SHIVELIGHT SPACE: BIOPHILIC LIGHTING DESIGN FOR INDOOR 'FOREST BATHING'

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ABSTRACT

This paper explores biophilic forest light as a design strategy for creating restorative indoor environments. Drawing on concepts of *shivelight*, *komorebi*, *shinrin-yoku*, biophilia, ecological design theory, and phenomenology, it proposes a framework for emulating forest-like light through architectural form and materiality. By translating natural light patterns into spatial design, the study introduces the concept of biophilic phenomenology - a multisensory, embodied ecological approach to light. Case studies demonstrate how such strategies can enhance well-being, offering a poetic and practical method for reconnecting urban occupants with nature through light.

KEYWORDS

Biophilic Design, Phenomenology, Architectural Light, Shivelight, Forest Light, Pattern Language, Sensory Architecture, Nature-based solutions

1. INTRODUCTION: THE FOREST WITHIN

In an era of rapid urbanisation and escalating climate crisis, our built environments are contributing to a profound disconnect from the

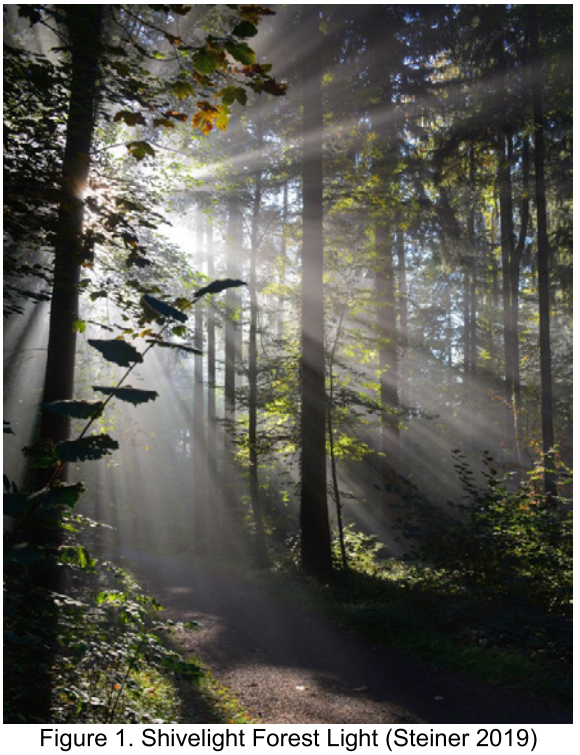


Figure 1. Shivelight Forest Light (Steiner 2019)

rhythms, textures, cycles and beauty natural world that once shaped daily human life. Architecture too often reinforces this divide: Many contemporary buildings are effectively designed as 'sensory deprivation tanks' - sealed off, man-made interiors devoid of sunlight, airflow, natural sounds and scents, and often lacking any evidence of non-human life. In a few short millennia - a blink in evolutionary time - humans have shifted from being immersed in natural systems to living in artificial spaces where greenery and wilderness are no longer part of our everyday lives.

As the climate crises accelerate and the natural world dwindles, mental health has also declined globally. Beyond carbon accounting and energy efficiency, there is a growing urgency for the built environment to address the full spectrum of human well-being, including physiological, emotional, psychological, and spiritual health of people in indoor environments. This calls for a deeper, more embodied form of design, which re-integrates living systems, nature-based principles, and ecological awareness into the spaces we inhabit. A return to nature-based

living will not just improve the ecological health of the planet and its natural systems, but also reconnect humans to our 'lost' natural world. This approach is not simply about bringing nature indoors, but about designing environments that make people feel embedded within the natural world once again.

We need more than sustainable buildings. We need spaces where the light shifts like it does beneath trees, where the air carries the scent of growth and life, and where we are reminded - subtly and repeatedly - that we are part of an ecological continuum. We need spaces that restore the forest within.

2. BIOPHILIC DESIGN: A RETURN TO NATURE THROUGH ARCHITECTURE

Biophilic design theory offers a compelling framework to restore nature to the centre of architectural experience. The foundation of this approach lies in the theory of Biophilia, a theory introduced by biologist E.O. Wilson (1984, 1986; Kellert and Wilson 1993). Biophilia posits that humans possess an innate, evolutionarily encoded affinity for the natural world, shaped by millennia of living in close contact with nature. By extension, the absence of nature, as found in many modern built environments, has been shown to increase both psychological distress and physiological dysfunction.(Kellert, 2015)

Social ecologist Stephen Kellert extended the theoretical foundations of Biophilia to identify the values of nature in human development (Kellert and Wilson 1993) and later developed practical design frameworks for biophilic environments (Kellert 2008; 2008b, 2015; 2018). Subsequent contributions from Browning and Ryan (2020), and Zong et al. (2022) further elaborated biophilic design principles into structured 'pattern languages'. These frameworks suggest that the essence of nature can be reintroduced into architectural space through a series of sensory-rich spatial, material, visual, and temporal design patterns that help the body perceive its environment as biologically familiar.

Biophilic design proposes that nature-based design is embedded into the heart of architectural experience and that buildings could simulate natural environments through immersive multisensory strategies. These include the emulation of natural light (dynamic, filtered, and circadian-aligned), the introduction of living vegetation, the use of organic materials and textures, the incorporation of water and natural scent, and the design of spatial rhythms that reflect diurnal and seasonal cycles. When layered intentionally, these elements can simulate the experience of being in nature, persuading both body and spirit that they remain connected to the living world, even within an artificially constructed environment. (Kellert and Calabrese 2015, 9-10)

Numerous studies have documented the benefits of biophilic environments: reduced stress levels and improved mental health, enhanced focus and productivity in workplaces, better learning outcomes in educational settings, shorter recovery times in healthcare facilities, and even reductions in crime in urban contexts (Ulrich 1984; Kaplan 1995; Dijkstra 2009; Donovan and Prestemon 2012; Kellert 2015; Kellert and Calabrese 2015, 4, 11; Aboushi et al 2019). Additionally, biophilic design also improves indoor air quality, enhances sensory engagement, and occupants report a general sense of beauty, peace, and well-being. (Kellert and Calabrese 2015, Khatri 2021) These are not luxury experiences, but essential human needs that have been largely neglected in contemporary design culture.

However, despite growing popularity, biophilic design remains underserved by practical tools and tectonic frameworks. While the literature offers guiding patterns and broad ecological principles, there is a noticeable absence of real-world, design-based methodologies, especially ones that translate theory into material and spatial language. Most biophilic frameworks do not provide clear architectural strategies or construction techniques, leaving architects without the toolkits, precedents, and tangible examples necessary to implement biophilic principles at scale. This gap is particularly evident in developing regions, areas with extreme climatic conditions, and budget-and skill-constrained urban environments.

Shivelight Space aims to address part of this gap

by investigating how one of the most fundamental elements of nature – light - can be reconceived through the lens of biophilic design, and how a practical design language and material toolkits may emerge for developing, climate and skill/budget-constrained regions. In doing so, it seeks to contribute to a growing body of practical, sensory, and spatial knowledge that repositions light as a living material, capable of restoring nature's presence within the heart of architectural experience.

3. RESEARCH OUTLINE

3.1. Research Aim

Despite the growing prominence of biophilic design within architectural discourse, the concept of biophilic light remains significantly underdeveloped and is often noted only as a cursory aspect of biophilic environments. Most biophilic frameworks reduce light to general principles of daylighting (referring to 'natural light', 'sunlight' or 'warm light'), without fully engaging with the more nuanced and multisensory and spiritual potential of light as experienced in nature.

The shifting qualities of 'natural light' – including the profound variations and nuances of light that one may experience in different natural environments, in varying climates or during different seasons – remain largely unexamined in architectural literature. There is also a lack of practical case studies which reflect how these light qualities may be translated into architectural design (as physical space, tectonic assembly and materials and constructed environments). In response, this paper outlines an in-depth exploration of one aspect of 'natural light': How architects might learn from the forest. By exploring how natural light behaves when it is broken, filtered, scattered, reflected, diffused and layered by leaves, bark, mist, and shadow, architectural design may emulate the dynamic, atmospheric, and immersive light conditions of forest environments. This paper attempts to develop a design methodology for what is termed '*Shivelight Space'* - an approach to 'constructed' biophilic lighting inspired by the dappled, shifting, sensorial qualities of forest light.

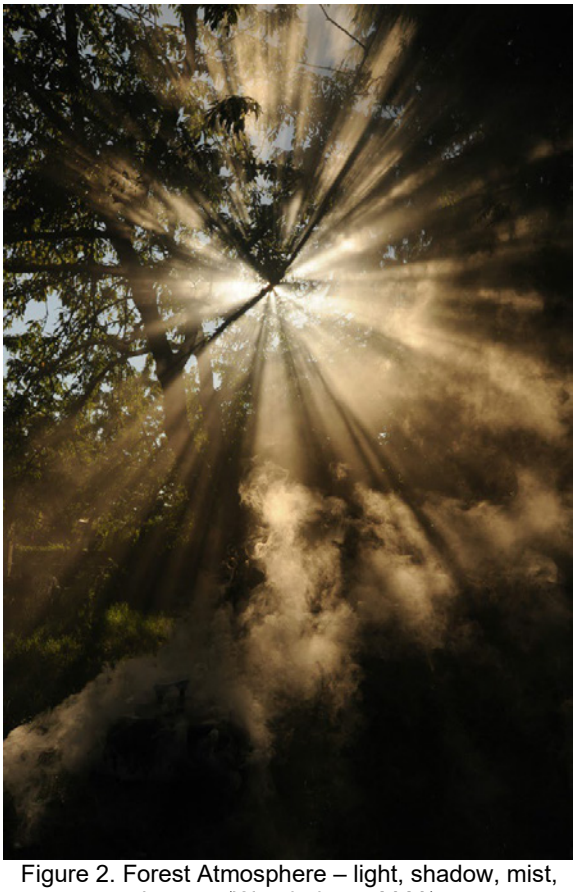


Figure 2. Forest Atmosphere – light, shadow, mist, leaves. (Wonderlane, 2020)

3.2 Methods

The study employs a multi-method research approach combining theoretical inquiry with spatial analysis to explore the architectural application of forest light. The following methods underpin the research:

Literature Review:

A critical examination of existing biophilic design frameworks, environmental psychology, theories of natural and forest light, and the documented health benefits of exposure to nature and natural light.

Grounded Theory Development: The concept of *shivelight* is explored through an interpretive lens, drawing from poetic and philosophical texts to develop a nuanced, spatial understanding of forest light.

Theoretical Framework: The study engages with core theories of biophilia and phenomenology to propose 'biophilic phenomenology' as a mechanism through which to understand the embodied, sensory, and affective dimensions of forest light, and to translate this to architecture.

Design Framework Development: The research formulates a new biophilic forest light framework, which synthesises theory, precedent, and phenomenology into a structured design language. This framework interprets the manipulation of light through various architectural material, tectonic and design mechanisms and is used as a lens to assess and interpret built case studies and to propose new tectonic design strategies.

Critical Case Study Analysis: Diverse architectural case studies were selected based on the developed *Shivelight Space Pattern Language* Biophilic Forest Light framework. Case studies were selected to range in programme, scale, context, climate, skill and budget to ensure that a wide range of projects were represented as practical examples of biophilic light. Each case is assessed for its approach to forming, filtering, and diffusing light to create immersive, health-enhancing atmospheres inspired by natural light conditions.

3.3 Limitations

While forest bathing involves a multisensory immersion in nature, including soundscapes, scents, air quality, tactile experiences, and temperature, this research focuses specifically on the visual and spatial dimensions of forest light. By narrowing the scope, the study explores light in greater depth, but it does not encompass the full sensory palette of forest environments. Additionally, although the case studies demonstrate practical applications of forest-like light, many projects were not explicitly conceived using biophilic theory, which may limit theoretical consistency across examples. Further research is encouraged into the architectural - or spatial-translation of other biophilic sensory qualities of the forest, including touch, smell, and sound.

3.4 Significance and Outcomes

Through theoretical frameworks, design strategies, and real-world case studies, this research contributes a practical and poetic toolkit for architects seeking to bring nature back into the spaces we build—not only for sustainability, but for beauty, for health, and for the profound human need to feel rooted once again in the living world. The research makes both theoretical and practical contributions to the fields of biophilic and regenerative architecture, including:

Expanded Theory:

It proposes a new conceptual and design framework for biophilic lighting, rooted in the nuanced phenomenology of forest light and informed by ecological and poetic thinking.

Practical Methods:

It provides concrete, implementable design strategies - including pattern languages, spatial techniques, and tectonic principles - for incorporating *shivelight* and other forest light typologies into architectural practice.

Pedagogical Value:

The research offers a design language and toolkit that can inform architectural education, particularly in studios or curricula exploring biophilic design, regenerative systems, and the sensory-spiritual potential of light in space.

4. THEORETICAL FRAMEWORK: THEORIES OF THE FOREST, THEORIES OF LIGHT

All great architecture speaks in light. It is a medium not only of illumination, but of meaning, shaping how we feel, perceive, and inhabit space. Light can soothe or stimulate, reveal or obscure, draw us inward or lift us toward transcendence and profound spiritual experiences. It is both material and immaterial, seen and felt. Bad indoor light can heighten stress levels and diminish health and well-being, yet critically, good light is neither expensive nor difficult to achieve. Light is not bound to one climate, construction budget, material palette, or cultural design aesthetic; It emerges from careful architectural tectonics and spatial design

through orientation, depth, layering, filtering, materiality and reflection. Good light is the result of carefully considered spatial design, attention to detail and architecture attuned to the movement of the sun and the spirit of place.

In a forest, light behaves differently. It is rarely direct, but always alive. Forest light is constantly shifting. It changes at different hours of the day as the sun arcs across the sky, shifting in warmth, tone, brightness, and colour as sunrises, sunsets, and different angles of light are filtered through layers of foliage, fragmented by branches, stems and trunks of trees. Forest light changes across seasons: it glows through new buds during spring, refracts through the verdant canopies of summer, reflects the deep auburns of autumn, and becomes austere and silvery in winter's bare branches. Forest light is also place-specific: The colour, density, and rhythm of light differ between boreal pine forests and tropical rainforests, between dry woodlands and dense temperate groves. These differences emerge from regional variations in tree forms, leaf types, canopy structures, and the shifting relationships between earth, sky, and vegetation. To understand forest light, then, is to understand light as a cultural, ecological, and phenomenological event—one that carries with it patterns, moods, and meanings that architecture can learn from.

The theoretical framework of *Shivelight Space* builds on the premise that light is not neutral, but a narrative sensorial structure. And when drawn from nature, especially the forest, it becomes a tool for designing spaces that resonate on both physical and poetic levels.

4.1. Shivelight and Komorebi

To translate the phenomenon of forest light to architectural space, the study draws on poetic and cultural understandings of light that give both sensory and symbolic depth. Two key concepts - *Shivelight* and *Komorebi* - serve as interpretive tools to explore light not merely as illumination, but as a nuanced atmospheric, textured, and poetic embodied experience.

The poetic notion of *Shivelight*, a term coined by poet Gerard Manley Hopkins, describes the "the lances of sunshine that pierce the canopy of a wood" (Mcfarlane. 2015). In his poem *That Nature is a Heraclitean Fire and of the comfort of the Resurrection*, Hopkins describes the occurrence as "shivelights and shadowtackle in long lashes lace, lance, and pair" (Hopkins 1888). The phrase evokes the visible beams, or 'shards' of sunlight, often experienced in forest environments as luminous shafts of light filtering through tree canopies. In *Shivelight*, the notion of light transcends abstract quality or atmospheric phenomenon to become a tangible, recognisable spatial form.

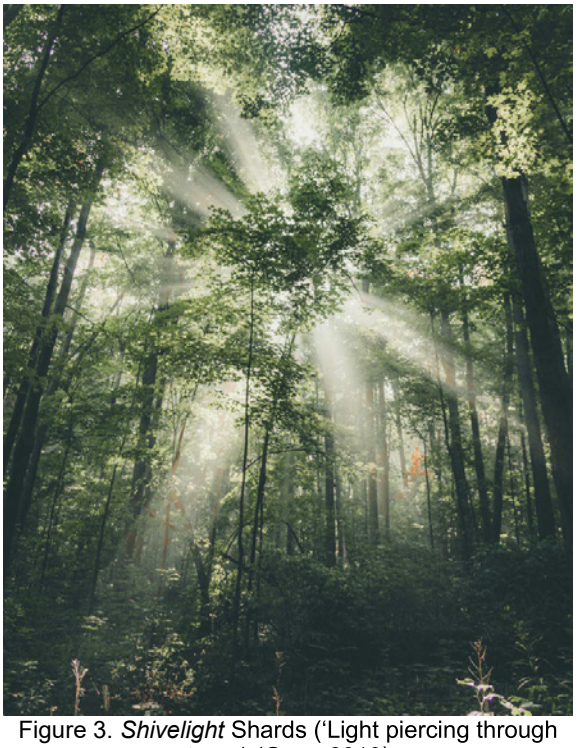


Figure 3. *Shivelight* Shards ('Light piercing through trees) (Gong 2019)

A second, parallel concept of Forest Light is found in the Japanese term *Komorebi* (木漏れ日), which translates as 木 (ko) "tree", 漏れ (more) " to escape from", and 日 (bi) "sun". Together, the characters mean something like "sunlight filtering through the trees." (Chicago Botanic Garden n.d.; Moor 2020) *Komorebi* (a term often used in Japanese literature and haiku poetry) Moor 2020) refers to dappled light patterns animated

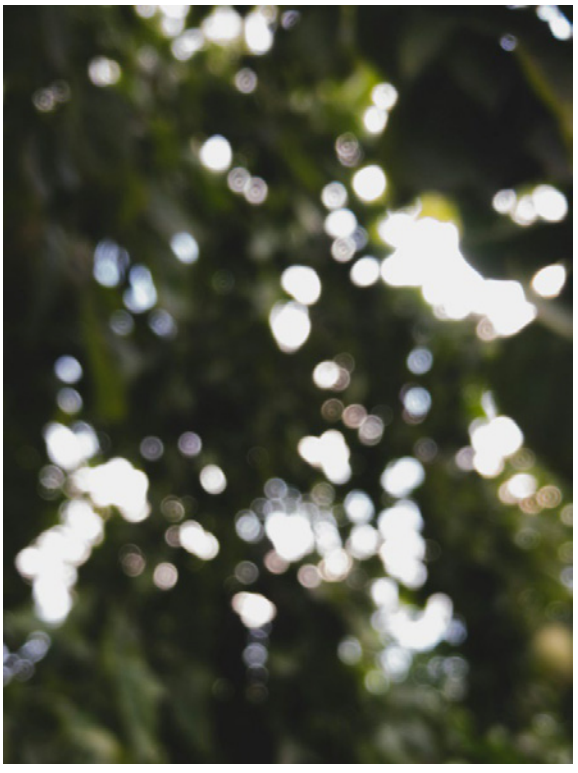


Figure 4. *Komorebi* Dappled Light (Dubei 2022)

by wind and leaves and evokes the shimmering interplay of light and shadow – or 'dappled light' - often found under trees on a forest floor. Unlike shivelight, which is more singular and dramatic, *komorebi* suggests a dispersed, animated quality of light in motion on a surface.

Together, the poetic concepts of *Shivelight* and *Komorebi* ground the phenomenon of 'forest light' in cultural and phenomenological interpretations, reinforcing the notion that forest light is not merely illumination, but possesses both physical form and emotional and sensory experience – light that is as much felt as it is seen.

4.2. Shinrin-Yoku (Forest Bathing)

A second lens through which forest light is understood is the Japanese practice of *Shinrin-Yoku* ("forest bathing"), an ecotherapeutic tradition that emerged in the 1980s. Literally meaning "taking in the forest atmosphere," it involves mindful immersion in forest environments to enhance physical, mental, and

Figure 5. *Shinrin-Yoku* ("Taking in the forest atmostphere") (Infernus 2020)

emotional health (Li 2018; Fitzgerald 2019; Forest Stewardship Council Africa 2021). While *Shinrin-Yoku* engages all senses, light plays a uniquely transcendent role and adds a spiritual dimension to the experience of a forest. It is through light filtering through branches, shifting across leaves, or glimmering on water that one begins to sense the forest as a living presence. This sensory immersion has been linked to reduced cortisol levels, improved immune and nervous system function, and enhanced mood, sleep, and hormonal balance (Li 2018, 2019; Park et al. 2007).

Through intentional design, the atmospheric and sensory qualities of forests—particularly forest light—can be translated into biophilic indoor environments. *Shivelight Spaces* seek to emulate the meditative, spiritual, and healing effects of forest bathing, offering accessible nature-based experiences in urban and indoor contexts where real forests may be out of reach.

4.3 Towards Biophilic Phenomenology

A third theoretical lens draws from phenomenology, particularly the work of Maurice Merleau-Ponty and Juhani Pallasmaa. In Phenomenology of Perception (1945), Merleau-Ponty argues that perception arises through embodied experience, where space is encountered not passively, but through sensory engagement shaped by memory, movement, and material interaction. Meaning is formed through being-in-the-world and through touch, temperature, rhythm, and light. Pallasmaa, in The Eyes of the Skin (1996), extends this to architecture, critiquing the dominance of the 'visual' in architecture and advocating for a multisensory design ethos that incorporates touch and texture, sound and scent, light and shadow, and atmosphere. Light, in Pallasmaa's view, is not merely illumination but a material and emotional presence: it reveals, veils, caresses, and defines space. It holds the power to evoke memory, intimacy, and transcendence—to move us, without words, through its shifting interplay with form and matter.

While both phenomenological theory and biophilic design advocate for immersive, multi-sensory environments grounded in material engagement, they operate through different conceptual lenses. Phenomenological design foregrounds the intangible: it uses the senses to access emotional resonance, spatial memory, spiritual depth, and the ineffable feeling of presence. Biophilic design, by contrast, uses the senses to reconnect with the tangible: to reintroduce the textures, systems, and forms of the natural world into the built environment, evoking a return to evolutionary familiarity and ecological belonging.

When combined, "Biophilic Phenomenology" becomes a powerful framework: Where phenomenology gives depth to how we experience space, biophilia explains why certain spaces feel inherently restorative. When phenomenological light is viewed through a Biophilic lens – particularly the lens of biophilic light - architecture gains the ability to connect body, memory, spirituality and ecology. The translation of forest light into architectural form thus transcends aesthetic motif or biological gesture, but becomes a vessel for nature-based emotional resonance, ecological memory, and multi-sensory spiritual reciprocity with a more-than-human world.

4.4 Theoretical Framework Implications

Together, these theoretical perspectives offer a layered understanding of forest light as a cultural, ecological, phenomenological, and spatial phenomenon. From poetic concepts like *shivelight* and *komorebi*, we inherit metaphors that give light emotional resonance and spatial texture. From *Shinrin-Yoku* (forest bathing), we learn that natural light is not merely functional, but therapeutic, capable of restoring psychological and physiological well-being. This underscores the urgency of reintroducing sensory and natural complexity into built environments, particularly in urban areas with limited access to nature. Phenomenology adds a deeper claim: that light is not only seen but felt, shaping memory, emotion, and presence. It operates at the threshold of material and spiritual experience, drawing the body into an embodied relationship with space.

Synthesising these strands, this study proposes a new framework that positions forest light as a central agent in biophilic design: a multisensory, symbolic, and material language shaped through architectural orientation, form, texture, and depth. By grounding light in metaphor, ecology, and embodiment, this framework enables the translation of ephemeral forest atmospheres into built form, offering architecture as a medium which enables light to become not only a connector to place but a mediator between nature and self.

5. LITERATURE REVIEW: QUALITIES OF 'LIGHT' IN 'BIOPHILIC DESIGN'

Using the *Shivelight* theoretical framework as a base, a literature review of 'Biophilic Light' was conducted. The aim of the review was twofold: first, to examine how light is defined and interpreted across key biophilic design frameworks; and second, to identify whether any

existing models offer insights into how architects might translate natural light phenomena – including concepts like ‘forest light’ - into design principles and spatial strategies. Four of the most widely cited biophilic design models were selected for critical review (Refer to figure 6):

1.Stephen Kellert (2008b): Kellert’s early framework offers perhaps the most in-depth description of the nature of biophilic light, and expands on the relationship between “Light and Space”. He describes various forms of light, including “sunglight”, “natural light”, “filtered and diffused light”, “Light and shadow”, “Light pools”, “Warm Light”, “Light shape and form”. However, the concept remains broad and underdeveloped, with no further elaboration on how sunlight might be shaped, filtered, or experienced in space beyond its functional importance for circadian regulation and psychological well-being.

2.Stephen Kellert (2018): In his later work, Kellert refines his earlier biophilic model, but the description of light is reduced to a singular bullet point listed simply as “Light.” The omission of spatial, aesthetic, or sensory detail highlights a persistent gap in the biophilic discourse.

3.Browning & Ryan (2020): The framework introduces a more promising pattern: “Dynamic and Diffuse Light.” This category begins to engage with ideas of temporal change, movement, and atmospheric variation - qualities inherent in forest light. However, while the recognition of dynamic light is a step forward, the framework provides no practical strategies for spatial implementation or material articulation of this light in architecture.

4.Zong et al. (2022): This later framework was developed following an extensive literature review of existing Biophilic frameworks. However, the engagement, definition and dimensions of light remain extremely limited: The framework uses the term “Daylight” but frames it almost exclusively in quantitative terms (i.e., lux levels, access to windows, solar penetration). There is little engagement with qualitative aspects such as light’s emotional or symbolic effects, or how sensory depth can be manipulated through tectonics, vegetation, texture, or orientation.

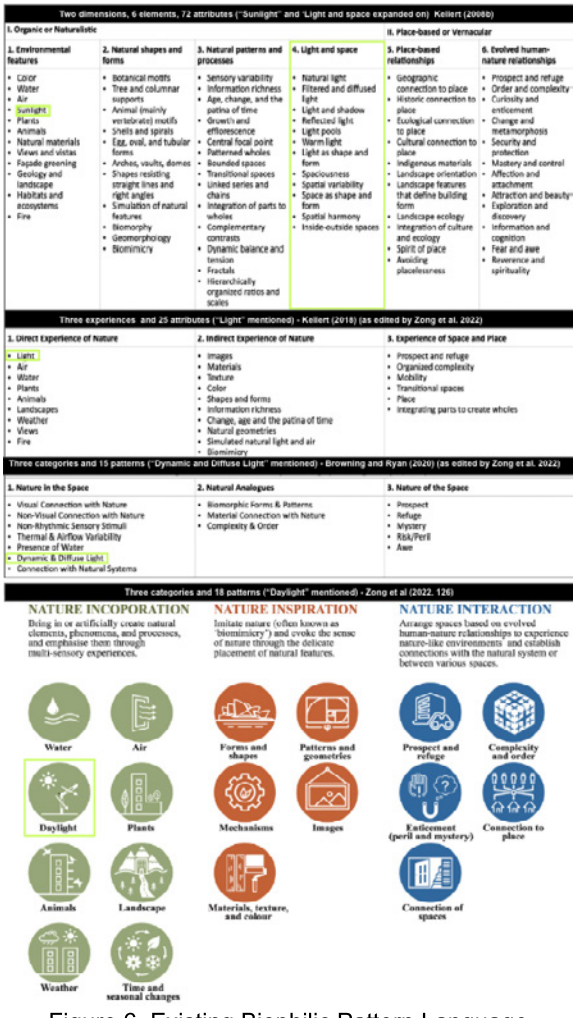


Figure 6. Existing Biophilic Pattern Language Frameworks (and their limitations when describing light). From top to bottom: Kellert (2008b), Kellert (2018), Browning and Ryan (2020), Zong et al (2022) (edited by author)

The literature review revealed a significant theoretical and practical shortfall in existing biophilic design frameworks: the lack of a nuanced definition and design-oriented approach to light. All existing frameworks use the term ‘natural light’ or ‘daylight’ fairly broadly, without recognising the existence of different types of nature-based light (e.g., forest light versus desert light), or the nuanced differences between light found in different types of forests. No frameworks explore how specific ecological light conditions (such as those created by trees, water, clouds, or wind) could be used as biomimetic models in architectural design.

Despite light being consistently recognised as an essential element of biophilic environments, the treatment across these frameworks remains superficial and technically vague. No framework offered the tools or language that architects need to shape, pattern, or compose light in a biophilic manner, nor do existing models articulate a theory of biophilic light that engages with emotional, poetic, or phenomenological dimensions. Moreover, there is a lack of tangible examples or practical guidelines for the design of 'biophilic light' conditions, such as how 'natural light' might be recreated in architecture through the design of openings, screening systems, material selection, or spatial rhythms.

6. LIGHT PATTERN LANGUAGE: TRANSLATING FOREST LIGHT INTO ARCHITECTURAL TECTONICS

In response to the limited treatment of light in existing biophilic design frameworks, a practical design framework was developed that recognises 'forest light' as a distinct typology of biophilic light and introduces a tangible, replicable, and tectonically grounded set of spatial strategies termed the *Shivelight Pattern Language*.

6.1 Typologies of Forest Light

Drawing from poetic and cultural frameworks such as *shivelight, komorebi*, and *shinrin-yoku*, at least four recurring and experientially distinct types of forest light were identified:

Shaft Light / *Shivelight*: Directional shafts or beams of light that pierce through canopy layers, often experienced as near-physical forms.

Dappled Light Spots / *Komorebi*: patterned, scattered light and shadow spots filtered through layers of leaves and branches, producing dynamic fractal shadows across surfaces.

Forest Glow / Ambient Light – a soft enveloping forest *glow* produced by light diffused through atmosphere (steam, mist, water) and shallow layered foliage, reflections off surrounding vegetation and ground-level reflections (off leaves or watery surfaces).

Figure 7. Four types of Forest Light (and their translation to architectural space and tectonics) (Image ed. by author using Wonderlane 2020, Larson 2020, Kamenar 2015, Alexandra 2024, Nouvel 2018, Boulanger 2024, RMA 2012, LLAB 2021)

Depth and Contrast / Deep Shadows – rich contrasts, gradations of darkness and spatial depth formed by the absence of light, created by dense planting, low light conditions, dark, unreflective surfaces and occluded sky views. Each of these forms arises through a convergence of orientation, opacity, layering, reflectivity, and movement. They are dynamic—changing with season, time of day, and ecological context—and they serve as the foundation for the design strategies that follow.

7. TOWARDS A PATTERN LANGUAGE: MANUFACTURING AND MANIPULATING FOREST LIGHT

Because forest light exists in multiple forms and is in constant flux, architectural responses must be equally varied. The *Shivelight Pattern Language* unfolds in two major tectonic strategies - Forming Light and Filtering Light - each comprising specific architectural techniques, or 'patterns' across fenestration, materiality, vegetation, and tectonic assembly. While the *Shivelight Pattern Language* offers nascent spatial, tectonic, and material principles through which architects can emulate forest light in built form, these patterns and elements are not intended to be static: Like light itself, elements and patterns should be installed to evolve, shift, age, grow, and change in response to site, season, time and use.

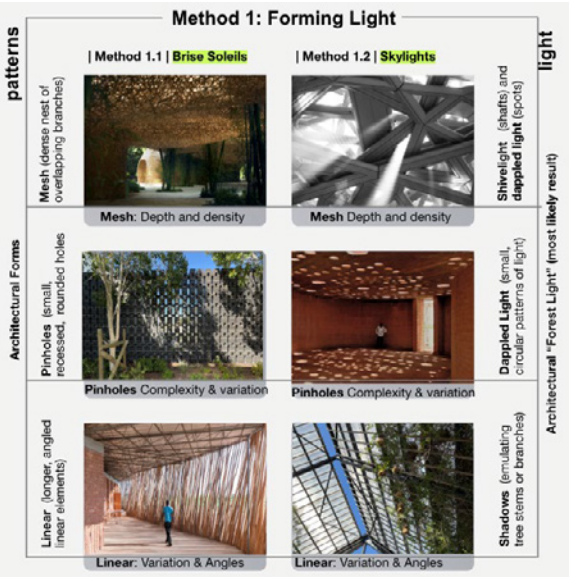


Figure 8. *Shivelight Pattern Language* Method 1: Forming Light (compiled by author using LLAB 2021, Boulanger 2024, Kere 2016, Nouvel 2018, Kere, n.d., Boulanger and studioMAS 2024)

7.1 Method 1: Forming Light

The formed light approach focuses on shaping and modulating incoming light through built form by guiding, breaking, or directing light through several architectural layers. The density and depth of layering can produce shivelight shafts, patterned dappled effects, and shadow contrasts simultaneously, depending on the screen design. Light can be formed either through bespoke Brise Soleils (Screens) or through formed Skylights and Fenestration, using various patterns:

7.1.1 Mesh screens or mesh fenestration

Steel, timber or textile rods, beams, branches, fibres, or threads are densely and randomly layered onto screens to emulate the 'nest-like' complexity of forest canopies. Screens are then mounted over fenestration, skylights, courtyards or openings. Critically, multiple layers of elements should be added over each other for depth – screens should not be flat or one-dimensional. When designed with sufficient depth and irregularity, mesh screens can create both directional shivelight shafts and *komorebi*-like scattered patches of dappled light. Ensure that flat, ordered, rigid grids or screens are avoided; irregularity, variation in spacing and depth is essential. Alternatively, where thick walls or stereotomic construction is present, small openings can be cut at sharp, dense angles to create similar mesh qualities in solid walls.

7.1.2 Pinhole screens or fenestration

Small, rounded, recessed, irregular openings are either integrated into screens/facades (fitted over windows, courtyards, skylights or openings) or subtracted as shaped skylights or wall perforations that project concentrated light spots onto interior surfaces. Variation in size and spacing is essential to evoke natural, scattered light rather than regimented geometries typical of artificial design. Pinhole openings can also be angled or oriented to catch angled light at certain times of day, casting both *shivelight* and dappled light into interiors.

7.1.3 Linear screens or fenestration

Repetitive but randomly spaced vertical or angled slats or rods (timber, reed, bamboo, or metal elements) that are assembled as screens and fitted over windows, skylights, courtyards or

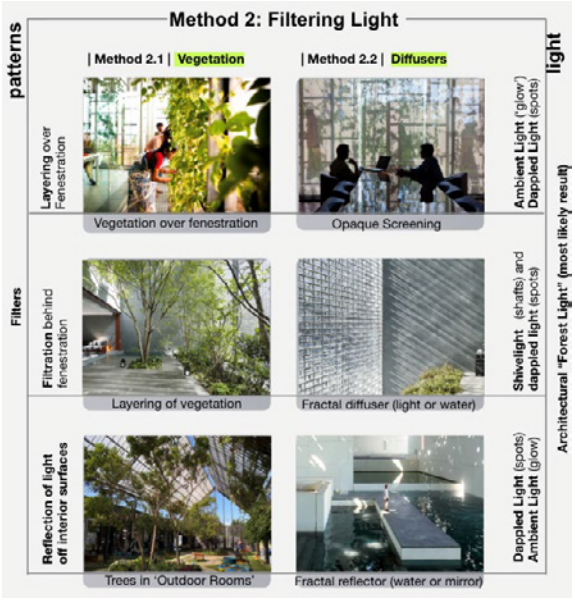


Figure 9. *Shivelight Pattern Language* Method 2: Filtering Light (compiled by author using RMA 2012, Nakamura 2012, Boulanger and studioMAS 2024, Nouvel 2018)

openings, or dense vertical fenestration cuts into stereotomic walls to mimic the shadows typically generated by the verticality and dense layering of forest stems (trunks, branches) or undergrowth. Ensure that linear elements have both variation and angle – overly regular or straight spacing will produce artificial patterns.

7.2 Method 2: Filtering Light

The filtered light approach prioritises softening and scattering light to produce ambient glow and immersive atmospheres. It emulates ambient forest light – or forest glow – rather than shaping it into specific forms or patterns. The translucency, reflectivity, density and materiality of the filtered diffuser impact the quality and colour of the ambient light. Light can be filtered either through living vegetation (planted screens, usually in front of fenestration) or through diffusers (translucent screens, fenestration or reflective surfaces), using various patterns:

7.2.1 Filtering over Fenestration - Creepers or translucent screens as diffusers (over fenestration)

Vines, creepers, or suspended planting systems across façades and directly over windows on trellises to act as living brise soleils. As foliage thickens or thins with the seasons, light is modulated accordingly. Alternatively, translucent materials such as polycarbonate, mesh fabrics (blinds, curtains), glass bricks or resin panels can break down direct sunlight into gentle, glowing, uniform interior illumination.

7.2.2 Filtering behind fenestration - Layered gardens or interior translucent surfaces

Interior layered gardens or densely planted thresholds behind openings can create varied, dynamic shadows and contribute to ambient colour shifts as incoming light is reflected off vegetation. Alternatively, a combination of multiple layered translucent diffusers in sequence (e.g. polycarbonate screens + mesh curtain + foliage or water interiors) will increase the complexity of light, add additional depth and variation to surface diffusion and ensure that incoming light changes throughout the day.

7.2.3 Reflection of light off interior surfaces

Strategic tree placement in interior spaces or courtyards can subtly reflect or tint incoming light. Even without a direct light source, the presence of indoor vegetation will alter the quality and colouring of interior illumination. Alternatively, layered reflective surfaces such as indoor water surfaces (pools, ponds, waterfalls or fountains), mirrors or polished metal surface cladding can be positioned to reflect or refract incoming sunlight and ensure additional reflective glow and scattering of light throughout interiors. This approach will result in both ambient light and dappled light. As water is inherently a dynamic surface, light effects and dapples will constantly shift throughout the day.

8. CASE STUDIES: APPLYING THE LIGHT PATTERN LANGUAGE

To demonstrate the versatility and universality of the *Shivelight Space* pattern language, nine built projects were selected to represent the potential application of *Shivelight* spatial patterns across a wide variety of projects. Each case study

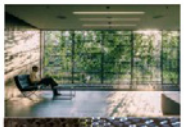
	#	Project & Location	Architect / Year	Climate & Programme	Dominant Light Tactics	Key Take-aways
	1	KMC Corporate Offices, Hyderabad, India	Rahul Mehrotra Architects, 2012	Tropical–semi-arid / Large workplace	Vertical mesh brise-soleil overgrown with flowering creepers; mist spray for dynamic diffusion	Layered living screens combine forming (mesh) + filtering (vegetation & water) to create seasonally adaptive shivelight and ambient glow.
	2	Rallim Modern Learning – Admin Block, Cape Town	Boulanger & studioMAS, 2017	Coastal semi-arid / Medium workplace	Courtyard "outdoor room" with aluminium pinhole screens, central tree, overhead climber	Even in treeless terrain, a protected outdoor filter can import forest-like light into perimeter offices.
	3	Louvre Abu Dhabi, UAE	Ateliers Jean Nouvel, 2017	Hyper-arid / Museum	7-layer steel-aluminium dome: deep mesh + pinhole skylights; tidal pools for reflection	Depth + overlap are critical: stacked layers modulate extreme desert glare into dappled serenity.
	4	Sanjie Lü Pavilion, Yangshuo, China	LLLab., 2021	Sub-tropical / Cultural pavilion	Woven bamboo canopy (mesh) + planted bamboo + river reflections	Low-tech organic meshes can equal high-tech domes in producing multisensory forest atmospheres.
	5	Lycée Schorge, Koudougou, Burkina Faso	Kéré Architecture, 2016	Sahelian / Secondary school	Undulating timber brise-soleil (linear elements) + reflective sheet-metal roof	Cost-effective timber screens both shade and bounce soft ambient light into deep classrooms.
	6	Gando Library, Burkina Faso	Kéré Architecture, u/c	Sahelian / Library	Thick earthen roof with inverted clay-pot pinhole skylights; truss mesh overhang	Deep skylight shafts generate dramatic chiaroscuro while keeping interiors cool.
	7	Rallim Pre-Prep & Prep School, Cape Town	Boulanger & studioMAS, 2017	Coastal semi-arid / Primary school	Breezeblock walls, polycarbonate diffusers, courtyard trees, vertical timber trellis	Hybridising screens + diffusers + vegetation yields rich, child-scaled light play.
	8	Optical Glass House, Hiroshima, Japan	Hiroshi Nakamura, 2012	Humid temperate / Urban residence	Stacked glass-brick façade, water-covered skylights, layered courtyard garden	Glass and water operate as living diffusers, producing forest-shadow ambience in dense city fabric.
	9	Paley Park, New York City, USA	Zion & Breen, 1967	Temperate / Pocket park	Waterfall light wall, deciduous tree canopy, ivy-clad side walls, night uplighting	Even exterior micro-courts can orchestrate filtered, dappled calm amid urban chaos.

Figure 10. *Shivelight Pattern Language*: Nine Case Studies of Forest Light (compiled by author using RMA 2012, Boulanger 2024, studioMAS 2019, Nouvel 2018, LLLAB 2021, Kere 2016, Kere n.d., Nakamura 2012, Zion 1967)

embodies one or more tactics of forming and filtering light across different climates, scales, programmes, budgets, construction techniques, materials and skills, proving that forest light can be meaningfully emulated almost anywhere. These cases reaffirm that forming and filtering tactics, when deployed with sensitivity to site and programme, can transform ordinary spaces into immersive, health-promoting *Shivelight* environments.

8.2 Cross-case insights

Depth & Irregularity Matter: Whether high-tech domes or bamboo weaves, layered density is key to creating authentic, immersive *shivelight*.

Dynamic Living Filters Amplify Effect: Living vegetation and water introduce seasonal colours and changes, constant motion, and ever-changing luminance.

Budget-Neutral Potential: From low-cost clay pots to complex steel lattices, forest light can be achieved at any cost level.

Climatic Adaptability: The pattern language

Figure 11. *Shivelight Pattern Language*: Nine Case Studies of Forest Light (compiled by author using RMA 2012, Boulanger 2024, studioMAS 2019, Nouvel 2018, LLLAB 2021, Kere 2016, Kere n.d., Nakamura 2012, Zion 1967)

adapts to tropical humidity, desert glare, coastal winds, and temperate seasons alike.

Programme Flexibility: Offices, schools, museums, homes, and parks all benefit from the restorative qualities of forest-mimetic light.

9. CONCLUSION: TOWARD AN ARCHITECTURE OF SHIVELIGHT

Architecture, at its best, does more than shelter the body. In a time when built environments increasingly sever our connection to the living world, *Shivelight Space* offers a gentle proposition: that architecture can become a forest, not through mimicry of trees alone, but through the careful choreography of light. In a time when the built world too often isolates us from natural rhythms, the quiet light of forests offers a blueprint for spiritual and ecological reconnection. *Shivelight Space* explores how the subtle, shifting phenomenon of forest light—ephemeral, multi-faceted, fractured, ambient, alive and ever-changing—can be translated into a language of architectural elements that evoke the sensory, psychological, and even spiritual qualities of being under a canopy of leaves. In this design framework, light is not a byproduct of architecture but its core spatial material: an element to be shaped, layered, filtered, and celebrated.

Through a deep investigation of theory, precedent, and design methods, four key conclusions emerge:

Forest Light is not homogeneous. It exists in many forms, from visible, shaped shards (*Shivelight*) to fractured dappled patterns (*Komorebi*), ambient glows and deep, contemplative shadows. To echo forest atmospheres, architectural design should strive to combine multiple types of forest light through the application of multiple methods or *Shivelight* patterns to ensure layering, depth and variation.

Forest Light is not static. Unlike artificial lighting,

forest light is in constant, unpredictable flux - It changes with time, weather, and season as an ever-shifting performance of colour, shadow, and contrast. The most resonant architectural spaces, then, are those that welcome change and temporal dynamism: angled screens that catch morning sun but block afternoon light, living canopies that shift with the wind or change with the seasons, and diffusers that soften the day's harshness into a gentle, luminous calm.

Forest light is not direct. It is always mediated through leaf, mist, water, bark. In architecture, this calls for strategies of concealment, filtration and diffusion: recesses, pinholes, screens, vegetation, and layered materials that scatter, bend, and soften direct light. Good light does not glare; it glows. Dappled light requires interruption through fractal or irregular forms, while ambient glow can be achieved through reflection (off water or glass) or diffusion (through polycarbonate, mesh, or vegetation). Shadows, too, are a vital part of this spectrum and must be crafted intentionally.

Forest Light is Widely Applicable. Across nine case studies - spanning climates, programmes, budgets, and construction methods - it is clear, *Shivelight Space* principles are scalable, adaptable, and materially agnostic. Forest light can be achieved through both high-tech complexity and humble materiality, and emulated across climates, cultures, programmes, and budgets. It is not dependent on building cost or programme, but on carefully considered design. The language of forest light—when rooted in sensitivity to site and human experience—can enrich any typology.

Further research required: While the qualitative benefits of forest bathing and biophilic design are well-documented, the quantitative health impacts of constructed forest light remain underexplored. Future research should employ empirical methods to measure the psychological and physiological effects of shivelight-inspired architecture, particularly in workplaces, schools, and healthcare facilities. Architecture affects the body as much as the mind, and establishing measurable correlations will strengthen the case for integrating forest light as a standard in architectural design.

Ultimately, *Shivelight Spaces* speak in the quiet language of light, reminding us, however briefly, that we are not separate from nature. By evoking forest atmospheres within built environments, we can restore the sensory richness so often absent in contemporary architecture and support human health and well-being. When we design with light as the forest does—indirect, dynamic, layered, and alive—we do more than illuminate space: we create room for stillness, for wonder, and for the slow return of the wild within.

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