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Light Pollution: A philosophical inquiry into what we lose when we lose the night

The magnetic pull of the heavens with their apparent infinite depth, the gentle twinkle of stars, the wonderful displays of “shooting stars”, the appearance of the great comets, the Milky Way, the constellations and the planets, and the sound and fury of electrical storms – all these things have played on the fears of the human race. Why are we here? Where did we come from? Give us a sign. The heavens have far too often complied with signs that have pointed to the best and worst of human nature.¹

Introduction

The cosmos, the nocturnal celeste, the heavens, the sparkling firmament, the dark ether – whatever the lexicon used, the universe that opens up with every new rotation of the Earth is one that has captivated mankind from the very dawn of existence. It has shaped our understanding of time, allowing our ancestors to develop sophisticated calendars, taught us to navigate the vast oceans, discovering new worlds in the process, inspired us to create beautiful works of art, now

¹ Levy, David H. *Starry Night: Astronomers and Poets Read the Sky*. Amherst, NY: Prometheus Books, 2001. Pgs. 13-15.

admired on the walls of celebrated museums, but even more fundamentally, the night sky has forced us to *ask questions*. As Timothy Ferris wrote in his book *The Mind's Sky*, “A mystery must emerge before it can be solved.”² What is the night sky, if not the most timeless and inevitable mystery we have? Unless of course, it is avoidable. Where we would be as a species without the guidance and enigma of the stars above is both an impossible question to answer and a critically important one to ask.

It is estimated that 80 percent of children born in America will never behold a sky dark enough to see the Milky Way. Millions of children, writes Paul Bogard, “without even the opportunity to ‘wonder what you are’.”³ According to the World Atlas of Artificial Night Sky Brightness, created in 2001 by Italians Pierantonio Cinzano and Fabio Falchi, two-thirds of the world’s population – including 99 percent of people living in the continental United States and Western Europe – no longer experience a truly dark night, or a night untouched by artificial electric night. It is, moreover, a pressing issue.⁴ “We are at a delicate time now,” writes astronomer and artist Tyler Nordgren, “where we still have some people that know what they’re missing.”⁵ If we wait much longer, those precious few individuals who have witnessed the beauty of a truly dark sky will die out and the major driver to try and protect this natural heritage will die along with them.

The implications of this new reality, this loss of night, I argue, go far beyond the ecological and health concerns that many biologist and medical professionals now study with increasing fervor, they represent an unprecedented cognitive shift of a species that is losing its oldest source

² Ferris, Timothy. *The Mind's Sky: Human Intelligence in a Cosmic Context*. New York: Bantam Books, 1992. Pg. 8.

³ Bogard, Paul. *The End of Night: Searching for Natural Darkness in an Age of Artificial Light*. New York: Little, Brown and Company, 2013. Pg. 269.

⁴ *Ibid.* Pg. 321.

⁵ *Ibid.* Pg. 260.

of inquiry and inspiration. While consequences of such a shift cannot pass for much more than educated speculation, that the greater population, born into the night glow of suburban and urban areas, is largely unaware of this change, reinforces the need for a larger philosophical discussion on light pollution. This paper will focus on three important relationships between humans and the night sky: the sky and the advancement of human culture, the sky and the human mind, and finally darkness and human anxiety. A closer look at these philosophical relationships will hopefully unlock deeper insights on what we stand to lose when we lose nighttime once and for all.

The Night Sky & Human Culture

For my part I know nothing with any certainty, but that the sight of the stars makes me dream.

- Vincent van Gogh

Of all the efforts and disciplines of mankind, the one area that the night sky has left perhaps its strongest mark is in the arts & sciences. Writers, poets, and playwrights – including Shakespeare, Emily Dickinson, Robert Frost, Walt Whitman, Ralph Waldo Emerson, Lord Tennyson, and Chaucer (to name a few) – have all drawn inspiration from astronomy and the night sky. Likewise painters like Van Gogh, William Blake, Johannes Vermeer, Giotto, and Norman Rockwell and musicians like William Herschel (an astronomer *and* composer), producer Michael Koppleman, and bands like Coldplay and Pink Floyd have all used the night sky and the cosmos as subjects in their art.

It is hard to articulate why the night sky and its astronomical study has been such a source of inspiration for artists, since it seems a rather intuitive connection. Perhaps it is as David Levy says that “Throughout it all, the senses of humankind inspired and articulated the characteristics of curiosity, emotion, study, analysis, creativity – the continuum that evolved the arts and sciences.”⁶ Levy, author of *Starry Night: Astronomers and Poets Read the Sky*, is himself a poet, literary historian, and amateur astronomer. His book details the works of painters and poets and how they have found their voice by consulting the heavens, so to say. There is perhaps, as Levy himself mentions, no better painting with which to try and uncover this relationship between artist and heavens than Vincent Van Gogh’s “Starry Night.”

Completed in June of 1889 soon after Van Gogh was admitted to the asylum of St. Paul-de-Mausole near the French town of St. Remy, the visionary painting, as described by critic Nathaniel Harris, was one “in which a huge moon, radiant stars or suns, and swirling, wave-like nebulae fill the night sky. A cypress and the entire landscape tremble and move in sympathy; only the little village remains solid and stolid in the turbulent vastness of the universe.”⁷ It is said Van Gogh found some peace once settled at the asylum. For him, it is possible that the universe in its state of constant flux and infinite energy was a release from the infuriating stillness of civilized life that drove him to madness. Of course, that *is* the power of the night sky: that it can reflect both that what is universally human and unconditionally private.

In British band Coldplay’s song “Sky Full of Stars”, the night sky becomes a metaphor for a lover. As the second verse illustrates: “Cause you're a sky, cause you're a sky full of stars*I want to die in your arms*Cause you get lighter the more it gets dark*I'm going to give you my heart.” The possibilities of using the night sky as metaphor are endless really, such that any curious mind

⁶ Levy, David. H. Pg. 13.

⁷ Levy, David H. Pg. 41.

and sensitive soul can read the sky in any way they see fit. When we say artists, of course, this does not eliminate scientists, who for most of history were never limited exclusively to the study of math and science. In fact, the separation of science from philosophy and art is a relatively modern phenomena.

Scientists like Galileo, Ptolemy, Copernicus, Herschel, Einstein, Newtown, and Bacon all were artists, philosophers, and statesmen in their own rights. Thus the overlap between scientific inquiry and artistic inspiration has always been blurred. The Mayan calendar, the astrolabe, the Big Bang, human space exploration – all of these scientific advancements were made possible by artist-philosopher-scientists looking upwards and asking those questions we have all likely asked. Sometimes it is the science that inspires the art, and other times it is the art that informs the science. Henry David Thoreau, for instance, in his introduction to *Walden* wrote what could easily be viewed as a precursor to quantum physics multi-verse theories that challenge both our understanding of time and place:

What distant and different beings in the various mansions of the universe are contemplating the same one [sun] at the same moment! Could a greater miracle take place than for us to look through each other's eyes for an instant? We should live in all the ages of the world for an hour; ay, in all the worlds of the ages. I know of no reading of another's experience so startling and informing as this would be.⁸

Imagine then, a world without the questioning blanket of nighttime's stars and planets? What knowledge we might never uncover, what beauty we might leave uncaptured. It could be

⁸ Levy, David H. Pgs. 146-147.

argued, perhaps, that we no longer need the night sky. We already know how the solar system works, that those fiery twinkling stars are actually suns, not unlike our own, that beyond our Milky Way Galaxy are millions more galaxies all flying away from each other. But we also know that any knowledge we have exposed is infinitesimal to the whole. To follow this line of thought, however, is arrogant at best and catastrophic at worst. It is true that scientific inquiry will continue with or without dark skies, but it will do so like a painter without its muse, uninspired and limited.

The Night Sky & the Mind

Besides the obvious external beauty of the night sky and the physical movements and phenomena studied there, the effect that the cosmos have on our internal minds is perhaps the most interesting relationship of all. Cognitive philosophers can often be split into two visions of the world, the realists who believe the world is exactly as we perceive it and the idealists who believe that there is only thought and that if we cannot perceive it than it doesn't exist.⁹ Of course it is more reasonable to split the difference and posit instead that the information flows both ways; that the stimuli of the external world inform our ideas of it and that by corollary our ideas of it inform what it actually is.

This is exactly what Timothy Ferris defends in his book "The Minds Sky: Human Intelligence in a Cosmic Context." He describes humans' relationship to the universe as a symmetrical hourglass. On one end of the hourglass is the outer realm, inhabited by all living beings and physical matter, and on the other end is the inner realm of the mind where all we can ever "know" lives. Through the neck of the glass flows both the sense data of the exterior and in

⁹ Ferris, Timothy. Pgs. 201-202.

the other direction, our models and concepts of the natural world. “We tip this imaginary hourglass from time to time,” writes Ferris, “but so long as there are thinking beings, neither bulb of the hourglass will ever be empty.”¹⁰ It is with this egalitarian model that I ask we consider our relationship to the night sky.

Why is it then that when we look up at the stars we think of ourselves? Why is it that the night sky is as much mirror as it is void? I would argue that it is for the same reason that when we look at our parents we see bits of ourselves. The universe is our past. Both in the fact that when we look up we are literally seeing millions of years into the past, and in the fact that we are all, in the end, made of stardust. With the growing evidence for the Big Bang theory of creation and the discovery of nucleosynthesis, scientists realized that all matter is created from the very same elements found in the core of stars. So when a star is born or dies, it releases these primitive elements into space. Hydrogen, helium, beryllium, and Carbon: these are the building blocks of all things, they are what physically connect us to the twinkling lights above us. In other words, we are an integral part of the mystery of the universe. By extension, what the universe is and who are, begin to look like the very same question. Max Planck, one of the founders of quantum physics wrote that, “Science cannot solve the ultimate mystery of nature...because in the last analysis we ourselves are a part of the mystery we are trying to solve.”¹¹ Ferris develops this argument even further, relating our existential crises to the comfort, or at very least commiseration, the stars provide:

We are confronted, then, not with the universe, which remains an eternal riddle, but with whatever model of the universe we can build within the mind. Every thinking

¹⁰ Ibid. Pg. xii.

¹¹ Ferris, Timothy. Pgs. 14-15.

creature shares this predicament; for all, the ultimate subject of inquiry is not the outer universe but the nature of its dance within the mind...And what is the emblem of a sound mind, if not conformance between the inner model and the outer reality? What we seek among the stars is sanity.¹²

Besides helping us maintain our sanity and footing in an ever shifting universe, the night sky may also be the key in connecting us to the human experience – reminding us that what divides us is second to that which unites us. There is a cognitive phenomenon that astronauts have described in returning from their assignments called the Overview Effect. The idea is that from outer space the natural and artificial boundaries that divide us disappear, and the need to create a global vision for our planet without all of our internal conflicts is not only paramount, but easily achievable from this new perspective, if only more people could experience it.¹³

Without the possibility of space flight, the next best thing to achieving anything close to the Overview Effect is the awe that comes from gazing at our fiery universe on a truly dark night. And by truly dark night I mean “that an observer needs to see 450 stars at a time,” as astronomer Bob Berman writes¹⁴. This is the number of stars one begins to see in a magnitude 3 darkness sky. This is the minimum, Berman argues, to get that feeling of “infinite” where we are “touching that ancient core, where it’s collective memories, or genetic memories, or something else from way back before we were even human.”¹⁵ In fact, there is a name for this experience too, where it feels as if the horizon disappears and you are falling into the universe. It is called ‘celestial

¹² Ibid. Pg. 15.

¹³ “Declaration of Vision and Principles.” The Overview Institute. Accessed December 2, 2014. <http://www.overviewinstitute.org/index.php/about-us/declaration-of-vision-and-principles>.

¹⁴ Bogard, Paul. Pg. 446.

¹⁵ Ibid.

vaulting'¹⁶. Unfortunately, with the increasing loss of darkness, the chance to experience celestial vaulting is becoming just as rare as space flight itself.

In Defense of Darkness

Electric street lighting marks a paradigm shift in human civilization. Before this time the setting of the sun meant the end of working and socializing hours, the signal to come, and remain, inside. The “nocturnalization” of society, as historian Craig Koslofsky calls it, was largely viewed as an ultimate triumph of mankind over nature. To give an idea of scope, the mealtimes for average Europeans shifted back by as many as seven hours from the Middle Ages to the 1800s.¹⁷ Our collective productivity from this point on would directly influence the coming industrial revolution and usher us into the modern era as we now know it.

Many arguments in favor of ever brighter public spaces at night use safety as their rallying point. While there is no doubt that lights at night make us feel safer, there is little concrete evidence to the idea that more light means safer streets, in fact there is more evidence to the contrary. There is a minimum amount of quality illumination needed for safety, it is true, but any light beyond that threshold can often cause negative effects. Bob Mizon, an astronomer and dark night advocate, says when he is consulting local governments about light pollution:

Look, there are thousands of little villages in England with no streetlights – are they hot spots for crime? No, they are not. And when you see crime on the television or

¹⁶ Ibid. Pg. 269

¹⁷ Bogard, Paul. Pgs. 723-728.

you see people rioting in city centers or fighting each other on the CCTV cameras and vomiting in the gutters, are those dark places? No, they're brightly lit places. They're the brightest places in Britain, and they are the most crime-ridden places in Britain. So what's the conclusion? Does light prevent crime? Of course not, it's rubbish.¹⁸

Overall, the studies seem to back up Mizon's claims. A 1977 U.S. Department of Justice report found no statistically significant evidence that street lighting impacts the level of crime.¹⁹ Why then are we taught to believe, almost intuitively, that more light means safer places? It goes back to primitive man, and our ancient, and quite justified, fear of the dark. "This most ancient of human anxieties," writes historian Roger Ekirch, "has existed from time immemorial...Night was man's first necessary evil, our oldest and most haunting terror."²⁰

It is no coincidence that happy people are said to have "bright" dispositions whereas unhappy people are typically "dark" and solemn. The dichotomy of light and dark, good and evil, seems to be just as old as our fear of darkness. It is a myth so ingrained into our collective psyche that it is no wonder we still fear the dark. How then can we hope to get past our fear of darkness? We no longer live in a world where nighttime means the threat of wolves or lions or fire. Rationally speaking, our fear of the night is an evolutionary souvenir, like tonsils and appendices, which we no longer have much use for.

Perhaps there is no way to fully heal this anxiety of the dark. Instead we might ask, as Paul Bogard does in his seminal book *The End of Night*: "What do we lose – women and men alike –

¹⁸ Bogard, Paul. Pgs. 76-77.

¹⁹ Ibid. Pg. 78.

²⁰ Ibid. Pg. 80.

when we are so afraid of darkness that we never experience its beauty or understand its value for our world, while allowing our lights to grow ever brighter?”²¹ Another question I would add: What exactly is the wrong with a bit of healthy fear? Today, civilized urban life is so over-protective, that a bit of primitive fear may do well to wake us up, keep us cautiously alert, and remind us what it feels like to be truly alive and vulnerable (even though we likely face no real threat). It is a particularly hard argument to sell, I have no doubt, but something to consider nonetheless.

Conclusion

Light pollution, unlike many other kinds of pollution, is an issue that is well within our power to control and correct. Because its reduction also means massive savings on electricity for individuals and governments alike, it really is a win-win scenario. With the proper re-education of lighting professionals, the general public, and local governments, there is no reason why stars cannot shine again in some of our night skies. As we have seen in this paper, the consequences of doing nothing could be tremendous. It seems to me that the very advancement and sanity our race depends upon the survival of this most ancient relationship, between man and the stars. There is something honest and true that passes between us and our universe when we stop to consider the stars. As Paul Bogard’s reflects during the Great Basin National Park in Nevada:

How right it feels to know a true night sky, how right to know the dark. And as my companions and I head back toward the parking lot, back toward the light, I let the others walk ahead, and turn— one more time before I go inside, before the lights

²¹ Ibid. Pg. 86.

take my night vision— to see in that darkness our home in the universe, the rising ribbon of billions of stars sashed overhead, horizon to horizon, just as it always has been.²²

Final Word Count – 3,300

²² Bogard, Paul. Pgs. 270-271.

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Answering Student Questions:

1. Pointing the light down helps reduce light pollution, but would they also decrease the intensity to help with the negative effects of artificial light?

A: The negative effects of lighting, in terms of astronomical light pollution, are that most of the time unshaded street lights illuminate in all directions. By only having them illuminate down this greatly decreases the amount of light being wasted and clouding our view of the night sky. Intensity is a separate issue.

2. Can light pollution affect mental illnesses?

A: There is no evidence that connects light pollution directly to mental illness, though it has been linked to sleeping disorders which can affect mental health.

3. Do the new dramatic shifts in light play a role in altering circadian rhythms? (Ex: Shift from bright lighting settings → low light)

A: Yes, this is the number one cause for negative health effects from light pollution. The disruption of the body's natural circadian rhythms that comes from light pollution, can lead to many other health effects such as insomnia and increased blood pressure.

4. Which types of artificial light are least destructive? (Flourescent, Halogen, FO, transmitted sunlight, etc.)

A: There is no single type of artificial light that is better or worse. It is how these lights are designed, and how often they are kept on that is the larger issue. That being said, there is new evidence that lights with blue undertones, especially those from electronics, can have worse health effects on human health.

5. What techniques can architects apply to help solve this issue (even if it is minimal)?

A: Using LED lights can help because it is easy to add light sensors and dimmers that will decrease the amount of unwanted light in a space. Outdoors, applying shades to all lights, so that no light escapes upwards can also help.

6. What type of collaborations should/are happen(ing) between designers/planners?

A: Currently light designers and engineers do collaborate with city planners, although more education is needed on the issue of light pollution. In more rural areas, however, there is the need for more lighting professionals.