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A STUDY ON THE CHANGE OF MODERN ARCHITECTURAL SPACE COMPOSITION ON THE ROLE OF THE WALL

Abstract. The new concept of space created by the technological development and ideological change since the 20th century involves in a change of perception about 'wall'. This means that walls, floors, and ceilings, which were only perceived as structures in space, have become independent and autonomous, and thus have come to mean from their role of defining space. In modern times, the changed recognition system and the advance of science and technology have changed and developed the form and space of architecture in a different way from the past. In other words, the walls became to include various functions and attributes of expression, and have evolved into a new task of designing space. The purpose of this study is to investigate how walls play a role in the interconnectedness of space and creation of meaning to compose architectural space. For this purpose, this study analyzes the works of modern architects based on the concept of boundaries that divide internal and external relations, clarifies that walls have become the subject of creating complex meanings through interconnection of spaces beyond the function of dividing the space and limiting structures.

Keywords: wall, boundary, modern architecture, space, meaning.

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1. Introduction

1.1 Background and Purpose

In architecture, the wall is a clue and a basic building element that determines the form and allows us to understand the interrelationships and boundaries of interior and exterior space. By the beginning of the 20th century, however, as the design of the elevation, the identity of the program, and the interior design, which have been promoting and integrating building design over the past 200 years, were isolated from construction, they began to be regarded as independent variables in each design equation. The change in the perception of wall is, in particular, a big occurrence that enabled modern architecture to become independent from classical architecture. Based on the fact that the shift in perception of 'wall' in modern architecture was a turning point for reconsideration of architecture, this study examines the polysemous concept of wall reflected in the architecture of Frank Lloyd Wright and Le Corbusier, and explores how the change in perception of space has represented modernity.

The main argument is focused on how walls with autonomy, not as part of the whole, were used in modern architecture and how the modern architectural space exhibited differences in ideology and constructiveness. Therefore, this study aims to understand the actual meaning of the spatial composition through deconstructing and recon-

structuring of the wall by understanding the interrelationships of spaces and flowing space created through the wall and reading the narrative between spaces, and to examine the evolution of spatial thinking developed through changes in the perception of walls.

1.2 Scope and Methods of the Study

By examining the various functions and meanings of walls in modern architecture, this study is to establish a framework for analyzing the works of modern architects. Then, in order to observe the variable space created by the change in the meaning of the wall as a boundary, Frank Lloyd Wright and Le Corbusier are selected as representative modern architects who applied the change in perception of the wall to composing architectural space, and explore polysemous concept of walls reflected in their architecture.

“Falling Water” of Frank Lloyd Wright and “Villa Savoye” of Le Corbusier are particularly selected as the subjects of the analysis. Wright considered space as fundamentals of architecture and used the metaphor of 「Exploding the box」 to carry out the spatial transition by walls, and Corbusier attempted complete independence of the wall from the structure to implement 'plan libre'. Through the analysis, the study examines the effects of changes in the role of walls on spatial transition processes, and verifies the relationship between differentiated plans and elevations (independent plane from elevation and independent elevation from plane), and the reversed relationship of internal-external space through phenomenal transparency and components of space. Finally, this study aims to find the applicability of the spatial composition acquired through these analyses.

2. Theoretical Investigation

2.1 Wall and Space

It was noticed that since modern times when walls became completely independent from structures and freed from the traditional perception of walls as constructive elements, walls have enabled spaces to float through mutual penetration of interior and exterior spaces [6, p.23]. The concept of walls that were liberated from the structure was a main factor in that since modern times, the characteristic of architectural space became vertical, ambiguous and flowing. In other words, the changed meaning of 'wall' evolved into a boundary with an ambivalent concept of limitative and nonrestrictive attribute, which not only separates but also connects interior and exterior at the same time [7, p.5], became to incorporate an uncertain, ambiguous and polysemous meaning rather than a boundary that separates space. Therefore, examining the multiple functions and semantic changes of the walls, makes it possible to consider the use of walls for various spatial composition.

2.2 Framework of Analysis

In modern architecture, walls have spatial functions that limit, divide, integrate and isolate space, structural functions that support loads, and physical functions that complement the form [7, p.7]. In this respect, this study defines the concept of "free plane" that reproduces functional changes in walls freed from traditional perception as a framework for analysis and attempts to explore the architecture of Frank Lloyd Wright and Le Corbusier as a representative example.

3. A Case Study on the Spatial Composition by Applying the Wall Properties in Modern Architecture

3.1 Frank Lloyd Wright –“The Destruction of the Box”

The "Destruction of the Box" by Frank Lloyd Wright (1876-1959) attempted to escape the architectural perception as a traditional enclosed box by removing the corners. For example, a column built on a corner acts as a boundary on behalf of a wall, and destroying the box in this way opened the possibility of overcoming the limitations of the wall and expanding into a space where the interior and exterior space freely communicate. This tells that the elements composing the space are no longer simply a part of a box, but rather an "Organic Simplicity" which makes a close connection to each part and the complete integration of the whole. Wright's 'organic simplicity' does not mean that the object itself exists alone, but that the separated parts are closely connected together to form a single complex, and that the relationships among the parts are integrated. As the boundaries disappear in the architecture of Wright, therefore, each room is connected to create a free flow, and the 'flowing space' is realized through the interpenetration of interior and exterior space, and interrelationship between vertical and horizontal continuity, expansion, repetition and opposition. Wright extends the wall into the concept of transition space by organically linking the space through the destruction of the box.

3.1.1 Development of transition space

Falling Water, completed in 1937, is the representative architecture of Wright, where the concept of transitional space is most expressive. In Falling Water, cantilevers look to be floating in the air as if suspended above a waterfall, through the separation of walls and ceilings. The transition from a vertical wall to a horizontal slab of concrete cantilever floating lightly shows a dialogue between the nature and artificiality through the morphological tension of vertical and horizontal. In other words, a vertical wall is considered not as a structure supporting a cantilever slab, but as an element implicating the transformation in space. The structure wall of Falling Water is not exposed to the outside, but three-dimensionally superimposed boxes in the interior space are connected vertically and horizontally. In other words, for Wright, walls are thoroughly being used as devices to mediate spaces rather than structures. The walls constituting the mass function as a medium in between spaces, and are used as transition devices regulating the changes in space from the top, through the sides, to the bottom. Using the space composition by these walls, the vertical wall of Falling Water leads the movement to the second floor through a narrow and dark space, and continues to draw the meaning of transition through a repeated intersection of narrow wide space.



Fig. 1. Floating Mass of Falling Water

The access to Falling Water is a drama itself. The pressure in a narrow and low space, the openness you felt at the moment of climbing one step around a wall, and the spatial transition into a stunning landscape of horizontally long windows are repeated. In this way, many attempts to constantly transfer internal and external spaces through various flow plans of Falling Water can be found. These various flows of Falling Water structuralize the flow of continuous spaces in arrangement by using walls.

3.1.2 Continuity of space

The spaces in Falling Water possess relative value as the boundary of the wall, in dividing the room, collapses and the space overlaps, blurring the fixed functions and boundaries of each room [4, p.8]. These boxes of different sizes are overlapped and combined to be read as a 'Totality of Unity'. The wall freed in the process of overlapping broken boxes, remains as an element that can infer the form of existing space. That is, through the destruction of the box, elements separated by the floor into the wall, the ceiling and the floor form the whole again through the flow of the inferred continuous space.

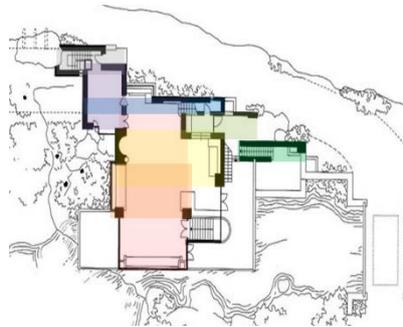


Fig. 2. Falling Water: Overlapped Boxes and Continuity of Space

Wright described the organic simplicity through the continuity of space, describing “organic means part to whole as whole is to part.” This concept of Falling Water shows that walls and roofs can be off-limits, that open corners can be sufficiently closed, and that different spaces can flow at the same time as they are separated [8, p.70].

3.2 Le Corbusier

Villa Savoye of Le Corbusier is a representative work of the five principles of new architecture based on Domino theory. The abstract grid space that creates order by repeating the basic grid modules and the walls as a formative form that creates the tension and difference in it, exist as a powerful object along with other elements in the space as the common language of housing at this period.

3.2.1 Movement and change

The key elements in the design of Villa Savoye are movement and change. Le Corbusier used a free structure system to put a ramp, the so called architectural promenade that form the entire framework of the house, on the central axis of the 1st floor of the Villa, and planed various volumes around the ramp as a strategic arrangement for this composition. Rectangular plan (close to a square) with a high geometric purity are puzzled by spaces of various shapes and sizes, and it is the central

ramp that weaves these spaces into one continuous visual experience. This ramp reaches to its climax as it climbs once more toward the garden on the top floor from the pocket-type roof garden on second floor. Le Corbusier creates an entire organic order by inserting a continuous flow of space called an architectural promenade in the static structure of the grid.

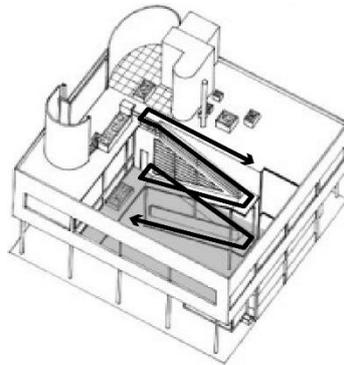


Fig. 3. Architectural Promenade of Villa Savoye

3.2.2 The facade as an abstract face

The exterior of the Villa Savoye is very simple and clear with horizontality, highlighted and emphasized by hiding the flow of inner and outer space, and by the dark and long horizontal window contrasts with the exterior walls. This means that the building's spatial structure and facade are no longer in interdependent relationship, but rather in independent with each other. As such, the wall as the facade of Villa Savoye exists as a two-dimensional abstract 'face', separated from the ground, emphasizing pure abstraction more, implying that the wall as a 'face' is a free facade [9, p.53].



Fig. 4. Elevation of Villa Savoye: Abstract 'Face'

3.2.3 Overlapped wall, Overlapped space: Phenomenal Transparency

Le Corbusier harmonized spatial interconnections by aligning the cubes of space and the opaque, transparent walls with the views unfolded at various angles. The panoramic view from the second floor terrace of Villa Savoye contains spatial transparency. Several overlapping spaces can be found under the roof of the outdoor pavilion. That is, the pavilion itself, the frame containing the exterior space, and the clear glass space directly into the villa. In other words, the landscape surrounding the villa, which is vaguely existing both inside and outside of the villa, is emphasized by a long horizontal window, which alternates the role of the background and the frame.

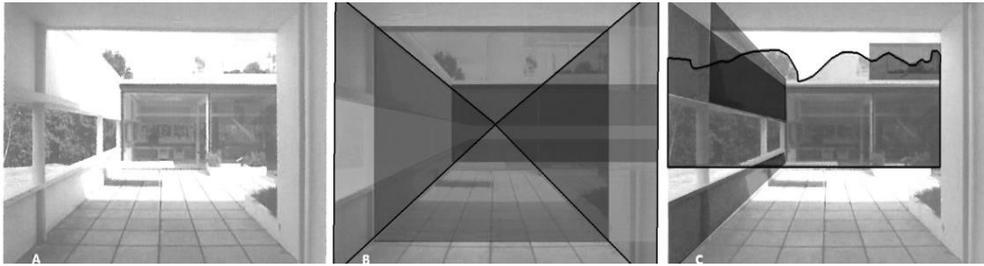


Fig. 5. Villa Savoye: Phenomenal Transparency

4. Conclusion

This study analyzed and investigated the spatial and morphological characteristics of two architectures through the walls whose meaning and role have historically changed, focusing on the relationship between architectural space and form that reveals space. The summary is as follows:

Wright enables the concept of expansion to the outside of interior space and transition space by destructing the corner of the box with practical strategies for penetration of interior and exterior space, and for the interrelationship of vertical and horizontal continuity and expansion, repetition and confrontation. Falling Water is read as ‘unified cluster’ that is integrated by several boxes in which the concept of transition is best expressed. Through this study, it was found that Wright’s wall is used as an intermediary device to mediate space, not structure, and that the faces separated from the cube into walls and floors were reunited into integration in the continuous flow of space.

Villa Savoye of Le Corbusier showed that walls evolved into a formative form that makes tension and difference in an abstract grid space made by structural grid modules. In particular, the grid arrangement of the columns regulated by the central ramp, an architectural promenade, shows that the structural modules of the grid system are a tool to realize the free plan with movement and change. The long horizontal window was found to obscure the boundaries between interior and exterior space and showed an abstract section as a free elevation while indicating that the elevation no longer depends on space.

The two architects showed that the spatial expansion of the wall and the frame of the building were overlapped with the ambiguous juxtaposition of interior and exterior of the building along with the landscape and nature around the building, and that by converting the vertical wall horizontally, they attempted to expand the space. Through this study, it is shown that the two architects expanded the meaning of the wall by reproducing the experiences of the walkers through the walls, and that such an attempt could be applied as a method of architectural design.

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ИССЛЕДОВАНИЕ ИЗМЕНЕНИЯ РОЛИ СТЕН В СОВРЕМЕННОЙ АРХИТЕКТУРЕ ПРОСТРАНСТВА

Абстракт. Новая концепция пространства, созданная технологическим развитием и идеологическими изменениями с 20-го века, предполагает изменение восприятия «стен». Это означает, что стены, полы и потолки, которые воспринимались только как пространственные структуры, стали независимыми и автономными и, следовательно, стали восприниматься как важные элементы в определении пространства. В наше время достижения науки и техники, а также изменившаяся система распознавания изменили и развили форму и пространство архитектуры в абсолютно новом направлении, отличным от прошлого. Другими словами, стены стали включать различные функции и атрибуты выражения, и превратились в новую веху разметки пространства. Цель данного исследования - выяснить, какую роль играют стены в создании архитектурного пространства. С этой целью в данном исследовании анализируются работы современных архитекторов, основанные на концепции границ, разделяющих внутреннее и внешнее пространство, и уточняющих, что стены стали инструментом создания сложных пространств.

Ключевые слова: стена, граница, современная архитектура, пространство, значение.

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