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**A STUDY ON THE CHANGE IN SPACE RECOGNITION THROUGH
THE HISTORICAL INVESTIGATION OF THE WALL:**

focused on the transition from planar thinking as layout to
sectional thinking as composition

Abstract. the study departs from a historical investigation on the changes of role and meaning of the wall that defines the space as the basic substance of architecture. Based on the fact that the modern architectural space made conceptual and ideological changes from Le Corbusier's "Domino" theory, this study attempts to redefine the interrelationship between walls and space as a theoretical and historical consideration that changes in perception of walls differentiated from classical architecture have transformed from the planar thinking of 'arrangement' of space to the sectional thinking of 'composition'.

Keywords: wall, space recognition, spatial composition, sectional thinking.

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1. Introduction

1.1 Background and Purpose

Regarding that the spatial interrelationship is created by the boundary, it is not exaggerated to say the wall making both physical and perceptual boundaries is the major component that directly effects spatial composition. And it goes without saying that the issues related to the form and composition of space, and the sense of place have been an overriding concern in architecture regardless of eras.

Generally speaking, architectural history has been recorded in diverse ways on the basis of ages and culture, civilization and technology, society and environment, and so on. However, there has been always a recognition and experience of the architectural space that becomes the nerves of architecture [5, p.14]. Entering into the 20th century, in particular, when the concept of construction was changed with the development of architectural technology, and the wall was ultimately freed from the structural function, the traditional understanding of the wall was also changed. In short, after modern era, the thought on space itself, rather than construction, has become an overriding concern in architecture, and space has begun to be regarded as a major element to be considered in architectural design [5, p.14].

In other words, the 'disappearance of the wall' increased a desire for creating free space [1, p.95], instead of shaping the space by perspective drawings or any external objects such as decorated facade and ornaments. Innovative ideas on the space

through ‘disappearance of the wall’ paradoxically paid attention to the interrelationship between the wall and space to be developed to thinking of the role and meaning of the wall in the spatial interrelationship.

With this backdrop, the study attempts a historical examination on how the roles and meanings of the wall in architectural space have been evolved and how these changes have affected the thinking of architectural space composition. By the historical examination, the study intends to verify that it is the perceptual change of the wall that changed the cognition of space and its interrelationship as well as the method of spatial composition. The study, through historical investigation, aims at drawing a conclusion that the change of role and meaning of wall have resulted in changing the planar recognition of space to sectional understanding, and in evolving the architectural attitude toward space from arrangement to multidimensional and sectional composition.

1.2 Scope and Methods of the Study

The study proceeds document research in order to derive the interrelationships of spaces in association with the meaning and role of walls, and their additional meanings. It is the development of 20th century architecture technology and ideological change, that changed the perception of “wall” and that makes the study consider the beginning and development of modern architecture as a turning point in the perception of architectural space. In other words, Le Corbusier's domino theory changed the notion of the wall which was regarded as structure, and the change of construction method had the concept of modern space expressed aggressively [5, p.4].

Researching the architectural history from ancient Rome to medieval, Renaissance and modern architecture in general, the main argument is focused on the changes between walls and spaces, in particular, around the time when Le Corbusier announced the domino system. Regardless of various aspects including form and function, psychological and social interventions, which affects space conceptualization in architecture, the study intends to confine the scope by changes of functions and meanings of walls as a physical element of construction, and to focus on the change of space concept and composition caused by the role change of walls.

2. The role of walls in architecture

Prior to a study on the change of the space caused by the changed perception upon the wall, the relation between function of the wall and the spatial characteristics is to be preliminarily investigated. A wall is lexically defined as “a structure that defines an area, carries a load, or provides shelter or security” [8]. That is to say the role of the wall, as a physical construction component, can be divided into spatial function and structural one.

2.1 Spatial functions

In the preface of his book, “An Outline of European Architecture”, Nikolaus Pevsner (1902~1983) describes the spatial nature of architecture. According to him, architecture is an art of creation of space, which not only includes an empty space in which people can dwell but also has a certain influence on the outer space.

In architecture, walls define and confine a specific area and separate the space into two, interior and exterior with different contents. The walls show how these two different spaces meet (open or closed) and indicate the balance of forces acting between the two spaces [6, p.7]. In other words, the walls are an agency that mediates kinds of collisions that occur between ‘invading outer space’ and ‘secure inner space’ in architecture.

2.2. Structural Function

Traditionally, walls have been recognized as a structural member supporting the roof. In other words, the wall was regarded as a primary structural element supporting vertical, compressive forces transmitted from the top to the bottom. The wall must also adhere its horizontal force and a parallel shear force transmitted to the wall surface. The openings and entrances on the walls makes these dynamics more complicated, however, the functional relation between structure dynamics and space, also had the walls have different characteristics in the post-lintel and masonry structure.

As the technology and materials were advanced and steel structures and reinforced concrete structures played a leading role in modern times, the walls became partitions and screens in its meaning. Le Corbusier's domino theory promoted the use of post-lintel construction further to liberate the wall completely from the structure, thereby free plan (plan libre) and free elevation allowed the space to manipulate the architectural form (Figure 1).



Fig. 1. Domino structure

3. Historical Review of the Wall and Change of Space

3.1 Wall as a Space: Spatiality of a Wall and Conceptual Expansion

From the Greek to the Baroque architecture throughout Western architectural history, the the wall meant just a structure that strictly separated inside from outside and displayed de-materializing tendency as an element to attempt fusion of internal and external spaces. Such change was occurred by the conceptual change of *poche*, which reestablished a dialog between the wall and the plan. In the vertical wall, *poche* insisted on a facade that was not merely an autochthonic screen but an integral part of the wall. In other words, *poche* was not regarded as a natural condition of planar organization, but as a three-dimensional union disclosed from the mass of the building [2].

St. Peter's Basilica is a good example of walls recognized as a composite of planes, facades, and cross-sections. The St. Peter's voluminous wall (Figure 2) possesses a planar function to organize the space; that is, a complex program expresses its structural cohesion while maintaining a majestic and dramatic spatial relationship. There is also no real concept of physical thickness, since there is interspace in the voluminous wall. Thus, voluminous wall cannot be defined as simple walls. The facade which deeper than the skin, distinguishes the complex interior without distortion of planes, sections, and exterior facades, and amalgamates again.

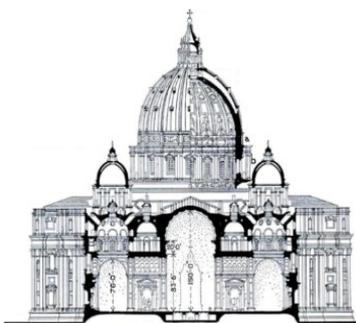


Fig. 2. Section of St. Peter's Basilica

Although the meaning of the wall had turned to the elevation of symbolism and ideology throughout Gothic and Renaissance, Rococo and Baroque, modern architecture has made a substantial revolution by appropriating and inheriting the concept of voluminous wall and by representing in other meaning to architectural design, based on the development of technology and materials of the era. Louis Kahn, for example, has established the concept of a servant or a served space [7, p.332] through the wall containing space at the Kimbell Museum or the Exter Library (Figure 3). In addition, Le Corbusier has expanded the 'screen walled exterior space' to a space that, as a poche removed from the larger walls, mediates between inside and outside (Figure 4).

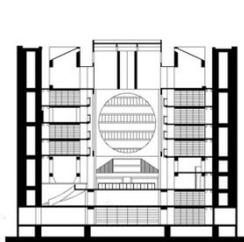


Fig. 3. Exter Library

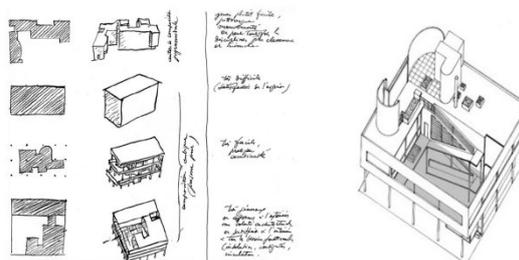
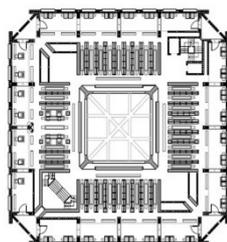


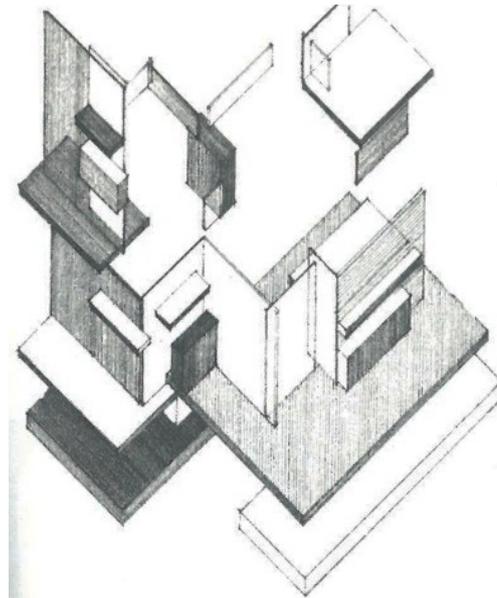
Fig. 4. Diagram of Le Corbusier

3.2 Wall as Object: Evolution into a new expression system

New building materials and technology developed from the 18th century's industrial revolution, not only freed closed box-like building of masonry and bricks to have wide openings using steel and glass, but also made an evolution toward a new expression system. Influenced by architecture, art, and new technologies and materials around 1920s, such changes had introduced a notion of vertical surfaces, which was reflected in three-dimensional spatial composition through the abstract theory of the De stijl and the architectural thinking of Le Corbusier.

Advocating 'creation of a new form by the composition of pure aspects', the neo-plasticists of De Stijl revealed the substantiality of the wall, which was once mentioned by Reyner Banham, and preserved its nature [3, p.141]; that is, an extension of the perception which recognizes the wall as an object through objective experience on its imaginary existence by its structural characteristics.

The concept of a wall of De Stijl can be explained in three ways: ‘a wall without decoration’, ‘a de-materialized wall’ that connotes transparency by perceiving the de-materialized opaque surface of concrete and transparent opening as one single surface, and ‘a wall of no gravity’ which seemingly removes weight. The forming system pursued by De Stijl emphasizes the interrelationship in which faces form surfaces that is recomposed to shape a space. In other words, an articulation of faces creates the form of architecture of which each form is jointed to define space (Figure 5).



*Fig. 5. Project for Private House, Theo Van
Dosbug*

3.3 Wall as Skin: Architecture as a mass representing the volume

Johnson and Hitchcock, established three aesthetic norms that distinguish modern architecture from previous architecture: first, architecture as a volume, not as a mass; second, giving another regularity instead of symmetry; third, purely material based architecture without decoration. The first norm, against masonry mass prior to modern architecture, allows to understand architecture as a volume expanded from inside space, to make it the aesthetic standard how precisely architectural skin expresses such expansions, and to signify the composition of the wall as outer skin.

The three dimensional contour of the volume created by the expansion of the internal space was made possible by the development of technology that separates the structure from the skin. Since then, the elevation has begun to be understood as the concept of ‘skin and skeleton’. While massive wall is related to gravity, such a skin concept comes from the non-structural outer wall early modern architecture which exhibited modernism spirit emphasizing simplification, efficiency, and removal of ornaments.

The architecture as a volume makes space open, de-materialized, weightless three dimensionality with transparent boundary. In order to emphasize the greater weight of floating walls, architects sometimes have emphasized flat and homogeneous surfaces and hidden structures.(Figure 6)

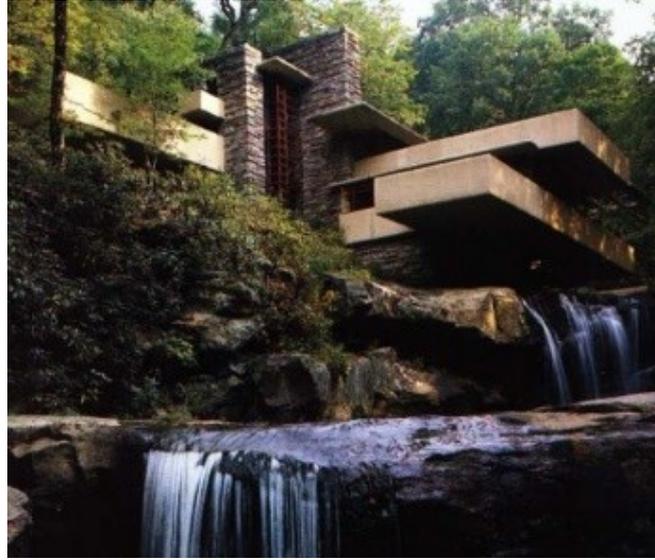


Fig. 6. Fallingwater

The concept of autonomous wall which expresses the reality of abstract and conceptual form founded upon modern characteristics of architectural space, was transformed into the concept of decorative and picturesque elevation and re-emerged in post-modernism architecture that sought to restore the image, message, and expressiveness of the image of form. However, the works of Peter Eisenman and J. Hejduk were still inheriting the tendencies of Le Corbusier, Cubism, and De Stijl.

4. Conclusion

Prior to modern times, space was recognized as an expression of the meaning of the space or structural action of matters that constituted it. In other words, wall is an element that not only regulates but also constitutes and expresses the internal space, is recognized as an element determining the building shape. Since the modern architecture, however, materials and technology have been advanced and the structural system has changed to have space and the way of composition understood as a new concept. The meaning and changes of the wall observed in this study are as follows:

1) The origin of the spatial composition that establishes the relationship between the inside and the outside as an assembly composed of plan, elevation, and section based on the spatiality of the wall

2) An object that composes architectural form and creates space as a new expression system, freed from an imaginary existence subordinated to the structure

3) The skin that expresses the interior space of architecture as volume and delivers the image and message of the figure, rather than that disclose a heavy mass of structural wall.

Through the study, it is aware that the wall, a fundamental element of spatial composition has changed from structural, material, and one dimensional construction subsidiary to de-materialized, multidimensional, and sectional subject for space representation. Consequently, the historical change of the role and meaning of the wall has contributed to the evolution of the approach and thought to space from the 'arrangement' of the planar space to the 'composition' of multidimensional and sectional space.

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**АНАЛИЗ ИЗМЕНЕНИЯ ВОСПРИЯТИЯ ПРОСТРАНСТВА С ПОМОЩЬЮ
ИССЛЕДОВАНИЯ РОЛИ СТЕН В ИСТОРИИ АРХИТЕКТУРЫ:**

переход от плоского макетного мышления к секционному композиционному

Абстракт. Работа проведена с опорой на историческое исследование изменения роли и значения стены, которое определяет пространство как основную сущность архитектуры. Основываясь на том факте, что современное архитектурное пространство внесло концептуальные и идеологические изменения в теорию Ле Корбюзье «Домино», это исследование пытается переопределить взаимосвязь между стенами и пространством как теоретическое и историческое соображение о том, что изменения в восприятии стен, отличающиеся от классической архитектуры трансформируются из плоского «обустроенного» распознавания пространства в секционное «композиционное» мышление.

Ключевые слова: стена, распознавание пространства, пространственная композиция, секционное мышление.

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