# Hello darkness, my old friend

Light pollution disrupts animals and has also been linked to human ailments. A bat scientist has some useful fixes, finds **Vijaysree Venkatraman**

Book

**The Darkness Manifesto**
**Johan Eklöf**
**Translated by Elizabeth DeNoma**
**Bodley Head**

IN THE twilight, the bats that nest in the old church of Suntak in Sweden fly around, hunting for insects. The 12th-century church's façade isn't lit up at night. So, as in the past, the building remains a sanctuary for bats, remarkable creatures that have evolved to function in the dark.

In his book *The Darkness Manifesto*, originally published in Swedish two years ago, Johan Eklöf, a bat scientist and conservationist, makes the case that when lights are on around the clock, in cities, the countryside or even offshore, the circadian rhythm of all beings on Earth changes. While nocturnal animals are the most affected by excessive lighting, few creatures on the planet remain untouched.

Early in the 21st century, astronomers established a scale to assess the level of superfluous artificial light at observing sites. Sky glow, which significantly affects stargazing, obscures all humanity's view of the night sky – just as though a careless individual had "used a dirty cloth to wipe the window facing the universe", as Eklöf writes

Biologists have studied how always-on artificial light disrupts organisms. Some that take their time cues from the sun or moon seemed clearly off: birds singing in the middle of the night, baby turtles heading off in the wrong direction. Research findings on how light pollution affects entire species and ecosystems are still emerging.

**"A hospital in Sweden has successfully invested in indoor lighting that mimics natural light variation"**

Take insects, of which nearly 40 per cent of species face extinction. To anyone who has ever seen an insect react to light, it is obvious that light pollution is a major cause, says Eklöf. Moths, which are largely nocturnal, are particularly vulnerable. In the pre-industrial era, moths were proverbially drawn to flames. Now, they are drawn to bright lights. Like daytime bees, nocturnal moths are pollinators. In fact, they visit more kinds of flowers than bees do – so moth decline is bad news.

What of the creators of electrical lighting themselves? White light from LEDs and fluorescent bulbs has a greater proportion of blue wavelengths compared with incandescent bulbs. Overexposure to this blue-tinged light has been linked to various human ailments, from disrupted sleep patterns to a greater incidence of hormone-sensitive cancers.

Recognising these health risks, Karlstad Central Hospital in Sweden recently invested in indoor lighting that mimics the natural variation in both colour and intensity of the light people would be exposed to outdoors. This successful model, Eklöf writes, suggests we can use thoughtful design to regulate light exposure, meeting our need for both light and darkness.

**Throughout our history, humans have been afraid of the dark**

The LED, an inexpensive, energy-efficient technology that led to a proliferation of outdoor lights, could also be a solution to our excesses, he writes. Today, light can be controlled and programmed in a way that wasn't possible with the incandescent light bulb. So, with greater awareness, some legislation and a host of better-designed lighting products – motion-activated lights, downward-facing light sources and the like – we can reduce the amount of artificial light that ends up being scattered into the atmosphere.

There are also sociological factors to consider. Throughout our evolutionary history, humans have been afraid of the dark, and culturally, we now consider light as a symbol of prosperity. In succinct chapters, Eklöf lays out the psychology, philosophy and politics behind the spread of illumination. Embracing the darkness isn't going to be easy.

But even before you finish this book, you will step out of your home at dusk sometime and you will become aware of all the wasteful lighting in your own neighbourhood. Thankfully, Eklöf's last chapter is a manifesto of actionable points to befriend the darkness, which, he assures us, is "merely a train trip, a walk or a turned-off phone away". He asks us to notice how the sun gives way to the moon and the stars – and to take ourselves out into the dark nights of midwinter.

From turning off the lights when we leave a room to allowing our backyards to rest in darkness at night, we can all do our bit to try to save this spottily, but still too brightly, lit planet. ▮

CHRIS HOWES/ALAMY

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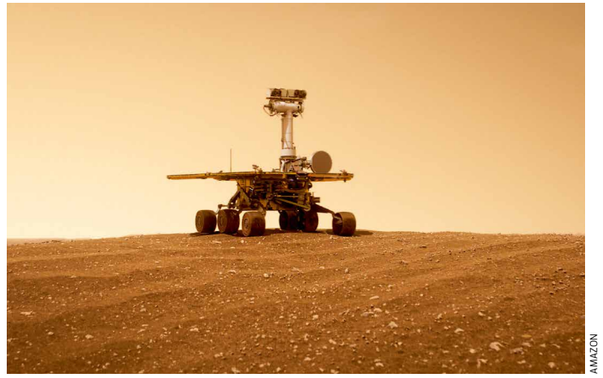
# The Oppy show

A hybrid documentary about Mars rover Opportunity is the best Pixar movie never made, says **Gregory Wakeman**

Film

**Good Night Oppy**
**Ryan White**
**Amazon Prime**



AMAZON

Oppy's every move across the Red Planet was perilous: a tiny mistake could have terminated its mission

**IT IS hard not to fall in love with *Good Night Oppy*, Ryan White's stirring documentary about the interplanetary rover Opportunity. The vehicle launched into space on 7 July 2003, a few weeks after its sister machine, Spirit, and the pair landed on different sides of Mars in January 2004.**

**NASA expected both to live for just 90 sols, or Martian days, each about 39 minutes longer than an Earth day. Instead, thanks to solar-powered panels and precise manoeuvring, the delightfully nicknamed Oppy survived for over 14 years. Spirit, however, only made it for six years and 77 days.**

**During this time, Oppy made some startling discoveries about the history of water on Mars. NASA researchers hope its findings will provide some lessons we can learn from on Earth, and ultimately help us discover whether the Red Planet ever had life.**

**Key to *Good Night Oppy*'s success is how quickly White creates a connection between the audience and the rover, especially during the film's first few minutes. Not only do we see that Oppy stands at a human-like 1.6 metres tall and has cameras that look like eyeballs, we are also told that it has a mind of its own and needs to feel love. Later on, we learn that Oppy struggles with joint and memory problems just like us.**

**White edits this information and footage together in such a smart and entertaining manner that we are instantly hooked. Especially when we discover that NASA's engineers would start every day of their expeditions by playing a song to get Oppy u and the crew pumped, including *Born to Be Wild*.**

**Music plays a major role in keeping us connected to Oppy. In some scenes it is rousing, in others melancholic. At one point, we are treated to dark humour, as a scientist plays Abba's *SOS* while they wait nervously to hear a signal from their metallic colleague.**

**The NASA members White interviews are also essential to building an emotional bond between the audience and Oppy. Their affection for it, which they all openly admit is a little bizarre, is clearly heartfelt – so much so that it quickly becomes contagious and you can't help but root for this tiny spacecraft all alone, over 86 million kilometres from Earth.**

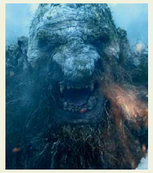
***Good Night Oppy* is really as much an animated movie as it is a documentary. White and the team at Industrial Light & Magic, the film special effects company founded by *Star Wars* creator George Lucas, use animated sequences to recreate Oppy's journey through space, its landing on Mars and its bumpy expedition across the planet's surface. It is so invigorating that it feels like watching the best Pixar movie never made. But forget comparisons to Pixar's animated sci-fi *WALL-E* – one of the film's severe dust storms is more reminiscent of the post-apocalyptic *Mad Max: Fury Road*.**

**Without these animated sequences, *Good Night Oppy* wouldn't be anywhere near as engaging. They help us to gauge just how dangerous it was for Oppy to climb over a sizeable rock, dig itself out of a deep bank of sand and traverse the side of the Victoria and Endeavour craters on Mars. With the help of the interviews and voice-overs, we get a real sense of the peril involved. Just one tiny mistake could have ended transmission to Oppy permanently.**

**There would probably be just enough in Oppy's plight to make *Good Night Oppy* a riveting watch on its own. But its exploration of why NASA goes to Mars and its honesty about the complex, emotional relationship that people build with inanimate machines brings a depth to *Good Night Oppy* that makes it all the more thought-provoking, moving and inspiring.** ▮

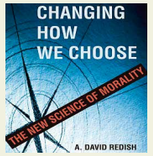
Gregory Wakeman is a writer based in Los Angeles, California

## *Don't* miss



**Watch**

**Troll** follows a ragtag group of heroes who set out to save Oslo from an ancient threat (pictured). Delayed by covid-19, this is the new film from Roar Uthaug, director of disaster movie *The Wave*. Airs on Netflix from 1 December.




**Read**

**Changing How We Choose** is possible, says neuroscientist A. David Redish. Drawing on research in behavioural economics, sociology and neuroscience, he argues that there is a "new science of morality". On sale from 6 December.

**Visit**

**The Science of the Multiverse** and the implications of this controversial idea are explored by Harry Cliff, a particle physicist at the University of Cambridge, at 7pm GMT on 30 November at Market House, south London.

JALLO FABER/NETFLIX, MATTL PHOTOGRAPHY/ALAMY