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The language of stone as material, phenomenon, and value for a new perception of architectural space

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Abstract
Contemporary architecture balances innovation with tradition, epitomizing responsible design. Stone's enduring significance in architecture lies in its symbolism, craftsmanship, and adaptability. Material, phenomenon, and value define architecture's essence, bridging the past with the present. Through thoughtful integration, stone continues to shape architectural narratives worldwide.

Keywords: Space, stone, material, phenomenon, value.

Introduction

Architecture is an art that combines form and function, aesthetics and utility, in a dynamic equilibrium reflected in the technical choices and construction details adopted during the design process. The design approach leads to choosing between the functional needs of space and the aesthetic expression of form. Technical choices, such as the selection of materials and the arrangement of structural elements, prove to be fundamental in translating the architectural concept into a built reality and also into an architectural language. This type of language, when referring to the use of stone both as a construction material and as a cladding material, has long been a universal language in architecture. In addition to being a durable and resilient building material, stone also holds rich symbolic and expressive significance that has shaped the history of architecture worldwide, especially in the Mediterranean context. The earliest forms of masonry constructions date back to prehistoric times, when humans began stacking stones or bricks to create shelters. These early constructions were often rudimentary but represented a significant step in the evolution of architecture, offering protection and security to early communities. In ancient Mesopotamian, Egyptian, Greek, and Roman civilizations, masonry constructions reached unprecedented levels of sophistication and complexity. From the pyramids of Ancient Egypt to Greek temples and Roman monuments, masonry became an expression of political, religious, and cultural power, testifying to the technical and artistic skill of builders of the time. During the Middle Ages and the Renaissance, masonry construction techniques continued to evolve, with the introduction of new materials, processing techniques, and architectural styles. Gothic cathedrals and Renaissance palaces testify to the skill of artisans in shaping stone and bricks to create architectural works of extraordinary beauty and complexity. With the advent of the industrial era, masonry constructions underwent significant transformations, with the introduction of new materials such as reinforced concrete and steel, which are cage structural processes, and for the first time in history masonry constructions are put in the background. However, interest in traditional masonry has remained alive, with movements such as neogothic and neoclassicism revisiting and reinterpreting architectural styles of the past. Therefore,

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stone as a construction material, except in small realities and for building restoration, seems to be a victim of this change but, from the beginning, it demonstrates an adaptability through the use of the material as cladding. Illustrious architects such as Otto Wagner, who constructed his subway stations with steel structure clad in stone, Adolf Loos, who analyzed how the concept of cladding, like that of dressing, are instinctive actions of man, up to Ludwig Mies van der Rohe, who assigned a primary role to stone in many of his works, leading to the Italian Rationalism movement.
The use of stone in Italian Rationalism had various effects both aesthetically and technically. Aesthetically, stone imparted a sense of solidity to buildings, emphasizing the idea of stability and rational order inherent in the movement. Technically, stone represented a reliable and durable construction choice, in line with the functional and pragmatic principles of Italian Rationalism.
Finally, the third millennium, in which society is in deep crisis but also undergoing significant transformation with the explosion of the digital revolution and growing environmental issues. The digital revolution has introduced a range of tools and technologies that are radically transforming the design and construction process. In the stone processing sector, digital modeling, 3D laser scanning, and computer-aided manufacturing allow for precision and customization never seen before. These technologies enable architects to fully exploit the aesthetic and structural potential of stone, creating complex and detailed forms with greater efficiency and precision.
Alongside the digital revolution, there is a growing awareness of the environmental impact of the construction industry. The extraction, transportation, and processing of stone can have a significant impact on the environment, including soil erosion, air pollution, and excessive use of water and energy resources. Consequently, there are increasing efforts to reduce the environmental impact of stone usage in architecture through sustainable practices such as the use of local stones, optimization of production processes, and recyclability of materials.
Stone, with its solidity, strength, and variety of shapes and colors, has always fascinated humanity. However, its importance goes beyond its physical qualities; stone has been shaped and interpreted through the lens of aesthetics, becoming a medium through which to express ideas, emotions, and symbolic forms linked to cultural aspects.
The aesthetics of stone is a complex and multifaceted phenomenon that encompasses multiple artistic and cultural disciplines. Through its transformation from inert matter to object of aesthetic contemplation and cultural symbolism, stone has profoundly influenced visual arts, architecture, and urban landscapes through its materiality, its phenomenon, or through its value. Its impact endures over time, continuing to inspire artists, architects, and urban planners worldwide.
For convenience of further study, we will discuss some built examples of architecture useful for understanding what has been discussed previously through key terms. The identification of these terms is arbitrary but instrumental to the discussion.

Material

The use of stone, or any other material, in architecture is not merely abstract choices but concrete decisions that must be established throughout the design process. The material has a precise form and its own processing method. In the project, it has its position and orientation that modifies its conformation. There are forms that can determine a space, a way of building, a structure, which with their measurements or proportions emerge as one style rather than another. We could say that every material possesses its own architecture. The choice and arrangement of building materials significantly influence the perception of spaces, creating sensations of warmth, comfort, and

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physical well-being. Additionally, the materiality of buildings can contribute to the creation of distinctive atmospheres and the expression of aesthetic and cultural values.

Fig. 1 – The use of split stone contrasting with the purity of plastered forms, *Ara Pacis Museum*, Richard Meier, 2006, Roma. Source: photo by S. Rugino

The use of stone in the Ara Pacis Museum in Rome showcases its physical substance, which takes on different forms in space, potentially even becoming a tactile, sensory experience. The finish of the stone explicitly reveals the processing carried out, through splitting, yet still manages to exalt the pure forms of the design. Meier chose to use travertine, a local limestone, to clad some parts of the Ara Pacis Museum. Travertine was employed for both external cladding and some internal elements, imparting a uniform and homogeneous appearance to the monument. Stone processing techniques were carefully selected to ensure the monument's durability and resistance over time while maintaining the integrity of its original forms and details. The smooth and uniform surfaces of travertine create a fascinating contrast with the clean and geometric lines of contemporary architecture. Furthermore, the choice to use stone as the predominant material allowed for maintaining a visual and symbolic connection with the ancient monument while adding a new aesthetic and conceptual interpretation. The aesthetic materiality of stone enhances its visual, tactile, and symbolic qualities, and the way it has been utilized creates an exaltation of form.

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Fig. 2 – The use of split stone juxtaposed with the purity of plastered forms and the white marble or the Ara Pacis, *Ara Pacis Museum*, Richard Meier, 2006, Roma. Source: photo by S. Rugino.

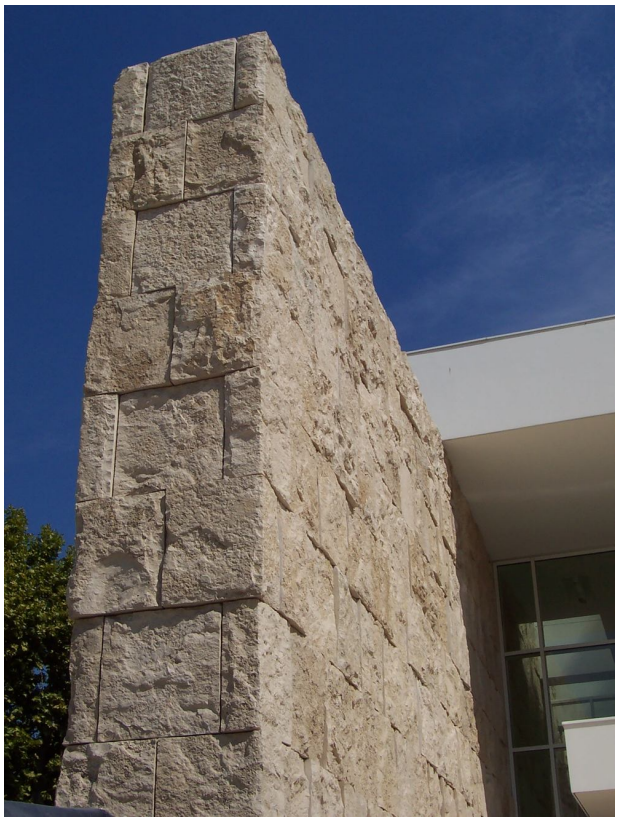

Fig. 3 – Detail of the wall constructed with split stone, *Ara Pacis Museum*, Richard Meier, 2006, Roma. Source: photo by S. Rugino.

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Phenomenon

The term “phenomenon” derives from the ancient Greek “phainomenon”, which means “that which appears” or more precisely “that which is visible”. In a general sense, a phenomenon can be defined as an observable event or manifestation that occurs in the natural world or in other domains.

Fig. 4 – The use of open-patterned stone decorating the space, *Barcelona Pavillon*, Mies van der Rohe, 1929, Barcelona. Source: photo by S. Rugino.

In philosophy, the concept of phenomenon is closely linked to ideas of perception and reality, with phenomena representing the sensory manifestations of human experience. Sensory manifestations play a fundamental role in the experience of architectural spaces, influencing the perception of space, form, color, and light.

Mies van der Rohe’s approach to the use of stone as a phenomenon is characterized by a search for essentiality through formal purity.

In the panorama of twentieth-century modernist architecture, Ludwig Mies van der Rohe’s Barcelona Pavilion emerges as a timeless icon of simplicity, elegance, and conceptual clarity. Situated in the context of

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the 1929 Barcelona International Exhibition, this architectural masterpiece continues to evoke admiration and interest for its unique combination of essential geometric forms, refined materials, and fluid spatiality.
The Pavilion stands out for its clear adherence to the fundamental principles of architectural modernism, including formal simplicity, structural rationality, and innovative use of materials, and is characterized by a harmonious intersection of horizontal and vertical planes in stone, defining open and fluid spaces. The glass walls engage the observer in a constant dialogue with the surrounding landscape, creating a sense of continuity between interior and exterior.
The skillful use of marble, steel, and travertine imbues the pavilion with a quality of timeless elegance and refinem
ent.

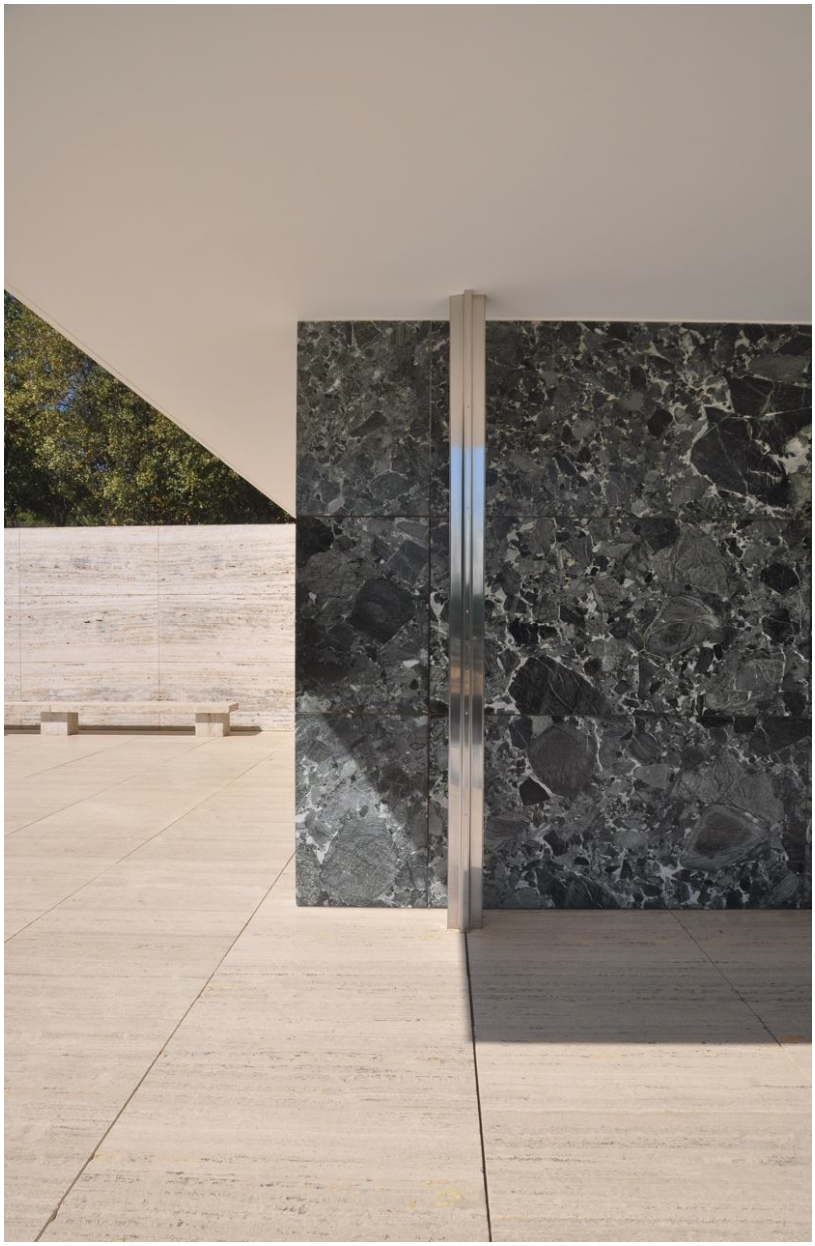

Fig. 5 – The use of open-patterned stone contrasting with new materials such as steel, *Barcelona Pavillon*, Mies van der Rohe, 1929, Barcelona. Source: photo by S. Rugino.

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While it can be described as an example of architectural simplicity, it is important to emphasize that this simplicity is not the result of a banal reduction or lack of complexity. On the contrary, Mies van der Rohe's quest for simplicity emerges from his ability to synthesize and harmonize a wide range of architectural elements into a coherent and harmonious composition. In this sense, the simplicity of the Barcelona Pavilion is the result of a refined process, in which each architectural element is reduced to its essential form. In fact, Mies states that the simplicity of architecture lies in the clarity of architectural means and the purity of materials.
The finish of the marble surfaces of the pavilion, in "open stain" technique, cutting the marble block into thin slabs where the veins compose designs similar to the entire block, renders the language of stone a "phenomenon" rather than "material". This means that Mies emphasizes the chromatic values of the stone rather than the materiality of the marble block.

Value

The concept of value in architecture is inherently linked to our perception of built spaces, encompassing aesthetic, functional, cultural, and emotional aspects. It can also be defined in terms of utility, beauty, symbolic meaning, sustainability, and adaptability. The value of a building can vary depending on the cultural, social, and economic context in which it is situated and can be influenced by factors such as history, location, and urban context.
The value of an urban context can derive from various factors, including the preservation of historical and cultural heritage, the promotion of diversity, and the creation of attractive and accessible public spaces. The historical tradition of a place contributes significantly to its identity and value. Architectural elements, structures, materials, and decorative details that reflect the history and culture of a place imbue architectural spaces with depth and a unique character. These elements can be witnesses to past epochs, significant events, or local traditions and can contribute to creating a sense of continuity and belonging.

Fig. 6 – The use of local stone that becomes landscape, *MAAT*, Amanda Levante, 2016, Lisbon. Source: photo by S. Rugino.

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Fig. 7 – The use local stone and typical tiles of the area, *MAAT*, Amanda Levante, 2016, Lisbon. Source: photo by S. Rugino.
Fig. 8 – The use local stone and typical tiles of the area, *MAAT*, Amanda Levante, 2016, Lisbon. Source: photo by S. Rugino.

This is the case with two architectures built in Portugal: Rem Koolhaas' Casa da Música in Porto and Amanda Levete's MAAT (Museum of Art, Architecture, and Technology) in Lisbon.
The Casa da Música, located in the Boavista district of Porto, stands out for its bold modernity in an urban context characterized by a mix of historical and contemporary architecture. Its strategic location in the center of a public square makes it a focal point of the city's cultural life. The design of the Casa da Música is characterized by bold lines, dynamic geometric forms, and innovative use of materials. The main facade is clad in panels of white concrete, while the interior features an explosion of color and light, given also by the cladding of the walls with typical "azulejos" tiles, large windows, and reflective surfaces.

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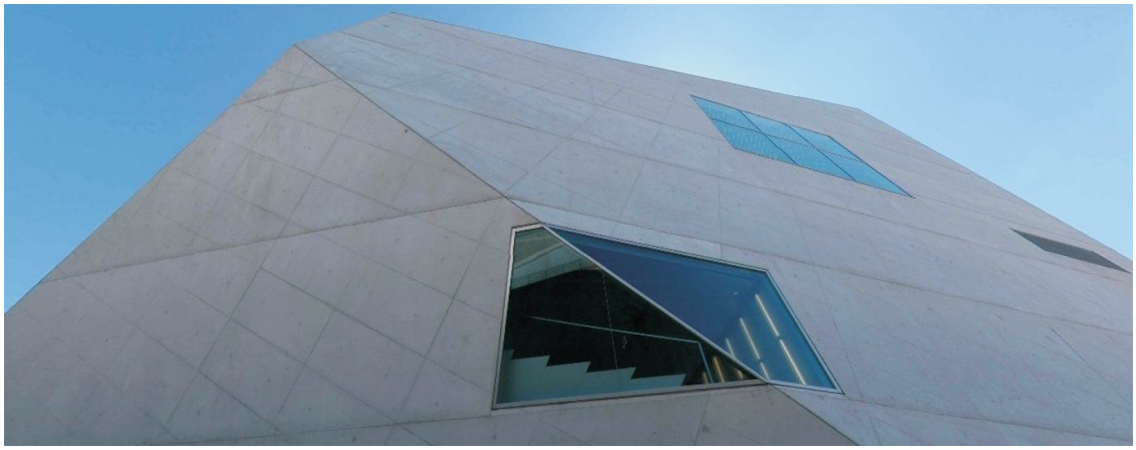

Fig. 9 – The exterior cladding white cement panels, *Casa da Musica*, Rem Koolhaas, 2005, Porto. Source: photo by S. Rugino.

Fig. 10 – The interior cladding with tiles featuring geometric patterns, *Casa da Musica*, Rem Koolhaas, 2005, Porto. Source: photo by S. Rugino.

Fig. 11 – The interior cladding with traditional tiles “azulejos”, *Casa da Musica*, Rem Koolhaas, 2005, Porto. Source: photo by S. Rugino.

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The tiles play a crucial role in the architecture of the Casa da Música, contributing to value and defining the style and atmosphere of the interiors. Used in various areas of the structure, from walls to decorative elements, the tiles harmoniously integrate with the bold and contemporary design of the Casa da Música. Their presence lends a sense of visual coherence and continuity to the spaces while adding texture and color to the environments. From traditional ceramic tiles to glass or metal ones, the structure features a wide range of materials and finishes.
The MAAT is located on the riverside of Lisbon, in an area rich in history and culture. The design of the MAAT is characterized by fluid lines, organic forms, and above all, the creative composition of historical materials: the tiles that cover the streets of Lisbon and the cladding of almost the entire building with trapezoidal tiles. The structure stretches along the Tagus River, with a series of interconnected volumes that rise like suspended waves above the ground. The main facade is clad in white ceramic, following the rich Portuguese artisanal tradition, which reflects sunlight and creates an iridescent effect that changes with atmospheric conditions.
The use of tiles as cladding represents an excellent example of how a traditional material can be reinterpreted in a contemporary context to create extraordinary visual and functional effects. The tiles significantly contribute to the aesthetics, functionality, and durability of the structure, imparting its spaces with a distinctive and engaging character. Ultimately, the innovative use of tiles in the MAAT highlights the creative and technological potential and value of this material and celebrates its versatility and beauty.

Conclusions

Contemporary architecture often finds itself navigating between technological innovation and construction tradition. While new technologies and materials offer new design possibilities, knowledge of traditional techniques and construction details from the past can inspire original and sustainable solutions. The dialogue between innovation and tradition is essential to ensure responsible architectural practice that respects human and environmental needs.
Stone in architecture goes beyond its practical function as a building material; it is a vehicle for complex and multifaceted symbolic meanings that reflect the aspirations, beliefs, and experiences of the local culture. Its solidity, craftsmanship, sacredness, and connection to historical memory are just some of the many symbolic dimensions that stone assumes in architecture.
Material, phenomenon, and value represent three key elements that define the essence of architecture. Material constitutes the physical substrate of buildings, phenomenon concerns the sensory and perceptual experiences generated by architectural spaces, while value reflects the cultural, social, historical, and economic importance of the context in the case of the Mediterranean.

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