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**The Need for a Night Sky**

By Pat Flanagan

Photo courtesy International Dark-Sky Association.

Lying on my back staring skyward, I find the balmy nights of summer are best for watching the night sky. Alas, I am a dilettante watcher only—I fall asleep too soon to develop a memory able to anticipate the changing procession of the zodiacal figures as they rise and cross overhead.

In August I have to make special arrangements (a bed of nails) to see my favorite meteor shower, the Perseids, in action. In case you think this means I am not passionate about our dark skies, you would be wrong. One reason I have tethered myself to deserts most of my adult life is to have the privilege of greeting the constellations I know by name while silently standing under the lightfall of what seems like a million stars bisected by the milky way.

I begin this article on a personal note knowing that the dark star-filled sky is an amenity we all crave. We no longer use the cosmos to explain and guide our lives as did earlier cultures, but the human mind continues to be drawn to places where the night sky can be experienced. But how much do we crave darkness? Have we outgrown our need to experience celestial events? I started thinking about these questions and others while attending meetings to update Twentynine Palms' lighting ordinance. It was also clear, from interviews I conducted for the update of the County General Plan, that Morongo Basin residents are possessive of their dark star-filled sky.

I think all of us who have visitors from the big city will nod and chuckle at the following story shared by K.C. Krupp, Archeoastronomer and the director of the Griffith Observatory in Los Angeles. After the Northridge earthquake, which struck at 4:31 a.m., January 17, 1994, the

Observatory received "peculiar telephone inquiries within a day, and they persisted for at least a week. People called to ask about the 'odd' sky they saw right after the earthquake, and they wanted to know if it had anything to do with the seismic disaster. The staff was puzzled by these calls at first, but after a number of them, it became apparent what people were talking about—the stars." The earthquake had knocked out the power poles and people had a glimpse of what they never see—the night sky.

Beyond the satisfaction of our aesthetic sense there is research showing that the dark sky is important for many biological systems. Some studies have been going on for over a century while others are just getting underway with help from new technologies.

Scotobiology—the science of darkness. This new term was introduced in the Ecology of Night newsletter and subsequent literature for the Dark Sky Symposium in September 2003. The term originates from the Greek: *scotos* or *skotos*, for the dark. But the term means more than darkness, as in the absence of light; it refers to the positive aspects of the effects of darkness: the alternation of light and darkness as it effects biological systems. The breeding systems, hunting strategies, and migration movements of animals (including reptiles and insects), the flowering of plants and the onset of dormancy, and the human immune system are all adapted to patterns of light and darkness. If these adaptations are overwhelmed by artificial light it appears there will be repercussions which scientists are only beginning to tease out.

What repercussions? Walking around in the night, flashlight in hand, porch light blazing, I don't see much go-

ing on. But then, I wouldn't, I can't—I am blinded by artificial light. The dark-adapting rods in my eyes have shut down. How blind am I? Humans have been very effective at illuminating the night. The Italian astronomer Pierantonio Cinzano has compiled a world atlas of night sky brightness using satellite data and models of light propagation. For a local look see this article's illustration of the U.S. at night.

Lights from the Morongo Basin communities and the Marine base are visible from space but on the edge of dark-sky country. Maybe we should turn the lights down and not join the one-tenth of the world population, the approximately 40 percent of the U.S. population, and one-sixth of the European Union population that live where light pollution is so intense that night vision is unnecessary.

I have had the unique experience of studying bats in Colima, Mexico. This area was of particular interest because it contained habitats spanning a large area from the coast to the mountain tops which included many forest types as well as coconut palm groves and cattle ranches. We worked with some urgency because, although there were historical records for the bat fauna there was nothing current, and the area was rapidly being altered for agriculture.

If you study bats you work at night when these mammals are out flying around foraging for insects or gathering nectar. Out and about at my usual hour for reading in bed, I was astonished to see what, in the daylight, were walls of green leaves become curtains of white blossoms at nightfall. Darkness triggered the flowers opening, the release of scent, and the emergence of bats from their roost to feed. The white petals, which reflect starlight, become bullseye targets for the foraging bats. Bats are major pollinators for a variety of plants including desert agaves and cactus. The nectar provides essential energy for bat metabolism, including the production of milk for baby bats back in the nursery.

We were also interested in the bats that were after the mosquitoes that were after us. Unpleasant duty, but as the manufacturers of mosquito netting know, night's where the money is. Finally, at night's end comes rest: the bats return to their roosts to sleep or care for their young; the researchers catch a nap before analyzing their night's labors to plan for the next. At the end of our season we had trapped nearly 30 species of bats, all of them uniquely adapted to specialized systems that require alternation of light

and darkness to thrive. The human researchers, by alternating their normal light/dark schedules, became grumpy.

Many bats, as well as birds, migrate north from the tropics with the change of season. Both birds and bats use night hours for their long flights. However, what used to be dark aerial highways have been radically changed by artificial illumination from office and apartment buildings, radio towers, and other dazzling points of light. This light overloads eyes adapted to navigating by starlight—it's too bright to see. The Fatal Light Awareness Program reports salvaging 27,413 birds from 158 species that collided with Toronto's towers since 1993. Throughout the length of migration routes spanning both hemispheres, millions of birds fall prey to the dazzle of city lights.

Summer evenings in Twentynine Palms I flash back on my tropical bat studies while watching these winged mammals flit about streetlights after insects. In this case, bats are taking advantage of the insects' attraction to artificial lights. Insects, of course, are not really attracted; they, like migrating birds, are trapped by the intensity of the light that overwhelms their normal navigational signals—the stars.

Without the lights I wouldn't be seeing the insects or the bats. Anyone living in the desert knows that, generally speaking, desert animals escape the dangers of overheating and dehydration by living their lives at night. Researchers in a wooded wilderness of Virginia, found that when they illuminated an area of forest floor with a strand of white Christmas lights, the nocturnal salamanders responded by hunkering down and waiting an hour longer to come out to begin foraging for breakfast. Their research will continue, hoping to find out what that accumulated lost hour means in terms of salamander calories ingested, offspring produced over a lifetime, and mortality rate.

We might ask how our "need" for illumination alters the life of those critters that leave only their footprints for us to guess at their identity and activities. Maybe we should consider giving those critters a break by turning off our bright night-lights or, at the least, changing them to sensor-activated lights. In town, it would be nice if proper shielding were installed by all businesses (the City of Twentynine Palms is on its way) to prevent light escaping into the dark sky, allowing creatures of the night to continue as they evolved, guided by starlight and the phases of the moon. 🦇

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