



Nature Notes

Pajarito Environmental Education Center

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Your Nature Center in Los Alamos

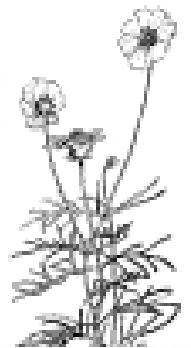
Breaking Ground

Groundbreaking for the new nature center was on April 22. The photo above by Bob Walker shows five of the people who had the original vision of a nature center for Los Alamos: Chick Keller, Yvonne Keller, Michele Altherr, Sarah Gustafson, Becky Shankland. At the ten-year anniversary of the founding of PEEC, Michele Altherr gathered recollections from the shoveling folks above and others. Yvonne Keller contributed the following memories of how it all began.

Ten years ago a small group of us, led by Michael Smith, began to meet once a week at the LA Cafe to discuss the possibility of a nature center in Los Alamos. At some point [it was] suggested that we invite directors of the nature centers in Santa Fe and Albuquerque to speak at a public meeting at Fuller Lodge. That seemed like such a bold move to me and I was quite excited but wondered how many people would show up. We reserved the Lodge and contacted the speakers, who agreed to come. The night of the meeting we arrived to find the Lodge filling up with a crowd! Los Alamos really did seem to want a nature center. Eventually PEEC had a place – the LA Schools leased PEEC space in the old Little Valley School. Having a place and having volunteers come forward to staff it along with the ability to hire part-time staff led to a great increase in programs, lectures, classes, etc. While there were ups and downs along the way, that first show of enthusiasm at Fuller Lodge has been affirmed over and over again as people have come to share some piece of nature with others. ☀

Little Yellow Composites: Greenthread

In 2007, Chick Keller wrote and Dorothy Hoard illustrated a booklet published by PEEC, *The Twelve Little Yellow Composites of Summer*. It has much to offer that other wildflower books don't. For one thing, you can see them locally. For another, they are arranged in order of their blooming periods through the summer. Here is one that has been especially abundant this year.



Greenthread, *Thelesperma filifolium*

By mid to late June, masses of 1-foot-tall greenthread bloom along the roadsides, especially on the road out of Los Alamos past the airport and along most roads between Los Alamos and White Rock. The thin, thread-like stem and leaves give the plant its popular name. Notice the curious green structure (called a receptacle) that holds the ray and disk flowers and joins them to the stem. Notice that where the bowl attaches to the stem, four or so leaflets (called bracts) extend out from its base. The solid bowl with these bracts extending outward makes identification of this plant easy. ☀

Watching Us, What Do Critters See?

Every now and then we see a photo of an animal looking in a window at interested human beings. Earlier this spring Becky Shankland watched a roadrunner being a predator on lizards. The bird brought a lizard to Becky's window as if offering to share dinner. (Photo by Becky.) Ramie and Marion Stelts were surprised to see a gray fox looking through a window one day. (Photo by Marion.) It went on to raid the bird feeder and was pounced on by a neighbor's cat! However, at Bob Walker's house during a birding session, a hummingbird hovered just outside a window and Bob said it was watching its reflection -- the other bird, not us.



So, just how well do animals see us? An online newsletter by *Nautilus: Science Connected* explains the vision of a variety of animals and invertebrates. See below.

Some animals, including your pets, may be partially colorblind, and yet certain aspects of their vision are superior to your own. Living creatures' visual perception of the surrounding world depends on how their eyes process light. Humans are trichromats -- meaning that our eyes have three types of the photoreceptors known as cone cells, which are sensitive to the colors red, green, and blue. A different type of photoreceptors, called rods, detect small amounts of light; this allows us to see in the dark. Animals process light differently -- some creatures have only two types of photoreceptors, which renders them partially colorblind, some have four, which enables them to see ultraviolet light, and others can detect polarized light, meaning light waves that are oscillating in the



same plane.

"We will never know what a cat would experience," says Dan-Eric Nilsson, a zoology professor at the University of Lund in Sweden and coauthor of the book *Animal Eyes*. But we can come close to seeing what it sees. Unlike humans, cats are dichromats; they have only two kinds of cones in their retinas. They see similarly to humans with red-green colorblindness, Nilsson says. To model a cat's vision, one has to pool everything that's red or green into one color.

The cat's eyesight has a lower resolution than our own, which means it sees objects slightly blurrier than we do. Human vision is among the sharpest of all animals, thanks to densely packed cones at the center of our retina. Nilsson

says cats' daylight vision is about six times blurrier than ours. However, cats have more rods than humans, so by moonlight, the advantage is reversed.

Unlike humans, birds are tetrachromats. Their four types of cone cells let them see red, green, blue, and ultraviolet together. A few birds of prey have sharper vision than humans, Nilsson says. A large eagle sees with about 2.5 times the resolution that we do.

If Nilsson could truly get inside the head of another animal, "birds would be interesting," he says. But we can neither sharpen our resolution past human limits nor see ultraviolet light -- we don't have the photoreceptors and brain neurons to make it happen. We can use binoculars to see the distant detail that an eagle would discern, and cameras that convert ultraviolet light to a color visible to our eye, but without such technology "there's no way of allowing a human to really experience what the world would be like to a big eagle," Nilsson says.

Note: this source web site offers photos with a chance to see as some animals and some invertebrates do. Try it at [//nautil.us/issue/light/how-animals-see-the-world](http://nautil.us/issue/light/how-animals-see-the-world).



Bears – An Inside Story

by Joyce Wolff

Instead of enjoying a warm sunny evening outdoors recently, I was sitting at the computer in my husband Walt's office. I became aware of some gentle bumpings in the living room. Not worried, and thinking it might be the cat or Walt coming down stairs, I was in no hurry to check. However, lately we have had a young bear roaming around the decks of the house, trying to get into the storage room where we put the trash, so a quick check seemed in order.

I walked down the short hall and stood astonished. Walking along the top of the credenza under the front room window (yes, inside) was a bear, while beside her in my recliner stood her cub.

I think I said, "Oh my, Oh my." I find I utter those words when no others will do.

My mind raced, wondering what to do. I was afraid they might start dashing around in a panic or even run up the stairs. That day I had been using a six-foot step ladder in that room. Fortunately, it was leaning against the wall right where I was standing. I took both sides and held it in front of me. That must have made me look threatening, for as soon as she saw me the mother bear turned and loped gracefully and quietly around a big arm chair across the room and out the sliding glass door. I will confess right here that I had left it wide open since I have never been a responsible door closer. She naturally had taken it as an invitation.

To my further surprise, and probably to hers, her cub didn't follow. It ran to a second sliding glass door on the same wall about six feet from the open one. That screen was closed and the cub was frantically trying to claw its way out.



I decided it was better to deal with the frightened cub than an angry mother who might come back in to retrieve it--and in doing so teach me a lesson on door protocol. I walked across the room, keeping the ladder upright in front of me, and closed the glass slider.

Now I'd deal with the cub that was still scared to death, desperately trying to get out through the screen. I hung on to my shield, since even a cub as small as this one can inflict serious hurt. I was able to awkwardly pin the little bear between the screen and my somewhat protected legs, reach around the ladder, and slide the screen open. That was a bit tricky, as the ladder was awkward and the cub was bouncing back and forth across the width of the opening, pressing hard on the screen and making it harder to slide open. But as soon as the opening was wide enough, the little bear tore out. I didn't think to watch

the reunion between mother and cub. I was sitting down to lower my heart rate.

During all this commotion I had called Walt a couple of times, but he heard neither me nor the two picture frames crashing to the floor when the big bear knocked them off the chest. I walked upstairs to tell him my little adventure, which had taken only a few exciting minutes, a much shorter time than it took me to tell the story with great animation and wild gesticulations. He listened patiently with appropriate ooohs and ahhhhs, then said (you guessed it), "Did you get a picture?"

Oh my!

Photo: Mother bear with cub taken from a home on North Mesa.

Photo by Hari Viswanathan.

Note: Joyce Wolff's bear adventure took place in her former house near Trinidad, Colorado. We're happy that she's now returned to the safety of White Rock. We're wondering, did the credenza survive? ✨

The Use of Vouchers in Determining What's Growing in Our Area, or, How to Get an ID on Your Plant

by Chick Keller

It has long been understood that the best way to know what plants grow in an area such as Los Alamos County is to collect them -- and photograph them. Collections are identified, pressed flat, mounted on archival sheets, entered into a database, and stored in a herbarium, which is essentially a library of plants.

These sheets are called "vouchers" and, as the name implies, vouch that a given plant has been found at a given spot. A voucher typically consists of a herbarium specimen -- a pressed and dried sample of an individual containing aboveground structures (leaves, stems, flowers, and/or fruits) and belowground structures when possible. The sample is usually mounted onto acid-free paper, although depending on the type of specimen, it can also be stored in a box, packet, or jar under controlled environmental conditions.

Eventually, the voucher must include an identification label that ideally lists the recognized scientific name of the plant, its accepted taxonomic authority, the name of the person who identified the sampled plant, the collector's name, date of collection, habitat of the collection site, locality of the site (preferably consisting of GPS coordinates, with the corresponding datum and degree of accuracy), and perhaps a collection number assigned by the collector; a unique accession number is sometimes added later by the herbarium.

These vouchers serve several purposes. **First**, and perhaps most important, they can be used to verify that a given plant has been found. Photographs can help do this, but they are seldom good enough for careful identification. At PEEC, starting this year, we are beginning to include photographs with our collections. This has the great advantage that

most new cameras record the GPS location of the photograph, thus insuring that the location of collection is accurate.

Second, a collected plant must be identified. This often is not easy, and people like myself may not always do this correctly. The voucher allows experts to make a more correct identification. I often mail my collected plants to others for verification. For example, in the past few months I've had several experts look at my collection of sedges (grass-like plants often found in wet places). Ninety percent of my identifications were correct, but the rest were incorrect and have now been corrected.

A **third** advantage of vouchers is to help determine the overall distribution of a given species across our state. Here our herbarium has made significant contributions to the understanding of how widely distributed some species are. We have documented a fair number of species at their northern extreme. White Rock Canyon has provided most of these and, as such, is a very important area in our state.

We also have found totally unexpected plants in the surrounding Jemez Mountains. Several just north of the Pajarito ski area in Cañada Bonito have been a great surprise to state botanists. Also, our wet canyons are showing us that many plants have been marooned in their upper reaches as the climate warmed and dried out after the last great ice age 10,000 years ago. This is also true of the San Pedro Parks Wilderness in the extreme northwest part of the Jemez Mountains. This rather flat area over 10,000 feet high contains many plants (such as Arctic cottongrass) usually found at much higher elevations, but marooned there after the last Ice Age when such plants were found at these lower elevations. As such they have adapted to warmer climate and thus have much to tell researchers about how plants adapt to changing conditions.

A **fourth** use is to help people identify a plant that they came across on a hike. PEEC has a special

exhibit called "What's Blooming Now" in which we put out the vouchers (with photographs) so people can come in and compare them with the plant they have collected or photographed.

How do other researchers find out about our vouchers? Happily our Jemez Mountain Herbarium, housed at PEEC, is now included in the database of the major web site of collections in Arizona and New Mexico (SEINet). This makes our collection available to anyone world-wide who is interested in plants of this area. For example, recently a botanist who had looked over our data base wrote me asking if I was certain of an identification. It turned out to be wrong, largely due to an ambiguity in New Mexico's newest plant identification book, a problem that we communicated to the authors.

Here I add that many of our collections were done in the 1970s and 1980s in work sponsored by Los Alamos National Lab. Most of these were done by our current PEEC president, Terry Foxx, working with Gail Tierney. Her early collections have proved very important in documenting plants of the Pajarito Plateau. More recently our herbarium is housing an increasing number of collections made by individuals who just came across strange plants in their travels. We correctly list these individuals as the collectors, such as Roy Greiner, Craig Martin, Becky Shankland, Paul Arendt, and many others. Thus PEEC has been able to enlist the help of many people, adding substantially to the number of "eyes on the ground."

Vouchers also allow another sort of identification. There is excitement at the herbarium when we discover that a voucher, collected years ago, has been misidentified and is actually a new species for this area. This usually is made possible by newer flower identification aides. And, while we often can't go back to the area of collection, the voucher remains in the herbarium waiting to be "rediscovered"! Vouchers also provide material for DNA studies that more accurately determine a

plant's place in the larger scheme of species and genera.

A **fifth**, sadly, vouchers can show the previous existence of species no longer present in a given area due to ecological changes. In Los Alamos County this is particularly poignant due to the loss of several very special species because of recent fires and resultant huge floods. These have either washed away the colony (spotted saxifrage in Valle Canyon) or it has died out due to intense sunlight where previously there was considerable shading by trees now burnt (fairly slipper colony at Scooter Pass).

A **sixth**, often overlooked, purpose is the aesthetic. As mounted, the plants are quite beautiful to see. Each has its own way of "making a living," some stout, some fragile, some vining, some short and densely packed. The curves and shapes as well as colors are a joy to see. Plan to visit the herbarium to see these wonderful "vouchers" (I'm usually there Tuesday afternoons, but I'm happy to make a special appointment to meet your schedule).

Elements of this article were suggested by the following editorial posted online at <http://www.bioone.org/doi/full/10.3732/apps.1300076>: Culley, Teresa M., "Why Vouchers Matter in Botanical Research," *Applications in Plant Sciences* 2013. 1(11). ☼



Voucher in the herbarium for Packera hartiana, Hart's Ragwort.

Photo by Chick Keller

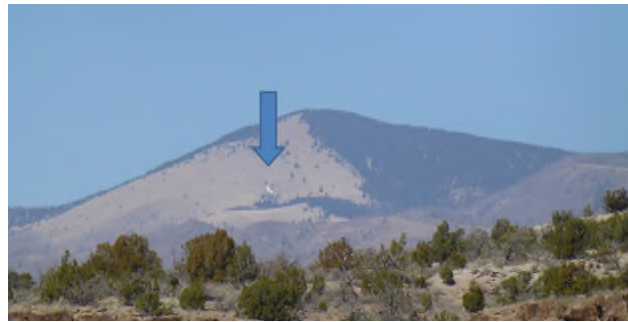
What Is Citizen Science?

Research often involves teams of scientists collaborating across continents. Now, using the power of the Internet, non-specialists are participating, too. Citizen science falls into many categories. A pioneering project was *SETI@Home*, which has harnessed the idle computing time of millions of participants in the search for extraterrestrial life. Citizen scientists also act as volunteer classifiers of heavenly objects and make observations of the natural world.

Source, with project descriptions:

[//www.scientificamerican.com/citizen-science](http://www.scientificamerican.com/citizen-science) .

There are citizen science projects at PEEC. The activities of PEEC interest groups about birds, butterflies, and wild plants include elements of good science: monitoring, discoveries, regular surveys, records, and use of scientific methods. Three



interest groups report to national and international databases. This year has become noteworthy for wild flowers. The wild plants group walked trails, took photos, reported online, and produced a long record of “first blooms” this spring.

These informal groups also help each other with questions. For example, recently Terry Foxx reported the following ongoing citizen science work by her husband Jim:

For years my husband Jim has watched a snowdrift disappear on the slopes of Tschicomo. He states that one year the snowdrift never formed; it melted

between each snow storm and that was a fire year. During the year of the Cerro Grande fire the drift left March 15. This year I took this picture on February 25, but we had a couple of light snowstorms after that. We were gone when the drift disappeared sometime between March 29 and April 12. Jim states that the latest he has seen the drift leave is June 28, but generally it is gone by May 15.

He has been observing the mountain since 1972. His citizen science falls short because the information is in his memory banks; he did not write down his observations each year. It was just his weather-watching interest, which he has carried on for 42 years.

So, did anyone observe the date the drift disappeared this year? We know it was between March 29 and April 12. Jim says this is the second earliest he has seen the drift disappear. By the way, you can not see the drift from the “hill” townsite but can from the White Rock area.

Aldo Leopold’s family kept records of what they observed and that led to his becoming a well-known ecologist. But each of us has the opportunity to be a Citizen Scientist and the observations that are recorded through these PEEC groups are important. I especially like the fact that records are being kept in online databases covering broad areas. These observations provide long-term data which is so important with environmental changes.

Let’s keep up the observations and record them on PEEC’s interest groups. ⚙

Nature Notes is the quarterly newsletter of the Pajarito Environmental Education Center, Los Alamos, New Mexico 87544

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From the Executive Director,
Katherine Watson

“The kids are showing so much cooperation!”

“Look at how they’re using engineering principles.”

“That child is usually shy, but look at her taking a leadership role!”

“Wow -- June 29, 2014 they really need to work together to get this job done.”

“They’re making food, waiting on hotel customers, helping each other deliver, and being tasters!”

“I like that you folks have areas where the kids can play in the dirt and get dirty. There are a lot of places that kids go to, and it’s ‘look, don’t touch,’ but here it’s not like that.”



“I thought it was great that there was an open play time built in. They learn so much from this.”

“I observed joy in playing with dirt and sticks.”

“I think the free play time was the most valuable part of the field trip. They could have done that for hours! Thanks!”

That’s right. We didn’t plan anything to make this great learning, teamwork, cooperation, and

engineering happen. Kids on field trips to PEEC were just let loose in our Nature Play Area. There they can dig in our dirt pile (also known as the mud kitchen), take apart forts that others have built and reconstruct them in a million different ways, and basically let their imaginations run wild. One teacher called this, “authentic outdoor play and exploration,” and I think that’s a great way to describe it.

What we’ve observed in our Nature Play Area has been backed up by many studies. Kids grow from unstructured outdoor play with a lot of loose parts. This is a different experience from going to a typical playground with swings and slides, where there’s a “right way” to play. In the outdoors, kids need to make everything up from scratch. And since their games usually involve lots of other kids (teachers are sometimes shocked to see that their whole class is playing together in one big imaginary game), there’s lots of negotiation, problem solving, and yes, the word we hear most often from parents and teachers, teamwork – to make the games fun.

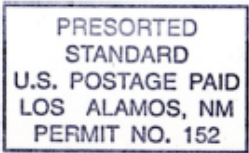


Do you want to join in the fun?

Good news – the nature play area never closes. Bring a group of kids or grandkids, meet your friends at the Nature Play Area, or come to First Friday Forts on the first Friday of every month. I think you’ll be pleasantly surprised by what you see going on there. As one parent wrote to us, “Fort building = awesome.”



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Enriching people's lives by strengthening their connection to our canyons, mesas, mountains and skies.

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