few. There was an interesting contrast between

## Chapter Reports cont'd

the presence of a Pinon that had been alive since Columbus came to this continent and the ephemeral flowers of late summer. The mosaic of broad, colorful meadows delineated by stands of conifers is as predictable an annual event as the meteor showers of Perseids. Once the sun fully disappeared from the horizon, Rowe Mesa offered an encore of sorts in the sky rather than within our reach.

8-16-92

Looking for butterflies and the requisite flowers and sunshine, we went to Aspen Vista and were rewarded with all of the above in addition to good company, humor and lepidopterist, Steve Cary, who is as adept with a butterfly net as he is knowledgeable about these winged creatures and their complementary plants. We had walked through Aspen Vista a month before. The Aspen had changed remarkably in a month's time. Last month the Aspen were badly affected by an infestation of tent caterpillars. It was reassuring to find that the trees had leafed out and looked healthy again. Other changes included the plants that now bore fruit, plants newly in flower and a shifting array of butterflies. Fruiting were: *Lonicera involucrata*, *Rubus deliciosus*, *R. strigosus*, *Vaccinium myrtillus*, etc. . . and blooming were: *Aconitum columbianum*, *Epilobium angustifolium*, *Erysimum capitatum*, *Penstemon barbatus*, *P. whippleanus*, *Mimulus guttatus*, *Solidago rigida* and many, many more! We encountered at least 19 species of butterflies; just two different Skippers, some Checkered & Veined Whites, more than 14 Orange Sulphurs, plenty of Purplish Coppers and High Mountain Blues, a Solitary Blue and one Dark Wood Nymph. Largest in number of species & number of butterflies seen and largest in size were the Brush-Footed Butterflies. The Painted Lady and three related species including the Red Admiral led the count. The Faunus & Zephyr Anglewing were next, followed closely by the Atlantis Fritillary. Many other species including a single California Tortoiseshell contributed to the colorful display. Numerous Steller's Jays and Clark's Nutcrackers added their sounds to the wealth of sights. An elk, its muscles glistening as it bounded through the Aspen and up the hillside in front of us, was a stunning ending to this walk.

8-22-92

It was no mystery that a fire had proceeded us, but it was not obvious, to the casual observer, by how many years or just how extensive or severe this fire was. Terry Foxx, Plant Ecologist and Fire Biologist, was ready to fill in the details. We were walking in La Mesa Fire Area witnessing the 25% plant coverage that had taken place since the fire 15 years ago. The area we studied most closely had been so heavily burned that the fire had girdled the Ponderosa destroying the cambium layer, the tree's "life blood". Other stands of Ponderosa were alive and showed "cat eyes" (a deep indentation into the trunk, but only in one area, leaving enough of the cambium layer intact). While approximately 100 square miles were burned in the 1977 fire, we only walked a small area on a trail leaving Ponderosa Camp Ground in Bandelier National Forest and so were viewing just one of the several types of reclamation methods that had been attempted.

Both the Forest Service and nature played roles in the new plant life we found. The Forest Service aerial seeded grasses including: *Agropyron pauciflorum* (Slender Wheatgrass),

*Andropogon gerardii* (Big Blue Stem), *A. scoparius* (Little Blue Stem) and *Festuca ovina* (Sheep Fescue). All but the Slender Wheatgrass are bunch grasses and according to Ms. Foxx the Slender Wheatgrass has died out while the most prevalent grass, Sheep Fescue, is so competitive it is inhibiting the germination of the Ponderosa Pines that would replace those lost 15 years ago. Nature provided several shrubs including *Ceanothus fendleri*, *Robinia neomexicana* and *Rosa woodsii*. While all have thorns arming them against the inevitable browsers, the Robinia showed the most substantial growth. There were an amazing number of flowers in bloom. The *Penstemon barbatus* and *Ipomopsis aggregata* were growing close enough together so the differences were obvious to anyone that might find them confusing. The same for *Erigeron divergens* & *Townsendia formosa* and *Liatris punctata* & *Petalostermum purpureum*. Also still in bloom, but hardly to be misconstrued were: *Erysimum capitatum*, *Fragaria americana*, *Oenothera hookeri*, *Monotropa hypopitys*, plus many more. The seed heads of *Cercocarpus montanus* caught the sunlight and the caps of many small *Boletus edulis* caught the eye of a couple of Mycophagists. Despite the bleak acres of charred Ponderosa stumps, Terry Foxx presented a straightforward look at the worth, if not the necessity, of forest fires. The word "controversial" was often used and we were able to learn and see first hand some of the issues involved in this controversy.

### Las Cruces-Paul & Betty Shelford

8-12-92

Lisa Johnson, from Artesia, gave an entertaining presentation of "Sense and Nonsense about Native Plants" at our August meeting. The why of some of the common names of plants, their contradictions to fact in some instances, and the outlandishness of the folklore of some plants gave us an enjoyable evening.

8-16-92

Tom Wootten led the August field trip into the Sacramento Mountains south of Cloudcroft. There were many stops along the way to discover wildflowers such as *Penstemon Neo-Mexicana*, the Hairythroated Pigmy Gentian, and a peach-colored Evening Primrose. We drove past the ugly scars of timber clear cutting, and we stopped in areas of old growth forest to admire stands of Ponderosa Pine, Hemlock, Douglas Fir and Aspen. After a stop at Bluff Springs, we went on to the Solar Observatory at Sunspot and discovered even more wildflowers in that setting.

9-9-92

At our September meeting, Dave Richman, NMSU Professor of Entomology, spoke of his research on spiders and scorpions at the Gray Ranch and the Animas Mountains. His slides showed many of the native plant communities in that area and aroused an enthusiastic anticipation from those members planning to take the guided tour at the Gray Ranch in October.

## A TRIBUTE TO THE AMATEUR IN BOTANY

by Herbert G. Baker, Professor of Botany, U.C. Berkeley  
Originally printed in the *University of Washington Arboretum Bulletin*, Fall, 1982

Continued from *NPSNM Newsletter*, July/August 1992

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 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 leafcutting 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 nonbotanical 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

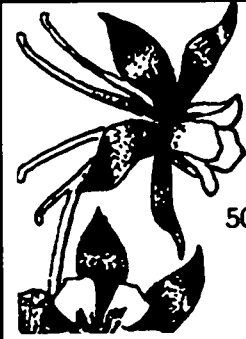
biological literature written in a jargon that only the initiated can comprehend. How on earth can the amateur contribute in these circumstances? Well, first of all, I should say that the amateur can still contribute significantly along lines that are traditional but are capable of improvement and expansion. 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 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.




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