

BOOKS FEBRUARY 27, 2023 ISSUE

IS ARTIFICIAL LIGHT POISONING THE PLANET?

*A Swedish ecologist argues that its ubiquity is wrecking our habitats—and
our health.*

By Adam Gopnik

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The Luxor Hotel's "sky beam," in Las Vegas, generates forty-two billion candlepower of light each night, confusing flying creatures that are drawn to its radiance. Illustration by Carson Ellis

Among the many looming ecological disasters that terrify us today, one that only a handful of people have contemplated as sufficiently looming and terrifying is the loss of the bats in our belfry. According to "[The Darkness Manifesto](#)" (Scribner), by the Swedish ecologist Johan Eklöf, most churches in southwest Sweden had bat colonies back in the nineteen-eighties, and now most of them don't. Light pollution, his research suggests, has been a major culprit: "District after district has

installed modern floodlights to show the architecture it's proud of, all the while the animals—who have for centuries found safety in the darkness of the church towers and who have for 70 million years made the night their abode—are slowly but surely vanishing from these places.”

The presence of bats in the belfry, as a metaphor for disordered thinking, is usually taken to refer to the way bats would flutter around the upper stories of distressed churches, but a larger madness, Eklöf thinks, is responsible for their absence. A professor at Stockholm University, he is an expert in bats, which might suggest a *déformation professionnelle* in his interest in darkness, the way an expert in roosters might have a weakness for the dawn. He is able to tell us authoritatively that, though bats do indeed use natural sonar to echolocate their way around, their eyes see well enough in the dark to help in their navigation. (As so often, nature's secret to survival is not one perfect plan but a little bit of this and a little bit of that.) Of course, Eklöf's arguments escape the narrow world of roof eaves and pointy ears. Though the book is written as a sort of “Silent Spring” manifesto against the ecological devastations of light pollution, its considerable charm depends on the encyclopedic intensity with which he evokes the hidden creatures of the night.

Agreeably in love with darkness, Eklöf is not entirely a sentimentalist about it. Sex and violence rule the night sky as much as they ruled the drive-in movies that the night sky once superintended. What governs the sunless vistas is not a peaceable kingdom but a fierce contest for life, occasionally made vivid for us by the fiery, bioluminescent nature of its display. The firefly is signalling and winking as desperately as a Raymond Chandler heroine for a mate, until a greedy frog, like a Chandler gangster, stops everything and devours it. Eklöf makes it clear that the great Cambrian explosion of species, which began the evolution of animal eyes that could translate light into images, was set off by the advent of predation and

countermeasures to it. Advanced animal evolution—and optical perception—began when creatures realized that they could make a better living by eating one another than by staying in place and absorbing nutrients from the ooze around them. Teeth and shells, claws and hide, rose in a flurry, and among the foremost of the defenses were eyes to sense the presence of a predator.

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The difference between light and dark is, in a way, arbitrary: what counts as light and what as darkness depends on what wavelengths we discern. But the nocturnal world gives rise to creatures, equipped with large-pupilled and infrared-sensitive eyes, that see what we cannot and that, under cover of darkness, act as we can only imagine. And so Eklöf's book is made most memorable by the sometimes wild eccentricities of the life-forms it chronicles. Though his catalogue of catastrophe is real, what one most remembers are the beasts in his bestiary.

We learn, for instance, of the ghost moths, a species in which the adult males appear in fields in twilight, white as their namesakes and just as evanescent-seeming, floating eerily as they signal to the females—only to mate once and then fall to the ground dead. Mouthless by nature, they, like various others of their order, never feed at all in their adult lives. They do not sow, or reap; they merely fornicate once in the dark and die. (The females carry the eggs from their lonely coupling to distribute across the fields, and then die themselves.) Though Eklöf tells us that these Tristan-and-Isolde-like creatures are threatened by the confusing presence of

artificial light and that moths play a crucial role as pollinators (“something of invaluable importance for keeping our ecosystem intact and thriving”), what one recalls is the plaintive doom of their couplings.

Biological creatures ourselves, we pair our lives with the rest of biology. “It is fascinating to imagine how nocturnal animals experience their existence in the dark, how their brains interpret sensory stimuli,” Eklöf writes. He cites approvingly Thomas Nagel’s famous philosophical essay on why we as humans cannot know what it feels like to be a bat. And yet we can *imagine* it—certainly, we can imagine what it would be like to be an owl. We may not live as owls do, mating once to make baby owls and then, after the owlets have safely flown away, going off to separate perches. But we can imagine how it would feel to soar alone all night, see your spouse for a brief period to raise the kids, and then head off for a divorced life in your own studio on the opposite side of town. A naturalist’s acts of empathy can be emancipating even if incomplete.

Alongside the spectral ghost moths come the speckled and companionable cabbage moths, as ready for one-night stands as Bobby in Sondheim’s “Company.” Only after the sun sets does the adult moth, having crawled from its chrysalis, look for a mate. “The female takes the first step by extending her antennae forward, flapping her wings, and secreting scents, at around ten in the evening,” Eklöf writes. “The two spend the night together, one wing of the female around the male’s body, then she leaves to lay the fertilized eggs.” But light ruins the romance: “The female emits fewer pheromones in the presence of artificial light, and furthermore, the composition of the scent is completely different from that emitted in darkness. So mating never gets started. The females wait in vain in the darkness.”

For all the poetic appeal of his examples, Eklöf has come to us from

Sweden—his book is translated by Elizabeth DeNoma—bearing a noirish moral. The source of all this harmful light is, of course, *us*, city-dwelling human beings, who are presumably keeping the lights on all night in pursuit of our own couplings. Where once human life had its nocturnal rhythms, interrupted only by the dim light of candles and fireplaces, the Earth is now so lit up that, seen from space, it glows like a Japanese lantern. Since the invention of the light bulb, street lights and floodlights have come, ominously, to disturb age-old circadian rhythms, to the point that, Eklöf writes, “artificial light, the polluted light, is now dominant—light that causes birds to sing in the middle of the night, sends turtle babies in the wrong direction, and prevents the mating rituals of coral in reefs, which take place under the light of the moon.”

It turns out that the strongest source of illumination on Earth is not some helpful harborside lighthouse but the “sky beam” atop the Luxor Hotel, in Las Vegas. Creating forty-two *billion* candlepower of light every night, meant merely as a come-on to tourists and gamblers, it unintentionally excites and undoes flocks of birds, genetically programmed by evolution to fly toward bright light—and, in 2019, attracted clouds of grasshoppers, who flew toward the pseudo-Egyptian pyramid with all the horror of a pseudo-Egyptian plague. “Every evening Nevada’s meteorologists could see on their radar screens the swarms approach Las Vegas,” Eklöf says. Whoever would have imagined that reconstructing an Egyptian tomb and sending a piercing pillar of light from it to the heavens would reawaken an ancient curse—that is, aside from every screenwriter with a spec script? The, er, black comedy of this effect is not lost on Eklöf, but he sees it as something less than entertaining. In recent decades, he tells us, the biomass of all flying insect species has, by some measures, collapsed by close to seventy-five per cent.

Nor are bugs and birds alone affected by the light; so are plants, and so are humans. Our eyes adapt badly to darkness, and our night vision—which is

activated by the pigment protein rhodopsin—takes a long while to turn on, as anyone who leans back on a car roof to watch the evening stars knows. By now, cities such as Singapore and Hong Kong are so brightly lit that their inhabitants scarcely call on night vision at all, and, as their rhodopsin becomes superfluous, they may well create descendants who, in even middling darkness, are as blind as, it turns out, bats are not.



“Do you want me to make you a tea you’ll forget about until it’s gross and cold?”

Cartoon by Gabrielle Drolet

The really insidious light pollution that people experience is of the indoor kind: our laptops and our devices bathe us in their light, and we find ourselves trapped in the same kind of death spiral that the Luxor beacon

creates for the poor Las Vegas grasshoppers. Our daily cycles of melatonin and other sleep hormones are disrupted, with sometimes dire effects. “The body enters a vicious circle where stress and disturbed sleep go hand in hand,” Eklöf writes. “We become vaguely depressed.” Overweight, too: “Obesity has many causes, but one of these is constant low leptin levels, which is a direct result of the breaking down of the melatonin circle.” The grasshoppers beam down to their burning death; we just grow chubby and cheerless.

Eklöf insists that doom is still avoidable. “Light pollution is the easiest of all environmental problems to solve, at least technically,” he writes. “We, as private individuals, can, with little cost, reduce the amount of our light pollution. With light shades, downward-facing light sources low to the ground, and dim lighting, we can reduce the cities’ total amount of light, as well as the artificial light scattered in the atmosphere.”

Yet the glum practicality of the solution seems inadequate to the wound it describes. “The Darkness Manifesto” has, beyond its ecological arguments, a particular moral temperament. Eklöf does not merely think that too much artificial light is bad for our ecology, which it doubtless is; he thinks that light, and our preference for amplifying it, is in itself morally dubious. In his view, the will to light the night is in essence a will to power. Industrialized capitalism lights up our streets not to assist us on our path home but to show that its empire is inescapable. His point is made with a kind of good-humored if slightly puritanical melancholy that one thinks of as distinctly Swedish; in this spirit, he quotes Strindberg’s observation that electric lighting, presented as betterment, was simply a way of getting workers to work more. Dimming the world is a necessary and reasonable goal, he believes, and he is encouraged by various green initiatives, including Earth Hour, an annual event newly promoted by the E.U., in which electric lights are kept off for sixty minutes, both to discourage power consumption and to

remind us of the antique joys of candlelight.

Undoubtedly, the loss of night to artificial illumination is a loss for diversity in every sense, ecological and experiential. Yet we can wonder if what human beings mainly experience as improvements must, in every instance, be subordinated to the “welfare of the planet,” a concept that is itself available only to humans. Nor are Eklöf’s examples always exemplary. He notes that van Gogh’s “Starry Night” could not be readily painted today, given the light pollution of contemporary Provence. (“Maybe this was a manifestation of his inner darkness, or simply how the night sky could be experienced as crackling and chaotic—before the entry of electric light.”) But the gas lamps of London, enemies of night, were themselves another haunting Romantic subject, as van Gogh knew from his love of Whistler, with an equivalent poetry of their own, while in his earlier “Starry Night Over the Rhône” the bright lights of human habitation are themselves made to shine with an almost celestial aura.

Inevitably, what presents itself as empirical inquiry reflects a cultural mood. Every environmental apocalypse bears the imprint of the apocalyptic imagination of its time: even the Book of Revelation, with its raptures and its scarlet woman, has a rich underpinning in Roman imperial politics. In the same way, Paul Ehrlich’s “The Population Bomb” (1968), now much derided, shared a semantic space with the sculptor Robert Smithson’s “Nonsites,” site-specific installations that were made in the same year and produced photographic monuments to the entropic wilderness of blighted post-industrial landscapes. Ehrlich’s specific pessimism may have been empirically misconceived, but it was part of the poetic pessimism of its time and perhaps a necessary corrective to a preceding era of pro-growth boosterism—as Smithson’s grim dust piles were correctives to the paradisiacal glow of industrial materials beloved of the other minimalists.

The allure of night is one of the great cultural discoveries of the Romantic era, with its twilight landscapes and piano nocturnes, and Eklöf's book is, sometimes knowingly and sometimes not, a Romantic one. If nature is made secondary to human will, as in classical and Enlightenment times, then a care for nature expresses itself in bucolics and pastorals—nature as a setting for human amorousness or agriculture. If the value of nature is an absolute, as it was for the Romantics, we discover ourselves in sublime nocturnes and moments of wonder. The Romantic love of darkness is a turn toward the embrace of nature in all her aspects. The faces that seemed hostile to us were to be as welcomed as those which seemed obviously benign.

The Romantic contradiction is that, since nature is in itself moral, no landscape can be left unmoralized by man. When the lights go off, we fumble in the dark for meaning as the ghost moth fumbles for its mate; the loss of night to artificial light thus becomes not merely a mistake but a sin. A few decades ago, expressions of an original taste in natural phenomena were usually sprightly or self-consciously eccentric in tone—Alexander Frater's wonderful travelogue "Chasing the Monsoon," in 1990, made the case for rain almost entirely on sensual grounds. Today, we would stress that rain is essential to life, an obvious truth, but one whose emphasis holds virtue to be more important than pleasure. Eklöf's nocturnal tastes are acceptable now only if we can make them part of a crusade.

It may seem unduly sunny, but surely not false, to say that we need both artificial light and natural darkness. Winged creatures rightly petition us to ease the intensity of the Luxor beam, but the city planners who insisted on mandating a high incandescent signature for every new sign in Times Square—the so-called LUTS (Light Units Times Square) measure—were aesthetes more than despoilers. Times Square must shine to remain timeless. We can want a brightly lit Vegas Strip, while still wanting the

desert outside Vegas, or for that matter the suburbs of New Jersey, to offer the spectacle of stars. The Enlightenment taste for progress and the Romantic love of mystery may be cabbage moths who seek each other in the night.

“More light!” Goethe’s famous deathbed command, was the battle cry of the Enlightenment, which produced the progressive-minded science that eventually gave us the light bulb and the neon sign and the L.E.D. “Turn on the night!” still the essential cry of the Romantics, from Caspar David Friedrich to Kiss, urges us to love in darkness. The light of reason makes searchlights and lighthouses; the love of darkness asks us to adjust our eyes and egos sufficiently to see as owls do. Seek light in the morning; accept the night when it comes. Then call it a day. ♦

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