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DEFINING SPACE THROUGH LIGHT: LOUIS I. KAHN AND THE PHILOSOPHICAL DIMENSION OF ZENITHAL LIGHT

DEFINIOWANIE PRZESTRZENI ŚWIATŁEM: LOUIS I. KAHN I WYMIAR FILOZOFICZNY ŚWIATŁA ZENITALNEGO

Abstract

The paper examines the philosophical role of zenithal light in Louis I. Kahn's architecture, arguing that architecture transcends function and aesthetics to give material form to ideas about human existence and collective life. Through qualitative case studies and analysis of Kahn's writings, it demonstrates how zenithal light defines space, establishes hierarchy, reveals structure and materiality, and conveys institutional meaning. The study concludes that zenithal light was Kahn's principal design medium, transforming philosophical concepts into enduring architectural experience.

Keywords: *architectural philosophy, Louis I. Kahn, zenithal light*

Streszczenie

Artykuł analizuje filozoficzną rolę światła zenitalnego w architekturze Louisa I. Kahna, dowodząc, że architektura wykracza poza funkcję i estetykę, nadając materialną formę ideom dotyczącym ludzkiej egzystencji i życia wspólnotowego. Na podstawie jakościowych studiów przypadków oraz analizy tekstów Kahna artykuł ukazuje, w jaki sposób światło zenitalne definiuje przestrzeń, ustanawia jej hierarchię, wydobywa strukturę i materialność oraz wyraża znaczenie instytucji. Badanie prowadzi do wniosku, że światło zenitalne stanowiło podstawowe narzędzie projektowe Kahna, przekształcające koncepcje filozoficzne w trwałe doświadczenie architektoniczne.

Słowa kluczowe: *filozofia architektury, Louis I. Kahn, światło zenitalne*

1. INTRODUCTION

If true architecture is philosophy, then its purpose extends beyond solving functional problems or composing aesthetically satisfying forms[1]. Architecture becomes a medium through which fundamental questions concerning existence, human experience, memory, and meaning are explored. Every architectural work embodies an implicit vision of humanity and society; it mediates between abstract ideas and material reality. What distinguishes timeless

[1] S.E. Rasmussen, *Experiencing Architecture*, MIT Press, Cambridge, MA 1959, pp. 1–251.

architecture from ordinary building is therefore not technical excellence alone, but its capacity to give enduring spatial form to universal human values.

This paper argues that one of the most powerful philosophical instruments available to architecture is natural light entering a space from above. Rather than functioning merely as a practical necessity or an aesthetic effect, light shapes the existential experience of space. It defines relationships between the individual and the collective, the earthly and the transcendent, permanence and ephemerality. In this sense, light becomes a medium through which architecture communicates meanings that cannot be expressed by form alone, allowing buildings to transcend their immediate historical context and remain relevant across generations.

The relationship between zenithal light and timelessness is legible through iconic architectural works representing different historical periods. In the Roman Pantheon, the oculus organises space according to a cosmic order, establishing a dialogue between the material and the divine[2]. Étienne-Louis Boullée's visionary projects employ monumental geometry and dramatic chiaroscuro to make the sublime perceptible, treating light as a primary architectural substance[3]. Frank Lloyd Wright's Guggenheim Museum in New York choreographs movement through the gradual modulation of daylight[4], while Louis I. Kahn's Exeter Library transforms light into the principal element of spatial order[5], inviting contemplation and intellectual reflection. Peter Zumthor's Bruder Klaus Chapel demonstrates how light can generate a profound sense of silence and spiritual presence[6], whereas Daniel Libeskind's Jewish Museum Berlin employs light and darkness to materialise memory, absence, and collective trauma[7].

Although these examples reveal different architectural languages, they share a common philosophical ambition: to use light from above as a means of expressing ideas rather than merely illuminating space. Light becomes a narrative device that gives material presence to otherwise intangible concepts, enabling architecture to articulate meanings about human existence.

This analysis will focus on the use of zenithal light in the work of Louis I. Kahn, whose architecture offers one of the most coherent syntheses of philosophical reflection and architectural practice[8]. Through an analysis of his design philosophy and practice, the paper demonstrates how Kahn employed natural light not simply to shape form, but to construct spaces that embody permanence, contemplation, and a profound vision of human community. His work exemplifies the architect's role as a mediator between philosophical ideas and

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[2] W.L. MacDonald, *The Pantheon: Design, Meaning, and Progeny*, Harvard University Press, Cambridge, MA 2002, pp. 1–137.

[3] E. Kaufmann, *Three Revolutionary Architects: Boullée, Ledoux, and Lequeu*, [in:] *Transactions of the American Philosophical Society*, vol. 42, part 3, American Philosophical Society, Philadelphia, PA 1952, pp. 430–564.

[4] D. Watkin, *Frank Lloyd Wright & The Guggenheim Museum*, "AA files" 1991, no. 21, Spring, pp. 40–48.

[5] D.B. Brownlee, D.G. De Long, *Louis I. Kahn, In the realm of architecture*, Rizzoli, New York 1991, pp. 1–448.

[6] P. Zumthor, *Atmospheres: Architectural Environments. Surrounding Objects*, Birkhäuser, Basel 2006, pp. 1–76.

[7] D. Libeskind, *Jewish Museum Berlin: Architect Daniel Libeskind*, G + B Arts International, Amsterdam 1999, pp. 1–115.

[8] J. Lobell, *Louis Kahn: Architecture as Philosophy*, The Monacelli Press, New York2020, pp. 1–240.

built reality, illustrating how architecture may become not merely construction, but a lasting expression of thought.

2. MATERIALS AND METHODS

This research employs a qualitative case study and logical analysis to investigate the philosophical dimensions of Louis I. Kahn's architectural practice through the analysis of his design methodology. Emphasis is placed on zenithal light as a primary means of defining architectural space and expressing philosophical ideas. Rather than treating light as a functional or aesthetic element, the study examines how Kahn determined which spaces should receive light from above and how these decisions established spatial hierarchy, reinforced the relationship between structure and form, and shaped human experience. The methodological approach focuses on selected institutional projects, analysing the use of zenithal light in relation to Kahn's writings and exploring the correlation between his philosophical conception of light and its architectural manifestation. The study argues that zenithal light functioned as a fundamental design medium through which abstract philosophical ideas were translated into built form, shaping spaces of permanence, contemplation, and institutional meaning.

The analysis draws upon both textual and graphic materials, primarily sourced from published literature. Among the extensive body of scholarship on Louis I. Kahn, two works proved particularly valuable for their comprehensive scope: *Louis I. Kahn, In the Realm of Architecture* by David B. Brownlee and David G. De Long[9], and the complete catalogue of Kahn's built and unbuilt works, originally compiled by Heinz Ronner, Sharad Jhaveri, and Alessandro Vasella, and later revised and expanded[10]. Moreover, Louis I. Kahn's own writings were studied to provide insight into his design philosophy[11]. A substantial portion of the research material, including photographs of the buildings and archival sources, was collected during the preparation of the doctoral dissertation[12].

3. TRUE ARCHITECTURE THROUGH LIGHT

3.1. LIGHT REVEALS SPACE

For Louis I. Kahn, light plays a fundamental role in defining space. He did not hesitate to emphasise that designing space is, at the same time, designing light[13]. In his view, "a space

[9] D.B. Brownlee, D.G. De Long, *Louis I. Kahn, In the realm of architecture*, Rizzoli, New York 1991, pp. 1–448.

[10] H. Ronner, S. Jhaveri, *Louis I. Kahn. Complete Work 1935–74*, Second Revised and Enlarged Edition, Birkhäuser, Basel 1987, pp. 1–437.

[11] L. Kahn, *Louis Kahn. Essential texts*, R. Twombly (ed.), W.W. Norton & Company, New York 2003, pp. 1–288; A. Latour (ed.), *op. cit.*, pp. 1–352.

[12] M. Pieczara, *L'échelle du territoire dans l'architecture de Louis I. Kahn*, [doctoral thesis], EPFL, Lausanne 2012.

[13] L.I. Kahn, *New Frontiers in Architecture, CIAM in Otterlo*, 1959 [in:] A. Latour (ed.), *op. cit.*, p. 89: "The making of spaces is the making of light at the same time."

is only truly a space insofar as it receives natural light"[14]. "Even a room which must be dark needs at least a crack of light to know how dark it is."[15] Through the differentiation of light, Kahn sought to express the unique character of a space. This intention, which establishes a close relationship between a space and its openings, led the architect to develop a vocabulary of various types of openings. First, there are openings through the wall, used for all prosaic purposes. Second, Kahn introduced the opening between two walls, which refers to the concept of the double wall[16]. A further type of opening derives from the column.



Ill. 1. *Light reveals space* – special books collection reading room at Exeter Library, daylit by windows and a clerestory strip. Source: author, 2010

[14] J. Lucan, *De la décomposition de la fenêtre à la pièce de lumière*, [in:] P. Mestelan (ed.), *Louis I.Kahn. Silence and Light. Actualité d'une pensée, Cahiers de théorie 2/3*, Presses polytechniques et universitaires romandes, Lausanne 2000, p. 100.

[15] *The Louis I. Kahn Facsimile Project*, https://www.louisikahn.com/ (access: 07.07.2026).

[16] P. Mestelan, *La portée théorique du discours* [in:] P. Mestelan (ed.), *Louis I. Kahn. Silence and Light. Actualité d'une pensée, Cahiers de théorie2/3*, Presses polytechniques et universitaires romandes, Lausanne 2000, p. 19.

Reflecting on the sequence of the column and the intercolumniation, Kahn proposed reversing their traditional relationship. "To the solid column, which reflects light, and the open intercolumniation, which absorbs and admits it, Kahn opposed a hollow column that absorbs light and an opaque intercolumniation that reflects it".[17] Finally, Kahn developed systems of zenithal lighting. These were generally reserved for the principal spaces of institutional buildings, where daylight was intended to reinforce the significance of the space. Yet, Kahn consistently rejected direct overhead illumination. Instead, the desired quality of zenithal light was achieved through the design of an autonomous structural system, ensuring that light was carefully modulated before entering the space. The resulting illumination did not simply brighten the interior but gave form to the space itself, making light an essential architectural material.

3.2. LIGHT REVEALS HIERARCHY

For Kahn, it was essential that the differentiation of light reflect the hierarchy of spaces. "Corresponding to the hierarchy and spatial definition generated by structural order is a hierarchy and a particular quality of light: each spatial type is defined by its own character of natural light".[18] Accordingly, Kahn differentiated the quality of light depending on the function and hierarchical meaning of each space.

In the case of the Exeter Library, Kahn distinguished blue and white light[19]. Blue light refers to the diffused light distributed through the clerestory. Evoking the archetype of the Pantheon, this blue light conveys the symbolic significance of the library as a temple of knowledge. Associated with the idea of the sacred, this quality of light was reserved for the library's central space. By contrast, white light has a more prosaic character[20]. It is the direct daylight admitted through the windows, whose quality is particularly well suited to reading. This type of light is used primarily to illuminate the reading stations, although Kahn also employed it to light service spaces and staircases.

In the design of the First Unitarian Church in Rochester, the question of light was a major factor shaping both the façade and the roof. Because Kahn believed that the character of a space is defined by the quality of its light, he studied this aspect with exceptional care. The first space to command Kahn's attention in relation to light was the sanctuary. As the principal space for worship and celebration – and the compositional and symbolic heart of the building – it was conceived from the outset as being illuminated by zenithal light. Throughout the design process, different methods of introducing daylight were explored in close conjunction with various roof configurations. In the final version, Kahn selected a roof form incorporating four light towers positioned at the corners of the sanctuary. In accordance with the client's recommendations, only the inner faces of these towers were glazed[21]. Furthermore, to achieve more precise control over the intensity of daylight, adjustable windowpanes were used[22].

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[17] P. Mestelan, *op. cit*., p. 20.

[18] P. Mestelan, *op. cit*., p. 18: "à chaque type d'espace, son caractère de lumière naturelle."

[19] J. Wickersham, *The Making of Exeter Library*, "The Harvard Architecture Review", 1988, 7, p. 142.

[20] *Ibidem*.

[21] R.B. Williams, *First Unitarian Church and School, Rochester, NY 1959–69*, [in:] D.B. Brownlee, D.G. De Long, *op. cit*., p. 343.

[22] *Ibidem*.



Ill. 2. *Light reveals hierarchy* – sanctuary of the First Unitarian Church in Rochester, lit by zenithal light through four light towers positioned at the corners. Source: author, 2010

3.3. LIGHT REVEALS STRUCTURE AND MATERIALITY

Kahn envisioned a profound relationship between structure and light. This interplay extends far beyond his conviction that structure and light together define space. His reflections on the subject reach much deeper, referring to the very origins of these two concepts. For Kahn, "Structure is the Giver of Light",[23] while "all material is spent light".[24] These statements express his belief that structure is not merely a means of support but an active agent in shaping light, and that matter itself originates from light transformed into material form.

[23] L.I. Kahn, *An Architect Speaks his Mind, An Interview with Beverly Russel*, 1972, [in:] A. Latour (ed.), *op. cit*., p. 89.

[24] L.I. Kahn, *Architecture*, 1972, [in:] A. Latour (ed.), *Louis I. Kahn: Writings, Lectures, Interviews*, Rizzoli, New York 1991, p. 273.

The materiality of architecture, including its perceptual qualities, is fundamentally shaped by natural light. Kahn maintained that "the sun never knew how great it was until it hit the side of a building".[25] This statement underscores his conviction that architecture reveals the expressive potential of light by rendering the textures, colours, and tactile qualities of materials perceptible. Rather than treating light as a secondary element, Kahn regarded it as an essential medium through which material acquires visual presence.



Ill. 3. *Light reveals structure and materiality* – sunlight and shadow patterns on the façade of the Kimbell Art Museum in Fort Worth. Source: author, 2007

He translated this principle into his architectural practice by deliberately shaping the quality of light to achieve specific perceptual effects. In the design of the Kimbell Art Museum, for example, he employed reflected daylight from the vaulted ceilings to impart a silvery luminosity to the exposed concrete. As he explained: "Here I felt that the light in the rooms structured in concrete will have the luminosity of silver".[26] His concern with the anticipated

[25] *The Louis I. Kahn Facsimile…*, *op. cit*.
[26] Patricia Cummings Loud, *Kimbell Art Museum*, [in:] D.B. Brownlee, D.G. De Long (ed.), *op, cit*., p. 397.

character of light extended beyond the treatment of individual materials to the conception of the museum's spatial sequence. Kahn described the courtyards as "Green Court, Yellow Court, Blue Court, named for the kind of light that I anticipate their proportions, their foliation, or the sky reflection of surfaces, or on water will give."[27] Rather than referring to the colours of materials, these names denote the distinctive atmospheres generated by the interaction of architecture, vegetation, water, and reflected daylight. This illustrates that, for Kahn, light was conceived as a design material whose qualities could be anticipated and orchestrated through architectural form.

3.4. LIGHT REVEALS MEANING

Kahn consistently reserved zenithal lighting for institutional or representative spaces. He consistently avoided direct overhead illumination, seeking instead a carefully modulated zenithal light shaped by the roof's structural system. For Kahn, this light was not merely a source of illumination but the primary means of expressing the spiritual and institutional character of architecture.

For example, the first concepts for the Exeter Library emerged from his reflections on the institution's purpose. In keeping with his design philosophy, Kahn approached the commission by asking a simple question: *What is a library?* Architectural form, in his view, should arise from the institution's intrinsic nature rather than from predetermined functional or formal solutions. A library may be understood as a temple of knowledge, dedicated to the preservation and dissemination of learning. Kahn's conception closely reflects this idea. When he stated that "a man walking toward the light with a book in his hand is the beginning of a library"[28], he described reading as the institution's primordial act. Here, light is both physical and metaphysical: it enables reading while simultaneously symbolising knowledge and enlightenment, the very purpose of the library.

The central void, positioned inside the two structural perimeters, carries a distinct symbolic significance. From the earliest stages of the design, Kahn conceived it as an entrance hall in which the book stacks would be immediately visible. He described this spatial experience as "an invitation of the books."[29] The concept recalls Étienne-Louis Boullée's design for the Royal Library, a project Kahn deeply admired because it "makes one feel what a library should be – you enter a room and the books are all there."[30] The reference to the *architecture parlante* of the Enlightenment is significant on several levels. Beyond expressing the building's function with exceptional clarity, Boullée's project embodies the Enlightenment ideal of making knowledge visible and accessible. Through this reference, Kahn aligned the Exeter Library not only with a tradition of expressive architecture but also with the conception of the library as a civic institution dedicated to the pursuit and dissemination of knowledge.

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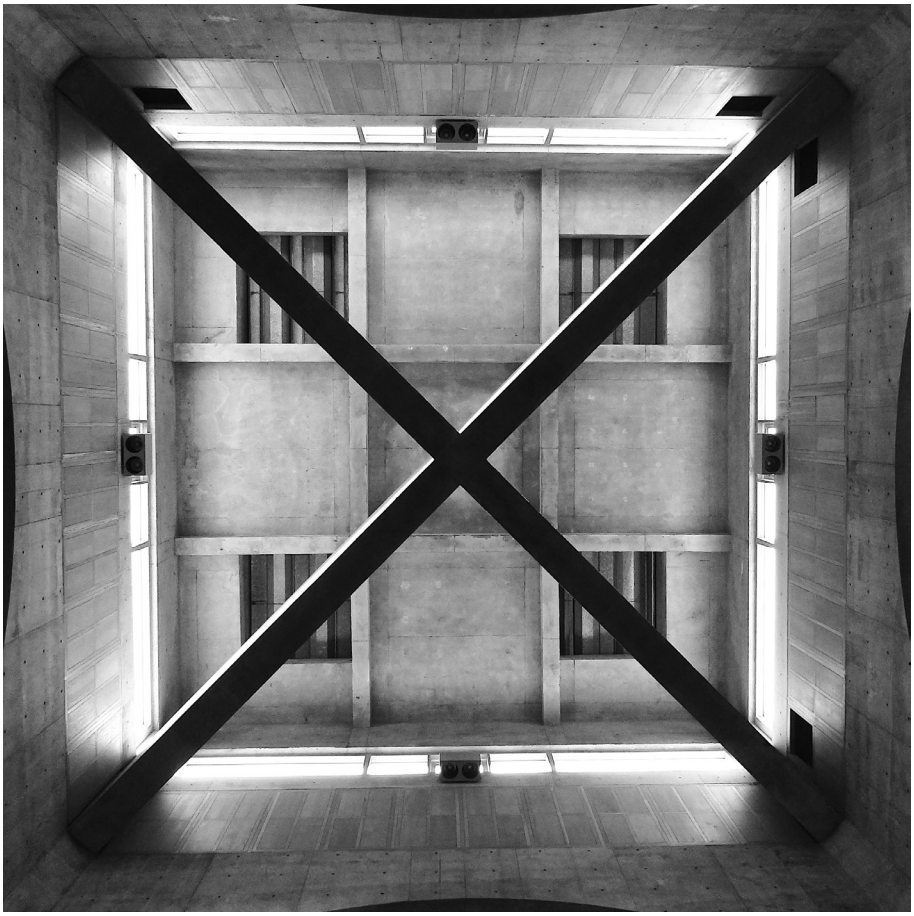
[27] H. Ronner, S. Jhaveri, *op. cit.*, p. 346.

[28] L.I. Kahn, *Spaces, Order and Architecture*, 1957, [in:] A. Latour (ed.), *Louis I. Kahn: Writings, Lectures, Interviews*, Rizzoli, New York, NY 1991, p. 76: "A man with a book goes to the light. A library begins that way."

[29] H. Ronner, S. Jhaveri, *op. cit.*, p. 301.

[30] L.I. Kahn, *Comments on the Library, Phillips Exeter Academy, Exeter, New Hampshire*, 1972, [in:] R.S. Wurman (ed.), *What Will Be Has Always Been: The Words of Louis I. Kahn*, Access Press, New York 1986, p. 182.

The central void, whose character is shaped by zenithal light, is therefore not merely an element that organises space, but a place where light, books, and the structure of the building give material form to the idea of knowledge.



Ill. 4. *Light reveals meaning* – central void of the Exeter Library, daylit by clerestory windows. Source: author, 2010

4. CONCLUSIONS

The analysis of Louis I. Kahn's institutional architecture demonstrates that zenithal light was far more than a means of illumination. It constituted the principal architectural medium through which philosophical ideas were translated into built forms. By carefully shaping the distribution and quality of natural light, Kahn revealed the essential attributes of architecture – its materiality and immateriality, the hierarchy of space, the expression of structure, the perception of texture and colour, and the symbolic meaning embodied in institutions. In this way, light shaped not only the visual character of architecture but also the experience of inhabiting it.

The analysis of Kahn's projects alongside his philosophical texts reveals a consistent correlation between Kahn's philosophical reflections and his design practice. Rather than illustrating pre-existing concepts, architecture itself became the means by which those ideas acquired material and experiential reality. Kahn's work thus exemplifies architecture as a philosophical practice, demonstrating that the deepest meaning of a building emerges where ideas about human existence are transformed into lived spatial experience through the agency of light.

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