



THE HEART OF DARKNESS

FINDING WILDNESS AND WONDER IN THE NIGHT SKY

BY DAVID CRONENWETT

I'm walking west tonight, away from the slight glow of town, on an undulating prairie road with starlit mountains miles ahead. The smell of bunchgrass mingles with the scent of lupine. An occasional thud of pronghorn hooves, the animals spooked by my presence, punctuates the quiet immensity of night. As always, I look skyward for the few astronomical markers I know: Polaris, Draco, and especially Orion the Hunter. On this night's dark road, it is good to know he's there.

I've guided many people across the Rocky Mountain Front over the years and have found that its overwhelming scale and beauty rarely fail to impress. But an aspect of the place frequently overlooked is the quality of its night. Of all the resources we think of in Montana as irreplaceable, fragile, and essential to the health of ourselves and other creatures, the "natural nightscape" is seldom mentioned. It is worth visiting a large urban area periodically to fully appreciate what a precious resource we've held on to here. Recently published NASA images of Earth at night show vast areas of the continental United States ablaze with light, especially along the coasts, in the upper Midwest, and in the northeastern corridor. While sparsely settled by comparison, the interior West is still pocked with enormous, metastasizing urban centers that spread bright smears of light outward from their core like oozing lava. Even the once reliably dark plains of North Dakota have been transformed in recent years by the glow of thousands of

gas-flaring drill rigs in the Bakken oil fields, looking like a Chicago-sized metropolis from space. But as we all know, it's different in Montana. No matter where you live here, it doesn't take long to drive to where you can clearly see the stars.

The night sky is never completely dark, even well away from human settlements. A clear night sky produces a spectrum of natural light from stars, the brighter phases of the moon, and the "airglow effect" of subtle illumination from cosmic particles bombarding Earth's atmosphere.

Nearly all living organisms have evolved closely with daily and seasonal fluctuations of light and dark. Unfortunately, those natural cycles are increasingly disrupted by human-caused illumination. "Scotobiology" (from the Greek *scotos*, meaning "dark") was a term coined in 2003 by scientists interested in studying the effects of anthropogenic (man-made) light pollution on species and natural systems. Light pollution harms wildlife by creating unnatural periods of attraction and repulsion, both of which can be highly disruptive (or fatal) for birds, bats, insects, and many types of mammals. A common example on any summer eve is the high concentration of flying insects attracted to a "security" light, which draws prey away from light-averse or nocturnal species such as amphibians and bats.

One November night while in Helena, I witnessed the dramatic effects of excessive urban light on migrating snow geese. Especially low cloud cover greatly amplified

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the city's sky glow, disorienting thousands of geese attempting to fly south from their last stopover at Freezeout Lake. The birds swirled above town for hours in a confused, squawking cacophony, obviously transfixed by the glowing vortex. While enchanting from the human perspective, such diversions are a dangerous waste of energy for creatures that can scarcely afford it. The National Audubon Society reports that roughly 100 million birds are killed outright in North America each year by crashing into the brightly lit windows of skyscrapers, broadcasting towers, and other illuminated structures.

Of course, bringing light to darkness is a hallmark of human civilization. First by harnessing fire, then through thousands of years of oil lamps, and finally to the invention of the incandescent lightbulb, nighttime illumination has been the most profound way in which people have alleviated anxieties over personal safety. Nighttime lighting warded off animal predators and warring tribes. It allowed people to relax and, later, read at night.

Unfortunately, we've reached a point where much of the developed world has become too bright. Light pollution can be a serious problem for humans, the vast major-

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ity of it coming from street illumination including vehicles, overhead lamps, and billboards as well as excessively lit buildings. People are intimately connected to the daily cycle of light and dark. Our 24-hour biological clock, or "circadian rhythm," is strongly regulated by the hormone melatonin, produced by the brain's pineal gland only during periods of low light. The wake-sleep cycle directly affects our immune system, mental health, and body's ability to heal. While any kind of light can inhibit melatonin secretion, the shortwave "blue" spectrum (generated by fluorescent bulbs and LED screens) is the most potent and disruptive. Scientists now believe that working the night shift, which interferes with circadian rhythm, is a contributing factor to a higher incidence of breast and prostate cancer.

Light pollution can be easily lessened by installing street lamps that direct light downward rather than in all directions, shutting off unneeded indoor lights, and using lower-wattage bulbs. These solutions cost customers and communities less money, not

more. Some of these fixes are now under way thanks to changing attitudes about the value of nighttime darkness. That impetus for dark sky conservation arose decades ago from the astronomy community, whose members worried they would soon lose the ability to observe the night sky for scientific research. Today, individuals and organizations advocate for the conservation of "natural nightscapes" through the International Dark-Sky Association (IDSA), which notes that the United States spends more than \$11 billion each year on unnecessary outdoor lighting.

Just as worrisome as the harmful effects of night illumination are what the brightness eliminates: the serenity of night, its breathtaking pallet of stars, and the universal sense of wonder it evokes. Many times I've had the privilege of sharing this with people touring the Rocky Mountain Front. After waiting until nearly midnight to view the summer sky in its nighttime glory, the visitors (generally from big, dark-deprived cities) audibly gasp at their first view of the Milky Way, something that can no longer be seen in two-thirds of the United States. They are overwhelmed by something I call "ancestral awe," that powerful feeling of connectedness to the past, the landscape, and the universe. Across cultures, night is evocative of many things, some polar opposites of each other: fear, safety, vulnerability, security, beauty, and, of course, that final "darkness" all mortals must consider. The natural night sky is a look into eternity as well as a way that people around the globe can witness nature's grandeur. In much of the world, that opportunity continues to shrink with each new neon billboard and illuminated parking lot. We are fortunate here in Montana to still have easy access to the dark sky's beauty and unknowable mysteries.

It's late now, and I've finally crested the low prairie ridge where I began. The timid glow of town is visible and gives me pause. I think about the millions of urban residents unable to enjoy the night sky as we do here, and how meager life would be in a world without natural darkness and the spiritual shelter it provides. Then my gaze is abruptly pulled toward something glowing faintly in the north, and the aurora borealis slowly unfolds, shimmering its green-white veil. I can't help but gasp. 🐾



LIT UP Looking north over southwestern Bozeman, just before sunrise.



LEFT: CHRIS BOYER; BILL MINSIK