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Darkness and Sustainability: Other Species' Night and Human Aesthetic Preferences

Abstract

This article explores the connections between darkness and sustainability, particularly in contemporary night environments, and the needs of various species. Artificial light plays a vital role in shaping the aesthetics of today's nightscapes. For humans, illumination during night-time serves both practical purposes after sunset and enhances the aesthetic appeal of the night. However, this same artificial lighting poses disturbances to other species. Consequently, using artificial light at night is a significant issue in discussing a sustainable future.

Keywords

Darkness, Artificial Illumination, Other Species, Aesthetic Choice, Aesthetic Preferences

Introduction

The aesthetics of environmental issues have changed over the past few decades. Former practices, for instance, using leaded fuels or regarding land-fill disposal as adequate for waste disposal, are now inappropriate. Waste, pollution, and noise have become established environmental problems. The levels of dangerous substances, including noise pollution, have strict limits, and exceeding them has legal consequences. The common aspect of these restrictions is that they are based on quantified information.

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The case of artificial illumination is different. There are limits to adequate lighting, but no consensus on defining harmful light exists. Moreover, when the energy consumption for outdoor illumination decreases, along with technological innovations like LED lights, the link between artificial light and its environmental impact changes. Energy consumption and emissions are no longer the focal issue in the context of artificial light. Instead, the magnitude and impact of light in the night-time environment are.

If artificial illumination is seen as beneficial for human lives and the restrictions for the magnitude of lighting are negligible, there is no real motivation for reducing night-time illumination.

Nonetheless, the harms of continuous illumination are acknowledged. Night-time illumination affects diurnal rhythms and can cause health problems for humans, such as those working during the night. Still, the harmful effect of light is seen as limited, and the benefits of artificial illumination overcome the problems. The impact of night-time lights is not well understood.

1. Night-Time Aesthetics

The aesthetics of night have been discussed rather extensively, considering both natural night and darkness in cities. The classic texts, mainly Edmund Burke (2014 [1759]) and Immanuel Kant (1987 [1790]), associated darkness with the sublime. However, Burke's analysis of darkness included the bodily effects, thus expanding the idea of sublime experience (Burke 2014, 108, 145, 279). In my understanding, Burke appears to be the only philosopher so far to consider the aesthetic qualities of darkness as such and not strictly in the context of the sublime. His initial intention was to analyze the relationship between darkness and the sublime, but the inquiry about the experience of darkness extends beyond that single scope. For instance, while Burke's deliberations about darkness as privation, the relations of darkness and blackness, as well as the physical reactions related to experiencing darkness, are presented in the context of the sublime, they explicate the qualities of darkness and our reactions to it also in a broader context (ibidem, 125, 278-280, 281, 283, 286).

Contemporary research on dark environments has two core subjects: the natural night sky and the urban nights. The texts about the natural night focus mainly on the visibility of stars, the Milky Way, northern lights, and other celestial wonders, and the effect of light pollution on these phenomena (Bogard 2013; Stone 2018, 2017). Studies about urban darkness have

adopted a contrasting perspective to the night and concentrate more on the historical and cultural aspects of the dark hours, such as the development and outcome of artificial illumination and the effects of extended active hours on urban culture, such as the feeling of security, the sub-cultures and their spaces in the urban shadows (Edensor 2015b, 2015a, 2012; Nye 2010, 1994; Dunn 2016; Tainio, Lyytimäki 2022).

Despite the various views on night, these examinations share the same perspective: in the center are the human experience and the human aesthetic preferences. The effects and consequences of night-time lighting on natural life are often mentioned, but second to human liking, even though continuous illumination threatens many other species and thus forms a part of ongoing environmental change and contributes to the loss of biodiversity (Tainio, Lyytimäki 2022, 29; Sanders *et al.* 2021). Furthermore, the focus of the studies is often on the exceptional—the sublime experiences under the starry sky—or the unique atmospheres created by artificial illumination in the urban night (Edensor 2012; Nye 2022, 23). The average darkness is not aesthetically interesting for today's observer (Nye 2010, 10).

In addition, most previous inquiries about darkness and the night regard darkness as more of a background than the subject itself. Darkness brings out faint lights as a backdrop and makes it possible to experience celestial views or captivating illumination in a city, but it is only partially significant for contemporary human life.

2. Normative Aspects of Night-Time Illumination

While the aesthetically positive outcome justifies night-time illumination—it turns the gloomy night-time environment into a modern and pleasing sight, it also has a vital security aspect, as night-time lights make people feel safe (Nye 2010, 12; Morgan-Taylor 2015, 164). These two perspectives on light are linked, but the security aspect is more substantial when the normative aspects of artificial light are rationalized. When night-time illumination makes moving around easier and enhances the felt security, it also assists people in enjoying free time in the late hours. Light affords various activities, enhances the night-time views, and thus is aesthetically enjoyable, but for justifying the omnipresence of light and the continuous increase of illumination, the security aspect is considered predominant.

Contemporary night-time illumination has a robust normative foundation as various local, national, and international decrees oblige a particular type and magnitude of night-time illumination. Modern societies have estab-

lished standards for adequate lighting that guide lighting on streets, highways, and other public spaces. Likewise, standards are set to make seafaring and air traffic safer (e.g., Finnish regulations for motor vehicles: Liikenneviraston ohjeita 16/2015). The common aspect of these standards is their indifference to the aesthetic experience of the illumination. The amount, color, orientation, and other details of light are specified, but their overall effect on the aesthetics of the environment is not considered. Sometimes, these standards are supplemented by local guidelines to achieve excellent and consistent night-time illumination (e.g., Helsingin kaupunki 2020). However, these guidelines are subject to technical norms that have different objectives.

The justification of the standards is often monetized, for example, by comparing the cost of lost lives in traffic and the effect of adequate illumination on traffic deaths (Liikenneviraston ohjeita 16/2015, 121; Tervonen 2015, 6). These numbers rationalize standards requiring more light without any fundamental questioning or discussion about the aesthetic qualities of night-time illumination. The rationale does not leave room for contesting the amount of light, and frequently, construction or renovation traffic routes produce more light in the night-time environment. Because the new technologies decrease the energy consumption of each light fixture, renewing lighting structures seems to align with sustainable development. The prevalent standards override possible contradictory ends, consequently hindering even a discussion about changes in night-time lighting—concerning especially the possibility that lower levels of illumination could be sufficient (Lyytimäki 2013, e46-e47).

3. Aesthetic Effects of Artificial Light

The aesthetic *footprint* (Naukkarinen 2011) is a concept that suggests considering the broader effect of our aesthetic choices and preferences. The idea of the aesthetic footprint is to support evaluating the relationship between one's aesthetic enjoyment of a product, event, or artificial changes in the environment and the aesthetic consequences of their production and consumption, thus bringing forth the broader impact of one's aesthetic preferences (Naukkarinen 2011). For instance, the aesthetic footprint of a garment bought in Finland often occurs in a distant part of the world, where the fabric is produced and the garment is manufactured, and the aesthetic impact might be more significant than the purchaser's enjoyment.

Artificial light is similar to other human products and activities—its ecological and aesthetic footprint is far-reaching. The aesthetic effect of artificial light is partially invisible, similar to the aesthetic footprint of the production

of garments. The aesthetic quality of a new shirt does not disclose its aesthetic longevity or the various aesthetic consequences of its production. In the case of artificial illumination, most of the light's impact can be detected easily; a light source illuminates its vicinity. This part of the impact is planned, but the light often glares where it should not, much further than one usually thinks. In more troublesome cases, the effect is much more comprehensive. Poorly installed or too-powerful light can produce a diffuse glow visible from a long distance, which is not noticeable near the lighting structure. In addition to these local effects, the aesthetic footprint of artificial light includes the production of the light source, its technical durability, and the production of energy needed for illumination. In the context of night's aesthetics, artificial light's local aesthetic footprint results mostly from carelessness, ignorance, and deficient planning. While decorating one's garden or protecting a property with lights, the far-reaching effects are regularly overlooked, resulting in unnecessary illumination.

Light pollution, which is nearly omnipresent today, is visible evidence of the aesthetic footprint of light. The way artificial light can leak into unexpected places is seldom noticed. Thus, the effect of light is identical to other changes in the current climate crisis. The shift in local ecosystems caused by light is so gradual that it is almost impossible to observe without a unique research setup (e.g., Boyes *et al.* 2021; Elgert 2023, 13-15). Popular light pollution maps exemplify the difficulty of detecting changes in night-time artificial illumination. They provide a generic view of the changes in night-time illumination but are inaccurate at showing the conditions in a specific environment. Thus, even notable changes in local ecosystems induced by night-time illumination become evident only through targeted studies (Lyytimäki, Rinne 2013, 127; Davies, Smyth 2018). The primary reason for the invisibility of the increasing night-time illumination can be understood through the *shifting baseline syndrome* that moves our idea of "normal" lighting levels and makes the brighter illumination the new normal (Stone 2017, 290). Furthermore, the spectrum of light also has a significant effect. The recent change from previous technologies, e.g., incandescent and sodium lights to LED technology has brought the spectrum of artificial light toward shorter wavelengths, which are more disturbing to both humans and nocturnal species (Svechkina *et al.* 2020; Van Tichelen *et al.* 2019, 67).

Humans suffer from various forms of light pollution. In addition to the generally increased illumination that hides celestial views, light can glare and trespass in dark spaces. Light sources can form clutter—"bright, confusing, and excessive groupings of light sources"—if not adequately planned

(Dark Sky International). Continuous light harms humans, causing different health problems, especially those working at night (Cho *et al.* 2015; Svehkina *et al.* 2020). Besides, other inhabitants of the night require darkness to survive and prosper.

Unlike in environmental aesthetics generally (e.g., Saito 1998), the non-human lifeforms and their needs are primarily neglected in the aesthetic investigations of night. The discussion about the aesthetic qualities of night and darkness has focused on the human experiences and how human activities and aesthetic preferences affect their ecological niches. However, the life sciences provide data about the harmful effects of continuous illumination on various species.

4. Artificial Illumination at Night and Other Species

Because of the comfort artificial illumination provides for contemporary lifestyles, the ecological impact of streetlights illuminating nearby fields or forests is not a concern for the general public. Moreover, nature along the streets or roads is seldom considered valuable. Various shrubs, generic trees, and half-wild, unkempt vegetation will likely raise no interest. For most people, they appear as a mess. Likewise, the animals in these areas are usually not aesthetically appealing but small and remain mostly hidden from human observation. It is easy to understand that this in-between environment is customarily considered insignificant in both the biological and aesthetic senses. However, these sentiments are incorrect. Seemingly negligible locations matter despite their unimpressive aesthetics and typical vegetation and animal life, and the environmental effects of night-time artificial light prevail there, too.

In general, direct street lighting has detrimental impacts on local insect populations and LED lights significantly adversely affect insect populations compared to older technologies, such as sodium lights. Especially harmful is diffuse skyglow, which occurs when artificial light shines upward and scatters off atmospheric molecules or suspended aerosols. Most skyglow comes from urban areas but affects rural areas that are still seemingly dark. Even a dim skyglow disrupts the diurnal cycles of many forms of life. This disruption becomes most visible in various moths whose diapause induction and, consequently, winter survival are negatively affected by small amounts of artificial light (Merckx *et al.* 2022, 1023, 1026). Even though night-time illumination is just one explanation for the decline of moth populations, its impact is clear (Boyes *et al.* 2021).

Light pollution forces animals to change their activities in ways that endanger the future of the population. For instance, night-time light disturbs the mate attraction of the common glowworm (*Lampyrus noctiluca*) by changing the behavior of female glowworms. Elgert (2023, 25, 26) has found that when subjected to night-time light, the female glowworms do not relocate to a darker environment but hide and refrain from glowing, which prevents the discovery of partners. Moreover, the male glowworms seem to favor the females in a dark environment and select brighter and larger partners than in natural circumstances. This changing behavior produces a bias in mating and suggests adverse effects on reproductive output.

While light pollution most notably influences insect populations, it also affects other animals. The effect on migratory birds as well as sea turtles is well-known (Lyytimäki 2013, e46), but animals like bats that are otherwise adapted for living close to human habitats are disturbed by light that exposes them to predators and impedes their foraging (Rydell *et al.* 2017). Furthermore, attempts to reduce the human impact on Earth can result in unpredictable consequences that sometimes have adverse effects on (night-time) ecosystems. For instance, wind turbines producing green electricity have night warning lights that disturb bats in boreal forests (Gaultier *et al.*, 2023, 6).

In addition, the sensory systems of most other species differ from human senses. Our eyes can detect only a narrow spectrum of “visible” light between wavelengths from about 380 to about 750 nanometers, while many species’ vision abilities reach outside this—to ultraviolet like birds or infrared like snakes. Many other animals can see in almost complete darkness where human eyesight is almost useless, and species like bats have other means of observing their surroundings in the dark (Telkänranta 2015, 13-21). Consequently, it is impossible to comprehend the effect of artificial light on other species.

The previous examples show the substantial effect of light on many species. Some species benefit from light, but more become disturbed when night-time illumination increases (e.g., Sanders *et al.* 2021). Current studies analyze the populations and behavior of insects and minor vertebrates that are reliant on particular ecological niches and, therefore, cannot escape increasing light and are easily attainable for research arrangements (e.g., Merckx *et al.* 2022, 1024; Boyes *et al.* 2021). These species seem to have minor significance, but their population and reproductive behavior changes can be the markers of notable changes in a local ecosystem or even in a broader context as their populations affect pollination and food chains (Boyes *et al.* 2021).

The direct effect of artificial light on animal populations has been shown (e.g., Sanders *et al.* 2021), and night-time artificial light has ancillary consequences on human population. If the impact of artificial light is viewed through ecosystem services, its extent becomes apparent. Jari Lyytimäki (2013) shows how artificial illumination adversely affects the services humans receive from night-time ecosystems. According to Lyytimäki (2013, e45), these services include, for instance, “nocturnal processes related to nutrient cycling, soil formation, primary production, disease regulation, pollination, and water purification” as well as “goods harvested at night-time,” night-time fishing. In addition, “nocturnal nature watching and recreation, including observing celestial objects from nature” can be included in the nocturnal ecosystem services. The effect in humans is primarily indirect, but it can be significant when artificial illumination impacts species essential to crop pollination.

There are implications that night-time lights affect the biodiversity of nocturnal landscapes in various forms of life, from vegetation to mammals (Kyba, Hölker 2013; Grubisic *et al.* 2018, 5-7). When thinking about the range of species disturbed by light and the differences in the sensory systems between life forms, we can suspect that artificially illuminated environments and skies form environmental harm today. As the lifeforms studied in the examples above are insects and other small animals, the changes seem like minor events, but they can be markers of irreversible changes in an ecosystem.

The views presented above mainly consider light to be a practical technology that impacts human culture and animal populations, but from the perspective of this article, much of the artificial light results from aesthetic choices and preferences. Technological development has allowed us to decorate the night with artificial light. However, new knowledge about the consequences of constant illumination raises an ethical question: should we make conscious aesthetic choices because of other species’ lives, even if it requires adjusting our aesthetic preferences about illumination?

5. The Night: Human Aesthetic Preferences and Choices

Darkness comes naturally every day, and our habit is to try to abolish it. It is both easy and difficult to restore. Technically, it requires cutting the power, but a cultural acceptance of a darker environment involves making a significant conceptual turn and fighting against our current habits. Instead of enjoying the abundance of artificial light, we ought to explore ways of thinking

that would assist in appreciating dimmer conditions and shadows. The Japanese classic *In Praise of Shadows* by Jun'ichirō Tanizaki (1977 [1933]) presents unlit environments in the context of traditional Japanese culture. Tanizaki's book underlines his nostalgic view of the shadows and dim lights while giving an example of the possibility of seeing darkness in a different light. Night-time lights are much more pervasive today than in the early 20th century, so contemporary culture will have more difficulties finding appropriate ways of enjoying or tolerating shadows. However, some paths can help adopt new approaches to darkness.

The aesthetic value of a particular environment can be separated from its spectacularity despite our inclination to be fascinated by beauty, cuteness, and exceptionality (Saito 1998, 103-104; Diaconu 2015, Section 4; Lehtinen 2021, 260). Unscenic nature may demand some effort to understand its structure and function. This cognitive undertaking allows the widening and deepening of one's perspective, which may bring forth the subtle aesthetic values of the unscenic environment (Saito 1998, 103-104). Knowing the ecological dependencies between the seemingly uninteresting vegetation, various animal species, and a specific place can turn dull streetside shrubs into an aesthetically significant environment. Furthermore, assimilating a place's characteristics requires an intimate relationship, meaning active engagement with the particular environment and its features (Saito 2022, 52, 54). Achieving this requires slowing down and looking at the mundane environment afresh. This approach relates to ideas in everyday aesthetics, where familiarity—time and repetition—results in a significant caring relationship with objects, environments, and events (Saito 2022, 144-146).

Respectively, a normal state of intangible, commonly unnoticed phenomena can become aesthetically pleasing when their extremities become too widespread and make life unpleasant. Mădălina Diaconu (2015) discusses the benefits of average weather in a climate crisis, which can shift aesthetic preferences away from extremes. When heat, storms, and other radical weather events become stronger or too frequent, the steadiness of average weather is a relief.

Normalized darkness can become aesthetically interesting and worth protecting for the same reasons. Getting familiar with mundane, unscenic, dark environments, learning about life in shadows, and perceiving it in different conditions assist in understanding the particularity of the night-time environment. Moreover, the awareness of nonhuman lifeforms and their dependence on the dark environment can cause a shift in our attention from human preferences and demands to a broader context.

The idea of a caring attitude toward the material world emphasizes the connection between aesthetics and ethics. These two are intertwined in various ways, so aesthetic choices are not without an ethical dimension. Neither seems dominant, but they are connected from both directions. Marcia Muelder Eaton (1997, 359-361) sees that moral development requires both “style and content,” which entails aesthetic skills. The aesthetic aspects of ongoing climate change and the sustainable future are connected to moral problems requiring action (Brady 2014, 552-553). According to Brady (2014, 554), the aesthetic dimension of climate change includes, for instance, the effects it has on nature itself, the aesthetics of technologies that deal with climate change, and changes to human practices and constructions induced by the changing climate. The aesthetic quality of these changes will produce uncertainty as they take place in the future, but considering the repercussions of the possible changes is required to promote a sustainable future—both ecologically and aesthetically.

Kevin Melchionne’s (2017, 289, 290) analysis of aesthetic choices can provide a potential method for considering their consequences. Melchionne’s analysis relates the aesthetic choices in the context of consumer behavior, but connecting his ideas with the choices in the broader environment context seems feasible. Melchionne sees that aesthetic choices are customarily connected to leisure and entertainment; they are voluntary and low-risk decisions. In addition, they are contingent and constructive, which means that the choice is not based on a consistent method; instead, the procedure takes place organically. Furthermore, aesthetic choices can have different weights. Sometimes, the choice is casual *picking*, more critical *choosing*, and in some cases significant, usually irreversible, *opting* (Melchionne 2017, 292). Melchionne places most aesthetic choices toward the lighter end of the scale, which is probably correct in making preferences for art or cultural products.

In aesthetics and sustainability, aesthetic preferences and choices have more weight. There is, or at least there should be, an ethical obligation to make aesthetic choices by considering a sustainable future and adopting a caring attitude toward our environment and other species. Linking ethics and aesthetics emphasizes the relationship between background knowledge about an environment and its appreciation in a correct manner, as well as the ability to make the right choices concerning it. Melchionne (2017, 296) also sees the problem of low-risk consumerist aesthetic choices and introduces the idea of aesthetic *plans* that work on underlying contingent aesthetic choices, giving a coherent direction to the unity of aesthetic choices.

He describes everyday aesthetic choices as a mechanism that steers a drifting choice-making individual, whereas the aesthetic plan works as a motor that propels one's aesthetic life (Melchionne 2017, 295). I want to add ethics as a compass that points the direction, at least when one opts for a significant choice that has a significant impact.

Adapting the concept of aesthetic plans to the context of night-time aesthetics and sustainability has consequences: when we consider the case of the night-time environment in the context of ecological sustainability, we should be able to think outside our prevalent aesthetic inclinations (low-risk choices) and human privileges, pay attention to the interests of the other species, and act accordingly. However, a shift in individual preferences can generate only partial changes. In order to accomplish a fundamental transformation of our approach to the night-time environments, the normative element of night-time lighting should be based on a new ideology that balances the current priority of security and the ecological necessity of darkness, which requires a turn in collective behaviors in the appreciation of the night.

6. Moderation of the Artificial Light

Changing our appreciation of night requires concepts and tools to facilitate the shift. When aesthetic values are based on a more profound understanding of the perceived object, the attractive surface is not enough to make it desirable or positive (Lehtinen 2021, 261). Understanding the environmental impact of a product, service, or habit can make a previously appealing object or arrangement unpleasant.

One possible start for shifting our appreciation of the night-time environments is the concept of *aesthetic disillusionment* that Cheryl Foster introduced in 1992. Aesthetic disillusionment occurs when the object of admiration changes because of new knowledge. For example, Foster provides situations when an object that one has admired as a skillful work of art turns out to be a natural formation and when the beautiful colors of a sunset turn out to be a result of airborne pollution (Foster 1992). With the new knowledge, one can enjoy the sight only in brackets—it is beautiful, but we must admit that the previously beautiful thing still looks the same, but we cannot enjoy it anymore.

Foster's idea can be applied to the context of artificial illumination. The application would involve finding a new mindset that assists us in abandoning our fascination with a brightly illuminated night like other visually im-

pressive ecological issues such as pollution-induced sunsets. If this viewpoint is achievable, it can lead to disillusionment with night-time illumination. Asking for a change in the typical taste for night-time lighting, a disposition that has prevailed since the late 19th century (Nye 1994, 176), might be impossible. However, a gradual dimming of the night or planned darkness as a special event could develop tolerance to darkness or at least generate an understanding of the positive experiences a gloomy environment can reveal (Tainio 2019).

Another method for making the shift towards darker nights more conceivable is to speculate with future aesthetics: the aesthetics of objects, conditions, and events we have not perceived yet (Brady 2014, 557). This aesthetic future calls for a similar use of imagination as the concept of an aesthetic footprint. It is not easy to obtain accurate data about the relationship between our choices in general and the aesthetics resulting from them. One option is to predict the coming condition by combining our current situation and our (aesthetic) options. After the speculations about the potential future aesthetic qualities, there is a need for actions that assist in achieving the desired outcome. While *choosing* a completely different future, for instance, a darker night-time environment, is not probably feasible, changing the direction of our *drift* is possible by consistent minor changes. By opting differently, it should be possible to shift our current aesthetic preferences and gravitate one's lifestyle towards fulfilling the expectations about a sustainable turn, despite that being aesthetically more demanding. The ethically right minor decisions (directed toward a sustainable future) can make a difference if recurring.

The theoretical concepts are the foundations for practices and tools required to reduce ubiquitous artificial illumination as a more desirable option. One practical possibility is to make the actions leading to darker environments appear more alluring. An example of making the change preferable is David E. Nye's (2010, 216) use of the *greenout* to describe voluntarily switching off night-time lights. Nye writes about greenouts as a form of energy conservation, but today, they can be used in the broader context of sustainability. According to Nye (2010, 56), greenout does not mean darkness but abstinence, using considerably less light, as in the earlier *brownouts* in the United States after the Second World War. When the greenouts are compared to previous acts that were similarly a collective effort, it is much easier to see them as beneficial. Today, comparable abstinence is possible with modern technology that activates the lights only when required by human activity. This way, the unlit night feels less intimidating and allows one to see shadows as a proper choice.

If it is possible to see a pollution-induced sunset as superficially beautiful and displeasing, then modern night-time illumination is also likely to lose its charm when we learn to understand the extent of its effects. Awareness of the effects of artificial illumination on other species, and consequently on biodiversity and a sustainable future, is a substantial reason to reconsider the current manner of illuminating the night. The necessary shift towards darker nights is more straightforward to accept if we, in addition to the sublime, starry skies, take an interest in the less spectacular forms of darkness and learn to enjoy cloudy nights, different kinds of shadows, gloomy landscapes, and all the joys of living in a darker night.

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