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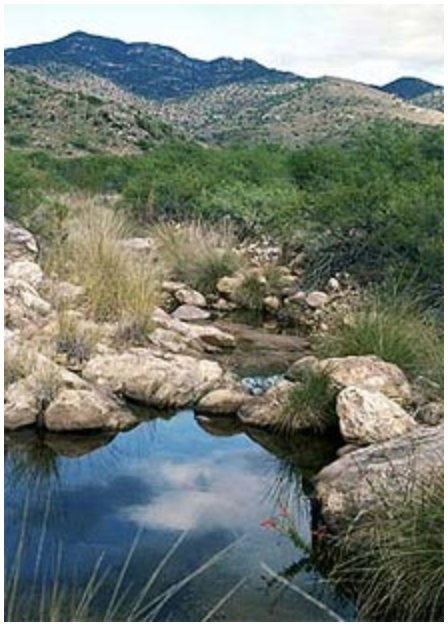
by Emily Brott : Sonoran Institute

The Living Desert: Our Most Valuable Lesson?

The Sonoran Desert is known for its harsh environment, and yet it is suggested that the earliest known Native American people, the Hohokam, chose to call this desert their home. Today, it is estimated that over the next 25 years an additional 25 million people will move to the Western United States. Arizona is the second fastest growing state in the country, based on the last census. By all accounts, the West can expect to continue to see much of the explosive growth that has characterized the last 20 years.



Rincon Creek, southeast of Tucson, Arizona.
Photo by Gene Wendt, courtesy Sonoran Institute.

What brings these people to the desert? It may be what the ancient Hohokam Indians knew long ago: the desert is a place of warm climate, natural beauty, and abundant resources. But as those resources changed, the Hohokam disappeared. Will the same fate be true of desert residents today?

As the West continues to grow, there must be ways to effectively plan for the expansion without compromising our resources; yet still provide for new homes, businesses, and natural areas. In fact, savvy Westerners are changing the debate from development vs. conservation to creating a demand for development that fosters conservation values.

The new community of Civano, in southeast Tucson, was a model for the *Houghton Area Master Plan's* 'desert village' concept.
Photo courtesy Community of Civano.

The City of Tucson, Arizona, is taking steps in this direction with Building from the Best of Tucson. The goal of the Building from the Best of Tucson program is to "create a vibrant, livable Tucson community surrounded by healthy, connected landscapes." Awards were created to encourage best practices by local builders and developers, and the City of Tucson adopted a vision statement to guide appropriate development. A Tucson Community Design Academy also trains residents as design ambassadors within their neighborhoods and across the city.

In a broader context, the region surrounding Tucson provides strong examples of how communities can influence and encourage development that is compatible with protection of natural open space.

In the late 1990s, Pima County began a comprehensive planning process that integrated designation of urban growth areas with protection of surrounding unbroken landscapes, resulting in the Sonoran Desert Conservation Plan. In the growth areas of southeast Tucson, the City of Tucson and the Arizona State Land Department began a large-scale planning process that emphasized progressive tools to reduce impact on natural areas and promote livability within neighborhoods.

The planning process became known as the Houghton Area Master Plan, named after a major road that runs through the area. The plan, which is expected to be formally adopted in 2005, encourages pedestrian- and bicycle-friendly streetscapes, connectivity between neighborhoods, creation of community centers to allow for small commercial enterprises and common areas, a mix of housing types and densities, and preservation of open spaces and sensitive natural features. Developments that reflect these qualities are detailed in the Sonoran Institute's Growing Smarter at the Edge.

The view across the lush Cienega Corridor, with the Rincon Mountains in the background.
Photo courtesy Sonoran Institute.

Thoughtful growth management is essential to absorb the influx of residents to the desert. Likewise, preservation of natural open spaces provides a critical balance to master-planned development.

For example, open space in the Cienega Creek watershed—known locally as the Cienega Corridor—just east of the Houghton Area Master Plan area provides numerous services to our community. Large, intact portions of the Cienega Corridor allow for rain and snowmelt to enter the ground and recharge our drinking water reservoirs. Native vegetation throughout the open lands provides habitat for many different kinds of wildlife. Many federal and local recreation areas have been established to allow for hiking, camping, horseback riding, hunting, and other activities. By preserving open space, rural communities, ranching heritage, and historic sites are also able to survive.

The rural Cienega Corridor was recently recognized by the Cultural Landscape Foundation as one of the nation's top seven endangered cultural landscapes. It was chosen based on the presence of archaeological sites, ghost towns, railroad camps, and current and historic ranches and transportation routes. These cultural resources are at risk because of rapid growth and development in the adjacent urban edge of Tucson. In its designation, the Cultural Landscape Foundation recognized not only the values of the Cienega Corridor landscape, but also the value of a diverse group of citizens, land managers, scientists, and other stakeholers who have formed an alliance to help protect that landscape: the Cienega Corridor Conservation Council.

Davidson Canyon is a critical corridor within Cienega, allowing wildife to cross beneath Interstate 10, linking the Rincon and Catalina Mountains in the north to the Santa Rita Mountains and the ranges of Sonora, Mexico, to the south.
Photo courtesy Sonoran Institute.

The mission of the Council is "to protect, steward, and enhance the cultural and natural resources of the Cienega Corridor." Specifically, it is working with a land use planner in a community-led process to develop the tools necessary to preserve open space, wildlife habitat, and cultural values, including a cooperative agreement and strategic plan for the Corridor's stakeholders.

The recent report Prosperity in the 21st Century West concludes that protection of public lands can be a positive economic driver for Western communities. The new global economy demands that successful communities have easy access to nearby protected open spaces, as well as large markets and an educated workforce. Places such as Tucson, on the northeastern edge of the Sonoran Desert, have all these factors, and can reap the benefits.

As Jeff Comer, CEO of Tucson's Northwest Hospital, recently testified, "Northwest Hospital depend[s] on Tucson's blue skies and open lands to recruit our nation's top healthcare professionals to our community."

A living desert is a growing desert: balancing human demands with nature's needs. If we appropriately apply this knowledge, we will have learned the Hohokam's most valuable lesson of all—sustainability is the essence of survival.

Emily Brott is a Sonoran Institute project manager for the Sonoran Desert Program in Tucson, Arizona. She helps community organizations in the Cienega Creek Watershed realize their conservation goals through outreach, facilitation, research, and general support. Brott comes to Sonoran Institute after receiving an Msc. in Environmental Sciences from Lund University in Sweden. She specialized in U.S. EPA drinking water policy support at the Cadmus Group, Inc., and studied biology at Harvard University. She enjoys foreign language and culture, running, hiking, biking, and playing the guitar.

Column: The Literal Landscape

by Simmons B. Buntin, Editor/Publisher, *Terrain.org*

Chasing Wildflowers in El Pinacate y Gran Desierto de Altar

Sunday, 9:15 p.m.

Brittlebush on a rock scarp in Organ Pipe National Monument.
Photo by Simmons Buntin.

Finding that I'm not at home, Scott Calhoun—my friend, neighbor, and author of the recently published Yard Full of Sun: The Story of a Gardener's Obsession That Got a Little Out of Hand—dashes over to the activity center in our Tucson, Arizona neighborhood and waits almost diligently for my meeting to end.

As we convene, he rushes up to me with a sparkle—or perhaps mad gleam—in his eye. "What are you doing tomorrow and the next couple days?" he asks. It's a loaded question, and I know it.

"Working on Terrain.org," I reply honestly. It is, after all, only two days until the next issue launches.

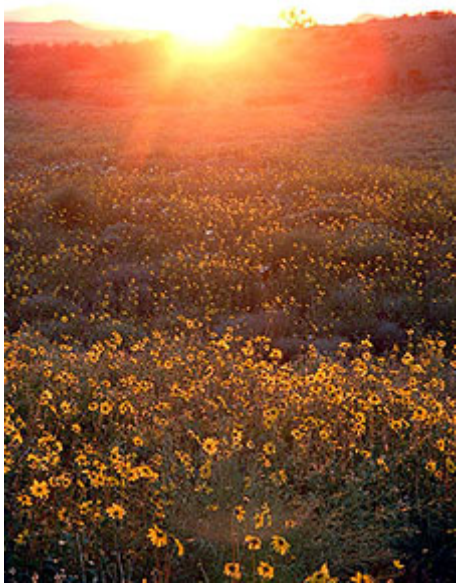
He dismisses my priority and tells me we've got an emergency. After all the spring rains, native flowers are blooming on both sides of the Arizona-Mexico border like they haven't in a decade or more. Reports have it, he says excitedly, that the flowers are nothing short of amazing at the Mexican state of Sonora's Pinacate Biosphere Reserve, officially Reserva de La Biosfera de El Pinacate y Gran Desierto de Altar. He looks me in the eye and says without a hint of sarcasm: "This is a wildflower emergency. Are you in?"

Monday, 2:44 p.m.

Our trip is confirmed, but we cannot leave until Tuesday because I'm taking care of my daughters tonight. Since Scott has to be back on Wednesday mid-day, and Terrain.org publishes the following day, that leaves us roughly 30 hours to cover some 600 miles, two languages, two national parks, three columnar cacti species each growing over 20 feet tall, dozens of wildflower species of every imaginable color and maximum density (we hope), and one seafood restaurant in Puerto Peñasco, at the northern tip of the Sea of Cortez, to enjoy fresh sea ray tacos and cold Negra Modelo in amber bottles.

Tuesday, 10:20 a.m.

We've just finished loading my Honda Accord, a four-door sedan logging 150,000 miles. What information on Pinacate there is—and there's not much—generally advises a quattro by quattro, but she's all I've got.



Pinacate sunrise: sunflowers, evening primrose, and sand verbena among sand dunes.
Photo by Simmons Buntin.

The snack collection we've assembled mirrors the hurried nature of our departure: turkey jerky, Fig Newtons, Swedish fish candy, random granola bars, husked almonds, and plenty of water. With all the gear we've packed—tent and lantern, sleeping bags and camera bags, tripods and wildflower guides, boxy coolers and wide-brimmed hats—you'd think we were driving the lonely road down Baja California rather than dipping into Sonora on one of Mexico's better roads.

11:11 a.m.

Less than an hour west of Tucson, coasting down state highway 86 before reaching Kitt Peak and the Baboquivari Mountains, a small hill rises from the cholla, saguaro, and mesquite dotting the landscape. Our minds must be playing tricks on us because suddenly it's autumn and a massive stand of aspens is aflame. Where, then, are the blue spruce and Ponderosa pine? The chill in the air and the dusting of snow?

As we get nearer, however, the illusion passes to the ecstatic realization that the hill, about a half-mile south of the highway, is blanketed in golden-orange Mexican poppies and bright yellow bladderpod. Already we've seen wildly pink penstemon, deep orange globemallow, waxy white desert chicory, and fuscia owl's clover—but nothing like this.

A field of bladderpod among creosote bush, south of Arizona 86.
Photo by Simmons Buntin.

While a few other cars have stopped—drivers hunching over glossy hoods to stabilize their cameras—we slide into an opening on the road's shoulder, dawn our hats and camera bags, and set off for a hike. Despite the cactus, this is clearly rangeland, and we carefully evade the barbed wire as we cross into the field. Immediately we are in a different world, and while the sun is higher than Scott—who definitely leans more toward 'professional' photographer than I—would like, our first real stop for wildflower photos, still so close to Tucson, is a great success.


Mexican gold poppies around cholla skeleton.
Photo by Simmons Buntin.

1:19 p.m.

Through the Tohono O'odham Indian Reservation and into the town of Why, Arizona, we spot more but far smaller patches of poppies, and also Gooddings verbena, and pink, purple, and white globemallow, a distinct and noteworthy difference from the more common orange globemallow. Turning south toward Mexico on highway 85, we enter Organ Pipe Cactus National Monument and stop for some advice. At the visitor center, a park ranger tells us about her trip to Pinacate only last week, saying we won't be disappointed in the blooms, though in a passenger vehicle our range will be limited.

"Don't underestimate the trusty Accord," I say, though realize the last thing we want to do is get stuck in Mexico's largest desert region, especially when there's already a travel advisory for Sonora. (In fairness, the advisory is based on problems encountered along the Texas-Mexico border, leagues east of here.)

"You have two options," the ranger tells us. "Take Mexico 2 west out of Sonoyta and enter Pinacate from the north, where there are dunes and large volcanic outcroppings. But that's a rough road with a wash that's probably too risky to try without four-wheel drive." Bummer.

"Or, take highway 8 south and enter the park from its south side, where the 'visitor center' is located." After some discussion we agree this is the best plan, in part because we intend to camp in the park tonight, and need to register.

3:12 p.m.

There are times, and this is one of them, when we shouldn't give ourselves as much credit as is due. Take Scott, for example. He recently published a book, with his own text and photographs. That could, in theory, make him a professional photographer. And as his accomplice of sorts, that might make me a professional photographer, as well. The problem, as we learned from a Pinacate Biological Reserve administrator—a serious, uniformed woman with a keen eye for protocol—is that to officially take photographs in a national park or biological preserve, there's a process that goes something like this: You request permission, in writing, a month or more before your visit; you


Senita cactus grows around a desert ironwood in Pinacate Biosphere Reserve, Mexico.
Photo by Simmons Buntin.

await an affirmative response; you provide a gift of thanks once you arrive.

For two tourists who have suddenly become professional photographers, this doesn't bode well. With the interpretive help of an actual professional photographer visiting from Mexico City, however, we are able to strike a deal: We may continue into the reserve to take photos, and then return this evening to get the director's verbal blessing that will allow additional photography in the morning.

Ocotillos bloom along the edge of Pinacate's Crater Elegante.
Photo by Simmons Buntin.

(At this point it's worth noting that Scott, while not prolifically fluent, speaks Spanish fairly well. Simmons does not.)

4:04 p.m.

With the sun well past its zenith, any deal is a good deal, so with camping permit in hand I guide the Accord slowly over the sand road and into the heart of Reserva de La Biosfera de El Pinacate y Gran Desierto de Altar with the goal of making it to Crater Elegante, one of the large, near-perfectly round volcanic craters caused between five million and 150,000 years ago by rising magma colliding with groundwater. The pressure from their meeting resulted in an explosion with the power of an atomic blast, creating a series of half-sphere cutouts from the Sonoran desert terrain, some a mile wide and a thousand feet deep.

Elegante is one such maar crater, and we fear the photographs will not adequately show the massiveness of the crater and its caldera, which at the bottom is ringed by poppies and also seems, along the dark red volcanic cliff edges, to create its own wind. Perhaps its own weather altogether.

Hiking along the edge, Scott and I are nearly speechless from the stark, geologic beauty of the crater and the surrounding area, with its wild collection of senita and saquaro cacti, stunted elephant trees, palo verdes, ironwoods, blooming ocotillos, and glowing teddy bear chollas. Though the flowers here are fewer—mostly the yellow daisy-like brittlebush and some ground-dwelling, tiny purple beauties—the vastness of the scene is worth the trip alone.

And then we meet the Arizona blister beetle, which is not the legendary namesake of the park—the Pinacate beetle—that we hoped to see. Heading back, something catches the corner of my eye, so I kneel down for a closer look. I call Scott over and while we don't mean to impose—apparently it is blister beetle mating season and their orgy is spread before us like the Moulin Rouge in miniature—we stick around a bit to watch the interesting black-and-orange insects. And since most are mating end-to-end or in more traditional manners, there seems little risk of getting our own skin blistered,

which is a legitimate risk of these cantharidin-carrying bugs.


Arizona blister beetles atop blooming peppergrass.
Photo by Simmons Buntin.

6:11 p.m.

As the shadows grow and the landscape begins to absorb the last light, taking on the desert glow we've waited for all day, we drive back toward the biological reserve station. Along the way, we take liberal stops to photograph the smooth, green senita growing between ironwoods, now overtaking them, from the black ashen soil. We photograph the rare Ajo lily. We photograph cholla and saguaro and ocotillo. As the light leaves, the yellow and, on rarer occasion, white evening primrose begin to open, giving us hope that tomorrow our wildflower expectations will be met.


Evening primrose among the fine sand dunes of Pinacate's northern edge.
Photo by Simmons Buntin.

Tuesday, 4:00 a.m.

After hearing the wild pack of dogs and that singularly damned cricket all night—as short as the night was—I may have preferred to camp at Pinacate rather than falling into this hotel room just north of Puerto Peñasco. Still, we had to have seafood for dinner last night, and need to be on the road early this morning.

We're heading north on 8, into and through Sonoyta, and then west on 2, toward Mexicali. Between the administrator, the Mexico City photographer named Frederico, and the custodian, we learned yesterday that kilometer markers 72 and 79 are the best (and perhaps only) places to stop along highway 2, places where we can walk or drive a short distance into the park, and take photos.

Last night the Pinacate director never made it back to the park. The only gifts we could have offered, we realize, are the Sonoyta oranges (15 pounds for $2) and the cold Dos Equis in the cooler. Turns out, however, that we'll need those for breakfast, so it's a good thing we didn't give them away.

5:26 a.m.

We've just turned south onto the microondas cobbled dirt road off highway 2, kilometer marker 72. Instantly, we know this is where we need to be. Primrose, sunflowers, sand verbena, and a number of others we cannot yet identify have exploded upon the sand dunes. While the inertia of magna and

groundwater created the rare maas craters south of here, the inertia of millions of energy-clad seeds and a marvelously wet spring created this spectacular floral event—and we have to believe this is the peak day for blooms, as it was yesterday for the Mexican poppies and bladderpod along Arizona 86.

Sunflowers greet the morning below a hill with *microondas*.
Photo by Simmons Buntin.

Words cannot convey what we hope and trust our photographs will [view wildflower gallery], but here's some of what we see, set against sharp mountains in the background and shallow dunes in the fore: clumping violet sand verbena, pale purple lupine with airy geometrical leaves, Western peppergrass atop the cheddar-colored dunes, large white evening primrose, a sea of dark-centered yellow sunflowers, and much more.

Scott and I head off in different directions as the sun begins to rise, being as careful as possible not to step on the plants—an impossibility. By the time we return, an hour and a half later, we are, as A.R. Ammons reports in his poem "Prospecting:"

At dawn returning, wet
to the hips with meetings....

Scott Calhoun photographs dunes and wildflowers at the *El Pinacate*.
Photo by Simmons Buntin.

The heavy dew on the morning plants has greeted our shoes and long pants. After burning through 72 slide exposures and more than 40 digital, it's time for breakfast—a surprisingly fulfilling collection of oranges, granola bars, and green-bottled Mexican beer.

9:08 a.m.

Back at Organ Pipe—after a requisite visit to a Sonoyta mercado and three carne asada tacos each—we have another decision to make: head home, arriving by lunchtime, or take the 22-mile Ajo Mountain Drive into the rolling hills of Organ Pipe National Monument. After consultation with the ranger of yesterday, we decide on the drive.

10:49 a.m.

Once again, we are not disappointed. Beginning with a sprawling display of flowering brittlebush against the burnt redbrown scarps, we've discovered a psychedelic collection of flowers among organ pipe cacti and their driftwood-like skeletons, saguaros, palo verdes, and ever-present chollas. Here we see more Mexican poppies, globemallow, penstemon, vividly blue lupine, Esteve's pincushion, desert chicory, a wonderful light blue lily called covena, deep larkspur, chia, chuperosa,

and a number of other white and yellow flowers like anemone and desert marigold.

I am also happy to report there is a slight traffic jam for a rattlesnake crossing our dirt road, then settling beneath an aromatic creosote bush.

3:22 p.m.

Pulling into our southeast Tucson neighborhood, we're hit by how much ground we've just covered. And we're exhausted in the best kind of way.

Flowering brittlebush among staghorn cholla and organ pipe cactus.
Photo by Simmons Buntin.

Globemallow blooms beneath a hillside dotted with saguaros, organ pipe cacti, and poppies.
Photo by Simmons Buntin.

In addition to the photographs and the sheer adventure of it all, I've quickly developed a new relationship with many of the desert plants I had been taking for granted, like brittlebush and globemallow.

We see these common desert shrubs planted as single entities or perhaps grouped in twos or threes in yards and medians. But to see them in uncountable numbers along a jagged hillside, or rising out of a sandy wash, or even in haphazard rows along the side of the road gives me a new appreciation.

So to them, and to Scott, and the Organ Pipe ranger, and the Arizona blister beetle, and the towering cacti, and the massive caldera, and the desert ironwood, and the late winter rains, and the resulting fields and hills and canyons of a raging floral fire, I give my thanks.

View more El Pinacate wildflower photos at www.terrain.org/columns/16/literal.htm.

Simmons B. Buntin is the founding editor of *Terrain.org: A Journal of the Built & Natural Environments*. With a master's degree in urban and regional planning, he is—logically—a web program manager for the University of Arizona. Recent work appears in Writing the Future: Progress and Evolution (MIT Press), and his first book of poetry, Riverfall, will be published in June 2005 by Ireland's Salmon Publishing. He has also published in *Southern Humanities Review, Sou'wester, Bulletin of Science, Technology, and Society*, and others, and is a recipient of the Colorado Artist's Fellowship for Poetry.

Column: What a Fool Believes...
by Todd Ziebarth, *Terrain.org* Editor

Back to Basics

The true desert—the one without swimming pools, air conditioners, and golf courses—appeals to a small number of people. It is a place that breaks you down and hangs you out to dry. But, if you are lucky, it is a place that also builds you back up again.


Green River overlook from Canyonlands National Park. Photo courtesy National Park Service.

I haven't spent much time in the true desert, or in the increasingly watered version that is replacing it. I did glimpse, though, the true desert's power during a weeklong canoe trip on the Green River in Canyonlands National Park in July 2001. I hesitate to say that we canoed, however, because that implies we exerted ourselves by paddling our boats down the river. Perhaps floated is a better descriptor.

It is not that we didn't paddle at all, though. On the first day of the trip, for instance, we rowed with all the vigor of a college crew team, which had an intoxicating effect on us. After spending almost eight years hiking and snow-shoeing through the mountains of Colorado, it felt wildly different to primarily rely on my upper body to propel my movement in the world. Notwithstanding the exhilarating rhythms of rowing, we soon experienced a couple of things that changed how we approached the river.

As we were putting the canoes in the water at the beginning of the trip, one of the fellows who rented the boats to us mentioned in passing that we may encounter a few bugs during the first fifteen to twenty miles of the trip. We listened politely, but sort of shrugged him off and hit the water. About five o'clock, we pulled over to the east side of the canyon and climbed up a hill to an open, flat area suitable for camping. The hordes descended on us immediately. To protect myself, I put on long pants and a long sleeve shirt. It worked, kind of—I didn't get bit up as bad, but I still got bit up. Although the clothes covered my legs and arms, the bugs chewed through the additional layer to feast on my skin.

Besides gaining a newfound respect for the tenacity of the bugs on that stretch of the river, we learned an invaluable lesson about summer in the canyon. Remember, this was July, in the desert, with the sun beating down on us. I was now in long pants and a long sleeve shirt, and it looked like it was going to be a few hours before the sun set behind the west side of the canyon. I was face to face with a serious choice: To be hot and bit up or to be roasting and bit up, just not as bad. I chose the latter.


Riverview: On the Green River.
Photo courtesy National Park Service.

When the sun finally set behind the canyon, we started a fire to cook our dinner. We also thought the smoke from the fire would keep the bugs at bay. We were wrong—again. The bugs plowed through the protective layer of smoke to where we were standing near the fire and sent us scurrying to our tents to eat our dinner. Shortly after we finished, we turned in for what proved to be a long night of fitful sleep. As we lay in the sauna-like conditions of our tents, the bugs made their way through our tent walls and descended upon us. I eventually passed out in the fetal position, covered in sweat and bugs.

Although I am typically a late riser, I was the first one up the next day. We packed up our gear in record time and hit the river. While weary from the lack of sleep, we were equally desperate to get another five to ten miles down the river and away from the bugs. We paddled vigorously until lunchtime, when we found a sandbar in the middle of the river. The clouds covered the sun as we sat in the sand and concentrated on chewing our sandwiches. I had been so focused on rowing that I forgot what I was rowing away from. After a couple of minutes of sitting in silence, I remembered. I looked around and was ecstatic to see that we were free of the bugs. We were also way ahead of schedule. Between our enthusiasm on the first day and our desperation on the second, we had paddled further down the river than we expected. It was time to slow down.

After lunch, the sun came back out. We spent the rest of the afternoon drifting from one shady spot to the next along the canyon walls. As the late afternoon approached, we began to look for real estate for the night—this time along the already shady west side of the canyon. Soon thereafter, we found a sandbar large enough to hold our three tents. Upon setting them up, a tremendous gust of wind came roaring through the canyon and sent us diving onto our tents to keep them from blowing away. We laid in the sand, holding our tents down, for a solid sixty seconds. And then it stopped.

It was time to eat. While a few folks prepared the meal, a couple of us gathered scraps of driftwood on the sandbar and built a fire. We glanced at the ridge on top of the eastern wall. The sun shone brilliantly on it. Just glancing at it made me sweat. That evening, we ate and relaxed around the fire—free of the indefatigable bugs and oppressive heat of the night before.

The rest of the trip was pretty simple. We got up each day, put our boats in the water, and drifted down the river. We actually spent most of the time out of the boats, floating next to them in the water. In the late afternoon, we found our spot on the west side, endured the daily gust of wind that soon occurred, and then went about fixing dinner and making the fire. Not one specific thing moved us from the paddling to the floating perspective. It was the cumulative impact of several—the relief of being free of the bugs and the heat, the comfort of the sandbars on the west side, the simplicity of preparing food and building a fire.

In the true desert, you are brought back to basics. Over the course of several days, the person that enters the desert—the one that paid attention to the almost deafening noise of modern life—is broken down bit by bit, leaving pieces of himself floating down the waters through the canyon. In its place, the person that remains focuses on the simplest of things, like finding a shady spot along the canyon wall. This kind of focus creates space for something else to be built up. This something is much more mysterious—some think of it as religious, others think of it as spiritual. I don't know what it is, but I have been fortunate to feel it. Even though it is rare, and it dissipates soon after you return to the daily grind, it does leave its imprint on you.

Rafting down the Green River.
Photo courtesy Holiday Expeditions.

There is many a day that I feel the sun upon my face and see the blue sky above me and the red canyon walls out of the corners of my eyes as I float effortlessly on my back down the river.

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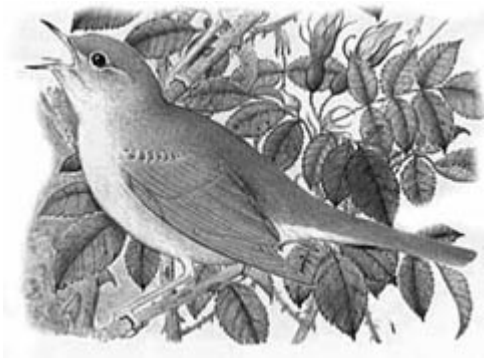
Column: Bull Hill
by David Rothenberg, *Terra Nova* Editor

Nightingale: The Bird of a Thousand Songs



In Persia the nightingale is the bird of a thousand stories, hazâr dastân, singing turn by turn, rad bâ rad, always changing its song. Calling a musician a nightingale is the highest form of praise—the greatest often have the word bolbol added to their names as an ultimate honor. In less fundamentalist days when music was not chastized or banned, bird song was considered a form of zikr, or remembrance of God, like muezzin's prayer. The meaning echoes more in the repetition than in the words themselves. All bird species have their own zikr, all praising Creation, and the bolbol is the master bird who never repeats himself, always coming up with new names for God. This gives bird song the highest form of praise in a devotional culture, a loftier purpose than biology has so far allowed.1

Despite the reverence their culture shows for nightingale song, Afghan musicians have not made much specific use of bird song in their melodies or forms. John Baily, one of Europe's greatest authorities on the musical culture of Afghanistan, brought a recording of English nightingale song and played it to some Afghan refugee musicians living in Pakistan. They were immediately excited. First they responded to the taped bird song using the 'drum language' of spoken bhols in which players speak the patterns they later play on the tabla. Although no one had noticed it before, the bird's phrases fit right into the sixteen beat recurring tintal cycle that is the most popular of rhythms in that part of the world. Dha Ti Ta Dha | Ti Ta Dha Ti | Dha Dha Ti Ta | Dha Dha Tu Na. Then they got out their tabla drums and rebab violin to jam along with the tape. To the drummers the nightingale's phrase was a fully stuctured tabla solo, easy to assimilate and respond to. But their tradition had not explicitly made use of nightingale rhythms before.2 The end result sounds like a new kind of interspecies music, part nightingale—with the relentless call-and-response not trying to go anywhere or conclude—and the musicians caught in the web of the challenge, trying to play exactly what is heard and to take it to some other, human level.

In neighboring Iran, in the Persian music tradition, there is a kind of musical ornamentation called Tahrir-e Bolboli, where singers and their accompanists imitate one another with rapid trills and nightinglike quips. Here is a tale about one of their most famous singers, named Qamar:

Once upon a day Qamar went to Darband, a scenic place near Tehran, to take a walk and practice in the open air. Qamar started singing Tahrir-e Bolboli while she was walking among the trees. A nightingale sitting on a branch heard her beautiful song, and he began to sing along. The nightingale was trying to sing like Qamar, and Qamar was trying to sing like the nightingale, just as singers and players meld together in traditional Persian music. The fever rose as they each tried to sing faster and

louder. Suddenly the nightingale fell down and died, because it could not keep up with thie great Qamar. Qamar cried deeply for two days. She could not forgive herself for having killed a bird with music. Was all this beauty and intensity nothing more than a fight to the death? Song, whether coming from birds or from humans, must be more than war.3

The yearning of the nightingale figures prominently in the famous Sufi fable of Attar, The Conference of the Birds, among the most known works in all of Persian literature. The master of birds, the gaudy Hoopoe, is trying to assemble all the other bird species to join him on a quest for the sacred valley. Here's how the nightingale answered the call to join up:

The amorous Nightingale first came forward almost beside himself with passion. He poured emotion into each of the thousand notes of his song; and in each was to be found a world of secrets. When he sang of these mysteries all the other birds became silent. 'The secrets of love are known to me,' he said. 'All night I repeat my songs of love. Is there no unhappy David to whom I can sing the yearning psalms of love? The flute's sweet wailing is because of me, and the lamenting of the lute. I create a tumult among the roses as well as in the hearts of lovers. Always I teach new mysteries, at each instant I repeat new songs of sadness…. If I am parted from my dear Rose I am desolate, I cease my singing and tell my secrets to none….

The Hoopoe replied, 'Although the Rose is fair, her beauty is soon gone. One who seeks self-perfection should not become the slave of a love so passing.'4

In Persian music and literature, and in the Afghan experiment, we see that much of the musicality of bird song lies in its special use of rhythm as much as its organization of pitches and recognizable melodies. I doubt it is an accident that we hear these sounds as being closer to music than to words.

Can we be any more certain that nightingales are making music if the song brings pleasure to our ears? "The supreme notes of the nightingale envelop and surround us," wrote Lord Gray of Fallodon in the nineteen twenties. "It is as if we were included and embraced in pervading sound." Yet he is not a complete fan. The song "arrests attention, and compels admiration; it has onset and impact; but it is fitful, broken, and restless. It is a song to listen to, but not to live with."5

We long for similarities between us and the birds to make us feel more at home in their world. Perhaps animals' perception is farther from our own than we would admit. Sixty years ago the great ethologist Niko Tinbergen noticed a stickleback fish aggressively displaying toward the window of his fish tank. What did he see there? Certainly no red-bellied fish

that would indicate the traditional attack posture. No, the fish was striking toward a red mailman's truck far in the distance. Why bring in this story? Nick Thompson, the brown thrasher man, mentions this in his critique of anthropomorphism in ethology, saying that this tale shows that this fish has one strange way of reacting to the world, something far from what a human would see. We should not imagine that we share much about aesthetics ire with a fish! He really didn't like that truck.

Each animal species lives in its own unique ethological world. Aesthetics, should we believe they exist in animals, must be part of that. The starling will never sing "-nee River." Song sparrows find matching songs to be a mark of aggression. Wood pewees' elegant songs are theirs alone. Why even claim then to appreciate bird music for some kind of elusive, eternal essence?

Sure, each species is different, but we are still all bound by some of the same kinds of cycles. Birth, experience, love, mating, travel, death. Each one of these phases can to be expressed! Raw emotion leads to bird song and also to human art of all kinds. Something needs to be released, and what does come out is so often wonderful. Communication and miscommunication both result from listening and playing along. Consider Oscar Wilde's story "The Nightingale and the Rose," where he turns that Persian nightingale story upside down to imagine a bird trying to interpret human sentiment and performance, and getting it all wrong.

A young philosophy student is desparate for a girl who says she will only dance with him if he finds a red rose. But there is none in the garden to be plucked. A nightingale in her nearby nest hears his plight. "Here indeed is the true lover," says the Nightingale. "What I sing of, he suffers: what is joy to me, to him is pain."6 At once the difference between birds and men arises. We suffer in love while the nightingale just enjoys it! (Wilde's singer is a 'she,' not a 'he,' but literature never exactly matches life.)

There is only one way the Nightingale can get the boy a rose, that terrible travail of Persian myth. A Tree tells her the method: "If you want a red rose you must build it out of music by moonlight, and stain it with your own heart's blood. You must sing to me with your breast against a thorn." The thorn will pierce the bird and she will bleed into the tree and a red rose will grow by morning. So love for the bird will strike from joy into pain and then death.

But she's ready to do it, and cries to the student with a song he cannot understand: Be happy, she sings, you will get your rose. "All I ask of you in return is that you will be a true lover, for Love is wiser than Philosophy." The student looks up, not comprehending, and only whispers, "Sing me one last song. I shall feel very lonely when you are gone." And then remarkably, at once he starts to analyze the nightingale music he hears: "She has form—that cannot be denied to her; but has she got feeling? I am afraid not. In fact, she is like most artists; she is all style, without any sincerity." If he only knew why she has begun to sing, and where it will end! All for him! "She thinks merely of

music, and everybody knows that the arts are selfish. Still, it must be admitted that she has some beautiful notes in her voice. What a pity it is that they do not mean anything, or do any practical good." The boy remains a philosopher, best trained to be a critic than anything else.

He goes to bed to dream of love, not listening close enough to the bird to grasp what she was doing for him. In the morning the nightingale lies on the ground, dead, but on the very top of the tree stood a magnificent red Rose, "petal following petal, as song followed song."

What luck, cried the student and plucked the great flower. He takes the proud flower to his girl, but she just sloughs it off. It won't go with her dress, and another boy has already bought her some gemstones. "Everybody knows jewels cost far more than flowers." The student tossed the rose into the street, and a cart ran over it. "What a silly thing Love is," he decides. "It is not half as useful as Logic." It always makes us believe things that are not true.

The nightingale spilled all of his blood to use song to make a flower, which no one cares for after it fails. The bird and the human never understand one another. That beautiful suicidal music changes nothing at all.

The basic criticism of the Romantics' love of nature is that they listened out to birds and heard only themselves. If we are sad, the nightingale sings a sad song, and if we are happy, the same music is all about joy. Wilde reverses this "pathetic fallacy," and has the nightingale suffering because she imagines the young boy is consumed with passion, while in fact he is a lover of logic more than anything else. He, in similar misconstrual, hears design in the bird's fatal song but no great wonder and force. He wants the flower but hears no connection between blossom and bird. Because the splendid rose gets him nothing in the end, he throws it out and goes back to his books, having missed the whole point and learned nothing of love, nature or life.

What will it take for us to learn all that we can from the song world of birds? We need reason, passion and diligence. Here are a few people who have taken the great time and effort to decode glimmers of great meaning out of the surges and patterns of the sounds of birds. They have listened and waited, imagined and described. Music, science, poetry, practice, theory intensify our awareness of nature's music without reducing the lingering wonder. If all the information doesn't bog you down, you may emerge from all the details with even more attention, more surprise when you hear a bird sing something you do not expect.

It is one small step from playing a bird back his own song to playing him ours instead. In the 1920s, the British cellist Beatrice Harrison moved to the Surrey countryside and began practicing outdoors in spring. Nightingales began to join along with her, and she heard them matching her arpeggios with carefully timed trills. After acclimatization they would burst into song whenever she began to play. In 1924 she managed to convince Lord Reith, director general of the BBC, that a performance

of cello together with wild nightingales in her garden would be the perfect subject for the first outdoor radio broadcast in world history. Reith was initially quite reticent: surely this would be too frivolous a use of our latest technology? What if the birds refuse to cooperate when we're all set to go?

It took two truckloads of equipment and a bevy of engineers a whole day to set up what could today he arranged in minutes. The microphone was set up close to the nightingale's usual singing post. Harrison dressed in finery as if for a London premiere, though she sat with her cello in a muddy ditch next to the bird's bush, so that the one microphone could pick up the both of them. She started with 'Danny Boy' and parts of Elgar's cello concerto, which had been written especially for her. No sound came from the bird. Donkeys honked in the distants, rabbits chewed at the cables, but no bird could be heard. This went on for more than an hour. Things didn't look promising.

Suddenly, just after 10:45 pm, fifteen minutes before the broadcast was set to end, the nightingale began to sing, along with Dvorak's "Songs My Mother Taught Me." If Hultsch and Todt were listening, they would definitely hear song overlapping here. Was the bird really trying to 'jam' the cello message? Most of us would hear something more sensitive, a mixture of bird and Beatrice, an attempt to fit in. Doth the pathetic fallacy rear its ugly head—naive anthropomorphism, or some moonstruck wish to hear music where there really is nothing but practical noise?

I doubt many of the more than one million listeners who tuned into this broadcast were so skeptical. Never before had a bird's song or any other sound from the wild been sent out over the airwaves. The program was heard as far away as Paris, Barcelona, and Budapest, and many who head read all these famous nightingale tales now heard one on radio for the very first time. Harrison received fifty thousand letters of appreciation. After this late night triumph she became one of the most sought-after cellists of her time.

The cello-nightingale duet was repeated live each year on the BBC for twelve years, and afterwards, the birds alone were broadcast until 1942, when the recording engineer making the show heard a strange, unmistakable droning sound which turned out to be the beginnings of the "Thousand Bomber" raid heading via Dover to Mannheim. He quickly shut off the sound, having the sense not to broadcast such a sound during wartime. The recording was preserved, and you can hear it today,7 this strange soundscape of menacing bombers and incessant nightingales, singing as they have always sung even in the midst of human destruction and the violence that comes with civilization. The airplanes could not silence the nightingale. Here is a bird who cares nothing for the whims of men and the great noises we produce. Does he know his place extends far beyond the disasters of history?

This essay is an excerpt from David Rothenberg's new book, *Why Birds Sing: A Journey into the Mystery of Bird Song*, published by Basic Books in April 2005.

www.WhyBirdsSing.com
Why Birds Sing: A Journey into the Mystery of Bird Song

End Notes

1. John Baily, "Afghan Perceptions of Birdsong," The World of Music, Vol. 39, No. 2, 1997, pp. 51-59.

2. You can hear this bit of Asian interspecies music and read the whole story here.

3. Mahdi Noormohammadi, Some Memories About Musicians, [in Persian] (Tehran: Obeyd Zakani, 1996), pg. 115. In personal communication from Iranian scholar Majid Labbaf.

4. Attar, The Conference of Birds, trans. S.C. Nott, (London: Continuum, 2000 [1954]), pg. 26.

5. Lord Gray of Fallodon, The Charm of Birds, (New York: Frederick Stokes, 1927), pg. 72, 76.

6. Oscar Wilde, "The Nightingale and the Rose," Oscar Wilde: Complete Shorter Fiction, (Oxford: Oxford University Press, 1979 [189?]), pg. 104.

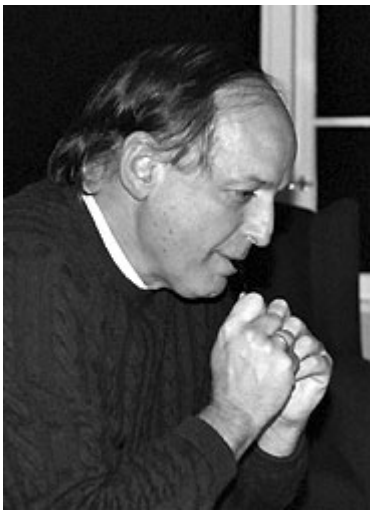
7. Many fine nightingale recordings, along with excerpts from some of Beatrice Harrison's concert, and the nightingale/bombers wartime duet, are all on the CD Nightingales: A Celebration, available from the British Trust for Ornithology.

David Rothenberg is professor of philosophy at the New Jersey Institute of Technology, and the editor of *Terra Nova: Nature and Culture*, an annual book series (formerly journal) published by The MIT Press since 1996. His books include *Hand's End: Technology and the Limits of Nature* (California, 1993), *Is It Painful to Think? Conversations with Arne Naess* (Minnesota, 1992), a collection on the changing meaning of wilderness, *Wild Ideas* (Minnesota, 1995), and *The New Earth Reader: The Best of Terra Nova* (MIT Press, 1999). Mr. Rothenberg is also a composer and jazz clarinetist, and he has five CDs out: *nobody could explain it* (Accurate, 1991) *On the Cliffs of the Heart* (New Tone, 1995) *Unamuno* (1997), *Bangalore Wild* (2000) and *Before the War*, with Douglas Quin (Earth Ear, 2000). He lectures and performs all over the world.

Interview

Terrain.org interviews
Stefanos Polyzoides
architect & urbanist

About Stefanos Polyzoides



Architect and urbanist Stefanos Polyzoides was born in Athens, Greece. He attended Princeton University and graduated with a BFA and MA in Architecture and Urban Planning. He has lived in Los Angeles since 1973. From 1973 until 1997, he was Associate Professor of Architecture at the University of Southern California. Polyzoides and his partner Liz Moule are two of six co-founders of the Congress for the New Urbanism and are current members of its Board of Directors. They are also co-chairs of the upcoming 13th Congress of the CNU in Pasadena, California, June 9 to 11, 2005.

Polyzoides is a principal of Moule & Polyzoides, Architects and Urbanists, located in Pasadena. His recent projects include master plans for various TODs in Southern California; master plans for the reconstruction of downtown Newhall, California, downtown Yorba Linda, California, and the Rio Nuevo project in downtown Tucson, Arizona; campus plans for Occidental College and Pomona College in Southern California; various architectural projects, including mixed-use, transit-oriented development for two new Gold Line stations, in Pasadena and South Pasadena; and courtyard housing projects, including 7 Fountains in West Hollywood, and Granada Court and the Vista del Arroyo Bungalows in Pasadena.

Polyzoides' writing frequently appears in both national and international journals. He is the author of two books: Courtyard Housing in Los Angeles: A Typological Analysis and R.M. Schindler, Architect. His research has produced four distinguished exhibitions and exhibition catalogs: "Caltech: 1910-1950," "Myron Hunt: 1868-1952," "Wallace Neff," and "Johnson, Kaufmann &

Del Mar Station and surrounding transit-oriented development located on the southern edge of Pasadena's Old Town—designed as a city gateway.
Graphic by Moule & Polyzoides.

Coate."

Interview

Terrain.org: In Charter of the New Urbanism, you state, "In contrast to an Architecture of Time, a New Urbanist architecture is an Architecture of Place." Why, especially in the Desert Southwest, does development so often seem to ignore place, ignore the "deep values held by those who live in and around" a place?

Stefanos Polyzoides: To deliver the promise of the New Urbanism at present, on any given project, planning, design, market, political and development interests should be thoroughly aligned.

It goes without saying that in particular, the architecture of production houses and housing doesn't often reach the level of architecture at all. Subdivisions are built by designs imported from elsewhere, often copied through the popular press and, sometimes, by people who are unqualified to be engaged in design at all.

In general, the current practice of architecture is dominated by the design and production of isolated objects. These are presented to society as necessary and relevant because, somehow, they are the most up to date expression of the values of our culture.

It is the obsession with its relevance to right now, that qualifies this body of work as an Architecture of Time. Ironically, these projects don't express the will of our society as self evidently as they claim. They are slaves to consumerism and fashion, narrow personal gratification and financial benefit to a few. How ironic, that our streets are littered with buildings designed to be exulted as works of individual genius, while their authors are either ignored, or already forgotten.

By contrast, an architecture of place delivers projects that respond to two fundamental purposes: Incrementally constructing the city and establishing a sustaining relationship with nature. And doing so for the economic, and psychic benefit of all. This pro urbanist and pro environmentalist Architecture delivers settings for human life that are constantly evolving, while being validated by those who stake their identity and their everyday life around them.

The operations of conventional subdivision developers and production builders resemble those of a cartel. They have been doing business for decades based on a dubious production analogy. They control the entire machinery of sprawl suburb production, its codes, land sales, comps, marketing, financing, design, and construction. They keep operating looking at the world through a rear view mirror that distorts last year's successful sales, as exclusive justification for this year's models.

Their work has nothing to do with place or time. They merely build and sell 'product' based on formulas that are autonomous, completely closed to outside influence and oblivious to contextual forces. The more extreme the natural conditions of a region and the less evident its cultural history, the more violent the development trespasses. For example, the more the tender history, built culture and natural environment of Arizona and the Southwest are ignored, the more development emerges there in a normative, stereotypical pattern that spreads terminal placelessness in its wake.

Have you noticed how increasingly difficult it is becoming to know exactly where you are while stranded in a typical American suburban townscape?

Plan for barrio-style homes in Civano's first neighborhood.
Graphic by Moule & Polyzoides.

Terrain.org: One of the first New Urbanist projects in the Southwest—which you designed—is the Community of Civano in southeast Tucson, Arizona. Once Fannie Mae became controlling partner, and more so when Pulte Homes entered the equation and offered to (and since has) purchased Neighborhoods 2 and 3, there was an immediate sense from New Urbanism practitioners that Civano is lost. At the beginning of discussions, there was a belief from neighbors and city officials—only an idealistic hope it now seems—that Pulte could do the right thing because it said it would. But as you noted last year, "You have been facing an acute problem at Civano for quite a while now…. How to take people, like Pulte, who have destroyed the west, its cities and nature through 50 years of building trash, and to convince them, for God's sake, if not everyone's children's sake, to build neighborhoods worth living in, rather than the car-dominated subdivisions that are their hybrid NU masquerades." Now it is painfully clear that Pulte is not interested in the founding ideals of Civano, principles like walkability and indigenous architecture. Is it simply not possible for a production builder like Pulte to effectively participate in New Urbanism? What can we learn from the losses at Civano?

Stefanos Polyzoides: I have learned a couple of things: The New Urbanism should be practiced based on its principles expressed in form, not the hollow promises of developers and politicians. Hybrid projects are a worse fate than death for the New Urbanism, because they dilute us as a movement, as they confuse the world about our intentions and standards of practice.

Cities, citizens and professional urbanists alike should never believe the assurances of self-interested developers and builders that have practiced sprawl their entire life. The likes of Pulte should always be engaged through the practice of the 'Show me' method. Instead of allowing them to dupe with

half truths, they should be forced into charrettes, where they have to design for the common good. The terms of engaging them should include a town plan, neighborhood plans, urban and architectural codes, and a process of being held accountable to the community during the execution of their project.

Pulte should have been forced by both the City and neighbors to deliver on the decades-old ideals of Civano, instead of being allowed to trample them.

Begin to get used to the idea that sprawl development is a political process. You can submit to this state of affairs, or you can resist it. If you decide to fight back, you need to organize, get financed and engage in a political battle. Sprawl developers can be beaten in their own game. Beating them is not about stopping their projects. It is about changing the dominant planning and development ethic of our country.

Relevant examples of such success are municipalities where New Urbanists have run and won seats in city councils and mayoral races. Another is the model of the NRDC, the National Resources Defence Council. Their strategy is confronting environmental polluters and resource wasters through legal means.

Civano was not killed for aesthetic reasons. It was viciously eliminated to slow down the inevitable advance of the New Urbanism in the Southwest, and to protect the interests of the sprawl economy for another generation. Will they get away with it? It is up to you.

The courtyard at Seven Fountains in West Hollywood.
Photo by Moule & Polyzoides.

Terrain.org: While the scale of your work ranges from full districts to individual buildings, many of your projects and writings focus on core gathering areas—courtyards and plazas—whether Seven Fountains in West Hollywood, California or the Plaza at Aldea de Santa Fe, a new town under construction in New Mexico. Why do courtyards and plazas specifically draw your attention? What are the biggest challenges with designing these public spaces? The biggest rewards? Is there a greater meaning or symbolism attached to these public spaces for the entire community?

Stefanos Polyzoides: The figural void of the city is the essential ingredient of Urbanism, as the building is the measure of its Architecture. Cities should be designed reciprocally between buildings and the public realm they define.

Architecture has been historically conceived as a discipline in terms of formal repetition, types of objects recurring over time. In the practice of Urbanism, urban space should also be cast typologically.

The patio, the courtyard, the quad, the green, the field, the plaza, the square, the greenway, the thoroughfare, are all kinds of urban space with historical precedence, dimensional and proportional

characteristics, geographic and climatic variants, symbolic and functional expectations.


The plaza at Altea de Santa Fe in New Mexico.
Graphic by Moule & Polyzoides.

This is what interests me most about urbanism: The character of a project at any scale depends on the judicious mixing in design of all the types of urban space at our disposal. We know that these may vary for each region we are typically asked to design in, the Southwest versus the Northwest, for example. In order to reveal the formal character and performance expectations of all types of urban space, we have had to become heavily engaged in learning through continuous research.

Thus, the 1979 book on Courtyard Housing in Los Angeles, our participation in the new "Civic Art" of 2003, a forthcoming book on The Plazas of New Mexico, and ongoing academic projects on Street Making, Campus Planning and Housing.

Ours is an office in which the urgency to act is moderated by the propensity to think. Reading, writing and drawing have become central to our method of design. Principals lead by example, and our entire staff is heavily involved.


The original plaza at Doña Ana, New Mexico.
Photo courtesy Moule & Polyzoides.

Terrain.org: Tell us about the Doña Ana Plaza reconstruction in Doña Ana, New Mexico. How does your approach differ for the redevelopment of a site such as this versus newer infill or "greenfield" development, or does it?

Stefanos Polyzoides: Urbanism is not a style. It is a set of place making options ranging from simple to complex and from rural to urban, that can be realized through judicious physical design. Every kind of development site, in redevelopment, new or old infill, brownfield or greenfield, has its own powerful character and context that need to be tapped to provide the founding idea for a project.

Historic places possess physical traces of human intentions, that if properly revealed and celebrated, can become important points of reference in a project. Doña Ana is a village in southern New Mexico founded in the 18th century on the Camino Real. The pattern of its thoroughfares, the size and geometry of its blocks and the character of its buildings are steeped in centuries old design traditions. We felt obliged to uncover this urban, architectural and cultural heritage before starting to design.

Doña Ana is also a living community. Working through the University of New Mexico, we engaged

the villagers in a process that confirmed a leadership structure, a program of ritual and common needs, and an implementation strategy. There were a number of startling discoveries made before design.

The most important was that the historic plaza in front of the village church, erased and paved for a parking lot thirty or more years ago, was still used for dancing and religious festival events. Ritual use and physical place, albeit a remembered one, were coincident in peoples' minds. We felt obliged to recast this historic plaza with new buildings.

But how to design a new plaza? None had been attempted in New Mexico for over a century. New Urbanist, transect-based practice, suggested that a village center is a place where informality of conception, simplicity of material execution, and roughness of construction were defining characteristics.

The new plaza at Doña Ana, New Mexico. Graphic by Moule & Polyzoides.

We tried to disown the arrogance and authority bestowed upon us but what we know about architecture and urbanism and their practice in the present. We imagined ourselves as rooted, practically minded villagers of two-hundred years ago. We induced imperfections in the geometry of the plan, imposed severe limitations on the palette of construction materials, and embraced the local, traditional building trades. Most importantly, we shut down the urge to self expression.

The result was an authentic design exuding permanence and local character, in balance with the timelessness of both the existing agricultural landscape and the building fabric of Doña Ana.

Terrain.org: In a 2003 article jointly authored with Juan Gomez-Novy, you detail the loss of Tucson's three-plaza settlement, noting that in 1967, "Bulldozers erased a uniquely irregular street network and obliterated a rich heritage of adobe structures…. Three hundred nineteen homes were torn down and more than one thousand residents were forcibly relocated." The conclusion: the crime of urban 'renewal' "involving an incalculable cultural loss was finally completed." Nearly 40 years later, Tucson is embarking on a renewal project of a different type: Rio Nuevo. What is your role in Rio Nuevo, and can it bring people and culture back to Tucson's downtown?

Stefanos Polyzoides: Rio Nuevo is a remarkable project for which we shared the honor of leading the urban design with Oscar Machado, of Miami.

Tucson's Mercado District at Rio Nuevo features a mixed-use, plaza-oriented plan.
Graphic by Moule & Polyzoides.

Forty plus years ago, Downtown Tucson was obliterated by Urban Renewal, without any regret by the powers that were. One of the great, historic city centers of the Southwest was demolished to make way for the normative, great modern city of tomorrow. Shockingly, half of the Downtown was built out through banal modern buildings in an urban form unsuited for human habitation. The other half, west of the Santa Cruz River, was left vacant.

The Rio Nuevo project aims to rebuild and enhance the parts of downtown Tucson so badly disfigured by planning and design since 1960. In 2003, we were asked by Rio Development, Justin and Jerry Dixon, to respond to an RFP to design a neighborhood on the west side of the river, centered on a new public market, a traditional Mercado. We ended up winning the commission.

Perhaps the most compelling reason for winning was the presence on our team of four young and ambitious Tucson builders. They had already built lots of traditional adobe and rammed earth houses in the Barrio and Presidio neighborhoods surrounding the site, with resounding aesthetic and financial success.

Through the charrette process, we designed a traditional neighborhood on an irregular grid that followed the traces of ancient acequias on the site. Its form followed CNU design principles applied to a desert climate and culture. It received the enthusiastic endorsement of neighbors, elected officials and city staff. The project was strictly coded and survived intact through the entitlement process.

Currently, construction on the infrastructure has begun, and buildings will begin to appear within months. The act of rebuilding a lost city is hugely therapeutic. It brings back places and memories lost. It also confirms the existence and cultural values of those that were removed, the Latino population of Tucson. By operating within the boundaries of their architectural and living traditions, we are paying homage to their creativity and zest for life.

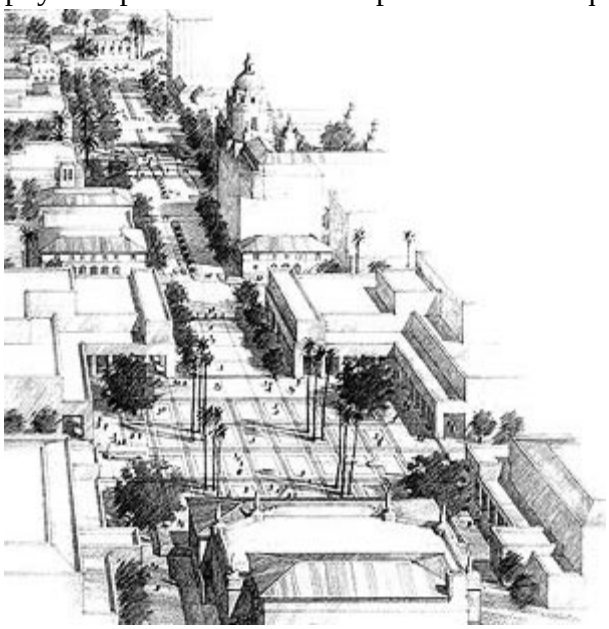
The Mercado neighborhood is one of many initiatives now unfolding in Downtown Tucson. Redevelopment on Congress Street, infill development everywhere, new civic buildings, the Mercado, a new plaza, are among the projects underway that are changing the face of the center city. Despite the fact that there is no compelling overall plan for the Rio Nuevo project, the fact is that Tucson is finally being transformed to the core and people are noticing.

Terrain.org: Nearly all of your work is in the Desert Southwest, from Southern California to New Mexico. Is this simply a matter of proximity—with your offices located in Pasadena and more recently Albuquerque? Or is it something more about the geography, the environments and cultures of the Southwest, the inherent architecture of place?

The Mercado District at Rio Nuevo: An 8-block, 7-plaza plan with 300 dwelling units and 100,000 square feet of commercial space.
Graphic by Moule & Polyzoides.

Stefanos Polyzoides: My partner Liz Moule and I, and by extension those who collaborate with us daily in the office, fervently believe that the New Urbanism is both an enabling theory and an empowering method of design. Its principles can be expressed in diverse form and stark contrast to one shoe fits all tendencies, particularly those of internationalist modernism.

The Architecture and Urbanism of Place, first and foremost, varies from setting to setting. We are convinced that the most important ingredient of any design is its physical permanence as a response to the unique qualities of society & culture, climate & geography, city & nature inherent in every region of the world.

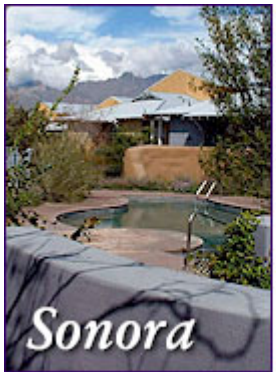


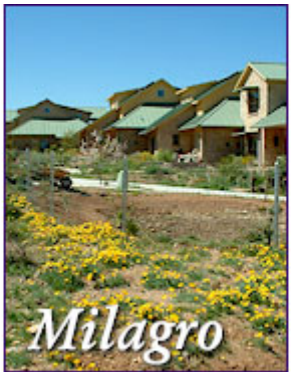
The Pasadena Civic Center Master Plan provides clearly defined squares.
Graphic by Moule & Polyzoides.

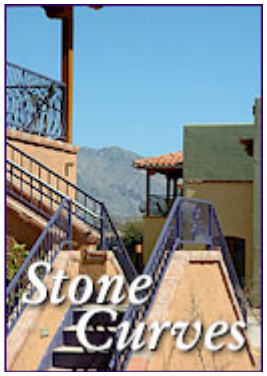
Before we profess in a given setting, we become expert in its history and evolving life. If we are asked to work in a place where we have not been or practiced before, then we spend the time and energy to become native there, in the shortest period of time.

The fact also is that we love the Southwest, its people, its rituals, its urbanism and architecture, its natural environment. We live in Pasadena by choice and are constantly challenged working in the region. We have learned how to be effective designers within the cultural framework and physical constraints of this beloved part of our country.

UnSprawl Case Study







Cohousing in Tucson
Arizona

Just the Facts

Cohousing in
Tucson, Arizona

Sonora

- Initiated in 1993, homes occupied by end of 2000, common house complete in 2001
- 4.7-acre infill development
- 36 homes utilizing ‘green’ construction and solar orientation
- Pedestrian core with peripheral parking
- Developed by Wonderland Hills Development Co. in conjunction with the CoHousing Company; architecture by Marty Floerchinger, FSSB

Milagro

- Initiated in 1994, homes occupied and common house completed by August 2003
- 43-acre desert site
- 28 clustered homes utilizing ‘green’ construction and solar orientation
- Pedestrian core with peripheral parking
- 75% natural open space preservation, publicly accessible
- Developed by residents of Milagro; architecture by Morton and Mackey

Stone Curves

- Villages 1, 2, 4 and 5 complete and occupied by February 2005, Village 3 will be complete in March 2005, common house complete in January 2005

- 5.1-acre infill development
- 48 homes utilizing 'green' construction and solar orientation
- Pedestrian core with peripheral parking
- Developed by Wonderland Hills Development Co. in conjunction with The McAllister Company, James Hamilton, and Diane DeSimone

What is cohousing?

Cohousing is an intentional, collaborative style of residential living that is characterized by private dwellings centered around extensive common facilities—including pedestrian-oriented pathways, other outdoor space, and a common house with such spaces as a large dining room and kitchen, lounges, meeting rooms, recreation facilities, library, workshops, children spaces, and guest rooms.

As at Milagro, environmental preservation and resource efficiency are critical for all of Tucson's cohousing developments.
Photo by Simmons Buntin.

Cohousing began in Denmark in the late 1960s, spreading to North America in the 1980s. Today, there are more than 100 cohousing communities in the United States and Canada. There are four cohousing communities in Arizona, and three of those are in Tucson.

Cohousing communities are generally designed and managed by residents: people of mixed ages who are consciously committed to living as a community. The physical design therefore encourages social interaction, and often an environmental ethic embodied through alternative and low-emissions construction practices, water and energy efficiency, limited or no use of pesticides, and open space preservation.

Residents live in attached and detached single-family homes, lend their knowledge and skills to community areas of need, and often have several optional group meals and other activities in the common house each week.

Characteristics of Cohousing

1. Participatory Process. Future residents participate in the design of the community so that it meets their needs. Some cohousing communities are initiated or driven by a developer—such as Stone Curves Cohousing—which may actually make it easier for more future residents to participate.

2. Neighborhood Design. The physical layout and orientation of the buildings—the site plan—encourages a sense of community. For example, the private residences at Milagro are clustered on the site, leaving more shared open space. The dwellings at Sonora, Milagro, and Stone Curves face each other across paseos (landscaped walkways) or courtyards. In all Tucson cases, cars park on the periphery. The common house is often visible from the front door of every dwelling. Fundamentally, the intent is to create a strong sense of community with design as one of the facilitators.

3. Common Facilities. Common facilities are designed for daily use as integral part of the community, and are always supplemental to the private residences. The common house typically includes a common kitchen, dining area, sitting area, children's playroom and laundry and may also have a workshop, library, exercise room, crafts room and/or one or two guest rooms. Except on very tight urban sites, cohousing communities often have playground equipment, lawns, and gardens, as well. Since the buildings are clustered, larger sites may retain several or many acres of undeveloped and shared open space.

Internal and external views, and access, are important at Stone Curves Cohousing shown here, as well as Sonora and Milagro.
Photo by Simmons Buntin.

4. Resident Management. Cohousing communities are managed by their residents. Residents also do most of the work required to maintain the property, participate in the preparation of common meals, and meet regularly to develop policies and do problem-solving for the community.

5. Non-Hierarchical Structure and Decision-Making. In cohousing communities there are leadership roles, but no one person or group of people has authority over others. Most groups start with one or two "burning souls," but as people join the group, each person takes on one or more roles consistent with his or her skills, abilities, or interests. Most cohousing groups make all of their decisions by consensus, and although many groups have a policy for voting if consensus cannot be reached after a number of attempts, it is rarely necessary to resort to voting.

6. No Shared Community Economy. The community is not a source of income for its members. Occasionally, a cohousing community will pay one of its own members to do a specific (usually time-limited) task, but more typically the task will simply be considered to be that member's contribution to the shared responsibilities.

Source: The Cohousing Association of the United States (Coho/US).

Sonora Cohousing

Overview


Lush landscaping and energy-efficient homes surround Sonora's central lawn area.
Photo by Simmons Buntin.

Sonora Cohousing is Arizona's first cohousing development, located on a 4.7-acre infill parcel in Tucson. Except for a circa-1940s adobe bungalow—which was converted into a cohousing residence—the parcel was vacant, and wedged between an apartment complex and predominantly 1950s-era homes.

Sonora is comprised of nearly 100 residents living in 36 attached townhomes, predominantly placed in groups of three and four units along lushly landscaped placitas to take advantage of solar orientation. The 3,500-square-foot, straw bale common house is the centerpiece of the community. Other amenities include a pool and hot tub, central courtyard with grass and adjacent play structures, peripheral covered parking, community-hosted intranet and high-speed Internet access, and a strong sense of resource protection embodied through onsite water harvesting, alternative building materials, energy efficiency, and passive and active solar energy use.

The Sonora Cohousing mission statement is:

> We believe that today's neighborhoods have in large part served to isolate people from one another and encourage alienation from ourselves and our communities. Together we seek to create a neighborhood which strikes a balance between public and private—respecting individual privacy while encouraging social interaction. In pursuit of this goal, we take an active part in the ongoing management of our community. This community of adults and children is not built around an ideological principle; rather , we seek a diversity of backgrounds, ages and opinions, with our one shared value being the commitment to working out our problems and finding consensus solutions which satisfy all members.

Design and Construction

Creating Sonora was an eight-year process, beginning in 1993 with a slideshow promoting the idea of cohousing in Tucson. Once organizing documents were created, in 1994, an initial site search began, focusing on an infill location providing close proximity to Tucson's urban and cultural amenities.

In 1995, potential residents formed the non-profit Tucson Neighborhood Development Corporation, establishing the initial investments for membership and creating the community's first business plan. By 1997, members selected the Wonderland Hill Development Co. and narrowed their choice of sites down to the current location on Roger Road.

Sonora Cohousing site plan, with common house at bottom.
Graphic courtesy Sonora Cohousing.

The following year the site was optioned, a feasibility study was conducted, community-building workshops were held, and construction documents were underway by year's end. According to John Jones, then project manager of Tucson's fledgling Rio Nuevo downtown revitalization project, Sonora qualified for city fee wavers both because it is in a low-income neighborhood and "because it embodies the principles of Livable Tucson," he said. "Those goals include greater accessibility by means other than the automobile."

Some neighbors dropped out when the Roger Road location was chosen—hoping instead for a downtown location (and, perhaps, hoping still for a Rio Nuevo cohousing project). Others dropped out earlier, when discussions at times dragged. But on May 8, 1999, a ceremonial groundbreaking was held, and later in the year, a builder was selected and construction finally began in October.

By the end of 2000, nearly all homes were occupied, despite a significant setback to the straw bale common house, which received heavy water damage and had to be rebuilt. It was finally completed in October 2001, bringing closure to the fundamental building and hardscape construction of Sonora Cohousing.

Green Building and Site Design

Central to Sonora is the tenet of 'green' building, in which natural features, design, and technology are maximized to make the community as resource-efficient and harmonized with the Sonoran desert environment as possible. All homes, for example, are oriented to receive beneficial passive solar heating and cooling opportunities, as well as take full advantage of solar energy for those homes with photovoltaic panels.

All of Sonora's homes front meandering *placitas*.
Photo courtesy Sonora Cohousing.

On the site itself, 100% of stormwater is captured in drainage basins designed to slowly percolate the water back into the soil, or provide the water for onsite landscaping. Many individual homes have cisterns to harvest water, as well. All plants required for protection by the Native Plant Protection Ordinance (NPPO)—including cacti and specimen trees such as mesquite—were transplanted onsite, and low-water native and desert-adapted plants are used throughout the site to great effect.

Outdoor gathering spaces incorporate both garden design and permaculture ideas, and integrate with open space courtyards, pathways, and related landscape amenities to provide the critical

opportunities for formal and spontaneous neighbor activities. Additionally, the community has more than 40 fruit trees, providing citrus, avocado, peaches, nuts, and much more for the neighbors' palates.

Other green building and site design features include:

Sonora's strawbale common house features wide, deep porches and plenty of community gathering areas. Photo courtesy Sonora Cohousing.

- Graywater system from common house laundry facility
- Common house built from straw bale
- Net-metered photovoltaic panels on common house
- Corrugated metal roofs that channel water for collection
- Hydraunic heating in homes
- R-38 and R-29 insulation in the homes' roofs and walls, respectively
- Energy-efficient homes that include double-pane windows, increased insulation, orientation for solar gain, solar tubes, programmable thermostats, high-efficiency air conditioners, and more
- Zoned drip irrigation system across the community
- Community recycling area
- Low VOC paint and OSB used in all buildings
- Air exchangers
- Community workshop

Common House and Community Amenities

The Sonora Cohousing common house is built in the traditional mission/territorial style, arranged with wide porches around a central courtyard. It features a large gourmet kitchen adjacent to the dining room, as well as a lounge, guest room, craft room, laundry room with outdoor drying area, kid's room, and teen/music/multipurpose room.

Housing

The 36 homes at Sonora are one- and two-story attached townhomes, many with basements. The homes' exteriors feature colorful stucco, metal beams and corrugated metal roofs, front porches, and close proximity to the landscaped network of walkways that weave through the neighborhood. After more than four years, the homes' exteriors have been personalized and the landscaping has matured, creating a richly textured sense of place. Rather than standard sidewalks, the placitas between homes meander and feature wide patios, creating destinations at each front door. The texture is replicated throughout the community's sculpted walkways, elaborate fencing, and low, curved walls.

Community Governance and Interaction

Residents get creative with their personal spaces, as with this custom-built *chimenea*.
Photo by Simmons Buntin.

Because Sonora Cohousing residents manage their own community, they make decisions of "common concern" at regular community meetings. Using the consensus model, decisions are made together as a community. Members define consensus as "a process in which decisions are made by the collaboration and consent of every member of the group. This does not necessarily mean unanimity, and in fact, total agreement is rare. The decision must be acceptable enough, however, that everyone can live with it."

"Consensus empowers all members of the group," they agree, "and requires them to be active participants in the decision-making process. Participation is a foundation of community governance. Participation in the maintenance, decisions, and social life cannot be enforced but is an expected part of the community experience at Sonora Cohousing."

View from the community garden, with its custom rebar fence and gate.
Photo by Simmons Buntin.

Prospective and new members are paired with a Sonora "buddy," who helps the new member understand the community's policies and practices. The buddy not only introduces the new resident to other members, but also facilitates participation in the community.

According to Sonora's members, there are many advantages of living in cohousing, including "rich relationships, a sense of extended family, and the opportunity to share resources and live more lightly on the land." With these advantages, however, come responsibilities inherent in any cohousing development. These include the requirement of each adult to join and participate in at least one work team—the entities responsible for community activities and maintenance. Members may also participate in committees, which are involved with overall community governance and function, and short-term task forces created to address specific issues that are not otherwise addressed simply by individuals working on their own. On average, members contribute about four hours per month in the community's organized work system.

The common meal "may be one of the few opportunities in our busy week to sit down and have a real conversation with our neighbors," say members of the community. Most common meals are prepared by a small team, based on the number of members who sign up for the meal in advance. Sonora's rule is that for every four meals a person eats, he or she is required to sign up for one work shift. Other common meals include potlucks and eating circles. There are usually three common meals per weeks.


Children enjoy the many onsite amenities at Sonora Cohousing.
Photo courtesy Sonora Cohousing.

Many people have moved to Sonora for other forms of personal support that, though not required nor necessarily defined, are also intrinsic to close-knit communities. Support includes shared childcare, rides, meals for new parents, offering assistance with a special skill, teaching swimming lessons, home maintenance assistance, and house, pet, and plant care while away. Other social activities include a wine-tasting club, singing group, Friday evening happy hours, book club, ping pong tournaments, game nights, landscape 'parties,' and more.

"Cohousing is a way for me to bring that thing about extended family that I miss," said resident Martha DePauli in 2001. She grew up in an extended Italian family in New Mexico, where "my grandma lived down the street, my aunts and uncles were in the same town. I had a sense of comfort that I worried my kids wouldn't have. This gives us a sense of place."

For more information, visit www.SonoraCohousing.com.

Milagro


Milagro, with common house to left, homes in background, and Santa Catalina mountains beyond.
Photo by Simmons Buntin.

Overview

Milagro—the Spanish word for "miracle"—is a cohousing community of about 80 residents living in 28 homes on a 43-acre site in the foothills of the Tucson mountains west of Tucson. "It has," the residents say, "taken many miracles for us to get as far as we have."

Milagro was initiated in 1994 and has been fully occupied since August 2003. Of the 43 acres, 35 are set aside as permanent natural open space. The homes— nestled into a small ridge and aligned east-west to take advantage of solar gain—are clustered around a common pedestrian walkway that by now is lushly landscaped with both desert and edible plants, such as artichokes and figs.

Milagro's vision is "People living in community with a focus on ecological principles," while its values are, "We value integrity, generosity, respect for other people, community, the individual, and the environment."

Specifically, Milagro's mission is:

- To generate community living which values diversity and consensus decision-making in a nurturing environment; to encourage the contribution and personal growth of each individual.
- To foster ecological principles which honor the sacredness of the earth.
- To demonstrate ecological community living as a way of being in harmony with people and the earth.

Milagro's site plan, identifying landscape and water features. Graphic courtesy Milagro.

Design and Construction

Milagro began in 1994 with four couples who "met regularly to develop the vision of a group of families living by environmental and community principles," according to the community's information on its living history. The following year, membership expanded and members developed a policy manual and committee structure while initiating the search for land.


Milagro's homes are clustered, preserving desert around the community.
Photo by Simmons Buntin.

After incorporating as a non-profit organization, members purchased the 43-acre site in November 1996. Two years later, the designs went before Tucson's city council. Despite its ambitious environmental and community goals, according to a 2001 Tucson Weekly article, "the neighbors were not impressed" and opposed the rezoning.

"There was a fear they'd get the rezoning, the project wouldn't be pulled off, and then they might put in apartments," said neighbor Carol Starr. Despite these and other concerns, Milagro members reached an agreement with neighbors, not to mention the Tucson Unified School District, which allowed the Milagro driveway to be moved east of a dangerous curve. Members also agreed to 'hide' the two-story homes by constructing them in natural tan adobe and sage green metal roofs. Additionally, Milagro members offered the remaining open space as a publicly accessible nature reserve.

The city council ultimately approved the cluster-design development, changing the zoning from one house per three acres to 28 townhomes.

Construction financing was not secured for another two years, but in 2001 Milagro held its groundbreaking ceremony, and the first member moved in the following April. Later that year, it was named the "Best Project for 2001" by the Arizona Planning Association. By August 2003, all 28 homes were occupied, even though members acknowledge at that time—and still today—that there "still remains much work to do, both on our individual homes and on community developments."


Milagro water harvesting features include cisterns and swales.
Photo by Simmons Buntin.

A Community in Balance with Nature

Milagro's tagline is "a community in balance with nature," and its emphasis on preserving the Sonoran desert and using alternative building materials and techniques in the homes is clear. The well-insulated homes are crafted of adobe brick, topped with metal roofs, and feature passive solar water heating and water harvesting in landscaping and, for many homes, corrugated metal cisterns. In the future, some homeowners plan to add photovoltaic panels.

The community's landscaping features principles of permaculture design with an emphasis on native plants, especially on the periphery of the clustered homes, where a temporary construction road has been reclaimed with salvaged trees, young cacti, and other native plants so that it is now impossible to tell it was once a road at all. The community's private road is paved with a non-toxic, non-permeable surface of decomposed granite held together with a wax and polymer binder. Its parking lot, primarily covered spaces, is a permeable surface of gravel held in place by a series of connected rings atop a water-permeable membrane.


Milagro's common house features a wide front porch.
Photo by Simmons Buntin.

Like Sonora, Milagro maintains its stormwater onsite. Milagro directs all stormwater into a recycling system that features a wetlands and an underground irrigation system.

Community and Amenities

Milagro's common house is located at the center of the community, adjacent to small plazas and play structures and overlooking a pool and the Tortolita Mountains to the northwest. The common house features a large gourmet kitchen, dining room, library, kids' room, and other spaces convertible for public or private needs. It also hosts the common meal twice per week.

"We need more young children," says Wisconsin transplant and resident Holly Lovejoy, whose lushly landscaped yard features a guest house and living ocotillo fence that back to the revegetated construction road. Two houses down is Milagro's newest resident, a five-week-old baby. "That said, it is really wonderful here, and was worth the wait."

For more information, visit www.MilagroCohousing.org.

Stone Curves

Overview

Wide and curving pathways front the attached homes at the young Stone Curves.
Photo by Simmons Buntin.

Tucson's newest cohousing development is also its largest: Stone Curves Cohousing features 48 attached homes in five 'villages' across a 5.1-acre infill site only a mile west of Sonora Cohousing. The second of two phases is nearing completion, and the impressive, two-story common house wrapped around a Mexican-style open air plaza has recently opened, as well.

Stone Curves is surrounded on two sides by a thick, curving wall stained a desert umber. It is interspersed with artistic rebar security gates designed by project manager James Hamilton, who created similar rebar fencing and gates at Sonora. Across from the arching wall is the colorful Stone Avenue mural that is a landmark of the Limberlost Neighborhood.

In addition to its Southwestern vernacular and artistic entries, Stone Curves is defined by its environmental and community ethic and variety of amenities available in the common house and elsewhere, all of which are embodied in its vision statement:

Stone Curves: A cohousing community that fosters diversity, respect for the environment, and harmony with each other and our greater community.

Design and Construction

James Hamilton, who was the original project manager for Milagro and then project manager for and member of Sonora, also helped found Stone Curves Cohousing. He is now a member of Stone Curves, and its project manager.

Stone Curves' site plan.
Graphic courtesy Stone Curves Cohousing.

Unlike both Sonora and Milagro, Stone Curves got a jump start on the design process by going directly to Wonderland Hill Development Co., a national builder of cohousing communities. “At Stone Curves, to ease the process, and ramp it up to full participation, we picked the site,” said Hamilton in 2001. “I put together the concept and the site plans. And I put together a 70-page process manual” that builds from the essential planning knowledge learned at Milagro and Sonora. “What we’re saying to the new group is we’re not gonna start at ground zero.”

Hamilton’s wife, Diane deSimone, more recently said, “What we’re basically creating is an old-fashioned neighborhood… an incredible project.” Like Hamilton, deSimone was also involved in Milagro and then Sonora before joining Stone Curves.

Common House and Community Amenities

Stone Curves’ 3,800-square-foot common house serves as the core of the neighborhood, offering indoor and outdoor space ranging from the ground-level plaza to second-story balconies, a two-level chiminea, to a community kitchen and dining room.

Phase 2 residences at Stone Curves, including salvaged mesquite and prickly pear.
Photo by Simmons Buntin.

Other features include a children’s playroom, adjacent playground, three guest bedrooms, an office support room with computer and other business equipment, library and reading room, the “teen room,” community living room with widescreen TV and an assortment of games, arts/crafts studio and workshop, community laundry room, and an exercise/dance studio.

The Stone Curves common house is the largest in the Tucson area.
Photo by Simmons Buntin.

Other Stone Curves amenities include a community garden currently under construction, front porches on every home, a network of meandering and landscaped sidewalks, covered parking at the periphery, a garage/shop, outdoor play facilities, pool, and native landscaping.

Environmental Focus

The members of Stone Curves have signed on to the community's environmental focus statement:

We agree to cooperatively create a community that is ecologically sound and economically viable and that generates healthy relationships among the residents and with nature.

The exterior wall at Stone Curves, adjacent to community garden.
Photo by Simmons Buntin.

The community meets the statement in many ways, including as an infill project that, according to its members, "intensifies an urban land use with a small footprint." Across the site, alternative building materials have been used where feasible, low-water xeriscaping—highlighting salvaged or maintained-in-place specimen plants such as saguaro and mesquite—is abundant, water harvesting and water flow management have been incorporated into the site's topography, and light, noise, and air pollution are "minimized by an undulating periphery ferro concrete wall build on berms," as well as native landscaping that attracts birds and, therefore, birdsong.

The homes themselves, which range from one to four bedrooms in size, are energy-efficient, as well. Window design and placement was as critical as overall solar orientation, and homes feature double-pane windows, solar tubes, extra insulation in walls and ceilings, and super-efficient air conditioners.

For more information, visit www.StoneCurves.com.

Interview with Grant McCormick

Sonora Cohousing Founding Member, Resident, and Landscape Architect

Terrain.org: As a founding member of Sonora Cohousing, what were your goals when you entered the group? Are they the same now, and if not, how have they evolved?

Grant McCormick:

Goals Then

In addition to the appeal of community living, I became involved as someone who had skills to offer in the development process, and I was interested in eventually owning a home. I did not own a home and did not have the resources to do so at the time, so for me it was less about creating a home in the short term and more about supporting something I felt would be good for Tucson. Having studied community planning in school, with an emphasis on social factors in design, cohousing seemed to me to embody solutions to many issues. It seemed to have the prospect of providing a desirable physical and social environment that might compete with factors behind the residential decisions which underpin suburban sprawl. Foremost to me it seemed were concerns, founded or not, that suburban locations provide better environments for children. Another is the idea that far flung locations provide better access to nature and open space. A goal of mine was to choose an urban infill site so as to not destroy untouched desert and not create infrastructure burdens associated with new suburban development. And I desired a location close to downtown, commercial services, and public transit.

The social basis of cohousing—such as community, collaboration, and consensus—were personally appealing and something I not only wanted to promote but to learn more about and integrate within both my personal and professional life. Many of the "textbook" cohousing ideas about being connected to a community, casual social opportunities, a pedestrian orientation, participatory design and management, shared open space, knowing neighbors, etc., were appealing as well.

Sunset on the Santa Catalinas frames the tops of Sonora's homes.
Photo courtesy Sonora Cohousing.

The prospect of collaborating in the creation of an entire neighborhood from the start was of interest because of contributions I could make on both urban planning and landscape design issues, plus I was intrigued by the possibilities of a highly participatory planning/design process, producing results more responsive to future residents than occurs in typical developments.

Aside from opportunities to demonstrate discrete sustainable development techniques (e.g., material selections), cohousing seemed to have potential to demonstrate sustainability due to the collaborative and "shared resources" nature of the community.

Goals Realized and Goals Now

Most of these goals have been realized to some degree. I have a home in Sonora Cohousing. The site is not as urban as I would prefer but is within several miles of the city core and is built on an infill site. I believe it to be a great environment for kids (and their parents) and it has a lot of very appealing open spaces. I've learned much about community, collaboration, and consensus although I think we have a ways to go in terms of reaching our potential. My full work life, combined with the time demands of being a primary steward of the community's landscape, combined with some community conflicts, have made the social results not as fulfilling as I had hoped.

I was very involved in the project development process and had a key role in the design and installation of the community landscape. This had its rewards but took a large toll as well due to challenges with the development team we worked with.

In terms of our use of a participatory development model, I believe the results speak for themselves—there are countless areas where value was added as a direct result of resident input. In some cases these were things the design professionals, the builder/developer, or the City had little experience with and thus was met with resistance. This ability to promote innovation was a direct result of the participatory process, and in my mind debunked the

common negative dismissal of participatory processes as being "design by committee." Many sustainable goals have been advanced, and the sharing/collaborative aspect of the community does seem to have resulted in environmental benefits.

My goals now revolve around my family, fostering a more effective community decision-making process, developing stronger personal relationships with other community members, finishing some projects around my house, and nurturing the Sonora Cohousing landscape.

Grant speaks with visitors on one of Sonora's many internal paths.
Photo by Simmons Buntin.

Terrain.org: What was the most surprising part of creating Sonora Cohousing? The largest challenge?

Grant McCormick: It took a long time. Perhaps seven years from the first meeting to move-in. Still, the more developer-driven and streamlined forms of cohousing development can take many years, as can conventional development projects. Despite characterizations of government regulations being a large drag on the development process, in our case the City was very supportive, predictable, and presented little overall impediment. There were some limitations associated with codes and approval processes, but by far a more limiting factor in terms of time delay and innovation was what might be called "design by inertia" on the part of the professional development community. The inertia of conventional practices presented challenges in implementing a more participatory process that distributed decision-making control. Despite these challenges, the key stumbling block related to financing. Finding a partner that could arrange financing was the "watershed event" that eventually made the project happen.

Terrain.org: What is your role today in enhancing Sonora Cohousing's "sense of place"—its identity not only as a cohousing community, but as a permanent part of the Sonoran desert?

Grant McCormick: I'm involved in the ongoing evolution and care of our common landscape, which I believe is key to the community's sense of place within the Sonoran desert. The landscape was designed to be a diverse and beautiful place centered on people, while also demonstrating appropriate ecological choices for the Sonoran desert. Other outstanding projects demonstrate sustainable practices appropriate to the region, such as re-vegetation with native plants, water harvesting, and landscaping with edible plants. While Sonora Cohousing incorporates such techniques, what I believe distinguishes its landscape is the integration of such things within shared spaces people actually live in and care for. We don't know what will evolve, but it will likely be a compelling symbiosis—between the natural world and resident stewards who care for it—that is rather uncommon beyond the scale of the single-family home.

An intricately tiled mural provides a backdrop for Sonora's community garden.
Photo by Simmons Buntin.

Terrain.org: How are community conflicts resolved at Sonora Cohousing? Does consensus ever break down, and if so, what does the community do?

Grant McCormick: Community meetings using consensus, mediations, informal discussions, and special workshops have been used to address conflicts. A Process Manual and various guidelines exist which are of

some benefit and are generally used in place of the official CC&Rs/Bylaws. Consensus decision making has been effective for various topics, but I believe we have yet to develop a shared understanding of consensus that might allow us to operate in a fully collaborative and satisfying way. When consensus breaks down there is struggle and conflict and meetings and withdrawl. We are holding a workshop with a skilled community/consensus facilitator later this month who I hope will help lay the groundwork for a more effective consensus process.

Terrain.org: What have Tucson's newer cohousing developments learned from Sonora Cohousing?

Grant McCormick: I can't say for sure, and you'd probably get a clearer idea from asking Milagro or Stone Curves, so the following is just speculation. Although Milagro was completed after Sonora, the development timelines were generally the same, so there probably were no real "hindsight" lessons, although I believe some mutual support occurred along the way. Stone Curves used our common house for many of their meetings, and I believe used our physical environment as a marketing tool. There surely were things learned by Stone Curves, but to my knowledge they did not request a lot of advice from Sonora members. Since much of the formative planning and design was by a developer there may have simply been less perceived need. I suspect after Stone Curves is complete many opportunities will emerge for sharing experiences and knowledge among residents. I believe the Stone Curves developers organized their development process in part as a response to what they perceived as challenges encountered with the highly participation-based process used by Sonora. They may well have taken a proactive approach to developing some operational policies, such as relating to pets, in response to some difficulties experienced at Sonora. While speculation, I believe Sonora's landscape may have "raised the bar," thus encouraging above average (for cohousing) budget and consideration given to the Stone Curves landscape.

A strawbale wall separates Sonora's pool area from residences.
Photo by Simmons Buntin.

Terrain.org: What is the process for someone interested in living in Sonora Cohousing to get involved?

Grant McCormick: Home sales are not restricted by the community in any way—it is up to the seller to accept or reject an offer for purchase. At the same time, there is an informal self-selection that happens, resulting in buyers who value the benefits of community. New residents often get an initial view of the community through our website (www.SonoraCohousing.com). Much is learned about the specific home for sale from the seller, or from other community members who provide community/home tours. Potential residents are encouraged to attend several meetings, common meals, or other activities to get a feel for the community prior to purchasing. A number of homes are available for rent, which is another way to make an incremental step into the community. A process for "new resident orientation" is evolving but is still rather informal at the moment and has included orientation meetings, welcoming parties and meals, and so on. Normally a "buddy" is assigned to help new residents learn about the community.

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ARTerrain Gallery

Ten water color paintings by Susan Meyer

Desert radiance, Southwestern splendor, cowboys and folklorico are the images that illuminate the paper of watercolorist Susan Meyer.

Inspired as a child growing up in Texas, such art has been a pivotal part of enlivening a world that can often be overlooked. Susan Meyer's intricate craft is a labor of love that reveals her thoughts and emotions of the moment, often happiness and warmth.

Self-portrait by watercolor artist Susan Meyer.

She studied art at New Mexico State University, the University of Texas at El Paso, and Midland College, where she received her associate's degree with honors.

Susan's work has been showcased around the country, collecting several distinguished awards. Among those are awards at the Arizona-Sonora Desert Museum's Ironwood Gallery, the Southern Arizona Watercolor Guild's Shows in Tucson and Lubbock, Texas, and the Western Federation of Watercolor Societies. Susan is a signature member of both the Southern Arizona Watercolor Guild and the Western Federation of Watercolor Societies.

Her work has found a comfortable place amid the Sonoran desert lifestyle of her home in Tucson, Arizona. Her paintings have graced the Tucson Museum of Art, DeGrazia's Little Gallery and St. Phillips in the Hills' Murphey Gallery, among others.

For more information, visit Susan Meyer's website at www.SusanMeyer.net.

Ten watercolor paintings by Susan Meyer

View ARTerrain Gallery at www.terrain.org/arterrain/16

Poetry by Maureen Tolman Flannery

From the Great Silence

In the days of the great silence
there lived a plain woman
called by the name of Hermosilla.
And it came to pass one day

as she was drawing water from the spring
a brave storm began to rage around her,
circling into funnels in the sky as though
it would bore a hole in the separation of worlds.

As she stared, transfixed, at what took place
above the ground a mighty sword descended
through a cloud of swirling sand,
landing blade-down directly at her feet.

Being ill-apprised of its meaning,
she clasped the hilt in her right hand
and found that it fit as if having been
crafted for the texture of her palm.

She left her bucket unattended
and strode forth, calm, from the spring,
the sword slicing a path through blowing sand
and a harsh wind at her back.

Maureen Tolman Flannery, author of Secret of the Rising Up: Poems of Mexico and Remembered Into Life, edited the anthology Knowing Stones: Poems of Exotic Places. Although she grew up on a Wyoming sheep and cattle ranch, she and her actor husband Dan raised their four children in Chicago. Her poems can be read in the online chapbook Conversations for the Road at www.tmpoetry.com. Her work has appeared in over a hundred literary reviews, most recently Atlanta Review, Meridians, Amherst Review, and Comstock Review and thirty-five anthologies including Intimate Kisses, Essential Love, Woven on the Wind, Intensive Care, Tokens, and Proposing on the Brooklyn Bridge.

Poetry by Darren Jackson

Show and Tell

The second time I presented a rattler in a mason jar,
the principal phoned mother to remove me
and the glass encased evil cradled between tiny hands.
I was five
and that was when father wanted to collar me
with leash and bell

since I kept vanishing into the desert
to catch snakes that were all poisonous,
curled to strike like sin, he said
and tried to exorcise from me
with hand cut switches each time
the principal called to say incorrigible.

Maybe it's true. Nothing worked, neither
spankings nor sermons kept me from the open desert
where eyes widened with each step
to take in the mystery of sun and sky
beyond the horizon's curve: how they burn
and how, climbing this lift of dune,
the earth burns,
the fire, me and them.

The Sum of It

It's just the way of things—to push
From the soil. Not made
The way we make ourselves each morning in the mirror,
Each hour in the office, the grocery
Or pub, catching one's reflection
In a tinted window
To run hands through hair, adjust
Collar and tie. The numberless days
Window shopping for that look—the glamour
Of fifteen minutes under the spots. Seated here
In the grass with you, I cannot answer
The contrivance of daffodils—I can't say they pose
Anymore or less than the harvest moon,
That orange on the surface of the lake.

Shadows

My shadows stumble over mountain, in
any language—one breath bound and released:

they trip over the span of the Atlantic; the Pyrenees,
Alps on this side; the Applachians, Rockies

over there. My words
bathing in the Mediterranean

cast shadows across cacti
on Llano Estacado; the same shadow

strolls aimlessly through snow
among the piñon on Mt. Elden—

the shadows as much me as I:

on the street, wet with morning rain,
by the train station where rooflines square,

open a gash in sky
where a flock of small, brown birds

played, surging back and forth.
A man paces ahead stopped

midstep to look up,
stopping me as well:

sparrows peppering the creek of gray-blue,
hovering one second before floating past

the walls, opening like a veil.

Darren Jackson teaches English and creative writing for TVI in Albuquerque, New Mexico, and studies Latin and Spanish at the University of New Mexico. Recent work has or will appeared in Pivot and Smartish Pace.

Poetry by Anne Whitney

Primal Views

Taking the x-ray in its manila envelope to the specialist,
and there is my daughter, skeletally speaking,
in black and white.
Though in this new light she's taken on an unfamiliar cast—
turned "homo sapiens"—whose bony skull, rooted ivory chunks,
and empty glaring sockets have gone down in history.
Her teeth, wire strung, look twice as long as those I see
when she laughs or eats.
That snaky backbone, the reason for this ontologic view,
indeed exceeds the bounds of ideal posture passed down to me.
Not the typical American teen in lipstick and blue jeans.
Instead a filmy, two-dimensioned creature hung up against the light.
Out of time—in touch with ancients,
with baby bones uncovered in caves,
with hollow victims' heads piled high,
with cannibal prizes and other pre-historic signs of alien life.
Too grim and thin.
These so-called bones just photographs of sticks.
And that's no sleepy head I've cradled in the night.
Such big bare jaws and teeth could torture me.
The spine, a dinosaur's spiky back no human girl would show.
No common pose, no ordinary sight, tacked up before us.
An imaginary hallowed figure never meant for mortal mothers.

How could I possibly identify these bones?
(If ever the time should come.) For their whiteness?
Their lightness or length?
And how pick out this skull among the billions?
Even those with wired teeth? (There must be millions!)
Nor is this chain of vertebrae particularly unique.
Though if I learned to read this print
it might supply the missing link.
Without the knotted yellow hair, her grandma's Swedish eyes,
her left arm's furry mole located on the same coordinates
as a similar mole of mine, who would she be? (Who I?)
But then again,
her connections have never been quite so apparent:
She is a living member of her genus and her species,
whose mother is the last to notice.

She is an evolutionary bridge to cross into the future,
imprinted with the very cells that make her singular,
sent ahead to carry the remnants—
hair, eyes, and mole—that I adore.
The vision of another world I was not created to endure.

Anne Whitney is a native Nebraskan who teaches writing and literature at the University of Nebraska-Lincoln. Her work has been published in Earth's Daughters, Forum, The Mower's Tree, and Platte Valley Review, among other publications.

Poetry by Lynne Bama

Legend Rock

Those old seekers went without water or food,
facing this crack in the bedrock of the world,
nest of silence, the slow trickle
of something that watches
from under the lid
of a stone eye.

On the fourth night, the cliff swelled and rang,
faint radiance leaking from its seams
horned figures with enormous hands,
mountain sheep, elk, a long-legged bird,
and this pecked form like a swollen tick
with four tiny feet and giant ears,
carrying the odor of singed fur.

It is Cottontail.
He who killed the sun because he said
it moved too fast.
Just at dawn, when long-whiskered rays
hissed out of the lake,
he shot his fire drill like an arrow,
and the wounded star reeled and sagged
to earth, hissing and groaning,
boiling rivers into steam,
setting trees on fire.
Cottontail, his fur smoldering,
dived into a hole.

After everything got quiet,
he crept forth, cut out the dead sun's guts
and threw them back into the sky,
bright spangles exploding
in a cold void....

It is desert here now.
The quiet stream fingers
through oily reeds. I hear
the distant hum of stripper pumps,
a pickup grinding on the unpaved road.
The diminished sun yawns,
sleepwalking through empty clouds.

Rattler

Crotalus viridis viridis

Always this lurch of the heart
when I find you, a scatter
of gravel that suddenly stirs,
revealed as a jeweled length
with unblinking eyes.

All winter you slept underground,
obscure as a root in a Gorgon's tangle
of dreaming coils, a skein
that unraveled with lengthening days,
each one setting forth alone
on the earth's dangerous skin.

You stare back at me,
tail a blur, saving
your venom for the deer mouse
in whose tunnel you waited all night
to stab and release, then follow
the staggering trail
through weaving infrared shimmers,
tonguescapes of molecules ending
in a small corpse.

Alert and serene as a monk
on your cushion of stones,
you practice the discipline of serpents:

To be spare as a swallow of water,
a breath of air.

To eat only in summer.

To carry the map of an alternate world
engraved in your elegant bones.

Lynne Bama's writing has appeared in numerous publications, including High Country News, Orion, Petroglyph, and Sierra. She received "The Nature of Nature" poetry prize in 2003. She lives with her husband Jim in Wapiti, Wyoming.

Poetry by Luis Cuauhtémoc Berriozabal

Autumn and Winter

Back under the pepper tree
I spoke to the dog
Buried there under its shade.

I was not expecting answers.
I was drunk with autumn
And winter would be no different.

This time of year I marvel at
The changes in the weather.
I welcome the cold and rain.

The muses sing from the branches,
A blackbird and a crow.
I prefer the crow's drunken song.

Luis Cuauhtémoc Berriozabal was born in Cuernavaca, Morelos, Mexico and now lives in Los Angeles County, California, where he works in the mental health field. He has published poetry in both English and Spanish and has work forthcoming in Cedar Hill Books, The Blue Collar Review, and Free Verse. His first book of poems, Raw Materials, was published by Pygmy Forest Press.

Poetry by Scott Edward Anderson

Redshifting

Everything, even size, is a human value... miniature is vast in its way.
— Gaston Bachelard

A crow makes its call from a distant tree,
rain soaking the meadow, soaking the earth.

Say that surfacing on the wind is as an oak leaf
cutting through air—

The way the universe expands in space-time,
with little regard for the matter in its way—

A star in the night sky redshifting (did you see it?)
as the eye adjusts, from blue to green to yellow to red.

An object radiates light, moving away from us,
lightwaves becoming longer, less energetic,

red heart pulsing, wavelength of lower frequency
then blue heart, pulsing out longing—

The crow flies overhead, cawing, its frequency,
its pitch, becoming higher when approaching,

then lower, longer, as it passes, until distance
makes the heart's pitch lower, too, with absence.

Absence being a lower frequency than presence—
Say that the heart redshifts down

as it reflects light, distance being
the time it takes love to travel from star to star,

lover to loved. Love is not a vacuum,
it has waves that bend with its expansion,

the heart is as that red star in a field
of blue; we cannot know its origin or

its destination—but if we think about that place,
or that absence, we are already there

redshifting through the distance of space-time or
blueshifting, where frequency and proximity collide.

Shapeshifting

When young Dawn with her rose-red fingers shone once more…
— Homer

Give the night back to the night,
the stars back to the sky—

Give the earth, spinning in space,
back to the earth—

(the stars look black tonight)

Give the moon, no, keep the moon,
it is the stars we want to give back—

Give the soil back to the isopod
emerging to the surface

(what is it looking for?)

Give the Dawn back her rose-red fingers,
she needs them more than the night.

Give the bluejay back his morning,
taken from him by the chickadee—

(sounds are deeper in solitude)

Give back to the sunshine
what darkness is his—

Give back to the night
what light is hers—

(stars, moon, clouds—)

Shape-shifting: bluejay into chickadee
into bluejay, night into day

into—what?

("harassed unrest"?)

Give back to the earth what is hers,
she will forgive you for taking it

or she will turn into a wolf.

Scott Edward Anderson received the 1997 Nebraska Review Award, won the 1998 Larry Aldrich Emerging Poets Competition, and was an artist-in-residence at the Millay Colony for the Arts in upstate New York in 2002. He is a founding editor of Ducky Magazine and writes as "The Green Skeptic" for GreenBiz.com and the blog www.greenskeptic.blogspot.com. These poems are from his sequence "Dwelling," which Alison Hawthorne Deming has described as "a phenomenology of how we live on the earth." His website is www.ScottEdwardAnderson.com.

Poetry by Tony Reevy

Stalking *Asparagus officinalis*, Socorro, New Mexico, 1970

Below the station,
picking wild asparagus.
The spears are
thin, just pale green.
There's a creosote
smell from the tracks.

The loud voice behind
us is rushing water
in the irrigation canal.
It grinds up kids, Mom
says, and spits them out
downstream.

The Rio Grande beyond
is barren, a great
sand box, play-
ground of snakes and
coyotes. But Hatch
has its chilies

and the brown water
runs through acequias,
under roads, into
backyard gardens in
town. That and the
sun brings melons,
corn, squash, peppers
green and red.

In my dreams, the
backyard gardens
still grow, the burros
are corralled along
dirt alleys in town, and
the river runs full.

But the asparagus—
straight, short,
succulent shoots,
unpicked, goes to
dimmed, woody seed.

In Mountain Lion Country

Winter meant piñon nuts.

The drive on highway
60, up from Rio Grande
to the peaks,

ruined smelter, rusted
branch line falling away
as our station wagon
climbs.

Then, rutted road to the
ghost town—hardly a
shed, much less a house.

Just above, shrubby
green trees:

piñon pines.

In their cones, the
brown nuts.

I stumble, my
tiny sisters toddle.

We shake the nuts
into bags, dreaming of
biscochitos, posadas,
the Christmas tree.

Mom and Dad watch.

Snakes are denned
for the season, but

cougars stir
in the hills,

the rusty tipple
rattles,

the mine tunnel
gapes.

Better to stay with
the piñons.

Leave tailings, wire
ropes, shafts
to the miners

whose bones
lie in town
or below.

Tony Reevy, a graduate of North Carolina State University, UNC-Chapel Hill and Miami University, is associate director for advancement of the Carolina Environmental Program at the University of North Carolina at Chapel Hill. His books are Ghost Train! American Railroad Ghost Legends, A Directory of North Carolina's Railroad Structures (with Art Peterson and Sonny Dowdy), Green Cove Stop: Poems and Magdalena. He lives in Durham, North Carolina, with his wife Caroline Weaver and children Lindley and Ian.

Poetry by Susan H. Case

Discards

When she clears dead saguaro flowers from her front yard
there is only the wind thrown off by stronger force.
It is always this way. She knows scarred saguaro skin will not heal
back to pristine. Hardened space now home to kestrel
or elf owl nest. Knows after family prayer her husband without word
will saddle his horse take gun to hip and track. His return
will not be straight.
There is another
waiting. Knows the waxy white saguaro castoffs she holds
are her secret cross to bear. Illness turning bone to powder.
Knows it will clear the path. Dried flowers making way for fruit.

Tucson Groaning

It's all about the car: where it takes me,
where it leaves me. You turn and I ask already knowing
can it ever be different?
Clutter could finally cover the whole city as you shake
your head no. At desert edge, the last house
from last year—no longer last. I stare too long
at metal fences while dust devils swirl
in new still-empty yards. So many ways
to keep a person out. It hardly matters how disturbance
takes root in my mind. This time a smoker
on a ridge road, fires flash again, no rain, no touch,
for seventy days. I can see the air. But next time
we could be different, like the Old Spanish Baptist Church
whose plastic marquee now says salvation is a gift.
If I leave, then come back new like that, every highway
this same dream. There's nothing
but movement out here. Or I could leave,
never come back. The map rattles
with flame and ash, builds in my head. Lacy cicadas jump
and rub themselves. Chatter with the heat.

Used

Desire. That must be what it was like for Georgia O'Keefe,
face aged like oak
in Abiquiu and Ghost Ranch, heating the desert.

I thought a little road wear not so bad;
surely someone
would make a reasonable offer, then I waited
for any offer.

At too many antique fairs, I moved
my fingers over finely patinated
wood surfaces. The finishes whispering
very desirable period.

Still, maybe her young man
was merely a potter, an acolyte. Didn't truly adore her,
want to fill her life with zest and pulp.

Susan H. Case's recent work can be found in Animus, Eclipse, Georgetown Review, The GW Review, and many other places, including "The Dark and The Light" issue of Terrain.org. She is the author of The Scottish Café (Slapering Hol Press, 2002) and can be reached via her website at http://iris.nyit.edu/~sgray.

Poetry by Susanna Rich

Monument Valley

Red sandstone buttes heave into
this abalone sky—Dolly Parton Rock, Ear
of the Wind, Sun's Eye—stray teeth
in some vast primeval mouth.

And you want us to go down this mountain—
seventeen miles of gooseneck and hairpin turns—
to "stand in their violet shadows," you say,
"Feel immensities. Be small for them."

All you see are colossal Mittens, West and East,
thrust into noncommittal strays
of clouds, as if dangling by fingertips
from the "toes of invisible gods."

But I, in this stripped-down Hertz, pump,
pump brakes against the dust sucking
the treads out of radials I so
carefully calibrated to 28 pounds cold.

You don't understand, it comes to me:
there is no climbing back up this 43% grade.
Don't tell me others are making it.
Don't take the wheel for me.

This is a road of pulverized sunsets.
These monoliths mock us—they
whose minutes are millennia,
hours eons. Three Sisters

and Rain God need not wait
for our inevitable dust—
their vast silence
pours from our eyes.

Susanna Rich is a professor of English at Kean University and producer and host of Poets on Air, through which she has interviewed Billy Collins, Alicia Ostriker, Stephen Dunn, and others. Her work appears in such venues as Nimrod, Phoebe, Frontiers, and The New York Times.

Essay

Burning Man
Creative Fire in the Desert

by Scott Hess

The Black Rock Desert is a place of sublime expansive space. This 400-square-mile, totally flat, alkali floor, resting between mysterious rugged mountains in Northwest Nevada, was formed when an ancient lake disappeared at the end of the Pleistocene Era tens of thousands of years ago.

The surrounding, austere ranges, ridges and peaks glow with rich reds, browns, and grays that become especially intense at sunrise and sunset. The extreme isolation, lack of familiar vegetation and animal life and the disorienting openness of this place was fearsome and forbidding to those early American travelers and immigrants who had to pass through it trying to reach their western destinations. John Fremont, whose 1843-44 expedition members became the first Euro-Americans to see the Black Rock Desert, called it a "perfect barren" and wrote that the appearance of the country was so strange, austere and unfamiliar that he was afraid to enter it.


Burning Man at dusk.

Yet the empty playa can also stimulate the imagination and allow for new and expanded perception. It seems to call out unusual dreams and visions. In 1994, a strange new dream began to take real shape and materialize on the desert floor—the Burning Man Art Festival. It is a gathering like no other on earth, with its emphasis on radical creativity and self-reliance on one hand, and an intense, spontaneous sense of community on the other. This collective adventure runs joyously along the thin line between order and chaos, between ecstatic release and gritty danger.

Art in this setting takes on a vibrant surreal glow that—multiplied by 30,000 participants—cannot really be described in images or in words. It is an awesome happening that

silences the mind with a roar of creative celebration amidst a landscape filled with vast wonders.

The desert floor is not really “sand” but a fine powder that swirls into great white clouds when the shifting winds stream into the valley from various directions—obscuring all vision and directional orientation. When the rains come, the powders transform into slippery, sticky mud that bogs down any attempt to walk or ride on it. This is not the place one would expect to find a small temporary city bursting with extreme artworks. Yet Black Rock City does materialize each year in the weeks before, during, and after the Labor Day weekend—and the celebrants appear to revel in the discomforts.

Tens of thousands haul themselves, all their supplies and all their art out on the desert floor with no water, electricity or garbage system provided. Everyone must bring all means of survival and expression. No commercial activity is allowed (except for the cafe in Center Camp, which sells coffee and ice). Participants are even encouraged to block out logos on trucks and equipment.

The basic Law of the Land is “Leave no trace.” Everything packed in must be packed out. The land must be clean and relatively undisturbed when we all leave. The Burning Man staff—paid from ticket sales—covers the inevitable gaps in awareness and preparedness of the departing crowd with admirable devotion. That is why the event is allowed to go on by the Bureau of Land Management, current “owners” of the land. I’ve spoken with various BLM employees on and around the site and relations with them appear to be excellent. The communities surrounding Black Rock City, many of them Indian, are given generous helpful donations from festival proceeds. This socio-ecological balance has held for eleven years of playa celebrations. The main impact for the surrounding communities is the traffic during the weeks of the event.

Burning Man is a time of pure personal and collective expression and free interactive experimentation. It runs on a “gift economy” that works in surprisingly delightful ways. The emphasis is on participation rather than passive attendance—and on creating something that can awe, surprise, or delight the assembled “citizens” of the temporary city.


Mastadon Art car on the roll.

Rules and regulations are very minimal and evolved along with the increasing size of the gathering. There is ongoing challenging debate on this subject. Larry Harvey, the originator of Burning Man, explains that as the city grew, the inhabitants necessarily had to go from a hunter-gatherer model to one of civic society. This development is resisted by some, but to one entering Burning Man for the first time, this civic society is one of the freest, coolest, most exuberant societies ever encountered.

The powerful, deconditioning impact of the Black Rock Desert on the mind and psyche of all who arrive in its vast space often goes unmentioned when people speak of Burning Man, but this gathering could never have achieved its current state of chaotic and unbounded creativity in another

location. It has the eerie feel of a new culture sprouting seeds within a post apocalyptic ecology.

View slideshow of 14 *Burning Man* photographs by Scott Hess at www.terrain.org/essays/16/hess.htm.

Scott Hess is a commercial and arts photographer based in the north San Francisco Bay area. His work ranges from portraits to landscapes to abstract works carrying layers of symbolic value. He has been widely published in regional media and continually shows work in galleries and other public venues. View his website at www.scotthessphoto.com for more information.

Essay

by Scott Calhoun

"Living in the Back Yard" appears in Yard Full of Sun: The Story of a Gardener's Obsession That Got a Little Out of Hand, by Scott Calhoun, and is reprinted with permission of the author and publisher, Rio Nuevo Publishers.

All photos by Scott and Deirdre Calhoun.

Living in the Yard—Cooking, Sleeping, and Going to the Movies

Neon-pink penstemon electrifies the edges of the pathways to the Calhoun's front door.

[O]ur front and back yards are not normal. That is, the front yard is not a big green lawn with a couple of trees, where a real estate agent might stick a sign and few others would venture. We wanted to turn the notion of a front yard on its head. Instead of a highly manicured area that no one used, we wanted to return front-yard living to the front yard. By design, our front door faced onto a gravel hiking path filled with wild trees, shrubs, and flowers. Within this area we aimed to enjoy many a barbecue, movie, and sleep-out.

In our back yard, we wanted to transform a rectangle of beaten earth, hard-up on the street, into a vine-covered, intimate hideaway, a sanctuary for plants, butterflies, hummingbirds—and people. A little quiet place enclosed by a big adobe wall.

Living in the Back Yard

Once we began living in our finished house, the lack of privacy from the street was a little shocking. The house stood there like a naked face, two big eyes with a long nose, looking out on the street. People driving by could look directly into our bedroom. Potential homebuyers would park on the street and walk right up to the door, thinking that our home was a model, sometimes catching Deirdre in a towel on her way to the shower. We knew we wanted to enclose this space. In a nod to the character of the house, we used mud adobe brick to build a circular wall. I got the idea from a garden at the Arizona-Sonora Desert Museum in which a badly eroded mud adobe wall enclosed a circular planting bed filled with red-flowered Texas betony (Stachys coccinea) and salvias. This garden was always alive with hummingbirds, and walking around it felt like exploring a ruin. We wanted a little of that mystery in this back yard.

Without a doubt, the back yard is the most intimate space in our landscape. Flanked by rainwater-harvesting culverts and enclosed by a mud-adobe wall, this 40 x 16-foot garden is Deirdre's personal retreat.


Red flowers lead to alluring pomegranate fruit.

Although the soil and growing conditions were better in the back yard, it still presented considerable horticultural and marital hurdles. The realities of the back yard were as follows:

- The yard faces south, making it the warmest microclimate on the entire lot. This left us with the opportunity to plant some southern Sonoran Desert plants that would be nipped back or killed by frost in other locations on the property.
- With an unnatural longing, Deirdre wanted a water feature.
- The space was divided into thirds by a steel gazebo, leaving no space for large trees.
- Because of its small size, vines and vertical gardening would be critical to the yard's success.

- The whole area was framed and watered by two rainwater-collection culverts, which each hold 422 gallons of water. These would provide irrigation for the plants within the courtyard. Like it or not, these give a strong vertical emphasis to this garden.

Some of the most high-spirited fights of our marriage have been over design issues in gardens. In one Oscar Madison-Felix Unger spat we agreed that Deirdre would get to design the back yard, and I would design the front yard and patios. This was the gardening equivalent of taping a line down the middle of the house. I can't say that it has worked out very well, since we both have infringed on each other's territory considerably.


Bottle-cap centipede with "stinky" passion vine.

Deirdre had a notion to plant citrus and pomegranates in this back garden, which ran contrary to my desire to plant cacti and vines from Baja California, Mexico. We reached a

compromise in which we planted a 'Wonderful' pomegranate tree in one corner and a variety of Sonoran Desert plants in the rest of the yard.

We also agreed that the garden would have a red theme. We both love the color red and how it looks with the sage green and pale blue trim on our house. The fact that red attracts hummingbirds was also a plus.

Since the pomegranate would be the only non-native tree in our garden, I wondered if it would stick out like a sore thumb. To my surprise, after I selected a nice five-gallon specimen, it seemed right at home in our landscape—perhaps because its red blossoms matched the red theme of the garden.


The back yard, with its twin cisterns, in the early spring.

Although the pomegranate is not native, it has a long history of cultivation in desert regions and is often mentioned in ancient literature. This tree was present in Mesopotamia and in biblical times. The unique shape of the pomegranate, a symbol of fertility, was often depicted in Egyptian jewelry, and pomegranates were placed in King Tut's tomb to sustain him in the next world. In the sexiest book of the Bible, The Song of Solomon, the pomegranate figures prominently as a tree to make love under and as a fruit that recalls both temples and the breasts of a woman; "Thy plants are an orchard of pomegranates, with pleasant fruits," says the biblical poet. In Chinese culture, whole pomegranates were rolled onto the floor of the wedding chamber to promote fruitfulness during the consummation of the marriage. Even if you're a guy who can easily disregard ancient Chinese wisdom, what straight male gardener can resist a plant with fruit that recalls the shape of a woman's breasts? Besides its mammary resemblance, the pomegranate is a true desert tree and will survive on only fourteen inches of rain a year. The pomegranate is also one of the rare desert plants with real fall color—its leaves turn an arresting yellow in autumn.

As it turned out, we planted our pomegranate on the verge of an American pomegranate renaissance. In December 2003, a Time magazine story touted the culinary and newly realized health benefits of the fruit. At a healthy fast-food outlet in Phoenix, I drank my first bottle of pomegranate juice, produced by a company called Pomwonderful. My mother had often sprinkled the multifaceted, ruby-like pomegranate seeds on fruit salads at Thanksgiving and Christmas, but I had never considered juicing the fruit. The juice had the sweet-tart overtones of cranberry and cherry juice, and the packaging was at least as alluring as the juice itself. It came in a stylish double-globed glass

bottle that appeared to have been fashioned within the confines of a push-up bra. Not only was the packaging sexy, Pomwonderful's marketing campaign was equally seductive. Because of pomegranate juice's high antioxidant content—which Pomwonderful claims is higher than that of red wine, blueberries, green tea, and a host of other heart-friendly foods—Pomwonderful used the slogan "Cheat Death" in their print ads.

Adobe wall surrounds the northeast patio.

Against all logic and my strident objections, Deirdre wanted a fountain against the back wall. I knew this would require several weekends of fooling around with electricity and masonry. I also knew that because my wife was strong-willed and generally smarter than me, I would probably end up building a fountain. After I gave up trying to dissuade her, we began to search for small fountain fixtures. We found a painted Mexican frog planter that we modified. When this frog was properly plumbed (we ran a tube from his drain hole to his mouth), water bubbled from the amphibian's mouth. For some reason, the crazy little frog started to grow on me. Maybe his spiral eyes hypnotized me.

To my surprise, Deirdre built the rest of the fountain herself, using spare lumber and a sheet of galvanized steel. She even used my worm-drive Skil saw for the first time, without incident. Behind the fountain, I installed three old doors we found at a local salvage yard. The center door had a mirror that we lined up with the centerline of our house as a gesture to remedy the feng-shui chi leakage problem mentioned previously. The mirror seemed to do a fine job of reflecting chi back into the house. I could sit at the head of the dinner table with a direct view of the mirror and garden. I could almost feel the chi rushing down the hallway, bouncing off the mirror, and hitting me in the forehead. I believe, although I can't be sure, that the two red and blue Corona beer trays flanking the mirror also helped to contain any stray chi that was bopping around.

I've never been one to spend lots of time fooling around with plants that grow in ponds. I frankly don't understand a plant that will grow by just dangling its roots into water. But Deirdre found some plants called water lettuce that float on the water and multiply like rabbits. At the rate these water lettuce heads propagate themselves, they may shortly be declared an invasive weed by the State of Arizona, as has already happened to water hyacinths and duckweed. But the water lettuce does look pretty good, spreading the color chartreuse out across the surface of the water. There are also a few good native water plants, and I found one that I really liked: yerba mansa (Anemopsis californica), which likes boggy conditions. It was a good plant to put in front of the mirrored door in some half-submerged pots in the fountain. Yerba mansa's zinc-oxide-white flowers look stunning emerging from the still waters and reflecting in the mirror. The shape of the yerba mansa flower suggests both prairie coneflower and Mexican hat.

One of the great things about screening is that dividing up an outdoor space usually makes it appear larger than it is. This became readily apparent in my back garden. Before we enclosed the space, the 16 x 40-foot rectangle seemed perfect for a shuffleboard court or horseshoe pit. But after we built our adobe wall, the space seemed plenty big for chairs and a table, trellises and vines, and a small fountain.

Twining snapdragon winds through the Calhoun's ocotillo fence and license plate collection.

The dominant feature in this garden is a steel grid ramada; 'Baja Red' queen's wreath and native passion vine weave their way through the steel squares of the four corner posts and top of the ramada, which are all made of the same metal grid. Also climbing up the ramada is the vining moon cactus.

On trips to Mexico with Zoë, we had accumulated a galvanized bucket full of Mexican pop bottles that now sat idle in the garage. We had moved them from our apartment to our house, but had not found the proper venue for their display. If not for Zoë's protests, they would have been thrown out. Meanwhile, every time we went to Mexico, Zoë always seemed to find a new bottle to add to her collection. I could see why Zoë liked them. The Mexican Squirt bottle, for the toronja (grapefruit) flavored drink, has a swirling green glass base like a soft-serve ice cream cone. The Crush bottle is fluted and looks like a mini Art Deco skyscraper. Of course we had the classic Mexican Coca-Cola bottles, but there were other obscure brands like Vita, Sidral Mundet, and Topo Crico—remnants of a slower time when people had time to buy a soda at the corner market, drink it on the premises, and return the bottle for a cash deposit. The bottles reminded us of happy journeys into Mexico, where sometimes we had slowed down enough to eat street tacos and linger over a soda for a good long while in a Colonial plaza. Finally, we used baling wire to hang all twenty-five pop bottles from the ceiling of the ramada and threaded clear Christmas lights among them to add to the market-festival effect. On a trip to Obregón, Sonora, Deirdre purchased a large disco ball made from strips of tin cans that we hung in the center and stuffed full of lights.


A Topo Crico brand bottle, part of Zoë's Mexico pop bottle collection, at twilight.

Draped with vines and festooned with Mexican soda pop bottles, the steel ramada reminded me of a stall in an outdoor Mexican market, or at least an idealized American vision of a Mexican market. Dangling in the breeze, the Mexican pop bottles became a symbol for our back yard; we began to call it the "Mexican pop bottle" garden.

Continuing the pop-bottle theme, we affixed a bottle-cap centipede to the side of the ramada, along with some magnetized tin-can cockroaches and grasshoppers. Deirdre made magnetic bottle-cap flowers that she arranged on the sheet metal panel of the fountain. The yard was becoming more and more idiosyncratic. We wondered if our neighbors would think it was the work of crackpots. On the contrary, we got a lot of compliments on the Mexican pop-bottle arrangement, none of which included the word "unique." If you stood

back a little in the evening and squinted at the bottles glowing in the sunset, you might wonder exactly where in Sonora you were.

We found that hummingbirds were attracted to the pop bottles with red-painted labels. So as not to discourage them, we added a real hummingbird feeder. I'm generally not a big fan of hummingbird feeders. I'd rather let real red flowers do all the work, and it took a while to find a feeder that really fit with the theme of the garden. Most were functional but too plastic; others were decorated with shining glass beads and chimes that recalled a New Age head shop in Sedona. They just weren't the right style for our Mexican pop-bottle garden. Finally, I found some hand-blown bubbled-glass feeders from Mexico, with elegant red glass flowers as the spigots for the hummers' beaks. Their octagonal shape was modeled after French perfume containers of the early 1900s, and the feeders looked so chic, I didn't care if a hummingbird ever visited. The feeders came in clusters of three, and we hung one directly in front of the mirrored door. This ensured that hummingbird battles over territory could be viewed from both inside and outside the house.

The perennial plant palette had a big emphasis on red plants, with bat-faced cuphea clustered around the palo blanco trees; and firecracker penstemon, slipper plant, and red fire barrel cacti along the wall. We used some blues, like Gregg's mist flower (Conoclinium greggii, also known by its folk-medicinal name, boneset) and sundrops to set off the reds.

Sunset chairs and totem pole cactus in the evening light.

The back garden was best in late summer following monsoon storms. During and after summer rains, the garden responded as if on steroids. In the sultry heat, it transformed itself into a thick, lush southern Sonoran hideaway. A garden that struts its stuff in summer is an oddity in southern Arizona. Our winter visitors (a.k.a. snowbirds) demand winter-blooming exotics and generally ignore much of the summer-blooming flora. For me, summer is the best time to enjoy the garden. Warm nights filled with night-blooming cacti, yellow morning glory flowers, and burgeoning bat-faced cuphea under the lacy tops of palo blancos make summers in our garden full of magic.

Cooking, Eating, and Just Sitting Outside

A couple of weeks after we moved into our house and long before we had any semblance of a garden, we ate Thanksgiving dinner on the north patio, which was not a patio at all but a patch of beaten dirt. Deirdre brought out folding tables, covered them with linen tablecloths, and put a pot of white and blue violas on each table. My parents, brothers, and sisters would be here, so we had to keep up appearances.

Our back-garden trees
palo blanco, sweet acacia, 'Wonderful' pomegranate

Our back-garden shrubs
chuparosa, Southwest coral bean

Our back-garden cacti and other succulents
candelilla, fire barrel, moon cactus, octopus agave, Queen Victoria agave, sharkskin agave hybrid, slipper plant

Our back-garden perennials, wildflowers, and grasses
bat-faced cuphea, Gregg's mist flower, cherry sage, dogweed, firecracker penstemon, Sierra sundrops, Mexican feather grass

Our back-garden vines
Arizona grape ivy, 'Baja Red' queen's wreath, "stinky" passion vine, twining snapdragon, yellow morning glory vine


'Baja Red' queen's wreath creeps across the steel ramada while the Mexico disco ball sparkles in the midday light.

In the back yard, I had another project—cooking our turkey in a pit. With the jackhammer, I excavated a hole big enough for a twenty-five-pound bird. My friend Eric Clark gave me a bunch of mesquite firewood that I piled into the hole and lit at 3:00 in the morning to get the coals ready so the turkey would be cooked by lunchtime. My fire was impressive. So impressive, in fact, that the leaping flames in close proximity to the eaves of the house made me too nervous and excited to sleep. I sat upright in bed looking out the window at the fire until the flames died down. Then, using clean bedsheets and damp burlap bags, we swaddled the turkey, placed it on a bed of hot rocks, and buried it with southern Arizona dirt. About six hours later, we unearthed the bird and removed the burlap and cotton sheets. For a moment, I worried that the turkey had not cooked—its flesh was as pale as an albino. But I checked the bird's temperature and it was indeed done, maybe even overdone. We carved the turkey with a fork and a butter knife. The meat fell off the bone, and its flavor hinted at mesquite smoke. It made for one of the best Thanksgivings we could remember, and we ate it on a patch of beaten dirt. It got us fired up about cooking outdoors.

You can cook outside just about every month of the year in southern Arizona. Early Spanish, Mexican, and Anglo settlers, as well as Native Americans, often had separate outdoor kitchens in order to avoid heating up their dwellings in the summer. Although we didn't have the space for an outdoor kitchen, we have made do with a rolling barbecue from Sears and a $50 table from Target that we painted to match the house. Although cheap, both have served a couple of kids on a budget pretty well. We've cooked Chilean flank steak, garlic shrimp, and pork tacos with good results. At night, we might set up a light on the dining table after dinner and play Boggle while listening to Billy Bragg sing a Woody Guthrie song:

They hang like grapes on vines that shine
And warm the lover's glass like friendly wine
So, I'd give this world
Just to dream a dream with you
On our bed of California stars…

Scott Calhoun is a writer and garden designer living in Tucson, Arizona. His first book is Yard Full of Sun: The Story of a Gardener's Obsession That Got a Little Out of Hand (Rio Nuevo Publishing, 2005). When he is not searching for weird plants or collecting color chips at paint stores, he can be found swimming in turquoise waters or playing volleyball with his daughter Zoe.

Essay

by Gregory McNamee

"A Desert Bestiary" is a series of essays originally appearing in A Desert Bestiary: Folklore, Literature, and Ecological Thought from the World's Dry Places (Johnson Books, 1997) by Gregory McNamee, and is reprinted with permission of the author.

The creatures that inhabit the deserts of the world—insects, birds, mammals, fish—are of special interest to a certain heat-tolerant breed of scientist, at least in part because of the adaptations that arid nature has forced on them, equipping them to survive in lands of no water and ferocious sun.

Those lands make up a good portion of the Earth, some twenty-five percent and growing. If you study a globe that marks the planet's physical features, as you follow the tropics of Cancer and Capricorn, thirty degrees on either side of the equator, you will see, distributed with suspicious regularity, a brown band of drylands. These lie in the so-called horse latitudes, where constant high-pressure systems separate the westerlies and trade winds, driving away the rain clouds, swirling above the earth to the music of global temperature variations and the Coriolis effect produced by the earth's rotation in space. Some of those drylands, like the Atacama of Chile, the Namib and Kalahari deserts of southern Africa, and the western Australian desert, are the result of cold oceanic currents that divert rain-laden air away from coastlines. Others, like the Mojave and Sonoran deserts of California, Arizona, and Mexico and the deserts of central and eastern Australia are caused by the "rainshadow effect," through which coastal mountains milk rain from the air before it passes inland. Still others, like the Gobi and Taklamakan deserts of Mongolia and China, are simply so far away from the ocean that the winds lose any moisture they may hold long before reaching the faroff continental interior, even what little moisture remains in the Indian Ocean—born clouds after they have scraped over the jagged Himalayas.

Harsh as they are, those deserts abound in life. And they abound in the stories that the people who live in them tell about that life; a library devoted to the folklore of desert animals would fill many large rooms. The small essays that follow, excerpted from my book A Desert Bestiary (Johnson Books, 1997), are full of true statements, outrageous and odd lies, and learned and not so learned guesses about why those animals live the way they do. With them, I hope to help construct a history of the drylands that talks at length, and with wonder, about the animals that share our world.

Ant

Lazybones, go to the ant;
Study its ways and learn.
Without leaders, officers, or rulers,
It lays up its stores during the summer,
Gathers in its food at the harvest.
How long will you lie there, lazybones;
When will you wake from your sleep?
A bit more sleep, a bit more slumber,
A bit more hugging yourself in bed,
And poverty will come calling upon you,
And want, like a man with a shield.

Thus the poet of Proverbs, who, like all desert people, turned to the ant for metaphorical example, finding in its industry the underpinnings of an ethic and a way of life.

Mark Twain, who spent time in the deserts of the American West, arrived at a good-natured rebuttal of the poet. "Science has recently discovered that the ant does not lay up anything for winter use," he remarked, continuing,

> This will knock him out of the literature, to some extent. He does not work, except when people are looking, and only then when the observer has a green, naturalistic look, and seems to be taking notes. This amounts to deception, and will injure him for the Sunday schools. He has not judgment enough to know what is good to eat from what isn't. This amounts to ignorance, and will impair the world's respect for him. He cannot stroll around a stump and find his way home again. This amounts to idiocy, and once the damaging fact is established, thoughtful people will cease to look up to him, the sentimental will cease to fondle him. His vaunted industry is but a vanity and of no effect, since he never gets home with anything he starts with. This disposes of the last remnant of his reputation and wholly destroys his main usefulness as a moral agent, since it will make the sluggard hesitate to go to him any more. It is strange, beyond comprehension, that so manifest a humbug as the ant has been able to fool so many nations and keep it up so many ages without being found out.

Ants are common to most temperate and subtemperate biomes of the world, but they are among the desert's defining creatures. What vegetation there is in a desert is partly thanks to the labors of the ants, whose endless digging helps loosen the hard soil and allow plant roots to find their way to water; ants seem to view the desert, at least the patch of it where I live, as a garden, constantly weeding the rocky ground. It is in recognition of their essential role, I think, that so many peoples of the deserts around the world have named themselves after ants: the Green Ant moieties of aboriginal Australia, the Ant warrior clans of the Berbers, and other groups honoring the anaxforminges, the archetypal lord of the ants. So, too, does the ant appear in Egyptian tombpaintings and Navajo sandpaintings, in the stories and songs of desert peoples everywhere, fooling, in Twain's eyes, so many nations.

In the Berber creation story, collected by anthropologist Leo Frobenius, the ant is the first humans' chief tutor.

> First Man and First Woman wandered around under the surface of the earth. One day they came upon a mound of millet, along with stores of barley, wheat, and other seeds. An ant was running around these piles of grain and removed a grain of wheat from its husk. Then it ate the wheat. The woman said, "Kill it!" But the man said, "Why? Someone created it, just as someone created us." The first man then said to the ant, "What are you doing there?" The ant said, "Do you know what water is?" When the man and woman said no, the ant showed them a spring and said that the grain would be good for them if they cooked it in water. The ant then led them above the surface of the ground and showed them stones. "With these stones," he said, "you grind the grain so that you can eat it." Then he showed the humans how to make meal, and how to make bread, and how to make and tend a fire. "Now we will have full stomachs," said the first man.

The Akimel O'odham, who live along the middle Gila River of Arizona, sing songs about their homeland that, along the way, liken the people to ants, clinging to sticks as they descend into the earth.

Greasy Mountain,
Greasy Mountain stands.
There inside
Green flowers
Cover me.
There inside
Manic is.
Broad Mountain stands.
There below, waters primed to spurt.
And I below there go,
On stick's end cling:
Stick glitters,
then enter.

In Arnhem Land, certain witches are thought to use a potion made of green ants and lizards to close incisions made in victims whose souls they have robbed. Green ants then bite any protruding organs until they retreat into the body, after which the victim is bashed on the head and told to forget what has happened to him. This would, I think, tend to prejudice a person against ants, but the inhabitants of Arnhem Land seem not to hold this sorcery against the insects.

The entomologist Justin O. Schmidt has concocted a rating scale for the bites of various venomous insects and reptiles. By that scale, the bite of a fire ant is akin to a mild shock of static electricity, that of the harvester ant somewhat more severe, as if someone were using a power drill to excavate a painfully ingrown toenail, and that of a bullet ant even more fierce, the equivalent of walking over coals with a heelful of iron nails. Even they do not add up to the punch of a rattlesnake, whose pain rating Schmidt ranks off the charts, akin to sending a scorching bullet into a sensitive limb.

For all their relative lack of firepower, fire ants are a great concern of American desert dwellers these days, and who knows what urban folklore, like that surrounding giant flying cockroaches and sewer alligators, the encroaching fire ants may one day inspire. These creatures first arrived from the South American tropics into the American drylands, having hitched a ride on banana freighters that landed in Mobile, Alabama, only sixty years ago. Their remarkably fast spread is an example of the adaptability of the ants, and other social insects, and cause for a scare, as the Associated Press reported on June 12, 1995:

> PHOENIX—Imported red fire ants are making their way toward Arizona, where experts say they are bound to become a common pest.
>
> The insects, known to be more harmful than "killer" bees, are native to South America and reached this country by ship during the 1930s. They have become entrenched in 11 states from North Carolina to Texas and have spread as far west as the lower Rio Grande.
> The ants have a painful and sometimes lethal sting that sends about 25,000 Americans to doctors each year. While improved quarantines have reduced the number of fire ants that stow away on truck cargo brought into Arizona, experts say efforts to keep the bugs eventually won't be enough.
>
> "There's nothing to stop them from infesting any metropolitan area in the country," said Tim Lockley, a researcher at the U.S. Department of Agriculture's fire-ant laboratory in Gulfport, Miss. "They are surviving in dry climates where they weren't supposed to, and they are surviving in cold climates where they weren't supposed to."
>
> So far, the Arizona Department of Agriculture has been able to eradicate every colony found in the Phoenix metropolitan area. Ants that arrived in the soil of plants from landscaping nurseries in the Southeast briefly infested a few Phoenix-area nurseries and even The Phoenician resort.
>
> The state's main defenses against the ants are inspectors who check trucks at border stations and examine nursery stock from infested states. The inspectors found fire ants on 28 shipments in the first five months of 1995 and on 304 shipments in 1994. Infested cargos other than nursery have included computers, swing sets and frozen chickens.
>
> Fire ants are capable of doing more economic damage than another stinging insect, the Africanized honeybee, also called the killer bee, which spread into the state in 1993. Experts say fire ants could kill as many animals and people as the bee in areas infested with both.
>
> The risk of human deaths from either of the easily provoked insects mainly is limited to a small percentage of the population allergic to venom.
>
> Besides attacking pets and newborn livestock, the South American fire ants kill other insects, birds, rabbits and reptiles. They are attracted to electrical current and have been known to chew through wires and damage outdoor appliances, such as air conditioners.

It is hard to imagine that these fearful fire ants will find a champion such as Albert Schweitzer, who once told a young Sahelian boy he witnessed torturing an ant, as at the beginning of Sam Peckinpah's film The Wild Bunch, "That's my private ant. You're liable to break it."

Ants inspire the sometimes totalitarian dreams of social engineers. The Zulu kings pointed to the example of the weaver ants (Oecophylla longinoda), whose tentlike colonies spread over dozens of baobab trees at a time and number half a million individuals governed by a single monarch, as models of social organization. So did the Zuni Indians, who call their crowded pueblo home in the high desert of western New Mexico the "middle anthill." Yet those who see in social-insect societies like those of the ant a model for human societies, as some lesser advocates of sociobiology have suggested, should beware. As Arnold Toynbee writes, "insect societies and Utopias are both patently in a state of arrested development," and we have little to learn from either if we are to live as humans in the world.

That lesson has not been taken in Arcosanti, an experimental community a hundred miles north of Phoenix, Arizona. A garish bit of construction perched on a high plateau, it resembles nothing so much as an anthill, one that mixes the architectural sensibilities of Antonio Gaudi and Albert Speer. Paolo Soleri, the Italian designer and self-styled visionary who has made Arcosanti his lifework, has articulated a weird view of the future that goes something like this: in the coming years, humankind will have despoiled the planet (a likely enough possibility) to the extent that we will all—or at least those of us who outlast the apocalypse—be forced to live in hermetically sealed towers, our allotment a cubicle apiece so small that it would make the denizens of San Quentin riot in a second. The vision is exactly that of a weaver anthill, and inspiration enough, I think, for us to do something about the various ecological messes we've made before we condemn ourselves to living in the empire of the ants.

Bat

The bat, nature's great insecticide, has had a bad time of it for millennia. Aesop tells this story about the perhaps too-versatile creature, which humans have always had trouble classifying into the neat categories of bird and beast, flying and terrestrial creature:

> Once a fierce war raged between the Birds and the Terrestrial Animals. The Bat, being of both air and land, remained seemingly neutral in this war, shifting allegiance as the moment dictated. When the Birds led, the Bat joined with them; when the Terrestrial Animals carried the field, the Bat took up their cause. When at last the Birds and the Terrestrial Animals made peace, both condemned the Bat for its opportune behavior, and neither side claimed him. The Bat skulked away and has lived in dark corners and holes ever since, never showing himself except in the near dark of latening twilight.

Likewise, the Chemehuevi Indians of the Mojave Desert tell this story about the bat's failure to fall neatly in step with others' well-laid plans:

> Older Brother, dressed in leather armor and holding a concealed bow and arrow under one arm, wrapped himself in a blanket to resemble a small animal. A Great Bird carried him high above a great rock and dropped him into its nest. He was protected from injury by carrying a medicine bundle in each hand. He took medicine from a bag and spread it in the rock; its resemblance to blood fooled the parent bird into believing he was dead and suitable food for the birdlets in the aerie.
>
> He turned one fledgling into an eagle and another into an owl; both flew away. Their fallen feathers were to be of use to the People in their ceremonies. Seeing their empty nest, the Great Birds flew south to find a higher mountain on which to build another nest.
>
> Unable to descend from the cliff, Older Brother begged Grandmother Bat to carry him down; she agreed to do so in return for the feathers in the nest. There were so many feathers that they could fill her basket; she planned to use them in her own nest. As he got into the basket, it expanded to fit him. He closed his eyes in accord with Bat Woman's command, but when he heard a queer noise which aroused his curiosity, he opened them and he and Grandmother Bat fell rapidly. He obeyed her command to close them again and they descended slowly and landed with a slight bump. Bat Woman clambered up the crag to collect the soft feathers for her nest but the wind blew them away. She had no use for the large wing and tail feathers which remained and half flew and half scrambled down the steep rock and gave them to the youth who would turn them into birds which were useful to the People. He would take some of them to his mother to show her he had really visited the home of the Great Birds. Bat Woman hid from him the fact that she had lost the soft feathers, by keeping her basket closed.
>
> Older Brother turned south to begin his long journey home but looked back to see Bat Woman wending her way home on a dim path that led through a dry lake bed which was overgrown with yellow flowers. He warned her not to go through the bushes which had grown on the old lake bed, but she pretended not hear him and continued on her way.

The aboriginal peoples of the Kimberley Range, who seem more kindly disposed toward the winged mouse, tell stories of a creator bat who was present at the dawn of the world—one of the few instances in which bat helps shape the planet, as it happens—and of Wariwulu, Batman, who is a protector of the people. In the Gadimargara dreaming, the world is surrounded by bats; when they sleep in their great cave, it is daytime, but when they are out flying they cover the sun, and then it is night.

The bats' play in shaping the world is now in danger. The population of the Mexican freetail bat, to name one prominent North American desert-dwelling species, is in precipitous decline. In some areas, the population has fallen by 99.99 percent in just thirty years; where Carlsbad Caverns, New Mexico, once housed some 8 million, only 250,000 are left, and in the tall caves over Arizona's San Francisco River where as many as 25 million bats once lived, the population is now perhaps 35,000. The thirty-nine other bat species in North America are in increasing peril as well, much of it traceable to the use of agricultural pesticides. With that fall has come a sharp rise in the mosquito

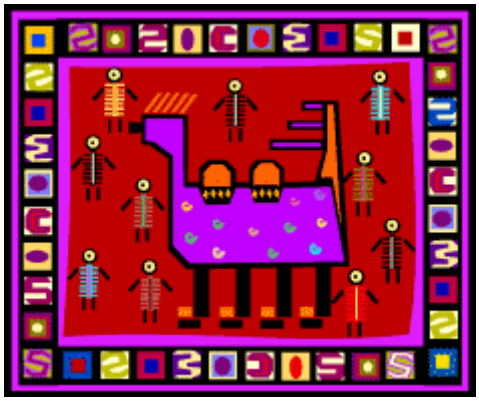
population—a Mexican freetail bat can eat upwards of six hundred mosquitoes an hour—and with that mosquito upsurge, in turn, has come an increasing prevalence of tropical diseases in the desert, diseases once thought to have been eradicated, among them dengue fever, which has been striking the inland deserts of Mexico since the early 1990s. With the loss of those bats, too, tequila drinkers will have to look for another libation; bats are the chief pollinators of the agaves from which tequila is distilled. Their loss means the end of an ages-old symbiosis.

During World War II scientists working for the U.S. Army Air Corps attempted to develop a bomb that would release hundreds of incendiary charge–laden Mexican freetail bats over the major cities of Japan. These bats would, the scientists hoped, take refuge in rafters and rooftops and thus set off a huge firestorm when delayed fuses set off the charges. Evidently this bomb was not to have been used on our European enemies, against whom we battled more humanely, and in any event the experiment was short-lived; the bats instead burned down the New Mexico laboratory in which they were being tested.

A Chiricahua Apache elder once told the anthropologist Morris Opler, “If a bat bites you, you had better never ride a horse any more. All the Chiricahuas say that. If you do ride a horse after being bitten, you are just as good as dead.” Bats, bombers, and bridles, it would appear, are mixes that just don’t work.

Folklore lives by flourishes of the commonplace. Diane Ackerman adds to that of the bat wonderfully by her remark, in The Moon by Whale Light, that “their guano smells like stale Wheat Thins.”

Camel



The camel, as the old bon mot has it, is a horse designed by committee: an ungainly creature, it is the largest of the ruminants, the creatures that, alone of all mammals, arise from the ground hind legs first. If you have ever been spat on by one you know what it is like to have been visited by demons. Its foul spittle, however, is probably not why the camel is considered unclean by the strictures of Leviticus, but instead because it was the steed of the Bedouin enemy, and thus an enemy to city people and cultivators.

The camel is one of the earliest mammals to have been domesticated—even today, humans have tamed only a few of the mammal species offering themselves to the task—and one of the few to have been domesticated first by nonagricultural desert societies. We associate the camel with the North African desert, but it is a fairly recent importation there from the deserts of Persia, brought into the Sahara as a beast of burden in Roman times at about the time the last native elephants died off, the Romans having killed them off to supply ivory to the empire.

Now, deserts are windy places, windy because they abound in solar energy, the driving force of the

world's supply of moving air. One wind, the simoun (from the Arabic word for poison), shrieks over the Sahara, whipping up sand and dust into fearful, sharp-grained chevaux de frise. Herodotus, the great Greek traveler and historian, whom his younger contemporary Thucydides uncharitably called "the father of lies," doubtless got it right when he reported the story of a Libyan army that marched off two and a half millennia ago into the deep Sahara to find and subdue the lord of these storms. The expedition never returned, "disappearing, in battle array, with drums and cymbals beating, into a red cloud of swirling sand." The Assyrians, it is said, did much the same, sending squads of archers to combat the approaching clouds. And for good reason: a duststorm once buried Ur of the Chaldees, cause enough to seek vengeance.

The simoun has many local equivalents: the Moroccan sirocco, the Libyan ghibli, the Saudi khamsin, the Egyptian zoboa, the Australian "brickfielder," the Mongolian karaburan, the Sudanese haboob, the Mauritanian harmattan, and the Indian loo, which Rudyard Kipling describes in his story "The Man Who Would Be King" as a "red-hot wind from the westward, booming among the tinder-dry trees and pretending that the rain was on its heels." The logic of those winds seems to have prompted evolution to make a few alterations in the master plan; recently, biologists have concluded that camels, strange creatures to begin with, evolved so that, standing, they can clear the sand-laden zone of air, which goes up only to about six feet, slightly lower than the average camel's height. Other creatures, such as the antelope-like saiga of Central Asia and certain kinds of desert hares, have filtering tissues surrounding their respiratory tracts that give them the same adaptive advantage.

Nikolai Prejevalsky, the Russian scientist and explorer who crossed the high deserts of Central Asia atop a string of Bactrian camels, came to have a great respect for his steeds:

> During the excessive heats in summer, the camels are attracted by the cool temperature of the higher valleys of Altyn-tagh, and make their way thither to an altitude of 11,000 feet, and even higher, for our guides informed us that they are occasionally found on the lofty plateau on its southern side. Here the chief attraction for them are the springs of water, to say nothing of the greater abundance of camel's thorn (calidium), and their favourite, but less plentiful Hedysarum. In winter the wild camel keeps entirely to the lower and warmer desert, only entering the mountains from time to time.
>
> Unlike the domesticated animal, whose chief characteristics are cowardice, stupidity, and apathy, the wild variety is remarkable for its sagacity and admirably developed senses. Its sight is marvellously keen, hearing exceedingly acute, and sense of smell wonderfully perfect. The hunters told us that a camel could scent a man several versts off, see him, however cautiously he might approach, from a great distance, and hear the slightest rustle of his footsteps. Once aware of its danger, it instantly takes flight, and never stops for some dozens, or even hundreds of versts. A camel I fired at certainly ran twenty versts without stopping, as I saw by its traces, and probably farther still, had I been able to follow it, for it turned into a ravine off our line of march. One would suppose that so uncouth an animal would be incapable of climbing mountains; the contrary, however, is actually the case, for we often saw the tracks and droppings of camels in the narrowest gorges, and on slopes steep enough to baffle the hunter. Here their footprints are mingled with those of the mountain

> sheep (Pseudo nahoor) and the arkari (Ovis poli). So incredible did this appear, that we could hardly believe our eyes when we saw it. The wild camel is very swift, its pace being almost invariably a trot. In this respect, however, the domesticated species will, in a long distance, overtake a good galloper. It is very weak when wounded, and drops directly it is hit by a bullet of small calibre, such as the hunters of Lob-nor use.
>
> We were unable to learn the duration of a camel's life; some are known to live to a great age.

Aelian observes that the camels of the Caspii, the eponymous people of the Caspian Sea region, which Prejevalsky crossed, were innumerable, "and the largest are the size of the largest horses and have beautiful hair. . . . Accordingly their priests and the wealthiest and most powerful of the Caspii clothe themselves in garments made from the camels' hair." Herodotus rejoins that camels have four thighbones in their hind legs, and that their genitals face backwards. He was also shocked to report that while camels would never dream of copulating openly, their Massagetae drivers did, an affront to the camels'—and Herodotus's—natural sense of decency.

Although it has long been popularly supposed that the camel's back is curved, its backbone is as straight as that of a horse; its hump is composed of not bone but fat, and a malnourished or overworked camel will often not have a hump at all. The one-humped dromedary (Camelus dromedarius) of the Saharan and Arabian deserts and the two-humped Bactrian camel (Camelus bactrianus) differ largely in that the latter has shorter limb-bones than the former; the dromedary, too, has a vestigial anterior hump that seems to have shrunk from the Bactrian's pronounced two humps in response to drier conditions. That reserve of fat enables the camel to store water and reabsorb it on long desert voyages when food and water are scarce, leading to the supposition that camels can travel for months at a time without taking a drink.

Adelard of Bath, an English theologian, spent several years in Syria and reported the things he had learned in his Quaestiones naturales, written in about 1117 but not published until 1480. Among the other learning he delivers to his foil, a young nephew, is a description of the camel and other ruminants. Adelard remarks, "It is a little difficult for you and me to argue about animals. I, with Reason for my guide, have learned one thing from my Arab teachers, you, something different; dazzled by the outward show of authority you wear a head-stall. For what else should we call authority but a head-stall?" When his nephew asks why some animals chew cud, Adelard replies,

> The natures of animals, like those of human beings, differ. Some of them are naturally hot, others cold, some moist, and others dry. Those which are hot more readily digest the food they have taken in, and more easily change it into blood, while cold animals have more difficulty with this. Everything subject to change is altered more easily by heat than by cold, for fire has, as it were, the property of sundering what is conjoined. Consequently, those animals which have a hot stomach easily digest their food. Others, however, which are of a cold nature, being unable to digest their food, bring it back, and use their teeth again upon it, in order that by a second process it may the more readily be softened: this is done by oxen, goats, and similar animals, whom the Greek physicists call "melancholic." How all these animals are of a cold nature is clear enough to the physicists, and you may get an idea of it as

> follows: it is for this reason, that they have both their fat harder, and what is commonly called the paunch more solid; while others, as being warmer, have the fat softer, it being better digested, or to use the common phrase, more greasy.

Why camels should have cold natures we do not learn, but the ancients also supposed that the camel dislikes clear water, preferring to drink muddy, dirty water over any other. Modern science does not bear up this observation, although camels do tend to step in whatever body of water they happen to be drinking from, thus stirring up mud and silt from the bed. With clumsiness comes a reputation for obstinacy, as an Egyptian proverb tells: "The camel curses its parents when it has to go up a hill, and its Maker when it has to go down."

Seeking elusive first causes, a medieval German philosopher-naturalist once supposed that the production of butter from churning cow's milk came by way of suggestion from Arab traders to the West. These traders, he wrote, manufactured butter by heaving canteens full of camel milk across the saddle, and then ate the congealed contents at the end of a long desert passage.

Camels have been put to other uses in the kitchen as well. The Australian explorer Peter Egerton Warburton (1813–1889) crossed the continent with a string of camels, which began to die from eating poisonous plants or from the heat, whereupon Warburton and his human companions began to eat their unfortunate transport. "No shred was passed over," Warburton recalled. "Head, feet, hide, tail, all went into the boiling pot. . . . The tough, thick hide was cut up and parboiled. The coarse hair was then scraped off with a knife and the leatherlike substance replaced in the pot and stewed until it became like the inside of a carpenter's glue pot, both to the taste and to the smell."

Gila monster

Every formally trained life scientist in the world is a master of a closed code, a private language: the Linnean binomial system of classification, whereby living things are assigned their place in the universe by the identification of genus and species. (Thus humans, genus Homo, species sapiens; thus wolves, genus Canis, species lupus.) The system is named for Carl von Linné (1707–1778), or Linnaeus, an odd man committed to not only the rigor of science and of exact classification but also the slipperiness of numerology, famed for his cranky mystical pronouncements just as much as he was for his undisputed advances in biology.

In his own time, Linneaus was challenged by other scientists who did not fully accept his insistence on rigid classification. One of his foremost opponents was Georges Louis Buffon (1707–1783), who favored a view of life that concentrated on the individual, then the species, as opposed to Linnaeus's devotion first to the genus, then to the species; it was Buffon who insisted that species be defined in part as a "succession of individuals that can successfully reproduce with each other," a benchmark that is still in general use today. Buffon also insisted on the study of the habits, temperaments, and instincts of animals rather than their gross morphological characteristics, an early holism that carries on in the present practice of natural history.

Neither Linnaeus nor Buffon knew the Americas. Buffon's student and follower Corneille de Pauw, one of whose descendants endowed an American university, did. He did not like the place much. De Pauw wrote in his Recherches Philosophiques sur les Américains (1768) that the lands of the Americas were all deserts, swamps, or mountains, filled with poisonous fogs and death-dealing sun; in that country "monstrous insects grew to prodigious size and multiplied beyond imagining," and the serpents and reptiles were horrendous beyond credulity. Thanks in part to his influence, many of those herps bear terrifying names—like that of the Gila monster, Heloderma suspectum, the "suspicious warty-skinned one."

Ignaz Pfefferkorn (1725–1793) spent seven years in Sonora, a province of New Spain that included southern Arizona, as a Jesuit priest among the Eudeve, Opata, and Tohono O'odham peoples. The ruins of the church built for him by the last group may still be seen at Guevavi, near present-day Nogales. Expelled from New Spain with the Jesuit order in 1767, Pfefferkorn returned to his native Germany, where he wrote his book Beschreibung der Landschaft Sonora (A Description of the Province of Sonora). Pfefferkorn found the desert surpassingly strange, and especially the animals that populated it. One of the strangest was the Gila monster, the beaded, venomous lizard that unfortunately has many of the characteristics of the basilisk, that fantastic creature of the medieval Catholic bestiary "which frequents desert places and before people can get to the river it gives them hydrophobia and makes them mad. . . . It can kill with its noise and burn people up, as it were, before it decides to bite them." The legend continued in later years; in The Faerie Queene, Edmund Spenser writes of the creature,

Like as the basiliske, of serpents seede,
From powerful eyes close venim doth convay
Into the lookers hart, and killeth far away

and in William Shakespeare's play Cymbeline, Posthumus says of the ring given to him as evidence that his wife has been unfaithful,

It is a basilisk unto mine eye,
Kills me to look on't.

Now, Gila monsters are timid, small-jawed creatures, with unfatal eyes. A human has to work to get one to land a bite; still, countless of the reptiles ended up skewered on Spanish lances in an effort to purify the Crown's holdings. (The lancers evidently did not share the belief, which Pliny records, that "once a basilisk was killed with a spear by a man on horseback, the venom passing up through the spear killed not only the rider but the horse as well.") The same fate befell rattlesnakes, "the most villainous kind of beast"; mountain lions, whose "only enemy is the dragon"; tarantulas, wolves, and bears; and innumerable other creatures.

The Gila monster, a "living fossil" far better adapted to the Southwest's temperate past than to its arid present, is still wantonly killed for sport or for its neurotoxic venom, or captured for commercial roadside zoos. An object of hatred since Spanish times, the unfortunate creature had developed a great body of folklore by the time Anglos came to the region. A traveling reporter overheard a

drunken cowboy bragging of his exploits with the Gila monster: “I’ve seed a lizzard what could out-pizen any frog or toad in the world. . . . [My pistol] shot blew the body clean in two, and then I hope to die if the fore-legs didn’t get that pistol clean away from me, jump into the [Gila] river and swim away with it.” Responding to such stories, one Phoenix doctor remarked, “A man who is foolish enough to get bitten by a Gila monster ought to die.”

In Arizona, it is illegal for an individual to own a reticulated Gila monster, but not in California, where the reticulated variety is not resident. Arizona reptile collectors thus take reticulated Gila monsters across the state line, sell them, and then immediately buy them back, so that the creature comes with a California bill of sale. This king-hell mess is becoming a big business, and, as herpetologist Robert McCord observes, “The game laws are almost useless.”

The Arizona legislature has not helped much. One lawmaker, a self-described antienvironmentalist named Jeff Groscost, even proposed a bill in 1994 that would allow Gila monster farming. “The rumor right now is that wholesalers are paying up to $900 apiece for them,” Groscost argued. “If someone could breed them and raise them in captivity, then you could sell them and not take them out of the wild.” He also suggested that the lizards be injected with computer microchips to distinguish them from wild lizards.

Gila monsters being already as rare in the desert as rich people deserving of entry into heaven, any increase in their number should be thought a good thing—but not if the end is simply to fill a collector’s cage or a spotter’s life list.

Millipede

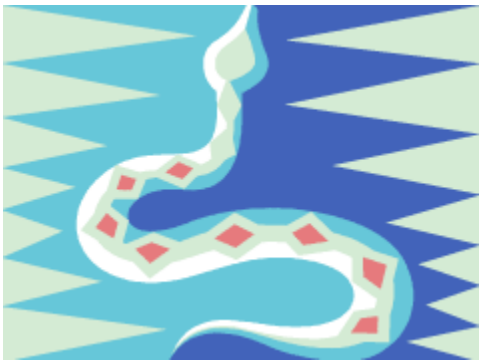
Only 6 percent of the living beings on Earth are vertebrates, but they are the ones we, perhaps because we are also vertebrates, are most concerned with. The creatures from other orders, like the often overlooked desert millipedes, need to assert themselves mightily in order to draw attention to their mere existence. They did so two thousand years ago, when millipedes overran Rhoeteum, a town on the Troad in the high desert of southwestern Turkey, and drove its human inhabitants into the sea.

In the Sonoran Desert the millipede Orthoporus ornatus has only one enemy, the venomous larva of the Zarrhipis beetle. This larva is luminescent, and it makes for a strange sight indeed to see it wriggle after its slow-moving target in blackest night.

Strange to say, too, but millipedes are vulnerable to heatstroke.

Rattlesnake

According to what we can reconstruct of the ancient Hohokam creation legend, at the beginning of time Elder Brother, the creator god, made Rattlesnake with detachable teeth, so that human children



could play with him freely. The children, however, made constant noise while they played, so that Elder Brother could not sleep. Finally he supplied Rattlesnake with permanent teeth, saying, “Now I have done this for you, and when anything comes near you, you must bite it and kill it. From now on people will be afraid of you. You will not have a friend and will always crawl modestly along.”

Charles Darwin observes that the rattlesnake, the only venomous snake that issues an audible warning before striking, would no more give warning to its intended target than a housecat would tell a mouse it was about to devour it. He remarks instead that the rattle acts something like the hood of a cobra or the raised hackles of a dog, as a signal to go away and leave its owner alone. Snakes being generally timid and nonaggressive creatures, his explanation makes good sense, but it is not widely shared, and even today in parts of the Southwest you will hear that a snake’s rattles—which are vigorously collected for the tourist market—will go on shaking until sunset once separated from the body. The rattler’s spinal column is indeed a durable creation, but it has no powers to sustain life without the heart and other organs.

If you are able without bad consequence to examine the underside of a rattlesnake, do so. There you will find a pair of hard protuberances lying flush to its scales. These are vestigial toenails, signs that rattlers are related to lizards and shed their feet somewhere along the evolutionary ladder.

But beware the bite, always. One bit of folklore that has basis in scientific fact is that the bite of a young rattler is more toxic than that of an older one. As is the case with so many animal species, the younger creatures lack self-control, and so their bites are full of venom. Older rattlers, it would appear, have a greater sense of what is appropriate, adjusting the venom to the task at hand.

In all this it is well worth remembering, however, that more people die of lightning strikes than snakebite every year. And it is thus strangely natural that desert peoples should long have equated snakes with lightning and water. The Wuturu hold that the carpet snake (Python variegatus) owns the water of the Australian desert, and the traditional O’odham believe that every water source has a serpent-god, a corúa, to watch over it. The O’odham water–snake connection is an ancient one, and its origins appear to be Mesoamerican: the Uto-Aztecan linguistic element co means snake, and it turns up in the name of the Aztec plumed serpent-god of the east, Quetzalcoatl. In O’odham belief these protector serpents were not aggressive, although they were endowed with huge fangs, and in any contact with humans the corúas usually lost. In the event of a serpent-god’s death, the O’odham held, its associated spring would dry up, and perhaps the idea of such a vulnerable if fearsome-looking snake kept the desert people from tampering with precious water sources. (The Mexican story of La Llorona, a weeping ghost who wanders along riverbeds and steals children who come too near, has a similar function.) Not all water serpents lived underground, however. Some dwelled in the hearts of the boiling summer thunderstorms that bring rain to the desert, not in life-replenishing droplets but in great black undulating curtains of water, leaving floods and destruction in their wake. It was no sin to kill such serpents, but even the most resourceful Tohono O’odham shaman was no match for the corúas of the air.

Here is a song sung by the Djambarbingu people of Arnhem Land:

The tongues of the Lightning Snakes flicker and twist, one to the other. . .
Flashing among the cabbage palm foliage . . .
Lightning flashing through clouds, flickering tongue of the Snake . . .
Always there, at the wide expanse of water, at the place of the sacred tree . . .
Flashing above the people of the western clans,
All over the sky their tongues flicker, above the Place of the Rising Clouds, the Place of the Standing Clouds,
All over the sky, tongues flickering, twisting . . .
Always there, at the camp by the wide expanse of water . . .
All over the sky their tongues flicker: at the place of the Two Sisters, the place of the Wawalag.
Lightning flashing through clouds, flickering tongue of the Lightning Snake
Its blinding flash lights up the cabbage palm foliage . . .
Gleams on the cabbage palms, and their shining leaves . . .

In his treatise on animals, Aelian writes that in India and Libya the people believed that a snake who killed a human could no longer descend and creep into its own home, but had to live as an outcast, "a vagabond and wanderer, living in distress beneath the open sky throughout summer and winter." This, Aelian understood, was the gods' punishment for manslaughter, punishment that applied to humans and animals alike.

And from the deserts of India, too, came ancient reports of a serpent seventy cubits—that is, more than a hundred feet—long. This serpent once attacked Alexander the Great's invading Macedonian army. Alexander did not succeed in slaying the serpent, although he is said to have come near enough to it to see that its eyes were as big as his shield.

Vulture

Oh bury me not on the lone prairie
In a narrow grave just six by three,
Where the buzzard waits and the wind blows free,
Then bury me not on the lone prairie.
"The Dying Cowboy"

Turkey vultures, the "indignant desert birds" of William Butler Yeats's great poem "The Second Coming," are to all appearances creatures of leisure. They prefer gliding on a bumpy desert thermal to flying under their own power; they'd rather hunker down to a found meal than hunt for themselves. The ones you'll see perching atop Arizona's power lines and cliff edges seem almost to be caricatures, emblems of easy living. But on this

bright early-March dawn, the turkey vulture perched just across the slender Bill Williams River from me had taken leisure to unusually laid-back extremes. Far from flying off in alarm at my approach, as just about any other bird would, this specimen of Cathartes aura greeted me with the avian equivalent of a yawn.

The turkey vulture's nonchalance made me wonder whether it had ever encountered humans before. There was good reason to suspect that it had not. The Bill Williams is easily Arizona's remotest, least-visited river, lying far from paved roads anywhere but at its beginning in west-central Arizona and its end at the Colorado River between Parker and Lave Havasu City in the fast-growing Mojave Valley. Only a handful of people know the Bill Williams well, and to the flood of Arizona literature the river has contributed just a few drops. It took me nearly two decades' worth of collecting Arizona's wild places before I stumbled across it myself, finally filling in an uncharted quadrant of my personal map of exploration.

Humans, I suspected, were an equally rare find for its wild denizens, like the turkey vulture, to whom Henry David Thoreau adverted when he observed, "We need to witness our own limits transgressed, and some life pasturing freely where we never wander. We are cheered when we observe the vulture feeding on the carrion which disgusts and disheartens us and deriving health and strength from the repast." Perhaps so. Petronius, the Roman poet, was not so cheered, remarking, "The vulture which explores our inmost nerves is not the bird of whom our dainty poets talk, but those evils of the soul, envy and excess."

In Aztec myth, the turkey vulture shares a lineage with humans:

> A long time ago a man who tired of working every day sat down on a stone and studied a passing vulture. "That vulture just flies around all day," he said, "and does nothing. I wish I could be like him." Then he called the vulture and said, "I want to turn into a vulture like you. I'm tired of all this hard work." The vulture said, "Very well. But listen. If you want to eat, you have to eat the things I do. I can't eat tortillas like you. All I can eat is dead things like chickens and dogs. If you can eat those things you can become like me." The man said, "Well, I can eat just about anything." So he jumped high into the air and changed places with the vulture. But after a while he got tired of flying around and eating dead things, and he thought it might even be good to work his fields once again. Still, he had changed into a vulture, and he could not change back.

Without the vulture, many earthbound scavengers would not be able to locate food as quickly as they do. The quick vulture comes in to feed—incidentally, only the turkey vulture and greater and lesser yellow-headed vultures are guided to carrion by smell—and hyenas, jackals, and coyotes follow to clean up afterward, the vulture having tipped them off.

In their book Innocent Killers Jane Goodall and Hugo van Lawick recount the wildebeest calving season, when hundreds of newborn wildebeests and their surrounding placentas dot the Serengeti plain. Vultures would first plummet from the sky to gather what they could, while the jackals and hyenas, just as soon as they could ascertain which direction the birds were flying in, "streaked across

the open plain, often arriving only seconds after the vulture itself and getting most of the afterbirth." The vultures seem not to mind, the authors note; they once witnessed a vulture fighting off a martial eagle that was dragging a young silverback jackal skyward to enjoy as a meal.

The O'odham peoples of southern Arizona and northern Mexico historically attributed the origin of diseases to the influence of different animals. To the vulture, unhappily, they assigned the sores that come from tertiary syphilis. Other animals fared no better in O'odham nosology: Gila monsters were held to cause fever, horned toads rheumatism, jackrabbits ulcers, rattlesnakes infections of the kidney and bladder, and butterflies all sorts of gastrointestinal discomforts.

Still, they also credited the vulture with shaping their landscape; the creator god charged Ñu:wi, the first Cathartes aura, to fly over the desert and shape the mountains and valleys with his wings, for the completion of which task he was honored with this song:

Buzzard bird, buzzard bird,
You have made the land just right.

Buzzard bird, buzzard bird,
You have made the mountains just right.

And apart from making the land just right, the vulture made the passage into the other world right as well in many ancient cultures. In Çatal Hüyük, Anatolia, more than eight thousand years ago, vultures disposed of the dead; they did so in several cultures in Africa and Tibet as well, although the tradition seems not to have been followed in the Americas. The Greek writer Pollux records that the Caspii, the people of what is now Turkmenistan, played funerary songs on the hollowed-out bones of vultures, and the funerary priests of ancient Egypt occasionally dressed in robes made of vulture feathers.

All that would not have impressed Charles Darwin, who wrote of the turkey vulture, "It is a disgusting bird, with its bald scarlet head formed to wallow in putridity."

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Essay

by Becca Deysach

Gin is my father; it is my nightly kiss to his lips. Its taste and smell, mingling with those of Spanish olives and cocktail onions, have imprinted themselves on my chapped lips, on my soul. The taste of it on my tongue strikes a chord deep within me, the way that the smell of woodsmoke or Grandma's perfume does for some. My father's evening beverage—a martini glass filled nearly to the top with an assortment of pickled vegetables, a few jiggers of gin, and a splash of vermouth—he referred to, with a self-congratulatory chuckle, as a "vegetini." His cocktail is now mine. I omit the onions, add olive juice, and call it, in a husky voice, a "dirty martini," but the flavor is essentially the same. I drink it because nothing else tastes so good going down, especially on a summer night. I drink it for an excuse to eat garlic-stuffed olives. I drink it because its flavor is as familiar to me as Kool-Aid was when I was little. Mostly, though, I drink a dirty martini because it is as close as I will ever get to kissing my dad goodnight again.

With garlic and gin-stained breath, my father taught me about wild beauty. Tired and small, I often leaned against his huge hard belly on my mom's side of their bed and traveled around the world to the cadence of his rich bass. His stories were usually about his Uncle Josh. Each one began with Josh's arrival at my dad's childhood Milwaukee home in his personal helicopter. Uncle Josh lived in Africa, was able to communicate with animals of all species, and was often in need of my father's help on his heroic expeditions.

My dad colored my four-foot-high world with tales of their journeys—the time a honey monkey saved his life, the time he killed a wild boar with a stick, and about the tail of a whale that he and Uncle Josh ate when they were stranded on a wild coast. He showed me Uncle Josh's picture at the Field Museum of Natural History in Chicago, along with the taxidermied honey monkey and wild boar of his stories. With my nose pressed against thick glass, I met the celebrities of my childhood.

On my seventh Valentine's Day, I received a letter from my great uncle. In it, he included photos of his animal companions—zebras, giraffes, ibex. I dreamed fervently of one day meeting him, of traveling in his helicopter over the ocean and landing in hot and mysterious Africa. Naturally, I treasured that letter and re-examined it obsessively. I remember noticing, as the paper grew thin and sticky from my fondling, that the pictures glued to the letter felt different than those in my mom's photo album—thinner and more crinkly, like the pages of a magazine. When I asked my dad about it, he explained that African cameras and photo development techniques were different from ours. His answer satisfied me for a while, but when I realized that Josh's handwriting was just like my father's, I had a bold epiphany and confronted him, crushed. He chuckled, of course, as only men who closely resemble Santa Claus can, and took indignant me into his powerful arms. I was angry with his seven-year game of make-believe. I had loved my uncle. I had loved the idea of someday joining him on his adventures, of being in the middle of a vast nowhere with honey monkeys as my traveling companions. I had tasted the idea of a beauty utterly unlike anything my geometric suburban world could contain. It was the true loss of a hero, the first fissure in my little heart.

Why did my dad do that? Why did he let me believe that I was related to a man who had killed a tiger with his bare hands and that my dad's solid gut was really the undigested remains of a whale's tail? Was it the cruel manipulation of a child's mind, gin-infused humor, or simply the unintended result of my readiness to believe thick tales? I remember a conversation with him years ago over chocolate malts in which he explained that he had created Uncle Josh just for me because he wanted me to fall in love with adventure and wild places. It seemed then a meager justification for manipulating my little brain and heart, yet an ache for wild beauty does command me. For that I am piercingly blessed

Indeed, it was the quest for grace and wild beauty that drove me West. The first home I made west of Lake Michigan was in central Arizona, tucked between low hills and covered in Ponderosa pine and sagebrush. I fell in love for the first time there. I fell in love with the sweet smell of the burning dry air; with the smooth red bark of the manzanita that always seemed to be turned inside out; and with the igneous evidence of the earth's toiling and churning visible out my front window, under my feet, and below my fingertips.

I studied at a tiny experiential college in the central highlands, and my field-based classes took me through diverse ecosystems, down variegated canyons, and into the painful place of loving something that is sick. Into the painful place of being a member of the species that has the unique gift of intellect, and the blatant inability to use that gift to guide our actions with respect to the planet we all share.

During my college years, I walked inside the five-hundred-foot-high concrete wall that is Glen Canyon Dam, grimacing north at the red rock lake which exists at the expense of a canyon as striking as the Grand. I sat at a coffee shop perched on the edge of Jerome, Arizona, and focused my eyes on the layers of rock that define the Mogollon Rim, hoping to block out the glowing pools of mining tailings that punctuate the valley below. I ate Indian food in a strip mall surrounded by prickly pear cactus and watched movies at the three-story theater that squeezed out the independent downtown joint. I watched the topography that I had grown to love fiercely become leveled, watered, and consumed by sterile stuccoed cubes. I learned that what is beautiful in the land is not often echoed by the edifices of my people. My desert years brought me to the understanding that we, as Americans, have betrayed beauty.

What is beauty, anyway? My 1941 Webster's describes it as "that quality or aggregate of qualities in a thing which gives pleasure to the senses or pleasurably exalts the mind or spirit." Given that pleasure is a word equally slick, I am having a hard time creating a formula for beauty. And it scares me to talk about it in any other way. I am scared to talk about beauty because I am afraid to be cheesy; I am afraid that I will be to words what disposable cameras are to landscapes; I am afraid that I will betray beauty. And yet how can I not talk about it? My nighttime journeys to the African bush gave me my earliest rush of an exalted spirit. They revealed the power of wild beauty that now commands me.

Anthropologists insist that the ability of our ancestors to express themselves through art marked a profound step forward in the development of our intellect. So profound, in fact, that our own species is distinguished from all of our extinct upright relatives by the ability to express ourselves through art. Over two-hundred caverns filled with paintings, sculptures, and engravings created during the last Ice Age have been discovered in Italy, France, Switzerland, and Spain. The oldest known works of art line the walls of a cave in the valley of the Ardeche River in France, dating back 32,000 years ago, about 170,000 years after anatomically modern humans first walked the African savannah. Those who have been privileged to visit our species' earliest art gallery have reported that the pieces are accurate depictions of the creatures with whom we shared the Pleistocene landscape. Witnesses of this art say that it is spectacular and beautiful, comprised of clean sweeping lines and fine detail.

What prompted our predecessors to portray the world around them on cave walls? The highly developed brains that gave us the ability to use tools, create language, and form complex communities also gave us a shocking recognition of ourselves as a part of a vast and mysterious universe. Art, then, became a way to make sense out of the complex world that our intelligence forced us to see. We re-created hunts on the walls of our dwelling spaces, and painted pictures of our totem animals and spiritual leaders. We brought the beauty of the natural world into our homes in hope of understanding it.

Not only did we decorate our walls with images from the wild world, we created our early sacred buildings to resemble it. By doing so, art historian Vincent Scully suggests, we hoped to draw upon the powers of the environment. Teotihuacán, a ceremonial site of pre-Columbian America in central Mexico, provides a perfect example of this environmental architecture. Scully describes the Temple of the Moon, behind which rises the mountain called Our Lady of the Stone.

“That mountain, running with springs, is basically pyramidal and shaped and notched in the center. And the temple imitates the mountain’s shape, intensifies it, clarifies it, geometricizes it, and therefore makes it more potent, as if to draw water down from the mountain to the fields below.”

The architects of that temple were struck by the aesthetic vigor of the natural world, and sought to honor it in their building. Their work, along with that of our Ice Age ancestors, suggests that our humanness is as embedded in a veneration of wild beauty as it is in the ability to use tools. Can the attentiveness to beauty which makes us human, keep us human?

If cave art and environmental architecture were the expression of the exalted minds and spirits of our predecessors, what, exactly, lifts the human mind or spirit now? While what inspires mine may not move another’s, most would agree on the beauty inherent in an ancient forest, a raw mountain range, or architecture that echoes the integrity of both. The ache I feel for these things is exactly what makes me glad to be alive, grateful for my sentience. And the ache I feel for these things is made more profound by the knowledge that they are being destroyed by the communities we create. Somewhere along the line, our humanness has become defined more by our ability to create imposing structures with speed than it has by our ability to celebrate the beauty of life, which has taken four billion slow years to evolve.

The Gallatin Valley of southwest Montana, my home of the last three years, is a long and wide basin with vistas that scream “big sky country!” and enough flat land to have sustained early settlers with huge acreages of cattle ranches and farms. As in much of the West, these generations-old family businesses are being sold without thought to developers. Over the three short years I lived in

Bozeman, I watched two sprawling mall complexes rise out of once expansive fields, and more new housing developments than I could count infest the open valley with which I had fallen deeply in love. It is difficult for me to believe that anybody finds beauty in these cul de sac-ridden, cookie-cutter communities exploding across the landscape.

Beauty, however, is not the question for architects of strip malls and housing developments. It is not a priority for the corporate developers of the country's last open spaces. Speed and financial efficiency are the investors' primary concerns. They can move on, while those of us who live in places of wild beauty are forced to gaze through acres of chain stores and identical houses to find it. We shop at those shiny stores and live in matching houses because our profit-driven culture leaves us few other options. What has this infrastructural abandonment of beauty done to the minds and hearts of the people who are a part of that culture—to all of us?

A brief glance at the events of this spinning world gives some clues. Take away that which exalts the mind or spirit, and in return we are a bunch of flat souls who have become numb to tragedies that would otherwise break our hearts. Take away a cultural responsibility to beauty, and we have no reason not to rip down entire forests. We have no cause to hesitate at destroying landscapes or societies sitting on the oil we need to fuel the vehicles that, in our commercial dreams, will bring us to a place of wild beauty. Take away a commitment to beauty, and we soon will find that even our biggest SUVs can't get us there.

Put beauty back into the human-altered landscape, and we may become a world of raw and sensitive people bowled over by the mysteries of the universe, of the earth. We may find that those mysteries thrill us with all of their elegant beauty, and fill us with gratitude for the chance to experience them. And we might find that they pain us, remind us of how small we really are. Our hearts might ache as we behold the intricacies of the natural world, knowing that we can never fully contain their beauty, knowing that it is ultimately fleeting. Put beauty back into the contours of our hearts, and we may find that pain is as essential to our experience of life as exaltation, for with being in beauty, as with being in love, we risk getting hurt. Put beauty back into the stories we live by, and we may find that the very pain it causes is what urges us to maintain it.

Shortly after September 11, 2001, I spoke to my brother from a payphone in Cooke City, Montana. I was working on a trail crew in Yellowstone National Park when the planes crashed, and days passed before we were able to get into town for a paper and news. When we finally did, I felt as challenged to grasp the horror of what had happened to all those people in New York as I do seeing any tragic news about anybody far away. That dissociation felt bad enough. But seeing President Bush drawl out the words, "terrorism" and "evil" and "infinite justice" on the television screen above the shellacked bar made my teeth itch. I felt confused and powerless against the landslide of nationalism and violence that was suffocating our nation and drowning our sorrow.

I talked to my brother that night about the anger that permeates this world; the ease with which the machinery of death is deployed by our leaders; the degree of arrogance which governs our species and our country; and my desire, yet complete inability, to change any of that. And he spoke to me of beauty. Of his life goal to fill the world with beautiful things, with clean lines and the texture of wood.

My brother is a furniture maker. Sculpture is his training; wood is his passion. I spent two months in Chicago last summer where my sister, my mother, and he still live. I passed many evenings at the apartment he shares with my sister, escaping the wet heat, drinking dirty martinis, playing cards, and being beckoned into his basement studio.

"C'mere, quick!"

I ran the first time he said this, certain that he'd left a limb in the table saw. But it was quiet down there, still. He gestured me over to the far end of his studio. Leaning against the wall were several two-by-eights, ragged looking, boring. "Aren't these beautiful?" he asked.

I laughed for a second, and almost teased him about stealing me away from my game to see them. But I caught myself. He was serious. I had never seen him look at something that way, get excited enough about the physical beauty of anything to grab me from twenty feet away, needless to say a whole flight of stairs. Those unfinished boards were of curly maple, and the shaggy parts were exactly what made the sanded, finished wood look iridescently in motion. He then showed me all of the boards leaning against the cement wall. Oak. Cherry. Walnut. He showed me his veneers, his inheritance from our father. Zebra. Birdseye. Paduk. He talked about quarter-sawn boards vs. plane-cut. I tried to listen. But it was hard because I was in awe of his excitement, his grade-school "show-and-tell" energy. And it was hard because this little voice in my head kept asking, "And what endangered cloud forest did these boards come from, and how did they get here?" And what made it even noisier in my head was the third voice admonishing the second, "Can't you see he is glowing, can't you see how vibrant this wood, this moment is?"

The same father who taught me about wild beauty impressed upon my brother the aesthetic inherent in the process of creation, in the texture of the grain of woods, in the joy of sharing these things with others. The irony of my brother's 'beauty mission' depending on the felling of ancient trees does not elude me. Yet shining through my confusion is hope. In his camouflage utility kilt and stained t-shirt, he is glowing as he runs his fingers down the smooth surface of a sanded board of curly maple. The same urgent joy I witnessed is infused into each cut of wood, each joint, and each final caress he gives a piece before delivering it to his client. He saturates the concrete maze of Chicago with the qualities that make his work beautiful. So that aching beauty may, for a moment, be less fleeting.

Driving along the contours of the Lamar River just before dawn, I follow Orion. It is bold and beautiful, and I cannot draw away my eyes. Jupiter hangs below and the earth falls from them both. Elk, only visible because of their bright white butts, bound away from my truck. I feel guilty for being this naked, little Homo sapiens in a big heavy vehicle on a stretch of pavement that disrupts their ancestral travel routes. And I feel grateful to my father who taught me to think about what it means to be a human on this wild earth, who showed me how good it feels to be in the middle of a vast nowhere with elk my traveling companions.

Greg Brown grumbles out of my radio as I park next to the river to wait for sunrise. I can't see the sun, but its light makes black cut-outs of the mountains. River and snow and fog mingle. Awareness heightened in the predawn darkness, my stomach clenches as I mistake boulders for grizzlies. Well fed by now, they are sprawled out in their dens, gestating and snoring. I envy them, but not enough to regret waking up at four this morning to a moonless sky, to Pleiades, Cassiopeia, the Great Bear, Orion. No, I don't regret witnessing this 7:30 sunrise and thinly spread cirrus clouds growing redder by the second. I want to catch the moment the clouds turn from pink to white, when morning becomes day and the mysteries of this landscape are revealed. For maybe in that instant, as fine as the boundary between my breath and the winter air, I will ache from the pain of being in beauty. I will be human.

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Essay

by Deanne Stillman

This essay originally appeared in Twentynine Palms: A True Story of Murder, Marines, and the Mojave by Deanne Stillman, and is reprinted with permission of the author.

Prologue: Prelude to a Kill

The concern here is the Mojave Desert, the dry, baptismal font of national consciousness, mythological birthplace of America. It takes a big, white-hearted desert to fuel the pursuit of happiness, vast stretches of emptiness to suggest that the world can be possessed like an oyster, extreme tableaux of beauty to obliterate all memory of bad news. "Have a nice day!" the Mojave Desert tells the crossing parade—the Donner Party, the seekers of buried treasure, the cowboys, the ranchers, the people who rush for Hollywood gold—"Good luck! Think positive!"


Cholla cactus in late afternoon sun, Mojave Desert.
Photo courtesy Twentynine Palms Convention and Visitors Bureau.

Called the Mojave Desert after the Indians who once lived there, this blank, sunny slate bears a name that has defied the plundering of linguists, the meaning of the original term, hamakhaav, long ago swept away by the Santa Ana winds, that strange atmospheric condition born in the desert which raises the skin on all living creatures and is said to warn of earthquakes. But the mysterious name fits; the unknowable is unnameable, too. The Mojave was here before California, Nevada, and Arizona planted their flags in it, and it will be here tomorrow. Not that it's keeping track of time—history doesn't matter out here; it's space that counts, space that drives the country,

space that suggests the possibility of declaring bankruptcy and starting over somewhere else, space that maintains the illusion of hitting the jackpot on some get-rich-quick scheme, space that whispers, make bombs and bring down the government all by yourself. In a weird bakery of the impossible, a vast scape of tortured beauty where all things are equal and do what is necessary to survive, personal demons aren't demons at all, but just some other creatures who need a drink.

Senseless violence, the world calls it, but the Mojave knows otherwise. The Mojave knows, has always known, that the violence is not senseless, the disturbing acts that unfold on its sandy stage in fact make perfect sense. For that is the very nature of the place, to convey meaning, to show events in living color on a giant screen in bas-relief, to make it seem as if everything is happening for the first time, even if for some, it is the last, or simply the latest in an endless spiral of repetitive, nowhere acts. And this is the nature of the people who come here. They are starting over in the oven of American Zen, refracting into new souls with each infinitesimal turn of the earth, cranking up the Van Halen as the sun becomes the moon, being right here, right now, this is it, but Officer, last chance for new ID.

But the concern is not really with all of the Mojave, just a part of it—one aspect of is character—its very heart. This is the town called Twentynine Palms, which is found at an elevation of four thousand feet at a longitude of 34 degrees 08 minutes 09 seconds North and latitude of 116 degrees 03 minutes 15 seconds West, one hundred and eighty miles east of Los Angeles, a short distance but a long way. Its stage props are the tortured rocks and freak-show plants of its progenitor, but it is a heightened version of the Mojave; from it the Mojave might have been cloned. It sits on top of seven known fault lines and perhaps countless undetected cracks in the earth. The bottomless fissures crisscross and zigzag for hundreds of miles in every direction, creating the most volatile web of geography in the American West, a region geologists call the Eastern California Shear Zone. To the north and east runs the Emerson Fault, epicenter of the 4.5 Emerson Quake in 1975. To the west run the Galway Lake Fault Zone and the Pinto Mountain Fault, site of nonstop temblors ranging from one-pointers, which are imperceptible to all but the most highly attuned desert creatures, to jolting slip-and-fall three- and four-pointers, which make for a noisy response among cactus wrens and mourning doves and send jackrabbits skittering across the sands and collapse the fragile nests of the desert tortoise and snap its freshly laid eggs in two. To the south and east run the Cleghorn Lake Fault and Homestead Valley Fault; these two cracks in the earth met fiercely tens of thousands of years ago, and they have continued to collide with each other so violently and so frequently that they have shaken and thrust upward the Coxscomb Mountains—a peculiar range outside of town that always looks bruised. In 1992 the intersection of the Cleghorn Lake and Homestead Valley faults ruptured in a quake of 7.2 magnitude, epicentered near Twentynine Palms in the town of Landers. As the ground in the Eastern California Shear Zone fell away, the Coxscombs lurched skyward—some say the ancient peaks gained two inches in the blink of a raven's eye. The Landers Quake echoed across the West, at the beach in Santa Monica where the palm trees swayed in response to the distant ground shivers, in Las Vegas where the casinos blacked out for a moment, hinting that there might be such a thing as time, in Montana where a truck driver drove off a two-lane, and in New Mexico where nervous desert dwellers in white helmets checked and double-checked missile silos that seemed relics of a distant global configuration.

In Twentynine Palms, some residents were so alarmed by the force of the quake that they did not sleep inside—under a roof—for days. Was the Mojave Desert beginning to eject its latest squatters, reclaim itself? Perhaps so—in one way or another, every so often, perhaps when it tires of its own stillness, it likes to scare people away, to writhe in pain and shake uncontrollably in delight, to stir things up, to make people think—otherwise how can its treasures be callipered, appreciated?


Joshua tree in Joshua Tree National Park.
Photo courtesy National Park Service.

And then there are the times when the Mojave Desert gets serious, wants more than fear and awe, demands a blood sacrifice. The personal-rights party has gone too far. Things must happen. Often, a girl is involved. Often, some boys. Generally, a knife. And then there is the military. In this case, the few, the proud... the Marines. The blood must flow, attention must be paid: the desert says, “Don’t tread on me, I’m where the party started and one of these days, I might just shut the whole thing down.”

Land of Plenty

I wish all the ladies were pies on the shelf.
If I was the baker I'd eat 'em all myself.
Left...left...left, right, left...
I wish all the ladies were bells on the tower.
If I was the hunchback I'd bang 'em on the hour.
Singin' hey boppa-ree-ba, he bobba row...
Wish all the ladies were holes in the road.
If I was a dump truck, I'd fill 'em with my load.
Left...left...left, right, left.

— *Gulf War marching cadence*

Who is this coming up from the desert
like a column of smoke,
perfumed with myrrh and incense
made from all the spices of the merchant?
Look! It is Solomon's carriage,
escorted by sixty warriors,
the noblest of Israel,
all of them wearing the sword,
all experienced in battle,
each with his sword at his side,
prepared for the terrors of the night.
— *Song of Songs 3:6-8*

MESS WITH THE BEST, DIE LIKE THE REST! said the bumper sticker on the back of a Chevy pickup. Although it bore the Marine logo of the eagle atop the globe and anchor... this was not a government-issue bumper sticker. It was a popular item in the local variety store, along with "Death Before Dishonor" and "Marines Don't Just Read About History—They Make It." These stickers and tattoos and decals—extreme to outsiders—expressed the famous Marine esprit de corps, a mind-set that set them apart from, say, the Army, whose members often announced themselves with Mickey Mouse tattoos. The truck snaked its way through the back roads of Twentynine Palms, today clogged with traffic, looking for a way to hook up with the massive military advance that was making its way into town from the 10, across Highway 62. The people in the truck, wives and girlfriends of Marines, were all decked out in their most alluring tube tops, tight jeans, high heels. In the back of the Chevy were four teenage girls in stretch denim and T-shirts that said LUNCH BOX GANG. For the first time in eight months, they, and just about everyone else in town, were happy: their boys had just kicked Saddam's ass in the Gulf War and now were coming home to the Mojave Desert, where they had trained, and trained well, for the desert operation. In fact, the military and the desert—well, they had a thing going on. In World War II, General Patton trained his troops in the Mojave in preparation for the desert battles in North Africa. The training was so successful that it gave rise to the military saying "We do deserts, not mountains." In fact, tracks from World War II tank maneuvers are still visible in the sands to the south of Twentynine Palms. Returning to the Mojave was not just a homecoming for those who fought in Desert Storm, but a communion with one of the proudest moments in American military history. And then of course, there were the two things that were of most concern to all who longed for this moment—sex or money.

U.S. Marine Corps marching band moves through the town of Twentynine Palms.
Photo courtesy Twentynine Palms Convention and Visitors Bureau.

For Mandi Scott, now fifteen, it was money. Debie had been tending bar at the Iron Gate, one of sixteen bars in town, and ever since the boys went to Saudi, the tips had dwindled down to a few bucks per week, courtesy of whatever the cash-starved locals could extract from their pockets. More than once, Debie had been tipped with food stamps. But she never used them because she was too embarrassed. Not that the family didn't need them. Pretty much since the deployment of troops to the Middle East, Twentynine Palms had been a ghost town. Most of the stores were closed or had scaled back hours. Homes, furniture, entertainment units all over town were being repo'd every day; even life on the installment plan wasn't cutting it in the low-cost Mojave. Tourism took a hit, too; the hotels were empty because there had been no wildflower blooms that season. The only signs of life were colors and sounds: the neon of bar signs—THE JOSH LOUNGE and THE VIRGINIAN and DEL REY'S—which looked so pretty against the dusky desert skies, betraying no hint of the desperation unfolding inside, and the occasional rumble and then sweet fade-out of Harley pipes on Highway 62, hightailing it to Yucca Valley, where the gas station was open twenty-four hours—and wasn't this why we were fighting the Gulf War in the first place? But here in the town that was home to the world's biggest Marine base, residents were stuck.

Mandi, Krisinda, and Jason weren't the only kids in town eating macaroni and cheese for dinner every night. Having to serve it up all the time humiliated Debie and all of the other working poor in town; the local edge felt sharper, people sucked harder on the last of their cigarettes, as if the inhale would take control of things, and then they downed pitchers of beer, because they knew it wouldn't.

The driver of the pickup approached the convoy of tanks, Jeeps, artillery guns, buses and started honking furiously; there they were, all the scruffy-looking guys, when they left they were kids, now they were war heroes (though having engaged in no combat) who had saved America, the world, and they acted in the manner of all returning victors: as the crowd waved flags, and red, white, and blue streamers, and placards that said, HEY SADDAM, EAT MY DUST, as some spectators ran to the buses crammed with war vets and proffered six-packs, the boys in their cammies reached down through the bus windows to slap five, grab beers, grab some tit—for eight months they had lived in a world where women were "off-limits," covered with veils, and some now contorted through the windows backward, mooning the welcoming crowd.

The desert two-lane was festooned with eighty miles of yellow ribbon—all the way from the interstate to downtown Twentynine Palms where 62 became Main Street and intersected Adobe Road, the major north-south thoroughfare that led to the main entrance at the base. The red truck carrying Mandi and her friends from the Lunch Box Gang fell in line at the end of the parade and followed the boys for a while. They looked good—all grungy, tanned, roughed up, hardened, if only from living in a desert bunker for thirty-two weeks, eating MREs, and traffic-copping Iraqi paws down the line toward the detention area at the back of the advance.

"Hey, boots," Mandi shouted, "you rule!" A couple of the guys responded with a nasty, "Oorah."

"Mmm, mmm, mmm, look at that fine desert scenery." This was Lydia Flores, one of Mandi's best friends, beautiful, sixteen, tough talking, and self-possessed in spite of her hardly menacing "Lunch Box Gang" T-shirt.

"Not for me," Mandi said. In other words, not black Mandi, who was still carrying a few pounds of baby fat, was into black guys, and they were into her. Black guys liked the extra poundage, and also the fact that she liked to dance.

"You seeing Kevin later?" Lydia asked.

"Yeah, he's coming to the party at the Gate. If my mom doesn't throw him out." Debie was not happy about Mandi's choice of color in boyfriends, and in fact often told her daughter not to "burn coal." "Why do you care so much about color?" Mandi would say. "What difference does it make?" But in the high desert, Debie was not alone in her view; for all of Mandi's refusal to choose friends based on skin color, there were plenty of others who did just that. In the Mojave, for instance, there was the unspoken tradition of stopping black people on the freeways for being a mile or two over the speed limit, while never stopping white people, unless they were driving spent muscle cars held together with duct tape, which generally translated as drug dealer.


"Iraqi Freedom" mural in Twentynine Palms, dedicated in honor of Operation Iraqi Freedom, 2003.
Photo courtesy Action Council for 29 Palms, Inc.

There was a well-known situation in certain restaurants, in which minority patrons who desired a table would be kept waiting for hours while white people were immediately seated. And even Mandi's own brother Jason, attempting to stake his own identity, fell in with a white-power crowd at school, after being repeatedly taunted by black kids and "wiggers" (white kids who fancied themselves gangbangers from Watts) as a "Hessian" because of his buzz cut. Indeed, as America and the world retreated into genetically coded tribes, the Lunch Box Gang was a breathtaking manifestation, a crosscultural "point of light" that neither President Bush nor his speechwriters would ever behold.

Mandi's friend Tina, also in her LBG T-shirt, suggested hopping off the truck and racing to the base entrance so they could personally greet the guys when they got off the buses. Her reason for being happy that the boys were back had nothing to do with sex or money. A good friend had been in the Gulf and she was happy that he'd come back alive. She thought maybe she could give him a hug if she was lucky enough to be at the right bus at the right time; he didn't know that his father was in jail on another DUI and his mother had cracked up three months ago. The girls took off, easily outpacing the parade convoy, high-fiving friends in the crowd, four teenagers skipping for joy, adding to, driving the swarm of jubilation, Mandi especially hating it when her mother felt low, loving it that her mother's tip jar would once again overflow, for she was the most popular bartender in town, that is, when anyone was in town. Now, like the desert frogs that manifest after a rainstorm, Twentynine Palms would once again come alive. At the base gate, the Lunch Box Gang, Mandi leading the way, squeezed through the crowd past weeping women, ecstatic women, seductive women, until they got to the front of a bus, only to find that another member of the town's greeting party had planted herself at the doorstep, hoping to get kissy-face with a Marine she liked. This was twenty-year-old Rosalie Ortega. Rosie liked black guys, too. "Hey, homes," Mandi said, "waitin' for the man?" "Yeah," Rosie said, hugging each member of the LBG, "I paid my cousin to fill in for me at work. I'm losing money on the deal, but hey"—and now gesturing at the Marines"—check out all these rockin' bods." "Where's Shanelle?" Mandi asked. "She's with my mother and Tom on a truck run,"

Rosie said. A tall, black Marine stepped down from the bus, eyed Rosie, and grabbed her hand. This was not her boyfriend, but she was happy to see him, though she couldn't remember his name. "Welcome home, Devil Dog," she said, and pulled him down for a kiss on the cheek. "Yeah," said the LBG. The Marine sized up the pretty young girls who were so joyful at his return. "It's good to be back," he said. "Party at the Gate," Rosie said. "And don't be late." He winked and headed for his barracks. "Hey, what's your name?" Rosie called out. Turning slightly, he said, "Val-enteen. Remember me?"

In front of the Iron Gate on Mesquite Road, several young women in hot pants and Joe Camel tank tops put the final touches on the bar's entrance. Like every commercial establishment in town, the windows displayed gleeful homemade signs: WE LOVE OUR MARINES, THE CHAMBER OF COMMERCE SAYS SEMPER FI!, AMERICA—BACK IN THE SADDLE AGAIN. Out of the bar came Debie, wiry as always, shooting energy sparks. She wore tight pants, vest, and high heels in her favorite color, red, and her favorite fabric, leather. "Looks awesome," she said as her fellow workers tacked up red, white, and blue bunting around the door. "Okay, Jason," she called out. "We're ready." Inside the bar, Debie's thirteen-year-old son and two friends maneuvered to the entrance with a roll of thick, red carpeting and unfurled it across the sidewalk. A small fleet of Budweiser trucks approached, trailing yellow streamers, honking wildly, and stopping at the bar. "Drought's over," Debie said, and ran to greet the first driver.

The sun on this fine March day went down and the Iron Gate began to fill up the way it was supposed to before the trouble in the Gulf. As the jukebox blasted "Dirty White Boy," Marines filed in, along with the various local tribes all dressed according to affiliation, and each having to walk past Corky, who sat atop the bar at full alert in shades and a red, white, and blue doggie vest. The guest list included Crips in red bandannas; Bloods in blue; white bikers in their leathers; Samoans, who were easily identified because they looked Samoan; young girls and old women all tarted up; kids and toddlers—out here on the frontier everybody goes to a party. While the ground troops got plastered and General Norman Schwarzkopf and General Colin Powell weighed lucrative book offers, on television George Bush basked in his skyrocketing ratings: the Gulf War had been good for America, on the face of things; once again, we had control of the oil supply, and for the first time since the Korean War, it was all right, perhaps even fashionable, to be a member of the American armed services. For the military, the moment of glory was brief, and in Twentynine Palms, the Marines seized it like a beachhead.

In the back room of the packed tavern, a postwar ritual unfolded. It was familiar to locals, but this time it was more intense, carried more meaning. Underneath a sign that said, BIG BULGE CONTEST, a local band called Velvet Hammer cranked rock covers for dancers who had converged to show off their wares. About a dozen Marines of all ages and shapes, partnered with women of similar demographic and physical status, shook their hips wildly, back and forth, to the right, to the left, back and forth again, as a mob urged them on. A pair of bikini-clad Jagermeister girls circulated, pouring shooter after shooter to Marines who knelt on the floor before them, mouths wide open and bleating, waiting for their welcome-home baptism. And the drink calls echoed across the floor: "Hey, Debie, bring me a double Jack... Hey, Debie, I want the usual... Hey, Debie, Midori on the rocks. . . And give it to me nice and slow. . . Hey, Debie, I greased an I-raqi for you. . . Whachu gonna do for me?" Yes, the Big Bulge Contest was in full effect, and there was one leatherneck who danced like a sex machine, a white boy from the South, grabbing his crotch and fondling his cock

Michael Jackson-style as the lead singer in Velvet Hammer belted out a liquored-up "Proud Mary." A voluptuous black girl in leather and a thicket of beaded dreadlocks jumped in front of him and mirrored his strokes, his bumps and grinds. The crowd liked this, as in "Let's get ready to rumble," and the Marine removed his sweaty T-shirt that said, GOD MADE DRUNKS SO UGLY WOMEN COULD GET LAID. He threw it to an eager teenager on the sidelines, who happened to have been wearing her own badge; her T-shirt identified her as a member of the Lunch Box Gang, and she quickly joined in. A couple of her friends followed dressed likewise, and then came Mandi, holding five-year-olds on each hand. "Let's show 'em our new moves," she told the kids, and now the dance floor was a mass of townies and Marines, a census report come to life only you would never find this stuff out in a census, never know how the groups were grooved together like a lock and key, all you would know is that there were a lot of kids and single mothers and Marines in Twentynine Palms. After a while, the music got slow and funky, suggesting a Gulf War victory sex show, the singer growling a mean "The House of the Rising Sun." The Marine continued stripping, removing his belt. Now another Marine cut in, pulling the dancing rasta queen his way. It was Val-enteen.

"Turned his ass down before Saudi," said a girl who was watching as the guy showed off his big bulge, stealing the spotlight.

"What the fuck are you doing back here?" a big, burly white man called out, approaching the dance floor. He was the club bouncer, and he reminded the dancer that he was banned from the Gate. Valentine Underwood, a regular at certain bars around town, had been thrown out of the place before. The bouncer considered him a freak who was always hassling female patrons.

"It's a free country," Underwood called back.

"Tell me about it," the bouncer said. "I was in 'Nam. You didn't do jackshit in Saudi."

Underwood ignored him, continuing to grind. His dancing partner matched him, dancing more erotically, with more anger; no one was going to interrupt the moment.


Providence Mountains in the Mojave Desert.
Photo courtesy California State Parks.

"He's achin' for a breakin'," said another girl on the sidelines.

"Fucked up Saddam and thinks he's twice as bad," said another, loudly, for the benefit of the girl with dreadlocks.

"Either you go or I'm comin' in," the bouncer said. Underwood ignored him. The bouncer bulldozed through the crowd. Underwood and the girl in dreadlocks kept dancing. The white boy tried to cut back in but Underwood would not let him, so the white boy threw a punch. Underwood hit back. The bouncer—bigger than Underwood—came from

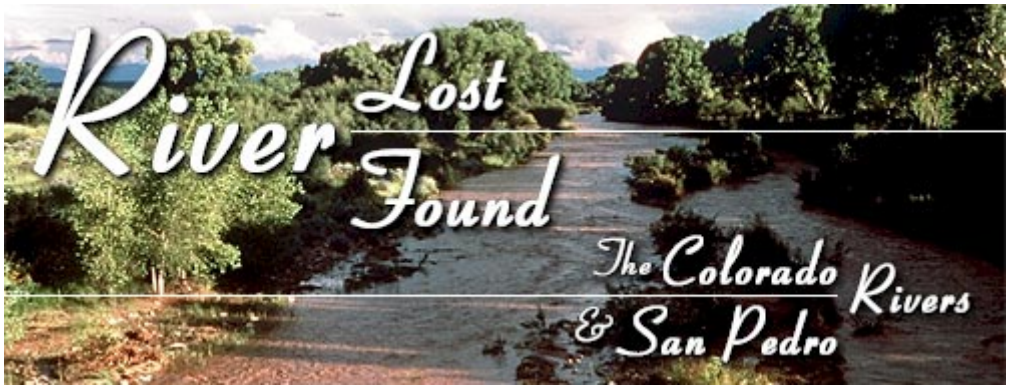
behind, grabbing him by the neck. Everyone else piled on; the Big Bulge Contest erupted into war, with Mandi's two charges lost in the action. "Mom!" Mandi called as she made for the bottom of the heap, through the tangle of flying elbows and clenched fists. Debie heard her daughter above the band, the shouting, the drunks, the chorus of "oorahs" that erupted every few minutes from Marines who clanged their pitchers of beer in sloppy toasts. "Corky!" she called, and put her fingers into her mouth and whistled. Corky leaped off the counter, flying for the brawl, snapping and pawing at the bodies. "Not in my bar," Debie said as she ran with the dog into the heart of the action, diving under the mass of bodies and retrieving Mandi and the kids. In a few minutes, the party was over—the crowd had dispersed, the kids were safe, Mandi had a black eye, Debie's tip jar was overflowing with five- and ten-dollar bills, and on television, all night long, and maybe forever, there was George Bush receiving a standing ovation from Congress. As the last of the revelers headed for various desert points, the band—which included a couple of Marines who had served in World War II and Vietnam—sang the leatherneck version of "Good Night, Ladies," a parody of the original cooked up decades ago by drill sergeants at the recruiting depot in San Diego to pass on tradition to the Corpsmen of another era:

Good night, Chesty! Good night, Chesty!
Good night, Chesty—wherever you may be!
After you the Corps will roll, Corps will roll,
Corps will roooooll,
After you the Corps will roll-on to victoreee!

Chesty was the nickname for Lewis Burwell Puller, a combat officer who was the ultimate Marine superhero, more notorious than Gimlet Eye Butler, Bigfoot Brown, or Pappy Boyington, a rough and tough bulldog who, according to legend, chased bandits in Haiti and Nicaragua, commanded the Horse Marines in Peking, battled his way from island to bloody island in the Pacific, led the landing at Inchon, and fought the most savage rearguard action in the Korean War. For a brief moment after the heady victory of the Gulf War, Marines, and through them, every citizen of America, gloried in this fine tradition, recalled with pride how the Marines had beaten the Japs at Okinawa, Tarawa, Guadalcanal, how the Marines were "the pointy tip of America's spear, out in front, kicking down the door," always the first on the battlefield, the last to leave…. Yes, maybe duty! courage! bravery! were desirable traits after all, and so every Gulf War veteran was toasted from coast to coast, honored for his service. But several months later, after they had restored order in a region of chaos, the other war, the one at home, had resumed.

Deanne Stillman's book Twentynine Palms: A True Story of Murder, Marines, and the Mojave (William Morrow) was critically acclaimed from The Washington Post to L.A. Times Book Review, which named it "one of the best books of 2001." Hunter S. Thompson called it "a strange and brilliant story by an important American writer," and it has been added to various college courses on literary nonfiction. Currently, Deanne is writing Horse Latitudes: Last Stand for the Wild Horse in the American West for Houghton Mifflin. She also writes for Rolling Stone, The Los Angeles Times, Slate, and elsewhere, and her work is widely anthologized. More information is available on her website at www.DeanneStillman.com.

Essay



by Tom Leskiw

Somewhere along the line, cottonwoods became my favorite tree. It's natural to want to root for the underdog: of the 106 forest types in North America, the Fremont cottonwood/ Goodding willow association is considered the most threatened. In Arizona, a scant 10% of this original habitat remains. Causes for its demise are many: dams, overuse of surface and groundwater supplies, cattle grazing, the elimination of beaver, clearing for agriculture, and the invasion of exotic plants. The insidious connection between dam building and the disappearance of old-growth cottonwood forests is this: successful cottonwood seed germination depends on clean seedbeds created by high, flushing flows. Dams, which are constructed to modulate flows, eliminate larger-scale floods. In addition, they trap sediment, robbing the river system of the material needed to form bars that support streamside vegetation.


Cottonwoods growing at Burro Spring on the Tonto Platform, Grand Canyon National Park.
Photo courtesy National Park Service.

Riparian areas—those narrow bands of green vegetation along the banks of rivers and streams and near springs, bogs, lakes, and ponds—are critically important to the health of arid lands. In Arizona and New Mexico, at least 80% of all vertebrate wildlife species use riparian areas at some stage of their lives, and more than half of these species are considered riparian obligates. In the Southwest, riparian areas support a higher breeding diversity of birds than all other western habitats combined. Many of the areas that once supported Fremont cottonwoods have been colonized by tamarisk (Tamarix sp.), an aggressive, water-sucking invader from Eurasia, also known as salt-cedar. Research confirms that most birds shun streamside areas where tamarisk is the dominant plant. From any perspective—total avian density, number of birds present, bird species diversity—Tamarix chinensis groves have a lower value to birds than any type of native tree community.

In 2001, I attended the 3rd biennial conference of the Association for the Study of Literature and the Environment. I was eager to

go, in part because I'd signed up for a post-conference 15-mile float trip down the Colorado River. Still on a high brought on by activities such as a writing workshop by ethnobotanist Gary Paul Nabhan, a poetry reading by Simon Ortiz, and keynote slideshow by singer, actress, and river runner Katie Lee, I boarded the bus for the put-in at the base of Glen Canyon Dam.

What kind of wacko floats the Colorado, silently seething, "Man, where are all the cottonwoods? They should be here." A wacko that bears a striking resemblance to me. Granted, much of the river flowed through a narrow bedrock canyon—unsuitable for the formation of bars. However, in those areas where sediments had been deposited, cottonwoods were virtually nonexistent. I tallied the number I saw: fifteen miles of river and one lone cottonwood to show for it. Tamarisk, however, was abundant.

I'm proud to be a scientist, but there's a downside. The techniques we use—those lenses through which we examine our world—are both a blessing and a curse. We're trained to look beyond today's "snapshot" of a landscape. It's a good gig, really: getting paid to have visions. Good scientists are capable of conjuring and maintaining these visions— "desired future condition" and "natural range of variability" in jargonspeak. Why couldn't I just let go, float the river like everyone else? Be content with the sacred triad of sun, water, and camaraderie?

Prehistoric granaries above Nankoweep in Marble Canyon, Grand Canyon National Park.
Photo by Mark Lellouch, courtesy National Park Service.

The media has trumpeted recent attempts by the U.S. Bureau of Reclamation to mimic spring flood flows on the Colorado. However, the 1996 controlled flood was smaller than all but 10% of pre-dam floods between 1922 and 1962. The amount of water being released is insufficient to accomplish the work that the river needs to do—scouring bars, uprooting exotic or decadent vegetation, and creating fresh seedbeds. While the trip down the river was enjoyable, my memories are of sterile salt-cedar flats, instead of the previous lush river groves that supported yellow-billed cuckoos. The Colorado—Spanish for red-colored—no longer lives up to its name. Robbed of sediment, it is often verde, a shade of green—reduced to a shadow of its primal power.

Conference over, I rendezvoused with my wife Sue in Phoenix. Her conference had been in Denver. We loaded the rental car and set out for southeastern Arizona. Despite the late-June heat, there was a place that I just had to share with her.

The San Pedro River originates in Mexico, flowing northward to its confluence with the Gila River near Winkleman, Arizona. The San Pedro's claims to fame are numerous: it is the only permanently undammed river in the southwestern United States, supports 75% of the nesting gray hawks in this country. Over one hundred of the 355 species of birds recorded here remain to breed along this narrow ribbon of life. In addition, the river serves as stopover habitat for an estimated 5-10 million migratory songbirds annually. For these reasons, it was the first Globally Important Bird Area to be

designated by the American Bird Conservancy, in 1996.

Brush and small trees along the Colorado River as it leaves the Grand Canyon.
Photo by Rhett Butler, MongaBay.com.

Acquired by the U.S. Bureau of Land Management in 1987 from the Tenneco Corporation, the 56,000-acre preserve is arguably the most successful modern-day conservation story in Arizona. The area is by no means pristine: by the late 19th century, an estimated 100,000 cattle grazed within the headwaters of the San Pedro River Valley. A series of events that, in sum, constitute a veritable watershed "management" Murphy's Law, speaks to the marvelous capacity for riparian areas to at least partly recover, given time. A drought between 1890 and 1893 caused cattle to die by the thousands. Meanwhile, fur trappers removed an estimated one million beaver from the area. The extirpation of beaver—a keystone species—in 1900 was especially devastating to the watershed.

Over the past 30 years, scientists have clarified the definition of a keystone species:

- Its members have a large effect on community structure and function (i.e., high overall importance)

- These effects are disproportionately large relative to abundance (i.e., high community importance)

Beavers, through their dam-building efforts, had reduced the erosive power of the San Pedro. The resulting stair-stepping watercourse buffered the watershed during seasonal floods. Large pools spread the water outward, fostering a network of wetlands that were effective in recharging the water table.

The devastated rangeland, shorn of grasses by too many horses and cows, had lost its ability to hold soil in place when the rains returned in 1893. The once stable, slow- moving, marshy perennial river transformed into an unstable, flood-prone, intermittent stream. Stream downcutting largely eliminated the wetlands, resulting in a lowering of the water table. In 1870, Arizona rancher H.C. Hooker had described the San Pedro River Valley as "having an abundance of timber with large beds of sacaton and grama grasses. The river bed was shallow and grassy … its banks with luxuriant growth of vegetation."

His description of the same area in 1900 told a different story: "… The river had cut 10 to 40 feet below its banks with its trees and underbrush gone, with the mesas grazed by thousands of horses and cattle." Native Americans had dwelled for 11,000 years along the San Pedro with little impact, yet a mere 20 years was all that was needed for Anglos to wreak major changes.

Then, in 1988, the BLM instituted a 15-year grazing moratorium, eliminating the season-long cow-calf regime of 6,500-13,000 animals. The rapid rate of vegetative recovery along the San Pedro has stunned even seasoned ecologists. Since 1988, 24 of the 47 bird species deemed to have a riparian affinity have increased significantly, with only three species experiencing significant declines.


The San Pedro River in the San Pedro National Riparian Area. Photo courtesy Bureau of Land Management.

Sue and I arrived at the San Pedro House—the hub for a network of trails—on a day that dawned clear and warm. Being heat wimps, we like to hit the trail early, reveling in the frenetic bird activity that occurs before the temperature rises. Fire-engine-red male summer tanagers foraged on the serrated, delta-shaped leaves of Fremont cottonwoods. As the air heated, the vaguely similar songs of dueting yellow-billed cuckoos and white-winged doves melded into one. An impossibly red male vermilion flycatcher hawked insects. Suspended languidly in the water, a Sonoran mud turtle poked about slowly, "going nowhere in plenty of time," as N. Scott Momaday would say. Blue grosbeaks sang from their perches. Below them, hopping through the crisp cottonwood leaf litter, were scores of juvenile toads.

We continued our way upstream, the trail soon bringing us to Kingfisher Pond. Green kingfishers are sometimes here, so we carefully scanned likely perches along the pond's margins. Beaver had been reintroduced, and their numerous calling cards—chewed cottonwood stumps—could be seen poking out of the still water. Experiencing such abundance breathed life, feather, fur, and bone into additional attributes of the San Pedro: the highest densities of breeding birds in all of North America have been reported from southwestern riparian woodlands. In addition, the San Pedro hosts the largest concentration of Yellow-billed Cuckoos in the western United States.

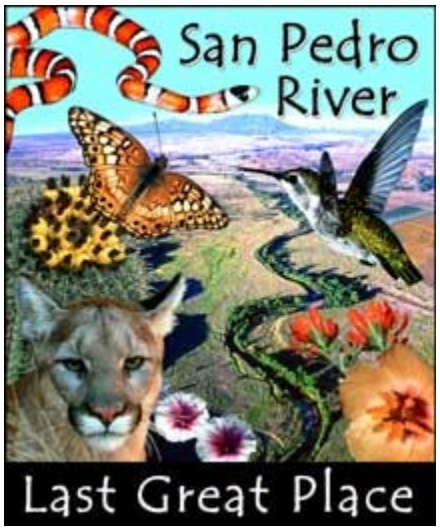
As we continued along the loop trail that paralleled Garden Wash, I reflected on the activities—past, present, and future—of those who call this area home. After experiencing the altered, diminished riparian areas along the Colorado River, our visit to the San Pedro was a much-needed tonic. However, the river's future isn't assured, owing to rapid groundwater withdrawals and the re-evaluation of the grazing moratorium that is currently underway.

A dream came true for me in January 2004, when we found property to buy a long stone's throw from the banks of the San Pedro. I returned in early March to close escrow and perform some repairs. It was snowing the day that escrow closed. The next day, the bright Arizona sunshine was back in action, melting the snowpack in the Huachuca Mountains. My timing was fortuitous, as the nearby city of Sierra Vista was hosting the 11th Annual High Desert Gardening and Landscaping Conference the next weekend. During the conference, I received a wealth of information on plants that I could expect to flourish in our yard.


San Pedro River and San Pedro riparian corridor. Photos by Adriel Heisey, courtesy The Nature Conservancy.

For me, though, the best part of the conference was the active participation of the University of Arizona's Cooperative Extension, which had a very informative booth. Furthermore, staff members were available to visit one's property, evaluate the conditions at the site, and offer suggestions for appropriate plants to use (i.e., those that demand little water). Their suggestions regarding easy-to-incorporate techniques of water conservation, re-use, and water harvesting made perfect sense. I left the conference feeling positive about the prospects for our culture to make some overdue course corrections about our attitudes toward water. In my mind, the death of the San Pedro just isn't acceptable.

Several weeks later, my working vacation winding down, I drove out to the river. March had been unusually warm. Cottonwood buds had broken, their nascent green leaves foreshadowing the waves of migratory birds soon to follow. The snow-capped peaks, looming above a desert river, were stunning. Mountain canyons—Miller, Carr, Ramsey, and Sawmill—whispered seductively. I'll return soon, I promised. The sight of a snowy eastern escarpment towering above a glistening desert river triggered in my mind a scenic analog that once existed in my adopted home state, California. A place of beauty, where a shining range of light casts shadows upon a desert watercourse: the Sierra Nevada and the Owens River.



The Nature Conservancy's Last Great Place campaign includes the San Pedro River.
Graphic courtesy The Nature Conservancy.

The tale of how L.A.'s thirst for water diminished the Owens River and obliterated Owens Lake should serve as a cautionary message for those of us who grapple with water issues today. Buying a second home in the Desert Southwest was not an easy sell to Sue. Not wanting to contribute to the problem, she had resisted the idea of spending even part of the year in this land of little rain. However, friends who live in southeastern Arizona say that they will welcome our presence, especially because we expect to be involved in spreading the dharma of water conservation and re-use.

Will we wind up being part of the problem or part of the solution? Is there a middle ground? It's my hope that, by exercising foresight and creativity, we can bequeath a healthy San Pedro River to future generations.

Tom Leskiw works as a hydrologic/biologic technician for Six Rivers National Forest in Northern California. When not in the field observing two of his favorite subjects—birds and trees—he is likely to be found at his computer writing about them.

Fiction

by Teague von Bohlen

They said the kid had asthma when we took him to the clinic. Chronic asthma, like there could be any other kind with a disease that won't let you breathe. The way I see it, either you can breathe or you can't, and there's no more than two ways about it. Still, if it were left up to me, I'd get the kid out of the house and into the outdoors. Away from the heat of Phoenix, with its belching freeways and its concrete walls choking the wind. Get him out into the desert, where you can sit in the shadow of something bigger than him, where you can smell the mountains, where everything is clean. Take him fishing with me sometime at Lake Roosevelt, maybe let him feel the slick of a fish. He's five now, he can do it if I help him, I say. But as Terri sometimes reminds me in our worst moments, the boy's not mine.

Terri's my wife, three years now. The boy's name is Justin, one of those 90s names that's got no earth to it. Not like John, which is not only my name, but the name of all the Snyder men, from way back. Not like Frank, who I worked alongside for nearly twenty years before a plat full of brick snapped its rope and came down on him. And not like Horace, who worked for nearly sixty years at the feed lot near where I grew up before he dropped over of a heart attack there in his office with the portable radio and the A/C going full-blast. Those were names of men, men with nothing more going for them but a strong handshake and a willingness to do anything to support their family. Even if the kid ain't theirs.

But the boy's name isn't the problem. The problem is that he can't breathe. Terri goes into convulsions when he starts wheezing, starts breathing hard herself, like she could take in the air for him. I just lift him up and get him to the hospital as quick as I can. The doctors give him some medicine, and he's all right again, and then I take him home. That's the way of it. And now, when I hear Justin come into the bedroom late at night—when he's having trouble, I always hear him before I see him—I think two things. First, that the poor kid is hurting, and that I have to do something for him. And second, that I'm going to have to try to wring another fifty dollars for the deductible from an emergency room visit out of my next paycheck. I actually think that, God help me, I do. The kid

is dying there on my shag carpeting and I'm worrying about maybe getting the cable disconnected, or having to cut back on my fishing trips. I feel ashamed of myself, and I don't tell Terri. I don't want her to leave me, and I don't want Justin to leave either, no matter what it costs.

It only happens in the middle of the night. Terri and I, we're sound asleep, her on her side, me on mine. We start out together, my arm over her side, hand on her stomach, holding her, but soon she shifts and I know that means she's getting uncomfortable, so I move back over to my side and sleep. It's what we do. Anyway, this is when Justin comes in, hair all a mess and bending at the waist slightly, trying to catch his breath. I can hear his lungs from the bed. "You okay, champ?" I say. I'm always the one who wakes up. Terri sleeps through it all. I know it's a stupid question, too, because the kid never comes in without needing a trip to the hospital—he's too polite, I guess, too scared to wake us up, even though neither Terri or I have given him a reason to be. "You need to go to the E.R.?"

He nods, leans against the wall. It's all the boy can do.

I tell Terri that we're going, and she wakes up a little and gives Justin a hug and a kiss on the head and tells him to get better. She's barely awake—sometimes she doesn't recall this, and wakes up alone in our bed and realizes that we must have gone. I get Justin his coat on—we don't bother trying to change his clothes anymore, since it just makes him wheeze harder and serves no real purpose, since he's five, after all, and he could wear his jammies to Church and no one would say boo. I pull some clothes on, grab my Diamondbacks cap to cover my bedhead, and we're out the door in less than five minutes. Terri is already back to sleep.

This is sounding like I'm saying that Terri's a bad mother, but I'm not, and she's not. In fact, she's one of the best mothers I know, always there for her son, always putting him first, ahead of her own needs. She was a couple of years into an accounting degree when Justin came along, and she realized quickly that she had to make money now. So she waits tables, now, full-time. And since she works early at the diner, and I work swing at the plant, we made this deal a long time back that I'd do the night thing. It's just easier, and besides, it's given me a way to be with Justin a little bit more, to really be his Dad in a way that I don't normally get to be, taking care of him and everything. The kid hasn't seen his real Dad in three years—the guy ran out on them one day, and Terri hasn't been able to find the guy since, not for child support or alimony or anything. Justin says that he doesn't remember his Dad, anyway. I know, because I asked him.

Justin wants to be an E.R. doc when he grows up, like on TV. He watches that show in reruns—he's asleep by the time they come on regular time—and he just eats it up, the way that the docs and nurses and everyone run around saving everyone. He gets real excited when there's a kid on there having an asthma attack, which is a little too rare, if you ask me, since half the time when we show up at the emergency room, there's at least one other kid trying to breathe, too. Its real common, they tell me. I read a magazine article in the waiting room of the hospital one time that said that it might come from cockroaches or old tires or something, but when I told Terri about it, she looked at me like I was a dumbass and asked me if I'd seen any roaches—or for that matter, tires—in the house. I had to admit, I hadn't.

She sometimes gets real upset when I talk to her about Justin. This time was no different. “It’s not the flu,” she said. “You can’t catch it. You just have it or you don’t. That’s it.”
There’s not much a guy can say to that.

“You let that woman go, John, there’ll be a line of fellas waiting for her. And I just might be heading it up.” This was Harris, whose first name was Leslie, so you can imagine why he went by his second. We were re-coupling a pipe down in the undercarriage of the Motorola plant. We didn’t know nuts about what Motorola was doing above-ground. Me and Harris were strictly mechanical maintenance.

“I’ll tell Joanne that you said that,” I smiled. Joanne was Harris’ wife. Terri and I went out with them some before Justin’s health got too bad to let us enjoy being away, too bad for us to feel comfortable leaving the kid with a sitter anymore. Joanne was a good egg, but churchy. The kind of girl you know talks about your sins instead of hers on Sundays.
“Hell, John,” Harris said, gesturing with his wrench. “You don’t know how good you got it. Old guys like us finding a good woman and a family all in one swoop? Doesn’t happen.”

“Give me a break. Forty ain’t old.”

“You kidding? You remember how old we thought our Dads were when we were kids? And this was when they were what, thirty, thirty-five? We’re past our prime, John. If we were cavemen, we’d be the elders of the tribe.”

“Did cavemen have tribes?”

“Sure.”

“I think you’re thinking of Indians.”

“So what did cavemen have, Mr. History Channel?”

“I dunno. Not tribes.”

Harris shook his head, veed-out his fingers and pointed at his eyes. “Focus,” he said. “I’m not talking about cavemen, John. I’m talking about life, and what you can expect. Face it, man, we’ve all got the death sentence. It’s just unscheduled.”

“Yeah, yeah,” I said, starting to gather up my tools. The pipe was pretty much done, and our meal-break was coming up. “I get it. All I said was that Terri and I aren’t getting on like we used to. Something’s different.”

"Like what?"

I shook my head. "You don't want to hear this."

"Who's here asking?"

I looked at him. We'd been friends for nearly 20 years, and gone through some rough shit. Two marriages for Harris had him living on something like a third of what he brought home, and on top of that, he had a kid at Mesa Community College who both took his money and hated his guts. He slept on my couch for nearly a year—in fact, that's one of the things that finally broke up my disaster of a first marriage, which wasn't really a marriage at all, but a commonlaw thing. But that don't stop the lawyers from taking half of everything. But yeah, Harris and me were tight. We'd seen it all, we thought, and then some. So I bit. "Okay," I said. "How often do you and Joanne have sex?"

He rolled his eyes. "What am I, Dr. Phil?"

"I told you," I said.

"Okay, okay," he said. "You serious?"

"Yeah," I nodded.

"Okay," he said, looking at me sort of slantways, in case I was really just kidding him and ready to pull the rug out. But I wasn't, of course, and he knew that. "I don't know. Maybe twice a week?"

"Yeah," I said. "That's what I thought."

"Sometimes more," he added, "sometimes less."

"Okay."

"What's this all about? You and Terri having bedroom problems?" The not-that-I-really-want-to-hear-this was understood. "You need to score some Viagra? I hear it's great, not that I use it myself, but you know, my brother goes on these trips down into Nogales, and gets all sorts of cheap meds. Buys one of those big clay statues of the Virgin Mary and stuffs her up with prescription stuff that would cost like ten times as much here at home. I could talk to him for you."

"It's not Viagra," I said. "It's just… we don't even try anymore."

"Oh." Harris deflated a bit. "Well, you're working opposite shifts to take care of the kid, right? And with the boy sick and all, I don't know. Maybe that's all it is."

"Maybe," I said. "Or maybe it's more."

"Well, fix it, John," Harris said. "It's what we do. Fix stuff."

"Yeah," I said. And then: "Smuggling shit stuffed up the Virgin Mary's skirt? There's gotta be a special hell for that."

Harris laughed. "Let's eat, man. I'll buy the burritos."

A week later, I sold Harris my fishing boat for three-hundred. The doctors had said that Justin needed a nebulizer, what he called a breathing machine, to have at home. It was basically a small version of what they gave him at the hospital, so it would save us time and money, in the long run, from all the ER visits we'd been taking. And, if the breathing machine didn't help, we could still run in for a shot of adrenaline, if we had to. It was easy.

I didn't much miss the boat. I'd been taking fewer trips out anyway, and Terri wouldn't let me take Justin with me either, so it had been just sitting alongside the house for most of the summer. And Harris promised to invite me along whenever he took it to Roosevelt, so we could drown some worms together. It was all good. Or at least it was until Terri lost her job.

She'd been waitressing at this place on Mill Avenue, this New-York-style deli place that catered to students from Arizona State and professionals from downtown Tempe. It was a pricey place for a deli, but that worked out better in the end, since it kept the misers away, and she was able to take home pretty good tip money. But she got fired when a group of grad students showed up, camped in her section for something like four hours sipping free refills of coffee over the $8 check that she'd left for them twenty minutes after they sat down. She asked them if they could clear out, to make room for the lunch rush, and they reported her, and she got fired. There's probably more to the story, but that's what she told me, and I didn't see a reason to push for it. We had bigger issues to face.

The most immediate one was, of course, the money. Terri's tips were what we'd been using to pay for Justin's medicine, little puffers and pills with names like comic-book villains: Vanceril, Albuterol, Theodur, Brethine. My paycheck was enough to keep the house going, and pay for food and electric and gas for the truck, but we were going to have to tighten our belts until Terri found another job. And the thing is, she didn't want to.
She told me this one night while we were in bed, not having sex. She was crying, and I was only making out about half of what she was saying, but I got the gist. "I want to take care of my son," she said. "I want to make him better." I told her that her staying home and taking care of Justin was fine, but it wasn't going to cure his asthma, which was true, but only made her cry harder, so much that I couldn't make out anything that she was saying anymore.

Two nights later, Justin came into the bedroom wheezing. I got up, as I always did, but I was in the living room, dripping the medicine into the breathing machine mouthpiece, when I realized that Terri didn't have work in four hours. So maybe she should be the one sitting on the floor with Justin,

measuring out solutions, mixing it with saline, turning on the switch, and then sitting with the boy, watching him take heaving breaths, listening to the low thrubbing of the machine. “Stay here,” I said to Justin. “You okay?”

Justin nodded. He was tired, too, even though the meds sometimes made him jumpy.
I walked back into the bedroom, and woke Terri up. “Justin’s awake having a breathing treatment,” I said, crawling back into bed. “He’s in the front room. You can turn the TV on if you want, but sometimes it keeps him up longer than he needs to be.”

I rolled over, and pulled the covers up over me. From behind me, I could hear Terri get up, could picture her sitting up halfway, not yet fully awake, and it slowly dawning on her what I was telling her. It was her turn. She wanted to take care of the boy. So I let her.
I hadn’t mean it as some sort of criticism of her mothering, but it was clear the next morning that this was the way she saw it. Justin was already off to catch the bus by the time I awoke and made my way out to the front of the house. Terri was sitting there, still in her robe and my t-shirt, drinking coffee. I could see both of them steaming.

“Morning,” I said. Thought I’d give it a shot, anyway.

“Eggs on the stove. I’m back to bed,” she said, setting her coffee down on the side table and getting up. “I had a long night.”

“I’m sorry,” I said. “I know how that is.” I still didn’t fully know what the fight was about, and didn’t know how to hold up my end.

“Yeah, right,” she said. “You made that perfectly clear last night, John.” She strode into the bedroom, and shut the door.

I ate the cold eggs she’d left in the pan for me, and put some peanut butter and margarine on a piece of bread and ate that, too. I knew I was supposed to follow her to the bedroom, but I didn’t know what to say, so I didn’t. I let my frustration grow as I sat there, eating. By the time I got around to pouring myself coffee, I was pretty pissed off at the whole thing. What in the hell had I done wrong?

It was just about then that Terri showed up to tell me. “You know, I can do without your holier-than-thou crap, especially in the middle of the damn night,” she said, and flumped back down on the couch where she’d been sitting before.

“I thought you were back to bed.”

“I’ve had too much coffee already,” she said, and picked up the cup she’d set down earlier, and took another sip.

“Look,” I said. “I don’t know what in the hell you’re on about, Terri, but…”

“What I’m on about, John, is the way you treated me last night. The way you’ve been treating me for

weeks now. Why do you think I lost my damn job?"

"It's my fault that you lost your job? How's that, exactly?"

"I don't know!" She was yelling now. "But it's all wrapped up in there together. You take care of Justin, and sell your boat, and get up with him all the time, and I'm just the chick who brings home some extra cash and makes your breakfast and fucks you now and then."

"Now and then is stretching it," I said, and immediately realized it was the wrong thing.

She glared at me. Terri has this look like the sun—look directly into it, you'll go blind. "Fuck you," she said.

"Promises, promises," I said.

"You are such an ass," she said.

"So leave," I said.

"Gladly," she said. "We'll be out of the house by tonight."

"Fine," I said. But it wasn't, and I knew it, and I hoped she knew it. If I was a wiser man, I would have gone after her, and made sure she did. But I wasn't. Instead, I sat down at the kitchen table, and felt heat rising off the back of my neck. I don't know if it was anger or the heat of the morning sun, but either way, it burned.

"We're going to the desert," I said that afternoon. Justin had just gotten home from school, and Terri had made some efforts—halfhearted, I hoped—to pack up some of their clothes. I'd called in sick to the plant—Harris said he'd cover for me, and that I owed him the beers next time we went out fishing—and spent most of the afternoon out buying supplies for camping. It was Friday. I had a plan. "The Superstitions."

"What?" Terri said.

"Cool," Justin said.

"It's not cool, and we're not going," Terri told Justin. "We have things to do."

"It's Friday, none of us have anything to do tomorrow, and we're going up into the mountains for the night. I've already packed everything—all you guys need is a change of clothes, if you want one."

"What is this, John?" Terri said.

"Can we bring the X-Box?" Justin asked.

"No," I said, "but we'll have plenty to do, so don't worry about that. You can bring some of your comic books, though, if you want to. We can read them around the fire tonight."

"Ghost stories?" he asked.

"Maybe. And I've already packed the marshmallows."

"Cool!" Justin said again, and ran back into his room to gather up his things.

"You pack anything besides marshmallows?" Terri had her hand on her hip.

"Hot dogs for me and the boy, turkey dogs for you. Chips, some fruit. Soda and beer in the cooler, already iced. A pan for eggs and bacon in the morning. Water in a jug. Coffee and a pot, cream in with the sodas. I think we're good."

"What about Justin's medicine?"

"Already in the truck."

"And what if he has an attack out there?"

"I'm packing his breathing machine. If he needs it, and I doubt he will, but if he does, I went out and bought an adapter to plug it into the truck." I grinned.

"Well, John," Terri said. "You certainly seem to have thought of everything."

"I hope so," I said. She shook her head, but gently, and I thought I saw a smile from her as she passed and went back into the bedroom to pack.

That night, after the hot dogs and the marshmallows and the fire dying, the three of us lay out in the bed of my truck, on an old family quilt, and watched the desert stars. We were in the Superstitions, and the sky was as clear here as washed glass. There was a breeze cutting down from the north, and the night was already starting to cool everything off. We heard tiny lizards darting about in the scrub, but other than that, it was quiet. I took a deep breath, and told Justin to do the same. Breathe it in, I told him. Breathe it in.

We told stories, all of us. The story I told was a true one, about me when I was ten, and my family had a small horse farm off Sandario Road southwest of Tucson, and I took off into the desert to the north one day to try to find a watering hole that a friend of mine swore was out there. He'd seen it, he said, swam in it, let his horse drink and cool himself. I believed him, and so off I rode one

morning, on my horse Mack, with my hat and a full canteen of water and some beef jerky tucked into my pockets. By noon, I'd gotten myself lost, and Mack was lathered, pulling at the reins, and I had to struggle to keep him on. I knew enough to try to beat the mid-day heat, so we stopped for a bit in the shade of a shallow wash, and I had to tie Mack to a dead tree to keep him from bolting. I started off again that afternoon, after Mack and I had finished the last of our water and my jerky was long gone. By the time night fell, I knew I was in trouble, and I didn't know what to do. Mack and I wandered in circles for a long time, it seemed—I saw my own tracks more than once—and finally, I gave up. I let Mack have the reins he'd been bucking for since mid-day, and he set off at a quick trot. I was sure I'd never see home again, of course, but then, all of a sudden, there it was, off in the distance. I saw my father, first, on his horse, and he rode out at a full gallop to meet me. He'd called in friends of his to help look for me, and the sheriff, too, but I'd come back. I was in trouble, of course, but I was so glad to be home that I didn't care. Mack had saved me. He'd saved me from my own bull-headedness. I could have been home in time for lunch, if I could've seen what Mack was trying to do, but I didn't. I couldn't. In the end, I had to give up in order to come home.

Justin was asleep before I finished my story, and I knew he was asleep. By the end of me telling it, I was just talking to Terri. She looked down at her sleeping son, ran her fingers through his sandy hair. A warm breeze fluttered over us.

"I'd better not be the horse in this metaphor," she said smiling.

"No," I said. "You're me. We're all me. You, me, Justin. It's us, together."

"Yeah," she said, and I could feel something fall away from her, then, something that had been there for a long time but I hadn't even noticed until it was gone. In that moment, I saw her in the light of the desert foothills, reflecting off her hair the color of the mountains, her eyes looking at me, smiling in a way that I hadn't seen in a while. She kissed me with promise, and for the first time in a long time, it was enough.

"I'm scared, John," she finally said.

"Me too," I said.

"I don't want to leave," she said.

"I don't want you to," I said.

"I'm scared," she said again, and she put her hand on Justin's shoulder.

I held her tightly, and she held me. Soon, I realized she was asleep, and I began to drift off, too. The three of us slept like that all night, buoyed by the sound of the wind in the ocotillo, bending around the saguaro, moving us all together towards a morning we could see coming but couldn't understand.

Teague von Bohlen teaches creative writing at the University of Colorado at Denver, and is a faculty advisor for their literary magazine Copper Nickel. He spent his late high school and college years in Arizona, and remembers the mud (and smoke!) in Peppersauce Caves, the sunsets at Gates Pass, and his wife teaching him how to appreciate hiking in the Superstition Mountains. His first novel, The Pull of the Earth, is being published this Fall.

Fiction

by Rita Kasperek

It was a fine night for stargazing. The purple-black sky above Death Valley throbbed with stars, hundreds of them, overlaid with a deep velvet silence.

“I’m scared,” Beth whispered. She popped her gum.

“People experience this maybe once, twice, in a lifetime,” Lenny said. “Try to enjoy it.”

“Leonard...” Beth called him Leonard. Only his mother called him Leonard. “Let’s go back and watch ‘Survivor.’ Or eat. I could eat a horse.”

“I’m going to show you Cassiopeia.” He loved saying the name. It had a baroque quality to it, like the Brandenburg Concertos.

Beth insinuated her arm around his. She was a big-boned girl, pretty, with a practical heart and a mediocre mind, a combination that alternately disappointed Lenny and made him feel superior. He met her at a San Francisco community college, where she had already spent three years, after dropping out of high school and obtaining her GED. He was teaching science while earning his master’s degree. Eventually, if everything went as planned, he would earn a Ph.D. in physics. Beth figured she would major in management. Or English.

She had initiated the relationship by offering to cook dinner for him. He was a dreamy, awkward sort of man, unused to attention from women. Tall and thin, he had a hooked nose that threatened by its very gravity to tip him over like a bird-toy that dips its beak into a water tumbler. He accepted her invitation, with few reservations and, with even fewer qualms, allowed her to seduce him. He was surprised at how tender they were together.

It was her suggestion to spend a weekend, the anniversary of their first meeting, in Death Valley, “the farthest place we can find,” as she put it. Initially he refused. He was planning on breaking up with her, at some point. He didn’t want to mislead her.

“It’s not like I’m asking you to marry me,” Beth argued, laughing at him.

And so he agreed.

On the first day they drove through miles of alien-looking terrain with evil-sounding names like Devil’s Cornfield and Desolation Canyon. Beth insisted they stop at Badwater first so she could say that she stood at the lowest point in the Western Hemisphere. She coaxed a German tourist into taking their picture in front of a sign indicating that the land was 282 feet below sea level. Then they walked on the alkaline plain, its white surface broken into interlocking pieces like a huge mosaic. Beth carved their initials into the crusted saltpan.
“It’s like being on the moon,” she said. “Only on the moon you don’t get sunburned,” she added, dabbing lotion on his face in short, quick motions.

She hadn’t wanted to go out at night. Lenny insisted. Although the spring sky was not as good as autumn’s for stargazing, the remote and treeless desert provided a spectacular backdrop that would, Lenny thought, impress her.

“Nobody else is out here,” Beth complained. “What if something happens?”

“Nothing will happen. Nobody’s out here. Now, could you be quiet? I can’t focus.”

Lenny switched on his penlight to read the star chart he had brought with him. Beth clung to him so tightly that he could barely move.

“Leonard, what’s that?” She jerked his arm; he nearly dropped the chart, the penlight, everything.

“What?”

“Over there.” She stabbed her finger at darkness. He pointed the penlight at the spot, and located faint tracks in the sand.

“Looks like a kangaroo rat,” he said.

“There are rats here? Ick!” She looked so girlish, it broke his heart.

“Not like city rats.”

“Oh.” She sounded let down.

"Come here." He held out his star chart and switched his penlight on it. "Today is March 5," he said, "so I'm going to adjust the chart to that date. Now, what time is it?" Beth gently turned his wrist so they could read his watch. He loved her for doing things like that.

"Nine-thirty," they said together.

Beth giggled. In the small circle of light her face looked soft and wise as a mother cat's.

"Your face is sunburned. You've got a Rudolph the Reindeer nose!"

He adjusted the chart, irritated. "This gives us an idea of how the stars are laid out tonight."

"Wouldn't it be better," she said, scuffing at the sand with the toe of her shoe, "to just look at them?"

He ignored her, busying himself with the sky. He used to be able to identify constellations and planets and, for a brief period, could reasonably discuss more obscure things like supernovae and variables and binaries. Now, he could barely read a basic chart. He consulted the stars again. The Big Dipper hovered slightly north and west of them. He could make out the Pleiades, a cluster of light that twinkled off and on again like a distant motel sign. To the left of that was Orion, unbelievably clear and bright, the three stars that formed the belt glittering like a chain of lit firecrackers. From there he might be able to detect—

"Jesus!" he yelled.

Beth had crept behind him and trapped him in a hug.

"Cut it out."

She squeezed him. "You're so serious," she said, "you're cute."

He pointed to the sky. "Look at the tip of the ladle on the Big Dipper and follow it down." His finger traced the air for her benefit. "See that orangish star there, kind of faint?"

She fiddled with the zipper on her jacket.

"That's the North Star," he explained. "The Big Dipper and North Star are sort of your guideposts. You can depend on seeing them in any sky, no matter what time of year. Once you find them, you can find other things—"

"Like Cassiopeia," Beth said.

"Exactly."

"What does it mean, anyway? Cassiopeia."

"It's a constellation," he said, eager to impress his knowledge upon her. "Actually, it was named after the wife of a king."

"Yeah?" Her voice took on a more interested tone. "Which king?"

"I don't know," he admitted. "But she was the mother of Andromeda."

"Oh." She played with her jacket zipper some more. "I'm cold." She snuggled against his shoulder. "Let's make out," she whispered. Her breath tickled like a feather against his ear. He could smell the spearmint gum she always chewed. This stirred him more than he could say.

"Cut it out."

She shivered. "There's something out there."

"Beth, I want to show you something."

"Waiting. Watching. I can feel it."

"Cassiopeia looks like this." To demonstrate, he tucked the star chart under his armpit and held the penlight between his teeth. He neglected to switch off the penlight and its beam shot into Beth's eye. He was, after all, an awkward man. He held up his hands, forming a "V" with the tips of his thumbs and extended his index fingers, pointing them down into an "M" shape.

"That looks like an upside-down W," said Beth, shielding her eyes from the penlight.

"Well, itth a right-thide up M."

Beth shrugged. "It could be an upside-down W," she said. "Or even a sideways E."

"Well, it'th not." These kinds of comments drove him crazy.

He took the penlight out of his mouth and consulted the star chart again.

"You know, I heard once that even if stars die, we can still see them. It takes so long for the light to

travel to get here, that it's still moving even after its source is gone. It's like...like..." He struggled for an explanation she would be able to understand. "It's like something has happened, but time hasn't caught up with itself."

"Do you think there are animals out here? Big animals, like wolves?" She moved close, so close he felt her heat.

"Wolves are extinct here," he told her.

"Maybe not."

"Stars can die pretty violently, you know."

"Maybe there's one left."

"They explode as a supernova. In fact, one exploded about fifteen years ago. It was so bright that it was visible to the naked—"

"I could get a rock—" She ducked to the ground, scrabbled about, and popped up again, presumably with a rock of adequate size. She massaged it in her palm, expertly gauging its weight. "This'll do it. Now we're okay. We're safe."

"—eye. Betelgeuse may already have gone supernova, but we won't know for another—"

"Isn't there a movie called Beetlejuice?"

Lenny wondered how he would be able to get into the same bed that night with someone so stupid.

She laughed softly, as if she had read his mind. "You are so cute."

Clouds began to drift from the edges of the sky. In a few minutes they would lose everything. He searched, following the Big Dipper to the North Star and moving left until he could make out the distinct lines of Cassiopeia. He gazed lovingly at the crooked W (or M, he thought with annoyance).

“This is really something, you know,” he said. “You should really pay more attention to this.” Maybe, he thought, he would break up with her as soon as they got home.

Beth tossed her rock from one hand to another. “Something moved,” she said, and pelted her rock into the dark.

Orion’s belt dimmed under the gathering clouds.

“You know what the lady at the front desk told me?” Beth scooped up another stone. “She told me a little European boy got lost out here last summer.”

“My father gave me a telescope. I was eight or nine. We used to look at the stars from my backyard.”

“She said the kid died of exposure.”

“It’s the one thing we used to do together. I couldn’t play ball or fish or hunt. None of the typical guy things. It’s the one thing we could do.”

“They found him with his tennis shoes melted to the rocks.”

“What? Who?”

“The little boy! Melted to the rocks.”

“I hate to say this,“ Lenny said, “but I think that lady was pulling your leg.”

Beth threw her rock into a clump of mesquite. “It’s no more outrageous than dead stars. Or black holes. Collapsed stars that just suck everything into it? Give me a break.”

She did this sometimes. Just when he thought she never understood a thing he said, she threw his words back at him and made them sound foolish and unimportant. As if she and only she had a pulse on life.

“Astrophysicists have proven the existence of black holes. Reverberation-mapping campaigns have revolutionized our understanding—”

The wind picked up. The sand made a shushing sound as it blew through the scrub. She turned to button his jacket. “It makes you wonder,“ she said, adjusting the collar to fit snugly under his chin.

“What?”

“Why a little boy was left to wander around this place by himself.”

“That lady was just pulling your leg,” Lenny said. The touch of her fingers lingered thrillingly at his throat. “They scare people so the rangers don’t have to go looking for some idiot who is dumb enough to get lost in the desert.”

“He must’ve been so frightened,” she said, as if she hadn’t heard him, “and his parents were off fooling with a camcorder or something.” She fished on the ground for more rocks.

“That reminds me—”

“Some people shouldn’t be allowed to breed.”

“We should go to Badwater again tomorrow. Take some more photos. We can’t trust those tourists to have gotten a good picture.”

“Sometimes,” Beth said, “sometimes, you are so dense, I could kill you.” Poised in the moonlight, with those rocks in her hand, she looked fierce, dangerous.

“Cut it out,” he said helplessly.

She fired off a pellet the size of a peachstone. “What I really need is a gun.”

Clouds shifted and parted. Cassiopeia tightened into an N, widened back into an M and then dissolved into a few broken lines.

“You missed it. Nothing left, now.”

“I didn’t miss anything,” she replied. Off soared another rock, this one large as a potato.

Lenny thought about the stars that had died years and years ago while their light survived, traveling toward him through space, outrunning a death that hadn't found any of them yet.

"Someday I'm going to have a baby," Beth said. Her voice was decisive and came from a completely instinctual place, a place that Lenny didn't have but knew about and could only feel outside of, like a secret clubhouse with an undisclosed password. She aimed carefully and leveled another stone at a threat only she could detect.

He cried out, suddenly afraid in a primal, ancient sort of way. "You're not going to leave, are you?"

She merely laughed.

Even now, Lenny thought, the light he was watching could be dead. He searched the sky for doomed stars and dead light, waiting for a past event to catch up to him, but the clouds closed upon the sky like stage curtains. The moon would rise soon, behind those clouds, beyond those stars. He watched and listened as Beth moved nearby, protecting them both from all of the unseen predators.

Rita Kasperek's fiction has appeared in The Portland Review, GSU Review, Storyglossia, Big Ugly Review, and Sand Hill Review, among other publications. Her work recently was nominated for a Pushcart Prize and named Honorable Mention in the New York Stories fiction contest. She lives in Oakland, California, and is currently tearing her hair out over a novel.

Fiction

by Christopher Woods

Synopsis

Moonbirds is a comic/drama for two characters. They are census-takers who work for an international relief agency. Their job is to count needy people in a Third World country. The play takes place in the desert of that country. The central problem is that there are no people left to count, only abandoned villages. There is also the uncomfortable knowledge that, of the census teams sent before, not one has returned alive. Finally, they find that they must deal with, of all things, large ghoulish birds.

Nevertheless, the work must go on. As one of the characters says, “Aren’t we census-takers? Isn’t it our duty to count?”

So they continue their mission. Moonbirds is about both duty and doom. It is like a meeting between Indiana Jones and Jean-Paul Sartre.

Scene 13

(Late. Night. A vague moonlight. Centerstage, an extinguished campfire. Around it, IGNOTO and RIEN, asleep.)

(Sound of fierce bird shrieks very close by.)

(IGNOTO’S sleep is troubled. HE tosses and turns, begins moaning. Finally, HE begins screaming. This continues until RIEN wakes. Momentarily dazed, RIEN then realizes that the screams are coming from IGNOTO. HE crawls over to IGNOTO and tries to rouse HIM.)

RIEN
Ignoto! Ignoto!

(RIEN shakes IGNOTO, who continues to scream. IGNOTO tries to push RIEN away. The more RIEN tries to help, the more agitated IGNOTO becomes. Desperate, frightened screams. Finally, RIEN slaps IGNOTO hard across the face. IGNOTO awakens.)

WAKE UP! IT'S ME, IGNOTO! YOU'RE DREAMING! IT'S ME, IGNOTO!
IGNOTO
(Coming to.) Is it you, Rien?
RIEN
It's me.
IGNOTO
(HE sits up, rubs HIS eyes.) I couldn't be sure. I saw so many things.

(HE feels HIS face, still stinging from RIEN'S slap)

I was on fire, I tell you. On fire.
RIEN
You were having a nightmare. Come, Ignoto. Sit by the fire.
(RIEN moves next to the campfire. IGNOTO follows suit.)
IGNOTO
It's good to be awake.
RIEN
Is it?
IGNOTO
I had a terrible dream. I dreamed I was being smothered by hundreds of blankets. Each of them was on fire.
RIEN
Sand fever. Everyone gets it sooner or later. I was hoping we would get it later. (beat) But I guess it is later.

(IGNOTO, shivering, leans over the campfire.)

IGNOTO
It's so cold. Has the fire gone out?
RIEN
(Pokes at the ashes without success.) There must be a spark alive somewhere.
(HE stirs the ashes some more.) One spark, that's all we need. One spark is enough.
IGNOTO
(Brittle hope.) One spark. One spark. Is that too much to ask?

RIEN
(Scatters the ashes in resignation.) That's it. It's dead. (beat) And that was the end of our matches.
IGNOTO
All gone? No more fire?

(RIEN shakes his head.)

That does it for me! No fire. No way to keep warm. I can't take it any longer. I'm leaving! I'm going home!

(IGNOTO stands, begins to walk away.)

I've had enough of this! I'm going crazy!
(As IGNOTO tries to leave, RIEN goes after HIM. HE grabs IGNOTO to prevent HIM from leaving. THEY fight. IGNOTO tries to push RIEN away. THEY wrestle to the ground. IGNOTO breaks free, starts to run.)
RIEN
Stop!
IGNOTO
I've made up my mind. I was crazy to come here.

(RIEN runs ahead of IGNOTO and confronts HIM.)

RIEN
Crazy to think you can leave. Where do you think you're going?
IGNOTO
Home. Isn't that what I said? Away from this godforsaken place! I can't take it!

(RIEN slaps IGNOTO several times in quick succession.)

RIEN
Listen to me! You can't go home. You don't know where it is. (beat) Tell me, which way is home? Can you tell me that?

(IGNOTO, in tears, looks around wildly. HE has no idea.)

See? You leave here, and you'll die somewhere out there. Alone.
IGNOTO
(Nearly hysterical.) What does it matter? We're going to die anyway!

(IGNOTO breaks into a run again, this time in the opposite direction.)

RIEN

IGNOTO!

(RIEN runs after IGNOTO again, tackling HIM. THEY struggle, end up on the ground, breathing hard and spitting sand.)

IGNOTO

(Angrily.) What do you want from me? Just let me go.
RIEN
If you leave, I'll be alone. You die alone, and I die alone too.
IGNOTO
So?
RIEN
Aren't we a team, Ignoto? Have you forgotten that? Aren't we census-takers? Aren't we?
IGNOTO
(Quietly.) I guess.
RIEN
What?
IGNOTO
(Louder.) I guess.
RIEN
Good. Remember that. We have a job to do. This is our mission. No matter what. (beat) We gave our word.
IGNOTO
(HE sits up, quite ashamed.) Yes, we did, didn't we? (beat) I'm sorry. (slight pause) My dream upset me terribly. I dreamed about blankets on fire. And I also dreamed that we were walking on a road. Between villages, I think. Then, we started seeing things.
RIEN
(Warily.) Things?
IGNOTO
Grotesque things. On the road. So many of them, we tripped over them. We had to watch where we stepped. Walk around them as best we could.
RIEN
But, what kinds of things?
IGNOTO
That's just it. We didn't know. And we kept seeing them. Stumbling over them. Finally, we realized what they were. Bones. Human bones. A village's worth, at least.

(Sudden sounds of bird shrieks.)

RIEN
Bones. Are you sure?

IGNOTO
Oh, yes. Human bones. Oh, we knew it all along, but we didn't want to admit it. To ourselves, you know. We didn't want to recognize them for what they were.
RIEN

(With resignation.) I see.

(A slight pause.)

IGNOTO
This isn't news to you, is it?

(RIEN doesn't answer.)

You know all about the bone business, don't you?

(RIEN doesn't answer.)

ANSWER ME!

RIEN

Yes. But I thought all that was still a few days away. (beat) Ignoto, your dream was in color, wasn't it? Not black and white?
IGNOTO
Color, yes. Why do you ask?
RIEN
Just making sure.
IGNOTO
What does the dream mean?
RIEN
It could mean several things.
IGNOTO
We both know better than that.
RIEN
In my father's last dispatch, he talked about seeing bones. They found them alongside the road, after they left Huzuni.

IGNOTO

What else did he say?
RIEN
Very little. He remained objective, right up until the end. Naturally, I've read that last dispatch many times. Between the lines, you understand.

IGNOTO
And what did you make of it?
RIEN
Not a lot. It's just like you dreamed it. A village's worth of bones. On the road, outside Huzuni. (beat) You were dreaming about them, Ignoto. The people who used to live here.
IGNOTO
What happened to them?
RIEN
The birds, Ignoto. The moonbirds. You know that.
IGNOTO
I did, yes. And tried to forget it. (beat) So many people.
RIEN
Yes, but there's always more birds.
IGNOTO
There's no getting around them, is there? The moonbirds?
RIEN
(Quietly.) No. Not a chance.
IGNOTO
I guess I knew that too.

(IGNOTO stands, stretches, looks at the sky.)

IGNOTO
I know that moon.
RIEN
Do you?
IGNOTO
From my dream. We walked most of the night. We were exhausted, but we couldn't stop. We didn't want to sleep beside someone else's bones. So we kept on walking like that, in the strange moonlight.

(THEY both stare at the moon.)

Do you know a moon like that, Rien?

(RIEN doesn't answer.)

Well, I do. Not a pretty sight. A ghost moon. That's what we call it where I come from. The ghost of a one-eyed God, staring.
RIEN
Not smirking?
IGNOTO
Maybe. (slight pause) What about you? Do you know a moon like that?
RIEN
I do. Very well. My father tells me that a hazy moon like that is really a sore.

IGNOTO
What?
RIEN
A bedsore. On the body of God. It's pressing through from the other side of heaven.
IGNOTO
But your father is dead. How can he say these things to you?
RIEN
He's dead, sure. But he still talks to me, in my dreams. And do you know what else he says?

(IGNOTO shakes his head.)

That he is very hungry. And very cold. He comes to me in my sleep, begging for a blanket.
IGNOTO
I see. (beat) Why don't you tell him to go to the village of Huzuni? There are more blankets there than he'll ever need.
RIEN
(Spiteful.) Don't you think he knows that? Don't you think he would go there if he could? (Slight pause) He's blind, Ignoto. The moonbirds took care of him.
IGNOTO
He died doing this same census, didn't he?
RIEN
Yes. It goes on and on.
IGNOTO
Strange, how it's never finished. Never.
RIEN
Because someone never stops smirking. And the census here has never been completed. Not even once. It's the birds. They eat a village. They eat the census-takers. They're always hungry.

(A pause.)

The best thing to do is not to think about it. By the time they come for us, Ignoto, we'll be asleep.

(RIEN lies down to go to sleep.)

IGNOTO
You really believe that?
RIEN
I'm sure of it. The dead are always asleep. The only time they wake at all is when they go looking for a blanket. (beat) If it's any consolation, we'll die of hunger. And after that? It hardly matters. (beat) Now, let's get some rest.

(THEY both try to get some sleep. Then, IGNOTO sits up again.)

IGNOTO
It's funny. Even if you know something can't be avoided, you still have a way of hoping. It's odd, how hope has a mind of its own.
RIEN
(Sits up again.) It's better this way. Believe me, we'll be heroes. Martyrs. Maybe even saints.
IGNOTO
I know, but...
RIEN
Why, someday, Ignoto, a school or a library might be named after you.
IGNOTO
Why not a restaurant?
RIEN
It could happen. (beat) Or a fountain. Yes, that's it! Imagine coins being thrown into a fountain with your name, in gold plate, on the rim. Each coin a wish in your homor. What could be better than that?
IGNOTO
Well, when you put it that way...
RIEN
We'll be the envy of many. And patron saints for all the census-takers still to come.
IGNOTO
I've wondered about that. Will they send another team to look for us?
RIEN
(Laughs.) Don't question the pattern of these things. They sent us, didn't they? After my father's team disappeared, looking for the team before them? Hasn't headquarters always been good about sending teams?
IGNOTO
Yes, but...
RIEN
But what?
IGNOTO
What if we're the last team ever?
RIEN
Nonsense. This is much larger than you and me. Or even the birds. The census must continue. Civilization goes on. Oh, maybe we don't know who we are, or where we're going, but at least we'll know how many of us there are.

(THEY both settle down. It is quiet for a few moments.)
IGNOTO
Rien?
RIEN
Yes?

IGNOTO
There's something I want you to know. No matter what happens.
RIEN
What is it?
IGNOTO
I count you as a friend.
RIEN
(Sits up.) No more than I count you.

(RIEN looks at IGNOTO, then turns over to go to sleep. IGNOTO counts silently on HIS fingers. Finally HE is too cold to count.)

IGNOTO
(Shivering.) It's so cold. So cold.
RIEN
I know.
IGNOTO
If I had been thinking, I would have taken a blanket from Huzuni. Maybe two blankets.
RIEN
No. You couldn't do that.
IGNOTO
Why not? We'd be warm now.
RIEN
You wouldn't want those poor people to be without their blankets. No, someday, when they come back, they'll need those blankets.
IGNOTO
You're right. It's better this way.
RIEN
That's right. (beat) Good man. (beat) Goodnight.

(THEY both try to sleep.)

(Sound of large birds shrieking nearby.)

(RIEN sits up and, shivering, crawls to the cold fire. HE remembers it is out. HE looks around.)

LIGHTS BEGIN FADING

(RIEN sees IGNOTO and crawls toward HIM. HE lies down beside IGNOTO. THEY are back to back.)

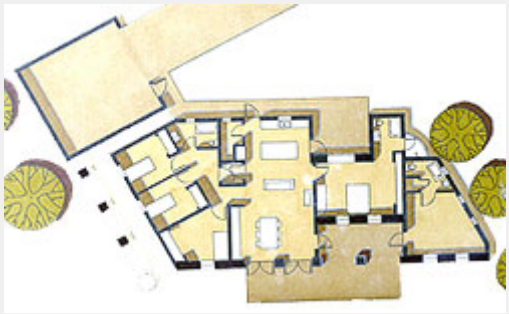
FINAL BLACKOUT

Christopher Woods writes fiction, non-fiction, poetry, and plays. He is the author of The Dream Patch, a lyrical novel about a Texas family during the 1940s. His collection of prose poems and brief fictions, Under a Riverbed Sky, was published by Panther Creek Press. His collection of stage monologues for actors and actresses, Heart Speak, was published recently by Stone River Press. His work has appeared in numerous publications, including Columbia, The Southern Review, New England Review, and Glimmer Train. His plays have been produced throughtout the U.S.

Article

by Rich Michal

The passive solar residence is a project architecture student and engineer Rich Michal led as part of the Master of Architecture program at the University of Arizona's College of Architecture, Planning, and Landscape Architecture. The home is born out of the realization that, in 2002, no good examples of passive solar design were available in the sustainable and New Urbanist Community of Civano, in southeast Tucson, Arizona—even among the community's custom, high thermal mass homes.



The primary goal of the passive solar residence is to provide a solid example of passive solar design—to showcase the successful combination of low-tech passive solar design principles with state-of-the-art building technologies and materials. To accomplish this goal, the progressive home was built in partnership with some of the leading national and regional suppliers, manufacturers, and financial services institutions in the building industry.

The project was designed not only to analyze and document the performance of building systems, but just as importantly to educate and inform the general public regarding the ease and economic, aesthetic, and environmental advantages of sustainable, energy-efficient design. The passive solar residence is also where Michal lives with his wife and three daughters.

Title photo by Wilson Graham. Title sketch and illustrations in this callout by Rich Michal.

From 2001 until the completion of the passive solar residence in June 2004, my family and I rented a home in Civano. During that time we fell in love not only with the concept behind Civano, but also the people and community we discovered within Civano. So in the summer of 2002, shortly after completing academic research on thermal performance of alternative building envelop systems across the community, we purchased a vacant lot within Civano with the intention of building a home on the principles of passive solar design.

With the help of Onset Computer Corporation and its HOBO series of data loggers, I will monitor the home's actual performance over the next year. I will then analyze the actual operating results and compare them with the projected performance results that I generated during the home's design using computer energy simulation modeling.

Passive Solar Residence Criteria & Design Concepts
Orientation & Shape

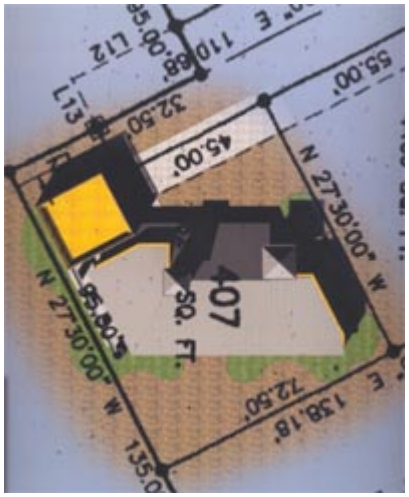
The first and most critical design decision in creating a passive solar residence relates to orientation and shape. While it can be argued that other decisions relating to passive solar design are important to the home's ultimate performance, this fundamental design decision determines the home's placement on the lot and its basic shape. It is so critical because, unlike other design decisions, it is one that cannot be later corrected or compensated for once the home is built.

In the northern hemisphere, in order to maximize a home's exposure for beneficial passive heat gain from the low-angle winter sun, a home's southern exposure should be maximized, resulting in a long east-west axis. Similarly, to minimize unwanted heat gain and glare from the east and especially that of the late afternoon summer sun from the west, the home's exposure along the eastern and western facades should be minimized, resulting in a short north-south axis.

Thermal Mass & Passive Solar Design

Thermal mass envelope systems rely on beneficial solar design and exposure to perform optimally and compensate for lower R-values. The thermal mass acts as a heat storage system—a battery—absorbing summer heat from the home's occupants during the day and keeping the occupants cooler. During summer nights, when temperatures drop significantly, the windows of the residence are opened, allowing stored heat to be released and the mass to be recharged for the next day. During winter days, alternatively, the mass absorbs heat directly from the low winter sun, which is allowed to penetrate into the living space. The heat stored during the day is then released into the living space at night, keeping the occupants warmer.

For the passive solar residence, we accomplished this criteria by first choosing a shape for the footprint of our home that oriented the long axis east and west, increasing the southern exposure while at the same time decreasing the length and exposure of the home's east and west facades.



The passive solar residence, superimposed over the plot plan, showing true southern orientation. Graphic by Rich Michal.

Accomplishing the orientation proved to be challenging given the relatively small lot sizes in Civano and the orientation of the lot itself. Our lot is approximately 6,000 square feet and rectangular—similar in shape to the state of Utah. It is oriented with its short southern axis (72.5 feet in length) not facing due south, but instead rotated 27.5 degrees off of due south.

To compensate for the lot's shape and orientation, in laying out the home's front facade we simply cut the diagonal from the southeast corner of the lot due west to the opposite property line. By not adhering to the property line in determining the home's orientation, we were able to help ensure the home's true south orientation and also increase the length of the home's southern facade.

Size & Function: Outdoor Living

The easiest way to minimize energy consumption associated with the conditioning of interior space is to simply reduce the amount of interior or conditioned square

footage. Fortunately, in this region of the Desert Southwest, year-round outdoor living is possible, allowing us to carve out 1,000 square feet of functional space as unconditioned outside living spaces. Instead of building and conditioning 3,000 square feet of living space for our five-bedroom, three-bathroom house, we reduced the building footprint to only 2,068 square feet, with only 1,750 square feet of conditioned space. The functional outdoor living spaces include an outdoor dining porch, front porch/sunspace, laundry room (now located in the garage), cool tower, and outdoor "cowboy" shower.

Fenestration & Shading

Hand-in-hand with orientation and shape are the decisions relating to the location, sizing, and types of windows. In order to maximize the beneficial solar gain from the south and minimize unwanted gain and glare from the east and west, not only do the facades need to be lengthened and shortened respectively, but the appropriate sizes and types of windows need to be placed within the facades. The passive solar residence, for example, has only two west-facing windows for two of the three children's bedrooms. To reduce solar heat gain through these windows we installed low-e, dual-glazed Andersen windows.

Southwest elevation after installation of the rainwater harvesting aqueduct and cistern and exterior paint.
Photo by Wilson Graham.

We also implemented shading strategies to minimize solar heat gain. Along the home's west facade we extended the rainwater harvesting system to carry water from the flat-roofed garage to a 500-gallon cistern. The rainwater harvesting aqueduct is supported by a series of concrete masonry unit (CMU) pillars from the garage at the northwest corner to the rainwater collection cistern at the southwest corner of the home. The pillars, along with a series of trellises placed between each, support deciduous vines that provide shade for the two west-facing windows.

South side of residence with completed facade, CMU pillars, and rammed-earth walls.
Photo by Wilson Graham.

Half of the residence's windows were placed along the south facade. This was accomplished by not only placing windows within the south facade to optimize beneficial winter solar heat gain, but also by adding a bank of south-facing clerestory windows. To minimize the amount of unwanted solar heat gain through the windows during the summer, each was carefully located to ensure that the high summer sun was shaded by the roof overhangs. Additionally, French doors within the south facade are recessed an additional 18 inches within two-foot-thick rammed earth walls.

Thermal Mass & Insulation

Once good beneficial solar access (the source) is provided, thermal mass systems (the storage) can be integrated into the design. It is important that these systems be integrated so they have access to solar gain in the winter but are shaded from solar gain in the summer. Thermal mass and insulation systems work by absorbing heat from occupants (and not heat from the sun) in the summer. If the interior thermal mass is not adequately shaded in the summer, the system will be compromised and other cooling systems will be required to compensate for the additional heat stored in, and subsequently released by, the thermal mass. Conversely, during the winter, if thermal mass does not have access to solar gain, then the mass will instead absorb heat from the occupants, making them cooler and compromising their thermal comfort.

In addition to Central Arizona Block Company CMU walls and exposed concrete floors, we built four two-foot-thick rammed-earth walls. Three walls were integrated into the south facade, where they have good solar access. The fourth was placed opposite a rammed-earth wall along the north facade of the master bedroom. This decision was made for aesthetic reasons—for consistency of materials and appearance in the master bedroom—with the full awareness that this would compromise the thermal performance within this space. While in the summer this additional mass in the master bedroom will help keep it cooler, during the winter the mass, without solar access, will work against the passive heating by absorbing heat from the occupants and making the space colder and less comfortable. It was a small sacrifice we were willing to make.

Looking southeast from cooling tower through family room and toward rammed-earth wall and still-unsealed SIPs panels on ceiling.
Photo by Wilson Graham.

Along the other facades and roof, insulation strategies were utilized to minimize unwanted heat gain and loss. Two roof systems were incorporated into the design of the residence. The first system covering the center third to half of the home is structurally insulated panels, or SIPs. The SIPs panels are 9.5-inch-thick polystyrene foam insulation sandwiched between two pieces of orchestrated strand board (OSB) plywood. The panels are four feet wide and can span lengths as long as 24 feet. The system serves not only as the insulation and roof sheathing but also as the underlying structure, allowing us to provide higher vaulted ceilings and greater spatial volumes in the family room, kitchen, and master bedroom without requiring additional structural members.

The other roof insulation system, covering the west wing over the girls' three bedrooms and bathroom, and the east wing of the guest bedroom and bath, is comprised of steel roof trusses with a one-inch polyurethane thermal break and blown-in cellulose batt insulation. At the girls' bedrooms, for example, the polyurethane foam insulation was attached to the underside of the steel roof trusses to reduce thermal bridging from the steel trusses and drywall ceilings. The drywall ceiling serves as the separation between conditioned space and unconditioned space. Above the drywall ceiling in the unconditioned attic space, cellulose insulation from recycled newspapers was blown in to provide a minimum R-32 insulation.

The unfinished southern sun porch, with rammed-earth wall on left and R-38 SIPs panels above guest room. Photo by Wilson Graham.

The exterior CMU walls are covered with a layer of 2-inch extruded polystyrene Dow "blue board" insulation with a value of R-10. The wall insulation is subsequently covered with lath and plaster. The combined system of thermal mass on the inside and insulation on the outside allows the thermal mass to perform within the space while at the same time allowing the insulation to reduce heat gain and loss from the outside.

A common misconception regarding thermal mass is that the outside or exterior face is the important face for thermal storage. In fact, it is the interior or inside four to six inches of the thermal mass that provides the most thermal storage. For this reason all of the interior thermal mass is left exposed or un-insulated.

West facade following installation of Dow 2-inch extruded polystyrene insulation over masonry wall.
Photo by Wilson Graham.

The exterior face of the rammed earth walls, on the other hand, were not insulated so that the aesthetic quality of the natural rammed earth walls could remain exposed. The slight energy savings associated with insulating these 2-foot-thick walls would not justify the amount of resources that would have to be expended—nor would it look as good.

Ventilation & Passive Cooling

In order for the thermal mass to work effectively during the summer, the mass must be ventilated or recharged each night. In an effort to enhance the natural ventilation and provide greater control of thermal comfort within individual functional spaces, twelve Hunter ceiling fans were incorporated into the home's design. The fans were placed in each of the five bedrooms (master, guest, and the girls' bedrooms), the family room, kitchen, south porch/sunspace, north dining porch, and the laundry room in the garage.

Two additional fans were incorporated into the passive evaporative cooling system. The primary component of the evaporative cooling system is the 30-foot-high cool tower located within the center of the home, between the family room/kitchen and the hallway to the girls' bedrooms and bathroom. The inside of the cool tower has a five-foot by five-foot square cross section shaft to allow the placement of six-inch-thick, four-foot-high by five-foot-wide Glacier Corp. cellulose pads at the top of the tower on each of the four faces of the tower. The pads are located at the top of the shaft, allowing a 16-foot fall to the top of the door openings at the bottom of the shaft. When the pads are saturated with water from the water supply lines located above the pads, the air drawn through the pads from the outside is also saturated. This moist, cool, and heavy air then falls down the shafts and into the living spaces through the door openings at the bottom.


North face of the 30-foot cool tower, recently stuccoed.
Photo by Wilson Graham.

The tower was designed and sized to generate approximately 4,800 cubic feet per minute (cfm) of airflow, which should effectively distribute the cool, moist air throughout the immediately adjacent living spaces. One of the ceiling fans was placed within the cool tower to enhance the operation of the cool tower, especially during periods of higher outdoor humidity.

The master bedroom and bathroom are the only interior living spaces within the main house that are not immediately adjacent to the cool tower. (The guest bedroom shares a common wall with the main house, but is only accessible via a separate exterior entry.) To draw the evaporative-cooled air through the family room and into the master bedroom, a second tower, or "exhaust tower," was incorporated into the design at the master bathroom.

This 20-foot-high tower, with a cross section of eight feet by 12 feet, has ten two-foot by two-foot operable Andersen awning windows located within its north, south, and east facades—three each on the north and south and four on the east. The windows were designed to be the highest windows in the main house: the tower acts as an exhaust chimney for the hot air. As hot air is drawn out, the cooler, moist air from the cool tower is drawn into and through the master bedroom. The twelfth and final ceiling fan is located in the master bathroom/exhaust tower to enhance its effectiveness.

Non-Passive/Active Solar Systems


View from southwest following stucco and solar water heating system completion.
Photo by Wilson Graham.

The only active or non-passive solar system included in the passive solar residence's design is the solar water heating system—an active closed-loop, drain-back system with two four-foot by eight-foot Sun Earth flat plate collectors and one 120-gallon solar/electric hot water tank. The flat plate collectors are mounted on a steel frame above the stair landing of the garage's rooftop patio. By elevating these panels, we were able to ensure a true south orientation, free of obstruction, while at the same time providing some shade for the rooftop patio. This location also allowed us to install the solar/electric water heater tank immediately below the panel, inside the garage, providing optimal slope for the drain-back system and mitigating heat loss and the potential for system pipe freezing.

While the home's passive energy conservation systems primarily rely on low-tech strategies such as orientation, size, and shading, the water conservation systems rely more on technology. According to the American Water Works Research Foundation, the highest single source of water consumption in the average household is the toilet. For this reason we selected an Australian ultra low-flow, dual-

flush toilet manufactured by Caroma. The dual-flush toilets utilize either 1.6 or 0.8 gallons per flush, which based upon average usage significantly reduces the water consumption associated with the conveyance of waste.

The solar water heating flat plate collectors/shade structure prior to the installation of the rainwater harvesting aqueduct. Photo by Wilson Graham.

Other water conservation technologies incorporated into the home's design include motion-sensor faucets at the bathroom vanities, a New Zealand-manufactured Fisher & Paykel energy and water conservation dishwasher, and a hot water re-circulating loop to minimize the amount of water wasted while waiting for water to reach desired temperature.

The low-tech water conservation strategies include separate rainwater and graywater harvesting systems. The rainwater harvesting system collects water from the flat roof of the garage and stores it in a 500-gallon corrugated, galvanized steel cistern for use in landscape irrigation.

The graywater harvesting system is associated with the outdoor "cowboy" shower, located off of the master bathroom. Water from the shower flows from the floor drain through underground piping to a French drain in the back yard. The open French drain is filled with river rock, providing the appearance of a natural streambed and facilitating the distribution of the water along the trench to a salvaged mesquite tree planted in the back yard. In addition to being a native drought-tolerant plant, the velvet mesquite was chosen because of its tolerance for graywater and its rapid growth and shading characteristics.

Results So Far

According to Tucson Electric Power Company, the average Tucson residential customer's annual electric bills total $1,403, or $116.92 per month. Our average total monthly electric consumption—including heating, cooling, water heating, lighting, appliances, and all plug loads—has been 76.9 KWh for an average of $65.75 per month, a 56% savings.

Similarly, Tucson Water reports that the average single-family residence uses 120 gallons of water per person per day. Our average water consumption has been less than 35 gallons per person per day—less than one-third of the Tucson average.

From an objective standpoint, we won't be able to isolate and determine the true effectiveness of the heating and cooling energy conservation strategies and systems of the passive solar residence for at least a full year, after we have had a chance to collect and analyze the year-round operating results. We will then be able to

Completed installation of the rainwater harvesting cistern, currently collecting water from flat-roof garage. Photo by Wilson Graham.

determine whether the home is able to perform at the level to which it was designed and modeled: $113 per year for total heating and cooling. Subjectively however, my family continues to enjoy the unique spatial, functional, aesthetic, and sustainable qualities of our passive solar home.

More Information

For more information—including energy modeling information, publications and presentations, and slideshows and narratives of construction progress—visit the passive solar residence website at www.SustainableCommunityBuilders.com.

Rich Michal is a civil engineer currently working toward a Master of Architecture in sustainable architecture from the University of Arizona. He has published and presented his research on sustainable architecture in the U.S. and Europe, and resides in his passive solar residence in the Community of Civano in Tucson, Arizona.

Article

by Pamela Wellner and Bryan Bird

2005 marks the 100th anniversary of the USDA Forest Service, an historic occasion that is being met with much self-congratulatory backslapping between the Forest Service and its industry patrons. However, in reality, the state of our nation's forests warrants not so much a celebration as it does an SOS. With only 15 percent total old-growth forests left and a mere five percent in the lower 48 states, forest protection should be the highest priority for the federal government.

Ponderosa pine in the Gila National Forest, New Mexico.
Photo by Jess Alford, courtesy Forest Guardians.

Our forests serve us in many ways, providing physical and spiritual renewal, stabilized soils, habitat for plants and animals, clean air, and drinking water for over 60 million Americans. Despite the long list of economic, social, and environmental benefits provided by our national forests, what little remains continues to be fractured and significantly altered under the purview of not just the Forest Service, but the Bureau of Land Management as well. For decades these forests have been systematically abused through a highly subsidized resource extraction program. Under the Bush administration, with its pro-logging agenda, the pace of this mismanagement has accelerated.

With so little high-quality forest left and increasing threats on federal forests, it is more important than ever to protect large expanses of connected forestlands to serve as a healthy ecological framework. A new report by Greenpeace shows for the first time that the best and biggest forest areas in the United States are on public lands, with the exception of forests in Maine located primarily on private lands.

The report, America's Keystone Forests: Mapping the Next 100

Years of Forest Protection, highlights 11 forest areas throughout the U.S.—the nation's last large areas of continuous forest—that provide the healthiest habitat for the greatest number of plant and a animal species. Greenpeace is calling these areas "keystone" forests, borrowing from the architectural term for the middle stone at the top of an arch that holds all the other stones in position. The keystone is the central cohesive source of support for the greater whole.

Economic Values of Forest Wildlands Recreation

The Forest Service estimated that the economic value of recreation in national forests was $6.8 billion in 1993, and that by 2045 it will grow to $12.7 billion. Recreation, fishing and hunting contributed more than $111 billion to the GDP, creating more than 2.9 million jobs each year. In contrast, National Forest timber sales created only 55,535 jobs in 1997, and netted only $354 million.

Clean Water
One of the most important environmental services that our national forests provide is fresh water. National forests are the single largest source of fresh water in the U.S. Over 60 million Americans, served by 3,400 public water systems, depend on national forests for their drinking water. Each year, national forests provide more than 173 trillion gallons per year at an estimated value of $27 billion per year.

Water utility companies spend tens of millions of dollars on water filtration that would not be necessary if surrounding forest had been left standing rather than clearcut by taxpayer subsidized logging operations. Additionally, once logged, many national forests are prone to flooding, mudslides and stream destruction due to runoff and siltation. In 1996, after logging induced catastrophic floods, the Forest Service spent more than $100 million to repair roads destroyed by floods and mudslides.

Non-Timber Forest Products
Public forests contain non-timber products such as medicinal plants, mushrooms and floral greens and boughs. The Forest Service estimates that more than 450,000 families rely upon non-timber products harvested from national forests. In Oregon and Washington, national forests non-timber products provided about $300 million to the regional economy in 1992. These products are also critical sources of subsistence foods. In Southeast Alaska, the average household consumes an average of 889 pounds per year of edible forest products, including 295 pounds of salmon.
Protection from Catastrophic Fire
Fire is part of the natural evolutionary process of many forests and natural intact forests actually reduce the risk of catastrophic fire. In the Douglas fir forests of the Pacific Northwest, the Ponderosa pine forests of the Southwest and the flatwood pine forests of the South, fire is a natural part of the ecosystem. As a natural ecological disturbance fire gives rise to a mosaic of habitats and age stands, creating a positive impact on biodiversity. Fire releases cone seeds from species such as the Giant sequoia, lodgepole pine and Ponderosa pine and redistributes nutrients to the soil, benefiting new growth.

Under the guise of fire prevention, President Bush launched the so-called Healthy Forests Initiative, which directs logging to remote, intact forests in one part of the country to pay for the thinning of fire-prone forests in another. The result is that truly "healthy" forests, such as old growth, are roaded and thinned, making them more susceptible to catastrophic fire. In November 2000, the Forest Service reported that "the number of large fires are dramatically higher in areas that are already roaded than in inventoried roadless areas."

Climate
It is estimated that the climate regulation benefits associated with the 58.5 million acres of roadless areas in National Forests are worth $490 million annually.

U.S. Agriculture
Public forestlands also provide important habitat for species that either feed on agricultural pests or pollinate crops, such as ladybugs, birds, bats, bees, amphibians and butterflies, all critical elements to U.S. agriculture. Research has estimated that the potential contribution of these wild pollinators to the U.S. agricultural economy is approximately $4-7 billion per year. On a global scale, temperate and boreal forests' contribution to natural pest control is estimated to be at least $11.8 billion per year.

Source: Greenpeace, 2005.

To locate these forests, Greenpeace worked with geographic information systems experts at Big Sky

Conservation Institute who prioritized the criteria of habitat fragmentation, the presence of rare species, and ecosystem quality. BSCI used GIS mapping software to assign numeric values to represent each of these criteria.

Why the criteria? Because the breakup of habitat into small, isolated patches is considered to be the foremost cause of native species loss.1 The presence of rare species and ecosystem quality is also an indicator of the forest health and the degree to which the forest is in its original condition.

Maintaining large expanses of intact ecosystems was certainly not a criterion used in the early and middle years of public land protection. It was during the advent of conservation biology in the mid-1980s that three essential elements of conservation came to the fore.

The first essential element is cores. Cores are protected areas designed to maintain existing natural landscapes where biodiversity, ecological integrity and wilderness take precedent over other uses.2 Cores are essential for protecting ecological health, especially for large wide-ranging mammals. Increasing the designation of larger nature reserves, either as parks or wilderness areas, is an effective way of establishing successful cores.

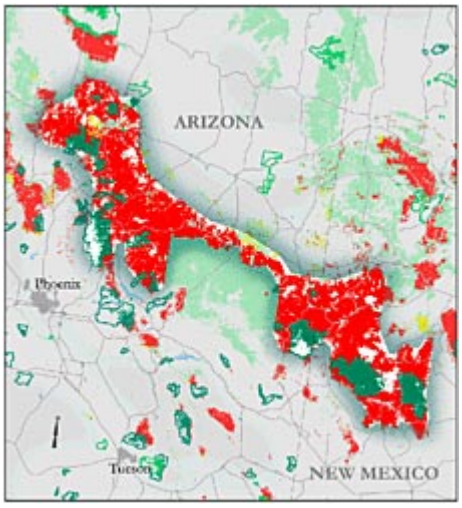
The second component is that of safe corridors for travel between cores to help ensure species viability in the long term.3

The third component, keystone species (also using the architectural term) are those plant and animals that play a critical role in maintaining biological diversity, the so-called custodians of healthy ecosystems. Keystone species may occur at any ecosystem level, from large to small animals to plants that physically change landscapes.

Contemporary conservation planners now recognize that these three interdependent elements—cores, corridors, and keystone species—are necessary for healthy nature reserve networks that protect biological diversity. Now that we have the know-how to protect habitats effectively, we need to take this knowledge and put it into practice.

Keystone forests, thanks to their large intact area and health, are ideal candidates for increased protection, conservation and restoration. They can serve as a base for healthy forest eco-regions. This is not to say that they are the only forest areas that need increased protection. Many critical forest areas, such as Vermont's Green Mountain National Forest and Colorado's Rio Grande National Forest, have been aggressively logged and the very survival of species like the Canada lynx and Northern goshawk depend on these forests being protected and restored. In addition, although prioritizing keystone forests for protection is vital, it is only a complement, not a substitute, for detailed planning on a regional and local scale.

Addressing the ecological disintegration of our national forests is vital, but its protection goes hand in hand with economic solutions, as well. Our country's forests are far more valuable standing than logged for commercial timber. The Forest Service and BLM timber sale programs cost the government more money to operate than that which is recouped from the timber companies that bid on the timber sales.



Mogollon Keystone Forest:
Click for larger image.
Graphic courtesy Greenpeace.

Legend	
Red	BLM and USFS forested areas
Green	National park and wilderness forested areas
Yellow	Other public and private forested areas

From a purely economic standpoint, our tax dollars would be better spent if federal forests were protected and restored. Independent economists and the Forest Service itself have estimated that timber accounts for less than three percent of the total value of goods and services from national forests, while recreation, fish and wildlife contribute more than 84 percent.4 A boost to the local economies can be even more profound, generating 31 times more jobs from recreation and tourism in national forests than logging.5

The Mogollon Keystone Forest, which stretches from Flagstaff, Arizona, almost to the Rio Grande Valley in New Mexico, is one keystone forest that holds great promise for re-wilding or restoration. Greenpeace named this forest after the region that spans the southern edge of the Colorado Plateau to where it meets the great Sonoran and Chihuahuan deserts. The prominent feature of this area is a long escarpment, known as the Mogollon Rim, extending for several hundred miles, with an average elevation 7,000 feet.

The Mogollon forests are characterized by vast stands of Ponderosa pine, as well as the piñon-juniper ecosystem of the upper deserts to the high elevation spruce fir forests. Born of fire, these are the largest of their kind in the United States, covering tens of thousands of acres. Fire is critical in the ecology of Ponderosa pine, and many efforts—some controversial—are underway to restore this ecological process. The negative effects of grazing, logging and fire suppression since the late 1880s on Ponderosa pine forests have been profound and lasting.

The considerable expanse of forested high country, river oases and wild mountains sweeping from subalpine parks down to arid grasslands offers a unique opportunity in the lower 48 states to re-wild and re-connect our spiritual affiliation with nature. Sufficient unbroken forests exist to reintroduce or restore populations of some of the continent's greatest carnivores, including wolf, grizzly bear, and jaguar.

The potential exists to carefully allow nature's natural architectural processes to resume a prominent role. Before civilization "tamed" these forests for its own ends, fire, mistletoe, insects and the like were the prime engineers of Southwestern forest ecosystems, creating diverse forest heterogeneity and thus a greater degree of biodiversity. It is virtually impossible for mankind to mimic this diversity through mechanical manipulations. Rather, the processes themselves must be safely reintroduced and permitted to function at their own temporal and spatial scales.

Embracing big, wild forests is compatible with economic growth patterns in the West. In fact, the more protected the better according to systematic analyses by Southwick Associates in 2000 and the Sonoran Institute in 2004. Wilderness areas, national parks and monuments, and other protected

public lands set aside for their wildland characteristics play an important role in stimulating economic growth. Dependence on resource extraction industries (e.g., logging and mining) results in the slowest long-term economic growth rates. Traditional rural economic activities account for only eight percent, down from 20 percent in 1970, of all personal income in the rural west.

In contrast, one out of every two new dollars in personal income over the past 30 years comes from service industries such as health, engineering and business attracted by large natural landscapes.

One threat to the Mogollon keystone forest is within Prescott National Forest. Here, the Forest Service is using fuel reduction and beetle kill as an excuse near Indian Creek campground to log "dead and dying" old growth. The Forest Service is employing new rules established by the Bush administration to avoid both an environmental impact analysis and citizen participation. The logging is proceeding under a National Environmental Policy Act categorical exclusion to log huge old trees under less scientific scrutiny, while leaving trees under 12 inches in diameter, the real fire hazard to communities. The Prescott National Forest representatives have admitted to conservation groups that they sold the old growth trees because 12-inch and larger trees are favored by timber industry.

On a positive note, under the guidance and commitment of regional conservationists, Gila National Forest, also within the Mogollon keystone forest, is implementing a 1,400-acre project called the Mill Ecosystem Restoration Project. This project focuses on thinning very small trees and using fire as a restoration tool. The project can also serve as a model for other forest restoration plans.

Forest wildlands around Sedona and northcentral Arizona.
Photo by Adriel Heisey, courtesy Forest Guardians.

America's forests, after a century of mismanagement, are at a crossroads. The Bush administration has chosen to take the road of maximum resource extraction, while the majority of Americans are opting for the road to protection and restoration of our nation's forest.

On a national level, it appears as though the path to protection and restoration is at an impasse. However, local participation in national forest protection is strong and growing, and even though national forests belong to all of us, efforts spearheaded by people living closest to national forests are gaining significant momentum.

To achieve long lasting protection and restoration of national forests, Greenpeace makes the following recommendations:

- A moratorium on large-scale commercial logging and road construction on all forests administered by the U.S. Forest Service and Bureau of Land Management. A moratorium provides a "time out," to investigate the mismanagement of our public lands, both ecologically and economically, with the purpose of developing appropriate remedies before further damage is done.

- Increased protection of federal forestlands with environmental, social and cultural significance through the designation of wilderness status, the maintenance of roadless areas, or and transfer to national park and preserve status.

- A halt to further elimination or weakening of forest protection laws by the Bush administration, and the reinstatement of those original laws already modified by the administration.

For more information or to receive a copy of America's Keystone Forest, call 415.255.9221, email info@wdc.greenpeace.org, or download the report here.

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Bryan Bird is the forest program coordinator for the Forest Guardians in Santa Fe, NM. Bryan received his masters in conservation biology from New Mexico State University in 1995 and undergraduate degree in biology from the University of Colorado, Boulder in 1990. He has undertaken conservation research and planning in both Central America and the Southwestern United States.

Article

by Julian Cribb, Yvonne Latham and Maarten Ryder

Australia's deserts are poised to give the world food menu its biggest shake-up since Columbus. The exotic, succulent, spicy and stimulating flavors of the indigenous foods of Central Australia are heading for home dining tables, restaurants and TV cooking shows worldwide, thanks to a partnership between Aboriginal communities, scientists, food companies and supermarkets.

A Gourmet Feast of Desert Delights

Indigenous communities and researchers from the Desert Knowledge CRC (Cooperative Research Centre) are trialing a gourmet feast of desert delights—the staple fare of the people of Central Australian for tens of thousands of years but still unfamiliar to the global palate.

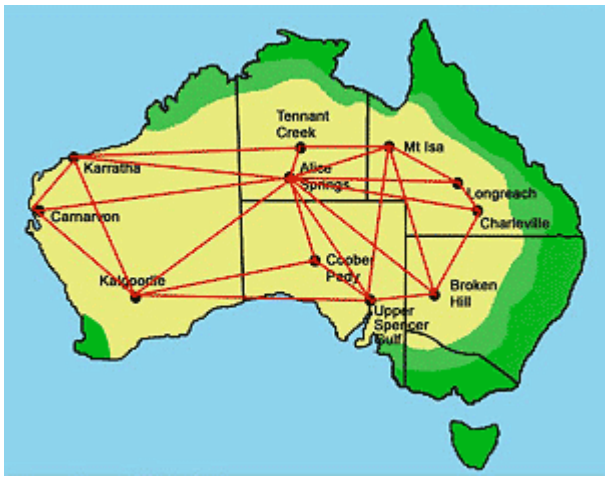

Dr. Maarten Ryder inspects newly planted hybrid native citrus in Moonta, South Australia. Photo by Bob Schuster, courtesy CSIRO Land and Water.

Bush tomatoes (intensely flavored pea-sized fruits), wattle (acacia) seeds, desert limes (a small knobbly fruit with a sharp lime flavor), quandongs (bright red berries high in vitamin C), sandalwood nuts, bush bananas (a vine bearing elongated fruits that taste of green peas and avocado), and a host of other traditional Aboriginal foods are among the many flavors of the desert now making their way into the 21st century cookbook.

Many are still hand-gathered by local communities who will share the piquancy, healthiness and sustainability of wild-harvested food with a wider market. Others will be domesticated for the first time in history, grown by indigenous communities along with more familiar horticultural crops, says project leader Dr. Maarten Ryder, CSIRO Land and Water research scientist.

"A vital part of this project is to explore how indigenous communities can be involved in this new

industry, and how it can generate new jobs and enterprises in remote areas," he says.



Desert Knowledge network stretches across Australia, which is the driest continent on earth. Less than 3% of Australia's population resides in its arid and semi-arid areas, which comprise 70% of the continent's land area. Graphic courtesy Desert Knowledge CRC.

The bush foods project will marry the traditional knowledge of desert dwellers who have inhabited Central Australia for more than 35,000 years, with modern scientific approaches, such as the breeding of new domesticated varieties that can be farmed in the inland.

The intellectual property of new crops produced will be shared with the Indigenous owners, who will thus have a say in how their new foods industry develops—as well as a range of delicious foods to stimulate the tastebuds of the world, just as their paintings are attracting art-lovers.

Desert Knowledge

Where Indigenous Know-How Meets Western Science

Desert Knowledge is the unique knowledge Australians have about prospering in the hot, dry and isolated inland that makes up more than two thirds of their continent.
Desert Knowledge Cooperative Research Centre (CRC), a virtual network of researchers from 28 organizations nationwide, links indigenous knowledge and local skills with cutting-edge Western science to improve the livelihoods of all desert people. This extensive new network is paving the way for Australia's next billion-dollar export sector by marketing the products of its unique research combination to some 1.5 billion people around the globe who also live in hot, dry and isolated places. Scientists and practitioners working on over 40 Desert Knowledge CRC research projects are busy finding solutions for people and their businesses throughout desert Australia. These include:
• Turning the medical and culinary properties of desert plants valued by Aboriginal peoples into new economic

Australia's Native Foods Industry

The native foods industry in Australia is based on traditional Aboriginal knowledge of what is edible in the Australian flora. The long history of Aboriginal occupation of this continent has resulted in many lifetimes of research and development of the native flora. The accumulated wealth of Aboriginal knowledge about the uses of plants has now formed the foundation of the native foods industry. Individual plant species often have multiple uses, including food, medicine, utensils, tools, musical instruments and weapons. Aboriginal knowledge of food preparation methods is also important. For example, some ingredients must be roasted before they can be eaten safely.

The Great Victoria Desert.
Photo by Greg Rinder, courtesy CSIRO Land and Water.

There is some evidence that Aboriginal people practiced plant improvement through selection, possibly also cross-pollination and also a kind of horticulture that is quite different from Western cultivation methods. For example, renowned Australian writer and social activist Mary Gilmore recorded in her diaries in the 1930s that Aboriginal people (Wiradjuri) in New South Wales cross-pollinated quandongs, planted selected seeds from especially large berries and planted grass seed in the soil after special preparation for burning, which would warm the soil, release nutrients, and destroy pathogens, creating a good seed bed.

oppor-tunities. The Plants for People project combines traditional indigenous knowledge with the latest science to develop the health-giving foods and life-saving medicines of the future and create economic opportunities for Aboriginal communities.
• Developing advanced, low-cost telecommun-ications technologies for isolated regions. The Sparse Ad-hoc Communications Networks For Desert Environments (SANDS) project is working on a mobile phone prototype which promises a reliable phone service to remote communities that lack costly infrastructure.
• Discovering more beneficial ways to use and manage bush fires—a fact of life in outback Australia. Desert Knowledge CRC draws on Aboriginal fire management techniques to breathe new life into desert landscapes, industries and cultures.
• Teaching the science of Desert Knowledge to future researchers and tech-nology teachers through hands-on assignments in desert communities and schools. The Lifecycle Models for Sustainable Investment in Desert Communities project encourages students to work with remote Aboriginal communities on practical ways of extending the life of houses and other infrastructure.

Source: Desert Knowledge CRC.

One cultivation method used by Aboriginal people was the burning of areas of land, mosaic burning practices or ‘fire stick farming’ for promoting grass lands for animal grazing or for edible seed collection. Early Tasmanian settlers noticed that once the Aboriginal people were made to stop their burning practices, the forest boundaries would begin to grow back over the land, infringing on the early settlers’ crops or pastures.

In Central Australia, mosaic burning or fire stick farming was performed to ensure maximum availability of food and movement for humans. The result was a “mosaic pattern of burnt and unburnt areas in different stages of recovery [which] ensures that at the end of the dry season when the vegetation is very dry and lightning strikes are very frequent, hot widespread fires are prevented.

As in Central Australia, a potentially disastrous ‘fire bomb’ has been cleverly defused.”

When Europeans settled in Australia, traditional Aboriginal customs started to change. Being made to live on ‘reserves’ or ‘community’ areas caused loss of country. Culture began to break down. Bonding with and tending to the land was a major part of the Aboriginal lifestyle, which was now forbidden by the new white inhabitants. As time went on, with the process of assimilation into the white community, the handing down of traditional knowledge, culture, spiritualism, art, language, flora and fauna began to decline.

The ‘modern’ native food industry brings the potential for Aboriginal people to regain health and social status along with the retention of some of the remembered culture, language and knowledge of plants and animals. While gathering was traditionally undertaken by women, entire families now leave the community for harvesting—going into the bush and taking the younger people with them. The harvesting practices additionally promote exercise and health and are a part of a social event. Language is being used, and some parts of the culture are being remembered and passed on. And of course, community members can also benefit economically from the wild harvest of food produce.

Central Australia's Desert Delicacies

Which of the hundreds of plants eaten by Aborigines have the greatest potential for modern food industry use and commercial cultivation? In general, native plants with the greatest potential for food use and cultivation are likely to possess the following core characteristics:

- Good and novel flavor
- Easy to harvest, handle, transport and store, or at least do not present any major difficulties
- Easy to process
- Have an existing, or likely potential, market demand
- Relatively easy to propagate
- Likely agronomy is reasonably well understood, and does not appear to pose any major obstacles to successful cultivation

Some of the most likely candidates to meet the global palate include:

Acacia

Acacia beans.
Photo courtesy CSIRO Land and Water.

The seeds of many Acacia species are edible; however, seeds of some species contain toxic components. The seed of Elegant Wattle (Acacia victoriae) is regarded by many as the food industry 'standard,' though there are a number of other species commonly traded or of interest for food, including Acacia colei, A. Coriacea, Golden Wattle (A. pycnantha), Sandplain Wattle (A. murrayana), Silver Wattle (A. retinodes) and Coastal Wattle (A. sophorae).

Wattle acacia.
Photo courtesy CSIRO Land and Water.

After roasting, the flavor is commonly described as 'nutty,' with variations in taste between species. Wattle seeds are high in protein and have a low glycaemic index and they could be included in diabetic and other specialty diets. Current retail product categories include baked goods, flour mixes, mustards, dressings, sweet sauces, beverages. Currently, the supply of Acacia seed for the food industry is almost entirely reliant on seeds obtained from natural stands. The current level of commercial cultivated plantings is still small and probably accounts for less than 10% of current seed supplies.

Bush Tomato

Cultivating bush tomatoes, a true desert delicacy.
Photos courtesy CSIRO Land and Water.

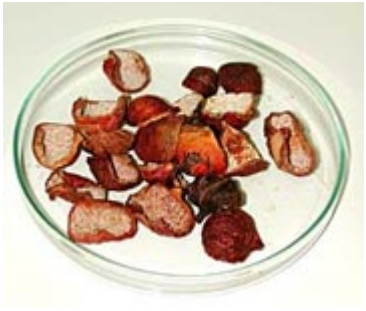
Bush Tomatoes (Solanum centrale) also called desert raisins or desert tomatoes. Other species such as S. chippendalei and S. ellipticum also produce edible fruit and are of interest to the native foods industry. Bush tomatoes have an intense, earthy-tomato and caramel flavor of great piquancy and pungency. Current retail product categories include dried spice, dipping sauces, chutneys and relishes, and seasoning for white and red meats. Most fruit is still sourced from the wild, although there is small-scale commercial cultivation.

Desert Lime

The Desert Lime (Citrus glauca) is native to Queensland and New South Wales, west of a line running from Rockhampton to Dubbo, with some isolated occurrences in central South Australia. It has a strong and distinctive citrus flavor, and is used for distinctive but recognizable citrus flavor in sweet and savoury products. Current retail product categories include jams and conserves, dipping sauces, and simmer sauces. Most fruit is still sourced from the wild, although commercial cultivation is now in progress.

Desert limes.
Photo courtesy CSIRO Land and Water.

Quandong



Colorful quandongs have a wide variety of edible uses.
Photos courtesy CSIRO Land and Water.

Quandong is also called native peach (Santalum acuminatum). The fruit has widespread distribution in arid and semi-arid areas of southern Australia. The flesh of Quandong has a high vitamin C content. The Quandong is tart, with peach, apricot and rhubarb characteristics. It is primarily used for fruit-type flavor in sweet and savory products. Its current retail product categories include liqueur, jams and conserves, dipping sauces, confectionary, dairy products, and baked goods. Currently, wild harvesting accounts for around 75% of supplies, with cultivated supplies increasing slowly.

Title photo—Ayers Rock/ Uluru in the central Australian desert—by John Coppi, courtesy CSIRO Land and Water.

Julian Cribb, a former editor with The Australian, is one of Australia's most prominent science journalists and communicators. He is a consultant to Desert Knowledge Cooperative Research Centre, a virtual network of researchers from 28 Australian organizations. The Centre links Aboriginal knowledge and local skills with cutting-edge Western science to improve the livelihoods of all desert people.

Yvonne Latham is an Indigenous project officer working with CSIRO Land and Water on the cultivation of native Australian food plants. She coordinates the maintenance and data collection of nine field trial sites in Southeastern Australia. She has a longstanding interest in both native foods and medicinal plants.

Maarten Ryder is a research scientist who leads Desert Knowledge Cooperative Research Centre's Bush Foods project team. He works for the Land and Water division of the CSIRO (Commonwealth Science Industry Research Organisation) in South Australia.

Article

Making Green Design Affordable at Boulder's Holiday Neighborhood

by David Wann

The Holiday Neighborhood in Boulder, Colorado is a world-class model of a sustainable, affordable residential and commercial development. By design, its houses and yards are smaller than average, but open space per capita is higher; retail and work/live opportunities are part of the neighborhood; high levels of energy efficiency, water efficiency and passive solar heating and daylighting are standard; and "livability" is enhanced by features such as a large park, a community garden and orchard, and a central, unifying walkway that invites people to get out of their cars and their houses. This neighborhood will be one to watch.

To people recently driving past the old Holiday Drive-In Theater site in Boulder, Colorado, it might seem like a new neighborhood has sprung out of the ground overnight. But those who worked on the multi-year project's development know better: collectively, hundreds of thousands of decisions and choices were made by various designers and developers to create the 330-home neighborhood, where affordability and sustainability are primary goals.

Holiday Neighborhood's 'Northern Lights' area. Graphic courtesy David Wann and Boulder Housing Partners.

Some of the most important decisions are documented in the film, Designing a Great Community: Behind the Scenes at Holiday, which took four years to complete. This documentary follows the progress of one project in particular—Wild Sage Cohousing Community, where future residents participated in the design of their own neighborhood. The stated architectural goal at Wild Sage is a "zero emissions" neighborhood in which solar energy, energy efficiency, and changes in behavior eliminate the need for fossil fuels. We examine architect Jim Logan's solar strategy, and show how incremental design improvements make this

strategy feasible, even though not immediately achievable.

It wasn't exactly a simple mission: to create a sustainable, "green" housing development that is also more than 40% permanently affordable. However, the proposed Holiday Neighborhood development—27 acres on one of Boulder, Colorado's last undeveloped sites—had a lot going for it.

New Urbanism with an Accent on Affordability

To begin with, the master site developer, The Boulder Housing Partners (BHP), had a vision for creating affordable neighborhoods that are also very lively, pedestrian-friendly, and energy-efficient. A place where the people who work in Boulder—the nurses, firemen and merchants—can afford to live. Co-director Cindy Brown and her colleagues brought in some of the most innovative designers in the country to plan, develop and design the neighborhood.

Main Street at the Holiday Neighborhood will start construction soon.
Graphic courtesy David Wann and Boulder Housing Partners.

Part of the Holiday mission was to reduce the overall impact of buildings on the environment. As green building expert David Johnston explains, "Forty percent of all the stuff we make and use in the U.S. goes into buildings, with all the associated pollution and impacts. Thirty-five percent of all the raw energy we use—the oil, natural gas and coal—is directly attributable to buildings, and 66 percent of all the electricity that's generated is used in buildings, primarily for heating, cooling, lighting and appliances. We are also using approximately 70 trillion board feet of softwood (a board foot is a one-inch board, twelve by twelve inches) in our buildings every year to build houses." Johnston is the primary designer of Boulder's Green Points system, in which building or remodeling permits are issued only after key sustainability goals are met.

An affordable, and green, Holiday Neighborhood home.
Photo courtesy David Wann.

Planners, architects and developers are fully aware that green design appeals to the market, yet as Jim Leach observes, "When it comes to choosing between high-efficiency appliances and a bigger kitchen, it's not always so easy."

Sociologist Paul Ray, author of The Cultural Creatives, says, “Three-fourths of Americans want an ecologically sustainable world, which means not having to drive so much, having healthy homes and preserving the Earth’s resources. The kind of neighborhood that’s being built at Holiday is exactly what many homebuyers are looking for.”

Sustainability and Quality of Life

Enter the Holiday design team, each member carefully chosen for his or her proven abilities to build sustainable and affordable homes and neighborhoods. Says George Watt of Barrett Studio Architects (the project’s site designer), “The key to sustainability is meeting needs right in the neighborhood, with opportunities to work, shop, play and grow.”

John Wolff, chosen as the developer of three separate Holiday projects, adds, “Building at 30 units per acre is probably the smartest thing you can do in terms of conservation of land, water, and energy. Consider a typical suburban development of three units per acre—you need ten times as much land area for houses and ten times as much infrastructure for water sewer, utilities, and roadways. What we try to do is offer the same quality of life in a more compact, affordable neighborhood with a greater sense of community.”

Wild Sage Cohousing common house, above, and central courtyard, below.
Photos courtesy David Wann.

Another developer chosen for the Holiday project is Jim Leach, a veteran builder of quality custom homes, and in recent years, one of the country’s foremost experts on cohousing—neighborhoods characterized by resident participation in the design process. “The building market tends to create the least inspired neighborhood the market will bear. Things like solar energy and diverse types of use are not usually even on the radar screen.”

Leach brings sustainable architect Jim Logan into the project, whose goal is a “zero emissions” development that doesn’t require fossil fuel. Easier said than done, when faced with the dual challenge of affordability and community consensus among the neighborhood’s future residents.

Fortunately, those residents are keenly interested in green buildings and lifestyles. They support Logan’s solar strategy for passive solar, high-efficiency appliances, centralized water-based heating,

and flat roofs to mount solar panels on. They even salvaged 20 solar panels off the roof of a large house in Boulder, to keep the project affordable. Some of the residents work with Habitat for Humanity to build permanently affordable houses (meaning the sales price can never go up).

Functional indoor/outdoor space is common with Holiday Neighborhood homes.
Photo courtesy David Wann.

Is the project a success? The numbers say "Yes." More than 400 people with low and middle incomes will live at Holiday, many as first-time homeowners. High levels of efficiency will keep the cost of living down for them and all Holiday occupants. At Wild Sage, all 34 homes are rated Five Stars Plus, the highest score given. Residents will drive an estimated 30% less, pay 50% less in utility bills and use 40% less water than the average American.

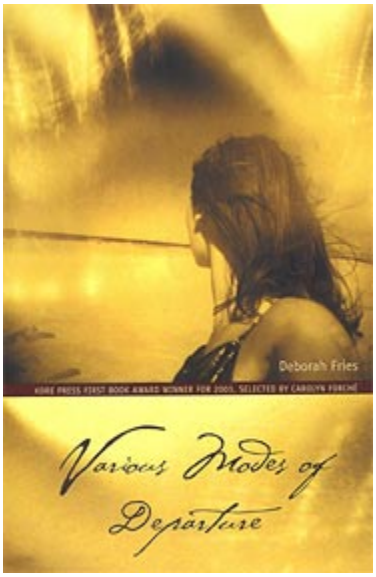
Clearly, the Holiday design team created a winning combination of building elements and features. But they also had the vision to create a livable place where people want to live.

Designing a Great Neighborhood: Behind the Scenes at Holiday DVDs are available for $20 from the non-profit Sustainable Futures Society, 1015 Cottonwood Circle, Golden, Colorado 80401, 303.216.1281, or online at www.SustainableColorado.org.

David Wann works to present images of a more sustainable American lifestyle in articles, books, and films. He has produced Designing a Great Neighborhood and 20 other films about sustainable living. He is coauthor of Affluenza: The All-Consuming Epidemic and Superbia! 31 Ways to Create Sustainable Neighborhoods, and author of The Zen of Gardening in the High and Arid West: Tips, Tools, and Techniques. Wann is editor of a forthcoming anthology about daily life in cohousing neighborhoods, written by people who live there; and also serves on Terrain.org's editorial board.

Review: Shifting Perspective

Simmons B. Buntin reviews *Various Modes of Departure*, poetry by Deborah Fries



There are, I must admit, a number of advantages to editing a journal like Terrain.org. Not least of those is the labor of reading submissions from new (or perhaps more appropriately not-very-published) writers. If the use of the word 'labor' seems harsh, it's not meant that way, not anymore than the new (or shall we say only-recently-first-book-published) poet Deborah Fries uses the word 'plume' in the poem of the same name:

> Plume. The word bubbles purple through the lips, evocative
> as peacock or Cabernet, a feathery grape stain that you
> imagine fanning out in an elegant tail of color beneath the
> lawn.

If I left it at that—if she left it at that—we wouldn't have the whole meaning. So by 'labor' I also mean the routine, maybe even the mundane, and then the sudden shift that alters, perhaps only slightly, our perspective on things from here on out. So by 'plume,' Fries also means:

> But it is colorless, the ghost print of a rainbow.
> It is under the house. Clear, flashing its fish-scale sheen,
> moving fast as a school of minnows away from the source,

So by 'labor' I finally mean: Reading through all of the submissions for our issue on The City Wild, and finding and absorbing Fries's poems "Leaving Whitefish Bay" and "Alone on Más a Tierra"—both included in that issue as well as her first book—my perspective was slightly altered. Now, reading the 32 poems that make up the award-winning *Various Modes of Departure* (Kore Press, 2004), my perspective is fundamentally altered. Altered, that is, as if I'm suddenly able to view a new light in the spectrum, a light always there but just beyond my vision.

Good poetry does that, and this is very good poetry. It is good like the poetry of Elizabeth Bishop and May Swenson, like that of Billy Collins. Yet whereas Collins has been (absurdly) criticized for writing about nothing, Fries's poems are definitely about something. They are about the visceral memories and events that make up a life, conversing as a life often does and then hanging—on the edge of the line, on the edge of a thought—as life itself does in so many unplanned ways. For example, in "Florida, 1983:"

> At night in the hotel, I forgot how
> long we'd been traveling from Wisconsin toward the sun. Thought
> instead of the light in Tarpon Springs,

And then the hang:

> When it grew dark, we
> sensed danger: animals flooded from the brush by so much water:
> deer and bobcat, cougar and bear, all waiting to be flung onto the
> interstate, driven through glass.

Eventually, however, this and another storm pass, and "By noon the sky broke clean and / the pool filled with pale northern children." But then another hang, like life itself: "Even then I knew that pictures from our last vacation would be / reviewed, handled, thinned."

As the poems teach us, and of course the title reports, there are Various Modes of Departure. The beautifully designed book (despite more than a few typos on the interior) divides these departures into three modes: The Disappearing Act, The Steamer Trunk, and The Astral Shift. All three sections begin powerfully and carry that puissance—and often it's not a force that we nor the narrator can control—throughout the section.

The Disappearing Act meets us head on with the book's first, and perhaps most haunting poem, "Like Field Mice," about abducted children:

> They are stolen while we are watching HBO. They are rendered
> still while we are showering with lavender and geranium. Waiting
> to be found in wetlands near I-95, some are never found.

While subjects change and to a degree the mood in other poems is a bit lighter, there is always a seriousness delicately woven into the poems so that they are not overbearing. The lines are on the longer side for modern verse, and yet the spacing between the lines gives a bit more light, more air. Yet, it is the crafting of the poems themselves—the tight play of the words, the subtle meanings and implications, the illusory imagery—that allows the reality of the poems' topics to succeed.

In The Steamer Trunk, the poems are more autobiographical, beginning with "Leaving Whitefish Bay," in which the narrator admits that:

> I was no good at leaving Whitefish Bay. Even when I left the first
> time, took half a house of old furniture and a half-time child with
> me into the city, I came back, settled for a small Cape Cod. For my
> daughter, I told myself.

And in "Leaving the Life," the narrator's parents abandon generations of farming in America for idyllic small-town life, leaving more than just a profession and homestead behind:

> Our memories leave us and without land this is how it ends:
> an empty metal file cabinet, an electric shoe polisher, a cut-glass
> bow. A piece of pill box shot out of the Ziegfried Line in 1945.

The third and closing section, The Astral Shift, may not be where the reader's shift of perspective occurs—by now, that's already happened. While the first two sections are more clearly defined (that is, the poems fit more neatly into their categorical titles), the poems in the final section are no less strong than their brothers and sisters of earlier sections, and their refusal to conform into even the poet's own 'sectioning' may be what makes this the strongest section of the book. See, your perspective is shifting!

There is something at work here, something that we can conveniently call 'astral'—we're allowed that now given the section's title. The shift that occurs in The Astral Shift is one both of subtlety—as in "Early Photo of Mother in Chair," in which a photograph reveals the narrator's mother holding her as an infant,

> the watery trail of smoke rising from her hand,
> a caul of indifference passing over the tiny face.

—and one of real change, as in "Danger:"

> blue, white, green flashes in the dark room. Electricity.
> Not static, but surging from the plug in the wall and we
> shrieked, afraid of powers unleashed, the terrible aurora
> of poltergeist anger, ourselves fluid and granted wattage.

And as politicians and priests and poets are wont to do, Fries may well have saved the best for last. "Boxes," haunting like the initial poem, is a tale of a serviceman who returns to his parents' house after "he had hunted through the caves in Afganistan, finding / only dust,…" In the time he is home, before shipping off again, he creates a room-maze of cardboard that his mother finds once he's gone:

> when winter came, pushing through the snow-soaked collapsing
> cardboard that filled the porch. Proof of his father's sickness,
> mixture of Marfan's, Wild Turkey and morphine, crazed collecting
> of nothing and storing it in space annexed from the outdoors, his
> sunroom without sun, arsenal of old crates, retaping them daily,
> shuffling and consolidating their phantom contents in the night air.

Fries reveals that we don't need to be young children to be abducted.

Not surprisingly, in reading Various Modes of Departure, we have been abducted as well—taken to a place of real memories and hard stories finely documented through the ink of a new American poet worth noting. In her first book, Deborah Fries brings a shifting perspective, a change that pays off now and for a long while to come.

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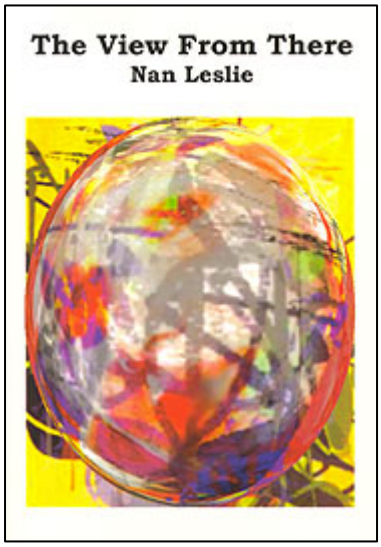
Review: From Here to There

Todd Ziebarth reviews *The View from There*, short stories by Nan Leslie



In *The View From There* published by Skrev Press, a new British publisher of shorter fictions, Nan Leslie has written a collection of stories that mix crisp writing and serious subject matter. The pieces of fiction she has created are less short stories and more vignettes of a particular moment in time in a character's life—thus intensifying the immediacy of the situations.

One of the book's strengths is Leslie's ability to clearly and quickly paint through the written word a world that intrigues the reader. While the writing is clear, the action in the story, and the motives behind it, are sometimes less clear—which is another one of the strengths of the book. Leslie doesn't provide you with the story's details in a linear way, but prefers to share key aspects of a character throughout the story in more of a non-linear way. Her approach creates room for the reader to play with differing interpretations of some of her stories.

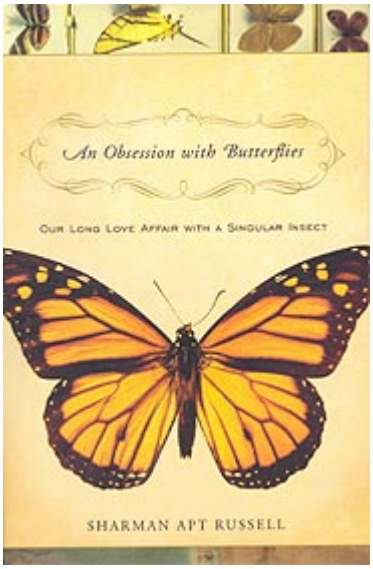
For the most part, the subject matter in the stories is fairly weighty. In this regard, Leslie shows an impressive range in the characters she creates. There is Marilina, the increasingly panicked mother who is falling further and further away from her teenage daughter. There is Pearl, the young black girl pushing the boundaries of her South Georgia world in large and small ways. And there is Howell, the machine shop worker who retires and isolates himself in his house to paint. These aren't trivial matters. To her credit, Leslie treats them seriously, without sentimentalizing the characters or their experiences.

To me, The View From There is, on the whole, about movement. The characters in many of the stories are faced with serious situations and must make tough choices with uncertain consequences. In their actions, they move from one place to the next—from here to there. While not always pleasant, the view from there often reveals life in a more honest and humbling way. For that, the choice is worth it.

Todd Ziebarth is a policy analyst at the National Alliance for Public Charter Schools. He is also a founding editor of Terrian.org. In addition to his regular Terrain.org column, Ziebarth sometimes reviews books and CDs for the journal. He has a masters degree in public administration and a masters degree in urban and regional planning.

Review: An Obsession with Butterflies—And This Book

***Terrain.org* reviews *An Obsession with Butterflies: Our Long Love Affair with a Singular Insect,* by Sharman Apt Russell**



Sometimes the best 'field guide' for an animal or habitat isn't an *Audubon* or *Peterson* or *Golden* guide—though these are all fine interpretive publications. Sometimes, rather, it's the narrative essay of a place, or a story of an explorer, or a natural history by a local resident. Such is the case with *An Obsession with Butterflies: Our Long Love Affair with a Singular Inse*ct by Sharman Apt Russell (Perseus Publishing, 2003).

While the mass-market field guides provide plates and plates of butterflies, organized by color and group, they don't leave much to the imagination—either theirs or ours. Russell, however, does that and much more, blending scientific facts with eloquent and sometimes eloquently quirky stories and superb writing, as in chapter seven, "Love Stories:"

> When he finds her, he will flutter, and she will flutter, and sweet pheromones will scent the air. Even a human passing at the right moment might pause and sniff, and sniff again. Honeysuckle? Lavender? Jasmine? The pheromones of butterflies have long co-evolved with the sexy scent of flowers promising food and drink (the flowers desiring sex, too) and we have long since taken these scents for ourselves, for our perfumes and our colognes, for our own longing.

Obsession is more than a collection of essays, and yet each of the fifteen chapters safely stands on its own. After an oft-referable "A Note on Names," the book begins with "Obsession with Butterflies," an overview of how humans have been obsessed with butterflies, which begins with a thesis: "Adding butterflies to your life is like adding another dimension." By the end of the chapter, after the review and examples, we can only conclude, as Russell has, that:

> There comes a moment in your life when you must look at what you love and think: Yes, I was right.
>
> People who love butterflies have it easy.

Russell does a remarkable job, as 'natural history' writers like David Quammen have before, of weaving historical facts and persona, scientific research, and the personality of the subject (be it mineral, vegetable, or animal) without falling into the trappings of anthropomorphism or sentimentality. So it is in the third chapter, "You Need a Friend," in which Russell presents the (usually) symbiotic relationships of some caterpillars with ants and other organisms, including

humans like entomologist Philip DeVries and British novelist Sir Compton McKenzie.

At the same time we learn about metamorphosis—in the fourth chapter—we also learn about Vladimir Nabokov, who Russell notes may be the most famous lepidopterist of the twentieth century not so much for what he wrote or said about butterflies, but how. In a Cornell University lecture in the 1950s, for example:

> Nabokov described the condition of the prepupal caterpillar, hanging upside down for hours at a time before it makes the final bid for pupation. At last, there is a wiggle, a working of the 'shoulders and hips.'

As entertaining as the stories of butterfly collectors, scientists, and conservationists are, most of the book is appropriately dedicated to butterflies (and in one case moths, too) themselves. Chapters like "Tough Love" (two), "Butterfly Brains" (five), "Butterfly Matisse" (six), the previously mentioned "Love Stories" (seven), "The Single Mom" (eight) "On the Move" (nine), and "Not a Butterfly" (twelve) are when Russell's writing is at its finest, as in the opening paragraphs of "Tough Love:"

> A female butterfly lays an egg that looks like a miniature pearl, or a squashed golf ball, or a whiskey barrel. She might lay one egg or a clutch of many.
>
> The danger begins at once. Viral, bacterial, and fungal infections can attack the egg. Tiny parasitic wasps or flies burrow into its tissue and lay their own eggs; when these young hatch, they feed on the embryonic caterpillar. In the adult female Owl butterfly, parasitic wasps ride on the mother's hindwing and jump off like pirates as she deposits her treasure. An assassin bug passes by and eats the clutch for breakfast. A deer eats the leaf on which the eggs are laid. The possibility for disaster is high; the chances for survival are not.

In chapters such as "In the Land of Butterflies" (ten), Russell turns to the historical characters of butterfly collecting-and-protecting lore, like Henry Walter Bates, Alfred Russel Wallace, Walter Rothschild, and Lady Eleanor Glanville. She also explores places like the British Museum of Natural History in London, and—in perhaps the most powerful essay of the group—El Segundo, California.

In chapter thirteen's "Timeline," Russell introduces us to Arthur Bonner, a former gang member, drug dealer, and auto thief who, after being released from prison in 1993 (for shooting a security guard), decided to turn his life around and joined the Los Angeles Conservation Corp. The tale Russell tells of Bonner, zoologist Rudi Mattoni, and their work in protecting the El Segundo Blue is as brilliant and finely crafted in the mode of Aldo Leopold's "February: Good Oak," from the hallmark A Sand County Almanac.

Obsession concludes with the business-like "The Business of Butterflies" (fourteen) and the final chapter, "Air and Angels," a full return to the near mysticism of chapter one with a short essay that simply asks: "Why do we love butterflies?" The answers are literal and symbolic and—well, you'll just have to read the book yourself. We've given enough of it away already….

When you opt for An Obsession with Butterflies, be sure to get the hardcover edition—a 7.6-inch by 5-inch classically bound book with a lovely, expedition-inspired jacket and black-and-white illustrations by Jennifer Clark. It's a little treasure that fits well into waiting hands; and though too big for the back pocket of your pants, it just might fit into the breast pocket of your coat or vest. Once there, it will make the journey often from pocket to palm, finally settling among your most cherished books on the hardwood shelf.