

## Repositório ISCTE-IUL

---

Deposited in *Repositório ISCTE-IUL*:

2018-06-07

Deposited version:

Publisher Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Saraiva, A. (2017). Between the shadow and the geometry of light: Hestnes Ferreira in continuity with Louis Kahn. In Oliveira, M. J. Osório, F. (Ed.), *KINE[SIS]TEM'17 From Nature to Architectural Matter*. (pp. 173-180). Lisboa: DINÂMIA'CET-IUL.

Further information on publisher's website:

--

Publisher's copyright statement:

This is the peer reviewed version of the following article: Saraiva, A. (2017). Between the shadow and the geometry of light: Hestnes Ferreira in continuity with Louis Kahn. In Oliveira, M. J. Osório, F. (Ed.), *KINE[SIS]TEM'17 From Nature to Architectural Matter*. (pp. 173-180). Lisboa: DINÂMIA'CET-IUL.. This article may be used for non-commercial purposes in accordance with the Publisher's Terms and Conditions for self-archiving.

---

### Use policy

Creative Commons CC BY 4.0

The full-text may be used and/or reproduced, and given to third parties in any format or medium, without prior permission or charge, for personal research or study, educational, or not-for-profit purposes provided that:

- a full bibliographic reference is made to the original source
- a link is made to the metadata record in the Repository
- the full-text is not changed in any way

The full-text must not be sold in any format or medium without the formal permission of the copyright holders.

---

## Between The Shadow And The Geometry Of Light

Hestnes Ferreira in continuity with Louis Kahn

Alexandra Saraiva

*ISCTE, Dinâmia CETIUL, Universidade Lusíada Norte- Porto, Portugal*

*ambac@iscte.pt; saraivaalexandra@gmail.com*

**Abstract.** This paper intends to show the relevance of light in the work of Louis Kahn and in the work of Hestnes Ferreira in formal and perceptive terms. Raúl Hestnes Ferreira (Lisbon, 1931) is a Portuguese architect who had the privilege of studying and working with Louis I. Kahn between 1963 and 1965. Light, although an external and contingent element of architecture, is a decisive element in terms of definition and perception. Therefore, four works by each architect are compared and analyzed. The results help to highlight the importance of light and shadow in the determination of architectural spaces and how silence enhances the perception of Hestnes Ferreira and Louis Kahn spaces.

**Keywords:** *Light; Shadow; Hestnes Ferreira; Louis Kahn.*

### Introduction

Light is a term with a vast number of meanings which has always been the target of constant reflection by art history, philosophy, and aesthetics.

The expressiveness of an architectural work is directly related to the concept of light, as the play of light and shadow can manifest the formal composition and the perception of a particular architectural space. Although the architectural space depends on a delimitation and physical measurement, the reach of its perceptive presence 'is greater than its materiality' (Pinto, 2007, p.23)

The paper is developed in two moments: the light and shadow as elements that delimit and / or shape the space; and the silence as a result of the perception that each user has about that same space.

The methodology used is a presentation of a comparative analysis between Louis Kahn and Hestnes Ferreira and four buildings by each one. Thus, for the work by Louis Kahn, we have used the research 'typology of light control' by Urs Büttiker (1993) and which resulted in a similar analysis on the work by Hestnes Ferreira, which I developed during the research for my PhD. (Saraiva, 2011)

By Louis Kahn, the Yale University Art Gallery (1951-53) in New Haven; Salk Institute (1959-65) in La Jolla, California; The Phillips Exeter Library (1965-72) in Exeter, New Hampshire; the Kimbell Art Museum (1966-72) in Fort Worth, Texas. By Hestnes Ferreira, the Beja Youth Culture Centre (1975-85) in Beja; José Gomes Ferreira Secondary School (1976-80) in Lisbon; the Bento Jesus Caraça Library (1989-97) in Moita; the Caixa Geral de Depósitos (1985-91) branch in Avis

### Purpose

The main purpose of this research is to understand light and shadow as decisive elements in the creation of architectural spaces. As well as introduce the concept of silence, so often mentioned and defended by Louis Kahn as a decisive factor in the perception of these same spaces.

Another objective of this research, which has been proven in my doctoral thesis, is to prove how Hestnes Ferreira designs in continuity with Louis Kahn.



## State of the Art

Louis Kahn presented a conference entitled *Silence and Light* February 12, 1969, at the Architecture School of the Swiss Federal Institute of Technology in Zurich. This conference was later published and it is mandatory for anyone intending to understand the binomial light and silence according to Louis Kahn. (Latour, 2003, pp.244-257)

The conference 'Architecture: Silence and Light' was held on December 3, 1968, at the Solomon R. Guggenheim museum, and was subsequently published in 1970 by the Guggenheim Museum, *On the Future of Art*. (Latour, 2003, pp.260-267)

For Louis I. Kahn, light would become a fundamental element in the creation of the architectural work - a creative element by its very nature; a presence-creating element. There are three emblematic phrases that contribute greatly to the construction of the theme of light in his work: "A building begins with Light and ends with shadows", and "The sky is the roof of a square" and "A room without natural light is not a room."

As Alessandra Latour (2003) states, I also consider that for Louis Kahn, words had the same power as his drawings and works in conveying images about the conception of the world and philosophy.

Urs Büttiker (1993, p.39) defined seven modeling elements (curtain; northern light, direct light, broken light, horizontal movable pannels, vertical movable pannels, leaf for ventilation) and the corresponding symbology in order to compare and systematize forty-nine works by Louis Kahn. This research was undoubtedly an added value for the understanding and systematization of the importance that light had for the work produced by Louis Kahn.

For Giurgola (1981) Louis Kahn's professional career is marked by a constant search for the essence of architecture through five constants that are repeated throughout his works: the composition and integrity of the building; respect for materials; the spatial module as the basic element, where repetition determines the design; light as a constructive factor; and the relations between the different architectural elements.

Leland M. Roth underlines the importance that Louis Kahn assigns to light 'it has the property of creating powerful, psychological responses and contains a precise psychological effect' (2005, p.77).

António Juaréz states that Louis Kahn 'associates light with a colour, a predominant tonality of the reflections of the materials' (2006, p.89) always taking into consideration materiality with something that cannot be dissociated from space.

Louis Kahn's concern was defended many years later by Campo-Baeza who considered the duality between matter and material. This search had already been felt and proclaimed by Kahn, both in his writings and conferences, as well as in his works. 'Light is matter and material (From the materiality of LIGHT)' (Campo-Baeza, 2004, p.15).

Hestnes Ferreira also shares the same references as Louis Kahn, as in his works, the control and the presence of Light is one of the most important and significant points in his way of designing and constructing, '*..light, for me, is fundamental; it is the spatial key of a building. I can assert that there are two types of light, one that guarantees functionality of space, and the secret light that gives spaces, especially those most hidden, the effect of the unexpected.*' (Saraiva, 2011, p.302).

## Between Light and Shadow

Natural light sees its importance increased in terms of architecture from the 1950s and 1960s onwards, as a result of new methods of construction and greater architectural freedom.

But, like any natural element, light is not a constant and static element, it depends on the light source, the geometry, the planes it is focused on, and lastly on the observer. When we refer to the source of light, we are in some ways specifically analyzing three elements: its intensity, the directional characteristics and, finally, its colour. Geometry always depends on the relationship that

is created between the light source and the illuminated plane. Thirdly, the planes where the light is focused - taking on a dual category of receiving and modifying light - can, through reflection, even become secondary sources of light by the way they redirect and alter the colour of light. And lastly, the most important factor - the observer - without him the reading and perception of the light would not be possible.

Louis I. Kahn described Architecture as the creation of spaces by the shaping of light. And this shaping includes the dialogue of light as a close relationship between duration and time, specifically between sunshine hours and seasons. It is also influenced by the shape and orientation of the openings and how the space is illuminated by a solid or diffused light.

In addition to the previous issues, we must also emphasize that light has to be analyzed in two distinct ways: inside and outside the architectural work. The appreciation of light in the interior is evidenced by the relation between solar trajectory and the valuation of specific elements existing in the interior space. While on the exterior of the building, so as to highlight the shape, the composition strategy uses the contrasts of light, shadow, and half-shadow.

Solid light produces a high degree of illumination, while producing well-defined light and shadow patterns. On the other hand, diffuse light, although less intense, remains constant and balances the light level in the space. Always bearing in mind the profound difference between external light - which shapes the volume, and the internal light - that gives life to the spaces that the volume itself contains.

## Vertical Light

Vertical light has a strong and constant presence in Louis Kahn's work. The use of this type of light depends, partly, on the interpretation and symbolism that the author intended to obtain in each interior space. Hestnes Ferreira shares the same anxieties and aims to achieve the same result in his works.

The interpretation of light, by Kahn and by Hestnes, goes against what the West defends by not focusing the light directly on an object, or on a space; instead designing so as to ensure an indirect light, which provides a controlled reflection, more specifically empowering the shadow.

The way these two architects capture the vertical light makes them stand out from others: by defining a specific shape and dimension, they condition the geometry of each opening.

The vertical light, used by the two architects, considers two possibilities and, consequently, determines two distinct well-lit spaces. First, when they associate it with large-scale interior spaces, allowing for the projection of the light beam to be enlarged in interior spaces; and second, when they decrease the size of the opening, they direct and intensify the light beam, increasing the luminous concentration on one point.

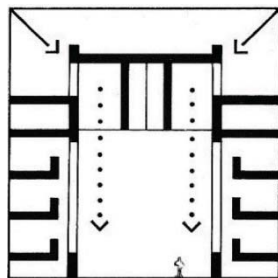


Figure 1. Philip Exeter Academy, Library

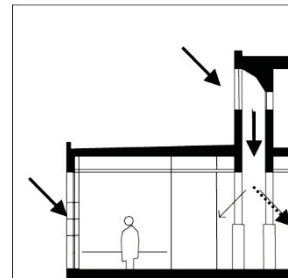


Figure 2. Caixa Geral de Depósitos, Branch

Louis Kahn, in the library hall [FIGURE 1] and Hestnes Ferreira, in the main public space of the Caixa Geral de Depósitos branch [FIGURE 2], improve the light possibilities of these spaces by using vertical wall bays.

The zenithal lighting proposed by Hestnes Ferreira between the two white concrete beams aims to illuminate the interior emphasizing 'the importance of the white concrete that lightly frames the light on the central counter, in contrast to the weight of the brick masonry that defines the building.' (Ferreira, 2012, p.127) These elements as a consequence of the size, shape, and material of the opening, increase the light capacity of these spaces and provide a more intense perception of these spaces.

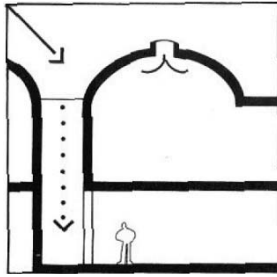


Figure 3. Kimbell Art Museum

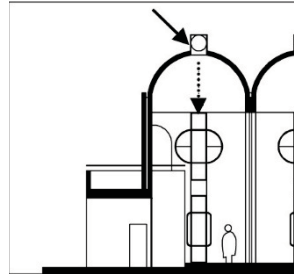


Figure 4. Beja Youth House

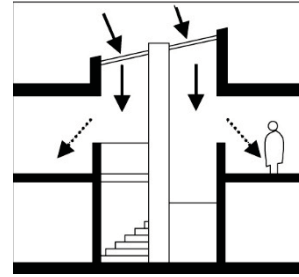


Figure 5. José Gomes Ferreira Secondary School

The exhibition space at the Kimbell Museum [FIGURE 3], the central space at the Beja Youth Cultural Center [FIGURE 4] and the vertical accesses at the José Gomes Ferreira School building [FIGURE 5], the latter by Hestnes Ferreira, illustrate the second type of space, where the shape and size of the opening intensify the light beam, while increasing the concentration of luminosity at a given point. These characteristics present the user with a perception of the differentiated space, whether it is in the shadow or in the illuminated space.

## The diagonal light

The diagonal light is the most used in North American and European architecture when compared to the light used by other non-Western cultures. Usually this type of light is the one that has the most influence on the spaces, allowing for a more efficient reading of the sunshine hours and the season of the year. This forces architects to design other elements associated with these openings. In the background, the purpose of these elements is nothing more than the control of the exposure and the light intensity of these spaces.

Louis Kahn associates this type of light to two different procedures: the first maintains the opening in the facade plane and introduces other elements of control of intensity; the second retracts the opening in regards to the facade plane.

Similarly, Hestnes Ferreira adopts these two procedures in a very interesting way, adapting the Portuguese constructive reality, as well as the materiality that characterizes the nation.

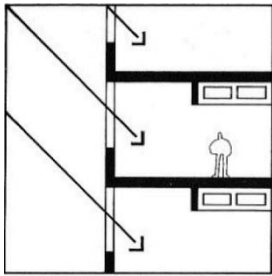


Figure 6. Salk Institute for Biological Studies

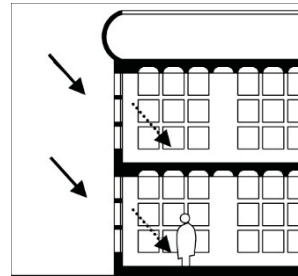


Figure 7. José Gomes Ferreira Secondary School

In these two examples [FIGURE 6] and [FIGURE 7] regarding work spaces in the Salk Institute for Biological Studies, as well as in the classrooms of the José Gomes Ferreira School, the size and positioning of the opening in relation to the facade limit the projection and control the intensity of light within each space.

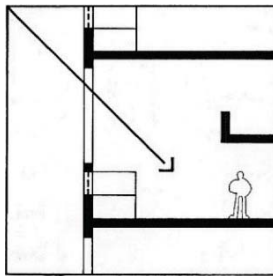


Figure 8. Philip Exeter Academy, Library

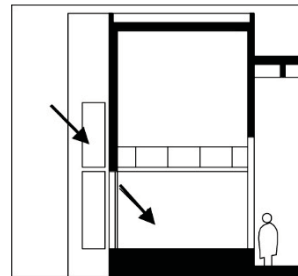


Figure 9. Bento Jesus Caraça Municipal Library

Louis Kahn, at the Exeter Library [FIGURE 8], designs two types of openings in the facade plane, a smaller one, which limits and concentrates the light on the individualized reading area, and a larger one that spreads and projects the light in a wider area.

At the Bento Jesus Caraça Municipal library [FIGURE 9], Hestnes Ferreira designs more contained openings so as to avoid constraints in terms of the incidence of light over the area of the stage.

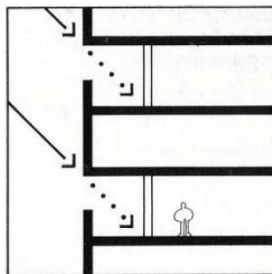


Figure 10. Salk Institute for Biological Studies

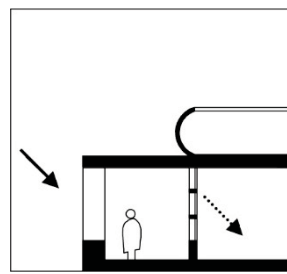


Figure 11. José Gomes Ferreira Secondary School



In the Salk Institute [FIGURE 10], when the glass plane recedes from the plane of the facade, Louis Kahn is able to obtain illuminated spaces, but with the best control over the intensity projected in that space.

At the José Gomes Ferreira Secondary School [FIGURE 11], Hestnes, when designing a pergola, introduces a transition space. Allowing the opening to be more restrained and the light reflected over the classroom space in an even more continuous and harmonious manner. I named this type of solution the 'membrane wall' (Saraiva, 2011, p.174)

After analyzing all the schemes, we were able to find the same concerns and similar solutions for the resolution of the incidence, type, and quality of light intended by both architects. The expression so often mentioned, - Without light there is no architecture -, shows an extreme validity in the work of both architects. The added value is directly related to the perceptual effect produced by users of the spaces.

## Silence and Light

'Silence and Light' is a binomial created by Louis Kahn around the time of the middle of his career and it prevailed until the end. For Kahn, the immeasurable is the force that drives the creative spirit toward the measurable, the Light. Therefore, it establishes the relation between these two concepts; silence represents what does not exist and light represents what does.

The principles of harmony and proportion were visible at the design stage, but the perception was only visible once the work was completed. Consequently, 'if what is drawn is precise, what is built should be precise [too]' (Gast, 2001, p. 11)

Hestnes Ferreira never spoke explicitly regarding the concept of silence, but we can draw an analogy with the definition given by Louis Kahn. Hestnes's architecture is characterized by homogeneous spaces, valued by light and materials. Silence in his works can be translated by the simplicity and neutrality of spaces, realized by the absence of ornamentation and by the simplicity and clarity of shapes. The determination of silence results from design strategies, where we can include: membrane walls, light, simple shapes, scale, and materials. The combination of these strategic elements determines and appeases correct acoustic enclosures, while at the same time stimulating our perception. The perception of architecture is more assertive and subtle when the senses (vision and hearing) work together in harmony.

The nature of his works [Hestnes Ferreira] is defined by a triad: the openings that receive and transmit light; the materials - decisive elements for the characterization and that have different levels of presence and express the way the buildings interact with the Place; and finally the resulting colour.' (Saraiva, 2011, p.175)

## Conclusion

Louis Kahn and Hestnes Ferreira, as we were able to validate by the analysis of our schemes in relation to those of Urs Büttiker, use vertical light by the amplitude and the capacity of their reflection on space, usually in spaces of greater size or of a more public nature; while diagonal light, being a more contained light, is used in smaller spaces or of a more private nature with the distinct aim of filtering the light, and in some cases using the inclusion of external vertical or horizontal elements.

For Louis Kahn, light was one of the key architecture elements, its interpretation and use transcended the typical relation: matter and shape. His ability to understand and build according to the light allowed him to combine human experience and spiritual ideals. Light and shadow reveal the building: its spaces, its shapes, and its meanings.

Hestnes Ferreira has the same ability as Louis Kahn regarding the interaction with light, designing spaces with a unique nature. Each opening is defined by its location and results from a

deep knowledge of light. The type of opening, as well as the source of incidence chosen by both, reflects the same approach. Hestnes Ferreira, while analyzing some of his own works, wrote the following 'the dialogue of materials is also the dialogue of light.' (2012, p.130). We can even say that light is defined by the material that frames it according to the spaces it illuminates.

Silence, in the works by Kahn and Hestnes, can be translated by the simplicity and neutrality of spaces, realized by the absence of ornamentation and by the simplicity and clarity of shapes. The architecture of both is characterized by homogeneous spaces, valued by light and silence.

Hestnes Ferreira does not, just as Louis Kahn did not, design according to the commercial use of stylistic approaches, nor according to the majority of them, but can, with the repetition of certain elements, create a registered trademark and distance himself from the Portuguese national perspective. Considering a unique authenticity, the course depends on the continuous search for the essence of architecture.

## Acknowledgments

I would like to thank the architect Raúl Hestnes Ferreira for his availability and for providing me with all the necessary material, as well as for all his support throughout the research process.

Supported by FCT grant (SFRH/BPD/111869/2015)

## References

- Büttiker, Urs, Louis I. Kahn: Light and Space, Birkhäuser, Basel, 1993.
- Campo Baeza, Alberto, A Ideia Construída, Coleção Pensar Arquitectura, Caleidoscópio, Lisboa, 2004
- Ferreira, Raúl Hestnes, "CONHECER O TIJOLO PARA CONSTRUÍR A ARQUITECTURA", in Lourenço, P.B. & Sousa, H. (Eds.), Seminário sobre Paredes de Alvenaria, pp. 111-132, Porto, 2002.
- Gast, Klaus P., Louis I. Kahn: The Idea of Order., Birkhäuser, Basel, 2001
- Giurgola, Romaldo, Mehta, Jaimini, Louis I Kahn, São Paulo, Martins Fontes, 1981
- Juárez, António, El Universo imaginario de Louis I. Kahn, Colección Arquithesis núm. 20, Fundación Caja dos Arquitectos, Barcelona, 2006
- Latour, Alessandra, Louis I. Kahn. Escritos, Conferencias y Entrevistas, El Croquis Editorial, Madrid, 2003
- Lobell, John, Between Silence and Light: Spirit in the Architecture of Louis I. Kahn, Shambhala, Boston, 2008.
- Pinto, José C., O Espaço Limite: Produção em Arquitectura, Lisboa, ACD Editores, 2007
- Roth, Leland M., Entender la Arquitectura: sus elementos, historia y significados, Editorial Gustavo Gili, SA, Barcelona, 2005.
- Saraiva, Alexandra, A Influência de Louis I. Kahn na obra de Hestnes Ferreira, Tesis doctoral, Universidade da Coruña, 2011.

## Figure Credits

Figure 1\_ Philip Exeter Academy, Library (Büttiker, 1993, p.139)





Figure 2\_ Caixa Geral de Depósitos Branch (Saraiva, 2011, p.217)

Figure 3\_ Kimbell Art Museum (Büttiker, 1993, p.145)

Figure 4\_ Beja Youth Cultural Centre (Saraiva, 2011, p.218)

Figure 5\_ José Gomes Ferreira Secondary School (Saraiva, 2011, p.218)

Figure 6\_ Salk Institute for Biological Studies (Büttiker, 1993, p. 111)

Figure 7\_ José Gomes Ferreira Secondary School (Saraiva, 2011, p.220)

Figure 8\_ Philip Exeter Academy, Library (Büttiker, 1993, p.133)

Figure 9\_ Bento Jesus Caraça Municipal Library (Saraiva, 2011, p.220)

Figure 10\_ Salk Institute for Biological Studies (Büttiker, 1993, p.111)

Figure 11\_ José Gomes Ferreira Secondary School (Saraiva, 2011, p.221)