EXPEDITION WEEK BEGINS NOVEMBER 16 ON NATIONAL GEOGRAPHIC CHANNEL

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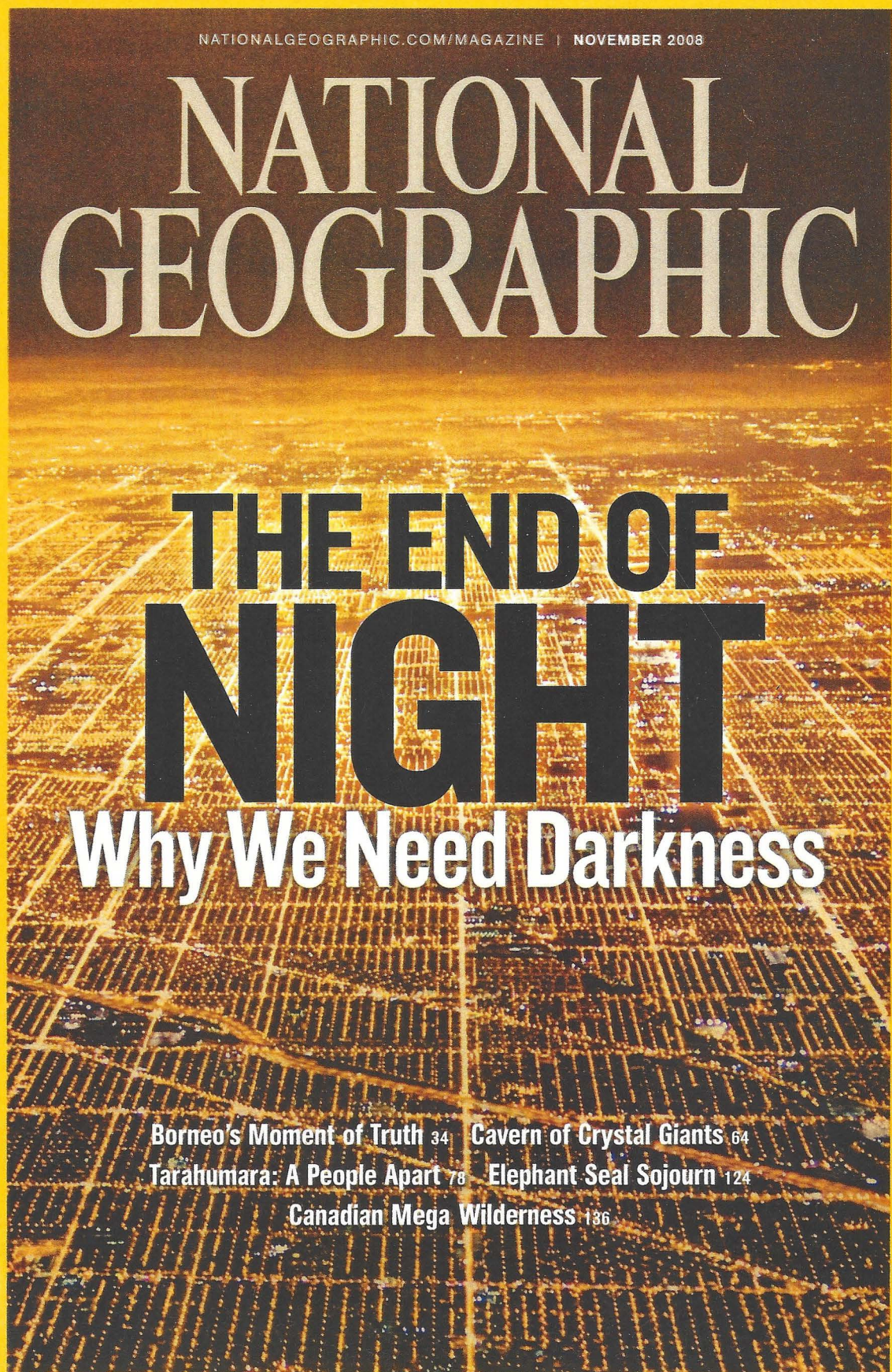
NATIONAL GEOGRAPHIC

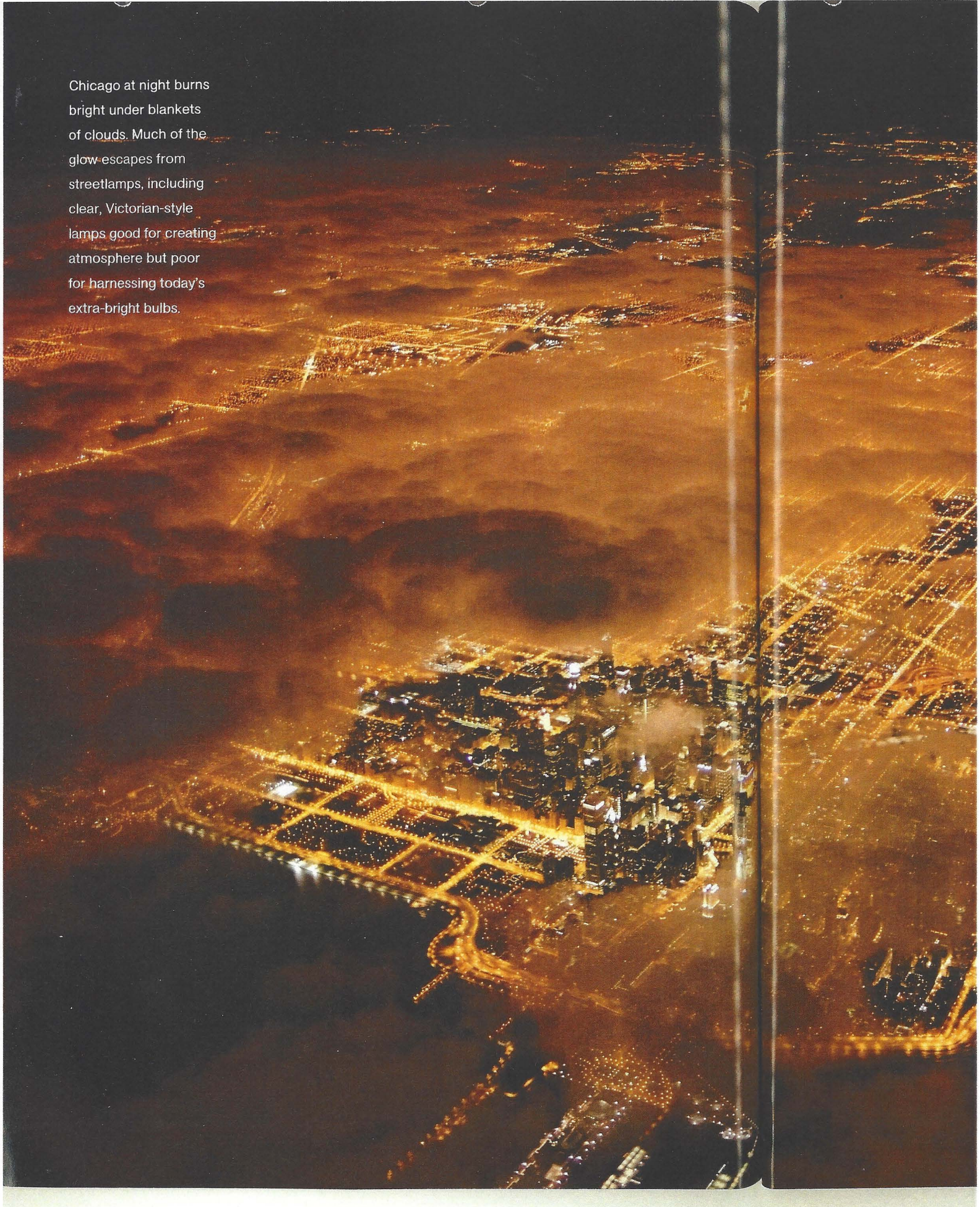


THE END OF NIGHT

Why We Need Darkness

OUR VANISHING NIGHT

A starry night gleams above Owachomo Bridge in Utah's Natural Bridges National Monument—named the first Dark Sky Park by the International Dark-Sky Association (IDA). "Here you see something forgotten," says ranger Scott Ryan, "and reconnect with the sky."



Chicago at night burns bright under blankets of clouds. Much of the glow escapes from streetlamps, including clear, Victorian-style lamps good for creating atmosphere but poor for harnessing today's extra-bright bulbs.

scattering rays from overlit cities and suburbs, from light-flooded highways and factories. Nearly all of nighttime Europe is a nebula of light, as is most of the United States and all of Japan. In the south Atlantic the glow from a single fishing fleet—squid fishermen luring their prey with metal halide lamps—can be seen from space, burning brighter, in fact, than Buenos Aires or Rio de Janeiro.

In most cities the sky looks as though it has been emptied of stars, leaving behind a vacant haze that mirrors our fear of the dark and resembles the urban glow of dystopian science fiction. We've grown so used to this pervasive orange haze that the original glory of an unlit night—dark enough for the planet Venus to throw shadows on Earth—is wholly beyond our experience, beyond memory almost. And yet above the city's pale ceiling lies the rest of the universe, utterly undiminished by the light we waste—a bright shoal of stars and planets and galaxies, shining in seemingly infinite darkness.

We've lit up the night as if it were an unoccupied country, when nothing could be further from the truth. Among mammals alone, the number of nocturnal species is astonishing. Light is a powerful biological force, and on many species it acts as a magnet, a process being studied by researchers such as Travis Longcore and Catherine Rich, co-founders of the Los Angeles-based Urban Wildlands Group. The effect is so powerful that scientists speak of songbirds and seabirds being "captured" by searchlights on land or by the light from gas flares on marine oil platforms, circling and circling in the thousands until they drop. Migrating at night, birds are apt to collide with brightly lit tall buildings; immature birds on their first journey suffer disproportionately.

Insects, of course, cluster around streetlights, and feeding at those insect clusters is now ingrained in the lives of many bat species. In some Swiss valleys the European lesser horseshoe bat began to vanish after streetlights were installed, perhaps because those valleys were suddenly filled with light-feeding pipistrelle bats. Other nocturnal mammals—including desert rodents, fruit bats, opossums, and badgers—forage more cautiously under the permanent full moon of light pollution because they've become easier targets for predators.

Some birds—blackbirds and nightingales, among others—sing at unnatural hours in the presence of artificial light. Scientists have determined that long artificial days—and artificially short nights—induce early breeding in a wide range of birds. And because a longer day allows for longer feeding, it can also affect migration schedules. One population of Bewick's swans wintering in England put on fat more rapidly than usual, priming them to begin their Siberian migration early. The problem, of course, is that migration, like most other aspects of bird behavior, is a precisely timed biological behavior. Leaving early may mean arriving too soon for nesting conditions to be right.

Nesting sea turtles, which show a natural predisposition for dark beaches, find fewer and fewer of them to nest on. Their hatchlings, which gravitate toward the brighter, more reflective sea horizon, find themselves confused by artificial lighting behind the beach. In Florida alone, hatchling losses number in the hundreds of thousands every year. Frogs and toads living near brightly lit highways suffer nocturnal light levels that are as much as a million times brighter than normal, throwing nearly every aspect of their behavior out of joint, including their nighttime breeding choruses.

Of all the pollutions we face, light pollution is perhaps the most easily remedied. Simple changes in lighting design and installation yield immediate changes in the amount of light spilled into the atmosphere and, often, immediate energy savings.

It was once thought that light pollution only affected astronomers, who need to see the night sky in all its glorious clarity. And, in fact, some of the earliest civic efforts to control light pollution—in Flagstaff, Arizona, half a century ago—were made to protect the view from Lowell Observatory, which sits high above that city. Flagstaff has tightened its regulations since then,

WHITE NIGHT

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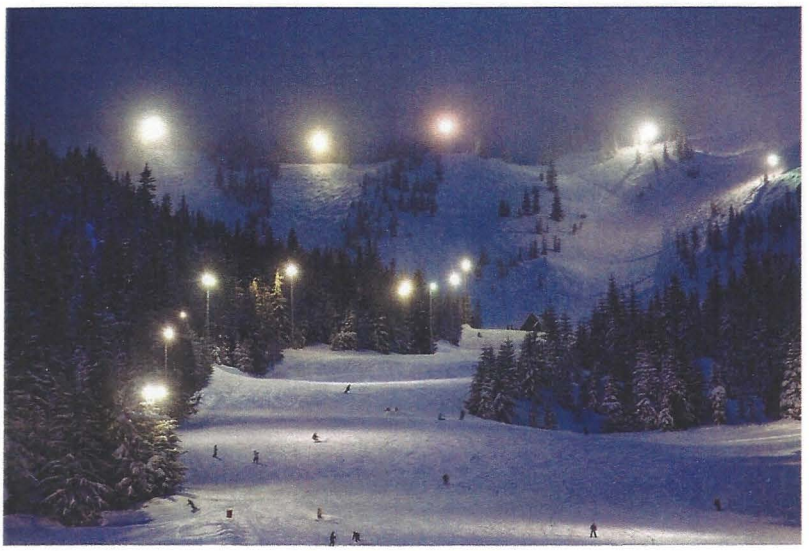


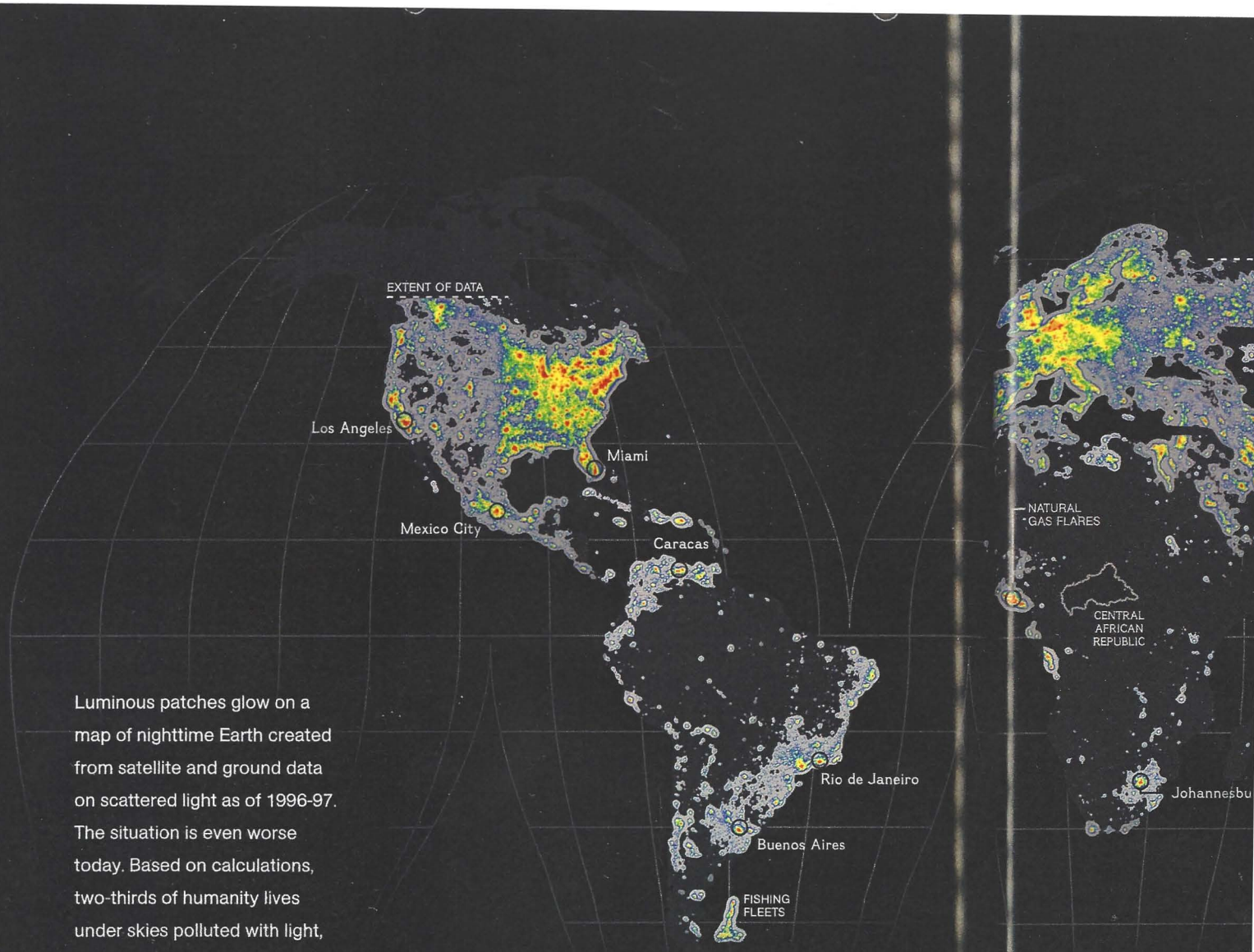
and in 2001 it was declared the first International Dark Sky City. By now the effort to control light pollution has spread around the globe. More and more cities and even entire countries, such as the Czech Republic, have committed themselves to reducing unwanted glare.

Unlike astronomers, most of us may not need an undiminished view of the night sky for our work, but like most other creatures we do need darkness. Darkness is as essential to our biological welfare, to our internal clockwork, as light itself. The regular oscillation of waking and sleep in our lives—one of our circadian rhythms—is nothing less than a biological expression of the regular oscillation of light on Earth. So fundamental are these rhythms to our being that altering them is like altering gravity.

For the past century or so, we've been performing an open-ended experiment on ourselves, extending the day, shortening the night, and short-circuiting the human body's sensitive response to light. The consequences of our bright new world are more readily perceptible in less adaptable creatures living in the peripheral glow of our prosperity. But for humans, too, light pollution may take a biological toll. At least one new study has suggested a direct correlation between higher rates of breast cancer in women and the nighttime brightness of their neighborhoods.

In the end, humans are no less trapped by light pollution than the frogs in a pond near a brightly lit highway. Living in a glare of our own making, we have cut ourselves off from our evolutionary and cultural patrimony—the light of the stars and the rhythms of day and night. In a very real sense, light pollution causes us to lose sight of our true place in the universe, to forget the scale of our being, which is best measured against the dimensions of a deep night with the Milky Way—the edge of our galaxy—arching overhead.

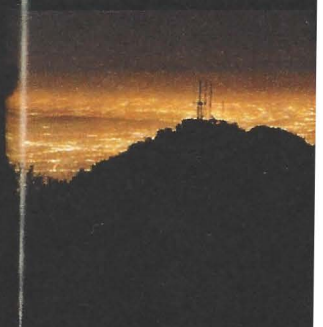
Verlyn Klinkenborg lives under deep night skies in rural New York. Photographer Jim Richardson enjoys the dark skies at his home in rural Kansas.



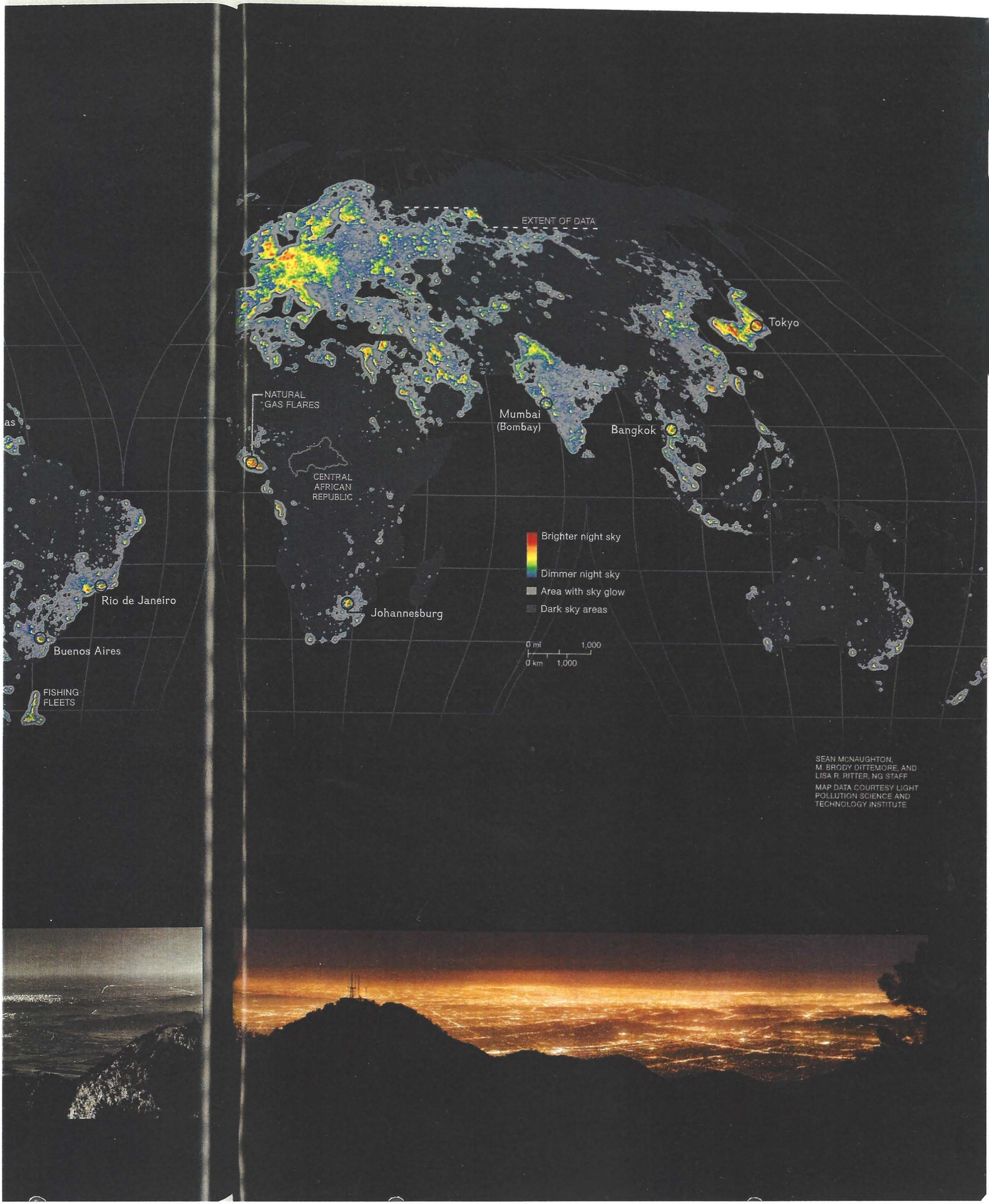
Luminous patches glow on a map of nighttime Earth created from satellite and ground data on scattered light as of 1996-97. The situation is even worse today. Based on calculations, two-thirds of humanity lives under skies polluted with light, and one-fifth can no longer see the Milky Way. Least affected? The Central African Republic.

LIGHTING THE WORLD

In 1908 dark countryside surrounded Los Angeles and Pasadena, combined population 350,000, in a view from Mount Wilson (right). In a 2008 view from a nearby vantage (far right), a mushrooming populace nearing five million fills the same valley, creating a sea of brightness.



 CARNEGIE OBSERVATORIES PHOTOGRAPH COLLECTION, HUNTINGTON LIBRARY (LEFT)

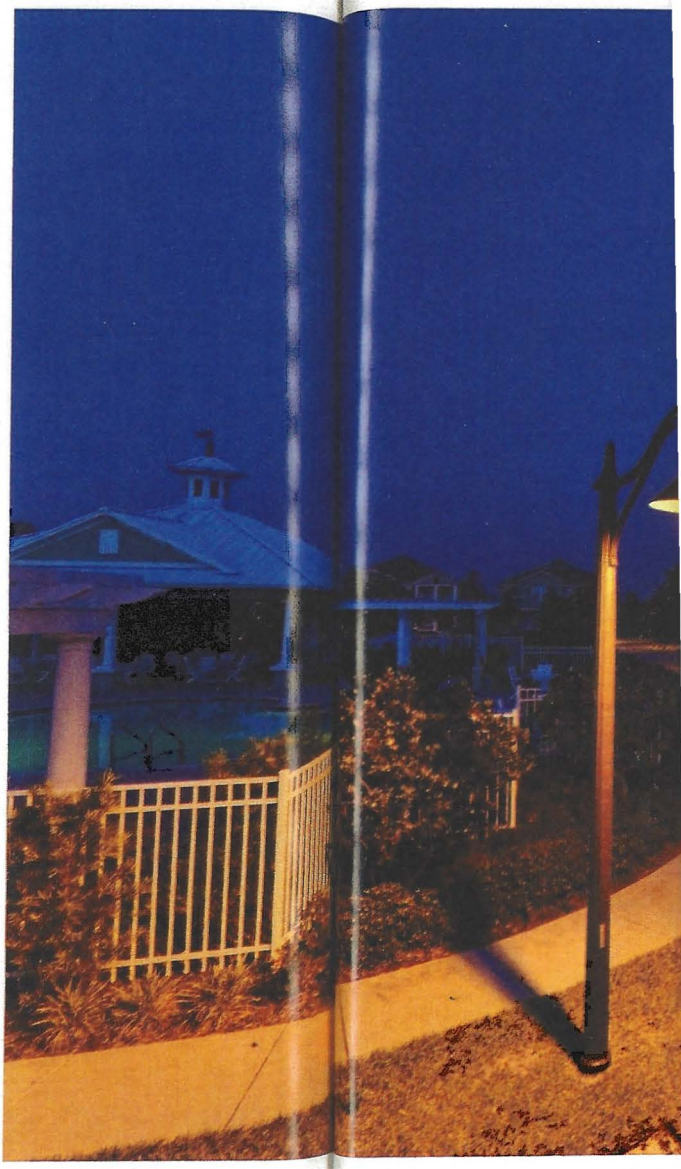


SEAN MCNAUGHTON, M. BRODY DITTEMORE, AND LISA R. RITTER, NG STAFF

MAP DATA COURTESY LIGHT POLLUTION SCIENCE AND TECHNOLOGY INSTITUTE

CUTTING THE GLARE

A globe-shaped fixture in Toronto's financial district (below) wastes much of its wattage over pedestrians' heads. Covered streetlamps in Harmony, Florida (right), spare the dark sky and save energy with their "full cutoff" design, which illuminates just the ground below. Bulbs are high-pressure sodium, giving a soft yellow glow. Porch lights tucked into ceilings keep light confined. "We see darkness as a natural resource that needs protection," says Greg Golgowski, conservation director of the Harmony Development Company. Others agree: Hundreds of U.S. communities now have ordinances requiring covered fixtures, light-density restrictions, and energy-saving light curfews.



Forty-four xenon theatrical lights at its base give the stainless steel surface of the Gateway Arch in St. Louis a dramatic night sheen against a ruddy sky. The beams are flipped off when fog dulls the effect or migrating birds pass through.