

# FORMS OF PENUMBRA

The Codependent Existence of  
Light and Darkness

Paulo Barbaresi

- 1 Tom Heneghan quoting Koji Taki in Ando, Tadao; Pare, Richard; Heneghan, Tom (1996). *Tadao Ando architecture: the colours of light*. London: Phaidon, 2000, p. 19.

- 2 Baxandall, Michael (1997). *Shadows and Enlightenment*. London: Yale University Press, p. 3-4

In reviewing the vast bibliography concerning the topic of light and shadow one notices how differing layers of knowledge have built up one atop another. Thus, one may also take for granted that light is omnipresent, and that darkness is almost inexistent, where shadows are collaterally local manifestations experienced as a relative deficiency of light itself.

Throughout history western cultures have used light as a medium to convey clarity and to emphasize importance. Light has been associated with the value of life, the after-death and philosophical constructs regarding truth. Darkness has been associated with the occult, the hidden, to negativity and surreptitiousness. Conversely, most eastern cultures have shown a predisposition for shadows, where shadows are linked to the soul and inherent aspects of one's personality. Regarding space, the nuance shadows have defined platforms for spatial comprehension. In their spatial conception "*meaning is produced not through abrupt changes but through subtle variations,*"<sup>21</sup> suggesting patterns of shadows as a vehicle for manipulating space. Besides the cultural differences one can agree that the nuances of shadows imply differing nuances of light.

Scholars have recently proffered the notion that the mystery of light in space does not gravitate towards its presence—as an independent isolated matter—but rather towards its absence. Based on this thesis, one can momentarily detach the cultural implications of shadows and observe that the absence of light—as a modal procedure—has been consistently present within the realm of artistic and spatial poetics of western culture.

Leonardo Da Vinci attempted to understand the phenomena of light linked to the studies and theories of perspective evolving during the renaissance through observational drawings. He categorized three types of light deficiencies: cast shadows, attached shadows and shading<sup>2</sup>. Despite discrepancies in how these terms are contemporaneously understood, the nature of Leonardo's observational sketches condense the phenomenal complexities of light through graphic codes: light represented through projections and shadow as surfaces.



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3 McCurdy, Edward (1871). *The notebooks of Leonardo da Vinci*. Old Saybrook, CT: Konecky & Konecky, p. 124.

4 *Ibid.*, p. 122.

5 *Ibid.*, p. 122.

6 *Ibid.*, p. 121.

1 "The Fall of Light on a Face", 1480, Leonardo Da Vinci. The study of the effect of light rays on a face is a part of Leonardo's scientific interest in painting and natural phenomena. The study concludes with a series of classifications of shadows according to how they fall and how they are produced. Royal Collection Trust © Her Majesty Queen Elizabeth II 2019

*The falling of Light on a face* (1480) maps an event [1] using syntactical trajectories of light to inform the relationship among the source (point a), the medium (face) and the receiver (skin). This analytical demonstration detaches the spatial characteristics of light and darkness by reducing the phenomena to simple representational/observational facts.

This reduction of content inherent in the analysis of complex events reshapes our mental constructs about these phenomena, preventing the awareness of other fundamental aspects of light and darkness: those critical elements related to space. This fact drives observers to associate light with “what is visible” and shadows with a collateral projected surface. A more experienced observer might semantically associate light with a presence – with addition, and shadows with absence – with subtraction.

If a representation implies—by default—a reduction of content, is there a possibility that we are losing inherent aspects of the phenomena that may reshape our conception of light and darkness? Can shadow—as a degree of darkness—be associated with a presence and light with absence? Is the analytical procedure conveying the idea that light and shadow are two separate conditions preventing the observer from seeing and experiencing them as one?

The perceptual understanding of the phenomena requires the inclusive analysis of both analytical and artistic representation. Leonardo Da Vinci himself wrote in his notes: “Darkness is the absence of light. Shadow is the diminution of light.”<sup>3</sup> He further asserts: “The beginnings and ends of shadow lie between the light and darkness and may be infinitely diminished and infinitely increased. Shadow is the means by which bodies display their form. The forms of bodies could not be understood in detail but for shadow.”<sup>4</sup>

Da Vinci’s notes suggest that a shadow is an interstitial condition between bodies...between light and darkness: “Shadow is the diminution alike of light and of darkness, and stands between darkness and light”<sup>5</sup>. It is important to understand that the term shadow was used differently by Leonardo, often as “the counterpart of the luminous rays, which are cut off by an opaque body”<sup>6</sup>, in other words as an absence, and as a degree of darkness, which he called *simple shadow* or *compound shadow*. To avoid misunderstanding, this interstitial condition can be identified with the term *penumbra*. Penumbra (from Latin *paene*, “almost” and *umbra*, “shadow”) is understood and revealed to us as the space of shadow between light and total darkness. It is an area where it is difficult to define the ending of one presence and the beginning of another. *Penumbra* is used here broadly and is not limited to the physical—fading light/darkness—but includes physiological and perceptual features that its presence generates in space. It frames the feeling of ambiguity inherent in the “liminal” condition, between two apparent, consolidated stages.



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- 7 Primordial is understood as an aspect constituting at the beginning, with the potential of giving origin to something derived from it.

- 2 "The Calling of Saint Matthew", 1601, Michelangelo Merisi da Caravaggio. The juxtaposition of two forces is solved with the technique of chiaroscuro, using shadows to convey meaning. © Scala / Art Resource. Public domain. Image displayed under Fair Use policy.

Da Vinci explored the interstitial nature of *penumbra* in *Madonna Litta* (1490-91) and *The Last Supper* (1498), among other works. Tiziano Vecellio, in his painting *The Agony in the Garden* (1558 - 62), furthered the idea which in turn influenced his pupil Michelangelo Merisi da Caravaggio. *The Calling of Saint Matthew* (1601) is well-known for exploring the coalition of the two forces: the power of faith represented by Jesus's illuminated face—bringing the omnipresent light with him—and the mundane world of tax collectors [ 2 ]. The painting representationally illustrates oppositions and inversions. The use of *chiaroscuro* on the right side is extreme, and illustrates the bodies of light and darkness—almost touching—with a clear horizontal dissection: the good from the bad, clarity from darkness. Jesus is positioned within the darkness.

The liminal condition between bodies—light and darkness—is expanded towards the left side of the painting. A wider body of penumbra corresponds to a wider range of personalities within the mundane world and the diffuse boundary between potential and helplessness. Penumbra embraces the tax collectors but also Matthew, defining a body where transformations happen: the call, the moment of conversion from one condition to another. Thus, the composition inverts the idea of shadows as a representation of absence and presents it as a fundamental, spiritual presence. Penumbra becomes a body capable of generating space and containing critical events via different illuminations. Light is associated with absence, or, with and external presence dominating the scene.

Caravaggio's penumbra contributed to making this biblical event a contemporaneously immediate, even pedestrian, event: the result of a modality that conveys meaning and exposes content by "solidifying" the relation between light and darkness. As timeless as they are in themselves, they also make the relation between space and tension timeless, regardless of the specificity of content. Certain forms of penumbra are—in themselves—a vehicle.

Caravaggio's alchemical approach using doses of penumbra and dramatic *chiaroscuro* have become fundamental for generating tension and conveying meaning. His work gave birth to the *tenebrism* for the pronounced use of light and darkness, especially when darkness projects *primordial* characteristics.<sup>7</sup> The profound potential of the technique inspired coetaneous painters—the *Caravaggisti*—to work inside a field with generous darkness, a field induced by tension; they successfully conveyed meaning by regulating interstitial accents and densities of penumbra.

In reviewing their work, one cannot dismiss that the dark compositional aura touches upon the transcendental edge of the sublime. There is a spatial richness "inbuilt" through the accented use of *chiaroscuro*, a force that expresses the capacity of emergence. Is there a potential form of space "locked" within this tension? Does this tension temporarily remain in time or does it vary with it? To which point is the medium—the form, which constructs accented



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- 8 Goldwater R., Treves M. (1980) *Artists on Art: From 14th to 20th Century*. London: John Murray, 1990, p. 440

- 3 "Mystery and Melancholy of a Street", 1914, Giorgio de Chirico. Penumbra is used in combination with optical tools to construct narrative content by observation. © Private collection. Image displayed under Fair Use policy



penumbra—responsible for holding this tension? Is it possible that a conceived form constructs such a tension that it transcends time?

Holding this condition in time has been the interest of many artists, in some cases taking the topic to levels that exceeds existence and posits a reality outside human perception. Giorgio Di Chirico confronted this uncertainty with a set of pictures known as *piazze metafisiche*, metaphysical explorations that began after a personal experience in Piazza Santa Croce, Florence Italy. The *piazze* are preludes to a deeper study of parallel experiences: “*Everything has two aspects: the current aspect, which we see nearly always and which ordinary men see, and the ghostly and metaphysical aspect, which only rare individuals may see in moments of clairvoyance and metaphysical abstraction.*”<sup>8</sup>

*Mystery and Melancholy of a Street* (1914) surrealistically maps an event. Penumbra is all there: it is a suggestion—the message to convey—it is a fading resonance embodied with latent content. The penumbra evokes the will to reveal what has not been revealed yet—the anticipatory threshold of the unknown [ 3 ].

An eclipse-like orange light slices the canvas with an incisive trace, a demarcation of the duality required to define form. The metaphysical event allows free projections, distorted vanishing points and suggests a juxtaposition of spaces as the measure for the composition. Degrees of darkness contribute to a modality that seems to dissociate space from time, the preface for a *time-lapse* experience.

The dark base of the picture, as in *The Calling of Saint Matthew*, and the skies in accented darkness are framing the observer to stand in a point in which light is faded. Darkness, as point of view, is the counterpoint of the incisive light at the center of the picture. It emphasizes the enigma of the central shadow and the girl’s silhouette. Chiaroscuro is used in perspective, through the depth of the picture, following a trace from the observer to the vanish points. These resources are framing a space dislocated from the point of action. The girl’s black silhouette forces us to focus on *what her shadow is saying*: to run to the shadows of a possible statue. The message is clear: the shadows come first—the will, the action; after comes the possible result—arriving to the statue.

There is a narrative path, a line we follow which raises tension. The unfolded enigma allows the observer to fill in the gaps of the unknown, becoming perceptually involved and eventually creating his/her narrative with potential spaces. The right-hand building in the penumbra offers the question of what may be inside the building itself, at the arcade and especially what is behind it: a square where action happens. As with Caravaggio, light is void.

The non-alignment of vanishing points contribute to the overlapping of spaces framing the time-lapse. The left-side projections and vanishing points define the armature for configuring a “hidden space”, a place where the action *may* happen. The right-side projections and vanishing

- 9 Campo Baeza, Alberto et al (2018). *El bisturí en la línea: razón, precisión y medida en el dibujo y el pensamiento arquitectónicos de Alberto Campo Baeza*. Alicante: Universidad de Alicante



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- 4 "El Guernica", 1937, Pablo Picasso. Shadows emphasizing the act of stillness versus light expressing movement. © Sucesión Pablo Picasso. VEGAP, Madrid, 2019. Image displayed under Fair Use policy.

points lead to the narrative action itself, a point where two shadows/silhouettes will meet. The non-alignment of forces challenges the idea of space and action as juxtaposed, synchronized entities and proposes that they are not oppositional within one's perceptual—observational—field.

The incisive line dividing both bodies acts as a scalpel, a tool used to slice form and space. As the architect Alberto Campo Baeza has suggested, line is used as a medium for understanding space by dissecting what is darkness and what is light<sup>9</sup>, what is form and what is space. The tension held between both is the field of maneuver for De Chirico to convey a message, a mode with potentiality for architects to influence architecture.

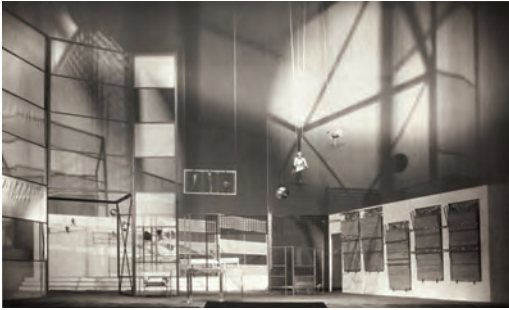
Furthermore, complex uses of shadows can be observed in certain works of cubism, the first artistic vanguard to challenge the strict idea of perspective as a form of narrative representation – a restructuring of formal representational tools and systems used to express all parts of an object—or scene—in the same picture plane, thus achieving a “holistic vision” of space. A divorce from a perspective is a divorce from a unique point of view. Multiple faces of an event are synthesized and collated into one piece as one expression.

The act of fragmenting form and space is not innocent. It distances itself from assumed factual representations. Pictorial representations focus on perceptual experience, expanding the time-lapse of events through multifarious points of view. In *El Guernica* (1937), Pablo Picasso explores the horrific drama of the bombing of Guernica. The whole scene is narrated by connecting individual events, which are semantically three-dimensional, bi-dimensionally stripped and exposed. A collection of elements is revealed one to another, expressing how they are related to each other inside the drama. Mapping these relations becomes a priority defining a palimpsestic reading, decomposing and fragmenting form and condensing information as needed to unfold the mayhem. Penumbra is fundamental. The body of shadows becomes independent. It becomes a separate identity capable of being “detached” from the form and performs a deeper role: to hold/connect the events that are vigorously, and anarchically, fragmented [ 4 ].

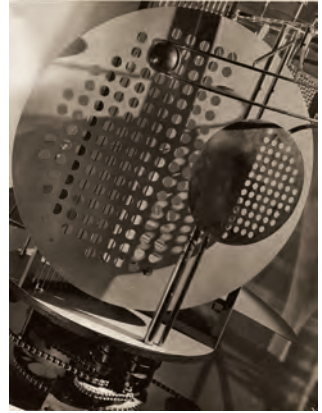
The body of shadows works as an armature in the composition, giving stability to fragments and pieces. The bull and horse positioned in dark shadow seem to represent the act of staying, a prelude for the drama. The nuances of the penumbra support static events: the ones happening an instant before the bombing—the living—and after it...the dead. The contours of the projected shadows escape the rational logic of light projections. They tend to connect to one another giving a sense of measurement between the elements in the picture. Light can be associated with suffering, screaming, running and escaping. Light is the movement that tends to escape from the armature of penumbra.



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- 10 Rawsthorn, Alice (2009). A Life of Light and Shadow. The New York Times. [Online] Available from: <https://www.nytimes.com/2009/10/19/arts/design/19iht-design19.html>
- 11 Moholy-Nagy László, Theobald Paul (1947). *Vision in Motion*. Chicago, p. 12

- 5 Photogram "Self-Portrait of the Inventor of the Photogram", 1926, László Moholy-Nagy. One-off picture as the end result of condensing light passing through several media. © The Moholy-Nagy Foundation
- 6 From left to right: "Scenography of Hoffmann's Erzählungen", 1929 and "Light Space Modulator" (© VG Bild-Kunst / © Lucia Moholy), 1930, László Moholy-Nagy. These images show Moholy-Nagy's intention to generate tools for *projecting* forms to create new manifestations of space. © The Moholy-Nagy Foundation

There is another form of penumbra that is not fully appreciated because it is not used as a medium for relating objects in the scene, but is rather a matter contained in the process of making. In 1922 László Moholy-Nagy began to map ideas of transparency using a source, a medium and a receiver. He produced silhouettes in a negative form by exposing objects on light-sensitive paper in a photographic process without the use of a camera. He called these one-off pictures ‘photograms’. *Photogram Self-Portrait of the Inventor of the Photogram (1926)*, as he called it, features a kind of penumbra that cannot be separated from the photogram itself. The image condenses the depth of matter produced by light passing through the objects and spaces between them. The whole journey of light is compressed in the receiver (the medium), in this case, photographic paper, around Moholy-Nagy’s face [ 5 ].

Moholy-Nagy was one of the pioneers in the use of Light as a decision-making element. Through an experimental machine known as *Light Space Modulator (1930)*, ideas about transparencies emerged as form of projected patterns of penumbra. The machine for “creat[ing] pools of light and shadow”<sup>10</sup> would exemplify his principle of “vision in motion”<sup>11</sup> based on understanding and extracting aesthetic forms from a living body to create new expressions of space [ 6 ].

Many instances in his career make his fascination with mapping transparency evident. The series of *Gelatin silver photograms* and *Gelatin silver prints* from 1939 to 1943, including experiences using color (1939), are patterns of penumbra as aesthetic forms. Moholy-Nagy saw space in these patterns, especially in the beauty of the movement as a prelude for spatial form. Projected registrations of penumbra were compressed in a surface medium—a photogram—resulting in a choreography of spatial associations. One can assume that Moholy-Nagy was not looking for transparency, but for forms of *translucence*: quasi-transparent forms that allow materially regulated transmissions of light, establishing an “aesthetic dialogue”. The result did not seek to evoke a reality but rather an exploration of the act of mapping itself. The relation between the elements along a trajectory of light became primordial. The source, the mediums and the receiver were everything needed for configuring the spatial manifestations to artifacts and artifacts to space.

The action of compacting space into a planar form reveals that penumbra can be “contained” in certain representational mediums. In 2014 Steven Holl visited Caja of Granada, considered one of the best works of Campo Baeza. According to Holl the visit was a celebration of the existence of architecture “regardless of its function”. He expressed the magnificence of this space as an “impluvium of light”, a vessel for light and a medium that stipulates the seasoning of the building. The spatial “richness” of this work would not be possible without the use of a key transmutational medium: thin pieces of alabaster.



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- 7 Caja de Granada, 2001, Alberto Campo Baeza. Screenshot from Steven Holl at Caja de Granada (video). Alabaster skin utilizing external light to reveal internal forms of penumbra, its structure and its essence. © Alberto Campo Baeza. Courtesy of Estudio Arquitectura Campo Baeza

The inner shell is constructed using plates of alabaster, a material that does not reject/reflect light but rather absorbs it. One can say the penumbra governs the interior of this stone: it only needs light to reveal what is hidden within. Alabaster, as a medium, allows light to escape or reenter the void. The same relationship is present here: the source, the medium and the receiver. Penumbra can be associated with density; matter condenses forms of penumbra [ 7 ].

Forms of penumbra are present in acts of representation and making. It is a medium in both. Penumbra contained in representations is connected more to the idea of conveying meaning, while penumbra as a result of making is related more to the idea of mass and form. Both can be seen as separate or joint experiences; as a continuum and a consequential process, from a bi-dimensional to three-dimensional manifestation, and vice versa. The first implies a process of creating space, adding content to a planar manifestation in order to spatialize it. The second involves a process of condensing, reducing and extracting content to eventually finish with a distilled armature.

The forms of penumbra considered above are deployed as *vehicles* operating within the design process. Specifically, Caravaggio's work features a penumbra that is often bi-dimensional: a juxtaposed planar field, extremely dark, that achieves three-dimensionality by being interrupted abruptly where critical content needs to be anchored, by becoming diffused where meaning needs to be constructed, by intensifying color-contrast where narrative links need to be heightened and by allowing transparency where metaphysical presences need to be evoked. The accuracy in the details and the manner in which penumbra colors the event make the "instant of the calling" a point in time palimpsestically embedded with meaning.

De Chirico's penumbra fundamentally embodies space, which is inherently latent in his metaphysical motives. Although there is a bi-dimensional medium, the spatial narrative is completed by the observer when filling in the gaps the artwork ambiguously conveys. The work has the potential to perceptually trigger a three-dimensional world.

Picasso structured *Guernica* with patterns of shadows and connected them with aspects of "time". Shadows associatively connect scenes as intentional armatures conveying content before and after the bombarding. Light is the action and the movement, which is framed between these two moments in time. Spatiality is also challenged semantically when multiple points of view reinforce the message.

Maholy-Nagy reshapes penumbra as technique—and tool—and situates it as an inherent, and transmutable, spatial condition. Through his photograms and ideas of transferring movement—or three-dimensional manifestations—to bi-dimensional mediums and vice versa he achieves the idea of synthetically condensing space versus expanding and creating space—adding content.

- 12 McCurdy, Edward (1871). *The notebooks of Leonardo da Vinci*. Old Saybrook, CT: Konecky & Konecky, p. 119.



Observations about Campo Baeza's building reinforces tangential ideas in Moholy-Nagy work, which implies that penumbra is not only an external manifestation of form but it is also an inherent interstitial manifestation of matter. Light is needed to reveal the hidden penumbra within the mass itself.

These ideas reinforce the potentially embedded in the use of penumbra within the design process. Leonardo Da Vinci has an intuition:

“Light [on an object] is of the nature of a luminous body; one conceals and the other reveals. They are always associated and inseparable from all objects. But shadow is a more powerful agent than light, for it can impede and entirely deprive bodies of their light, while light can never entirely expel shadow from a body, that is from an opaque body.”<sup>12</sup>

Penumbra has a strong relation to accuracy, latent content, armature, expanded and condensed space and matter. Therefore, it has the potential to enrich design processes when it is understood as a *medium*, not just as an armature for conceiving design, but rather an *element of transition* to new creations, enhancing continuity in the design process.

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