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Study on the Spirit of Modernism Related to Form

Formal Aesthetics in Corbusier's Early Modernist Architectural Theory

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***Abstract*—As a flagship figure in the development of modern architecture in the world in the 20th century, Le Corbusier's thoughts and remarks directly reflect the spirit of the times and the value system of modernist architecture. His thoughts and techniques still have deep-rooted influence on contemporary design. The exploration on the embodiment of Corbusier's formal aesthetic thought in his early modernist architecture theory is conducive to the understanding of the theoretical system of modernist architecture and a more profound grasp of its practical significance to later architecture and theory.**

Keywords—Corbusier; modernism; architecture; formal aesthetics

I. INTRODUCTION

The period from the 1890s to the early 20th century is an important historical period of epoch-making changes in the history of world architecture. From the classical buildings full of overelaborate decoration to the reinforced concrete geometric buildings that refused to be decorated in 1920s, it shows the arrival of a brand new architectural era.

As an icon in the development of modern architecture in the world in the 20th century, Le Corbusier's thoughts and remarks can best reflect the spirit of the times and the value system of modernist architecture. As the founder of the theory of "mechanical aesthetics" in architecture, he stressed that architecture should adapt to the development of industrial society and believed that reinforced concrete would be the dominant material of future architecture. He emphasized that "modernist architecture" should meet functional requirements through empirical forms, and proposed to get rid of the shackle of the outdated architectural style and use the abstract artistic elements and engineering aesthetics to constitute the new aesthetic principle of architectural form advocated by the modernist architecture. Form and functionalism together constitute the basic category of the architectural spirit of early modernism he established from the beginning of the 20th century to the 1950s.

II. THE DEVELOPMENT OF MODERNISM ART AND FORM

In the early 20th century, the painting art, which also emphasized the form and color, played an important role in the development of the form thought of modernist architectural theory. The end of the 19th century was an era when machine industry swallowed up the medieval idyllic life, and when the old era was being broken and the value system of the new era was not yet fully established. The whole society was in a kind of anxiety, wandering. At that time, "modern consciousness" was slowly rising, and people began to learn to abandon the shackles of traditional blind obedience, and think positively.

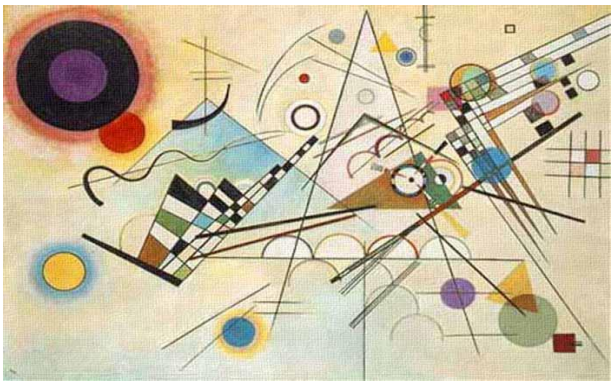

Fig. 1. Kandinsky's constructivist painting.

Artists also began to seek more creative expressions. The forms of painting that Paul Cezanne, "father of modern painting", had been exploring for years, begun to "weave into a layered geometric figure geometric shapes, in which the mighty abstraction conquers the near and far space visible to the naked eye, just as the wordless eternity conquers the corporeal life." "Everything in nature," he wrote, "can be modeled into spheres, cones, and cylinders." And Henri Matisse, the first major representative of the 20th century's "brutalist" modern art, said of modern painting: "color should be expressed in a harmony different with that composed by music. In the early 20th century, the Soviet paintings represented by Wassily Kandinsky also started the exploration of modern art, immersed in the countless possibilities of combining points, lines and faces into abstract composition. As can be seen from "Fig. 1", it is not only a brand new art movement, but also a great progress in the evolution of painting form and style, which eventually formed the thought of constructivism and influenced the whole world. Meanwhile, Piet Cornelies Mondrian of the Netherlands also explored abstract art in the early 20th century. It was not until 1918 that his De Stijl painting of classic black and white and basic color expression was finally formed. (See "Fig. 2")

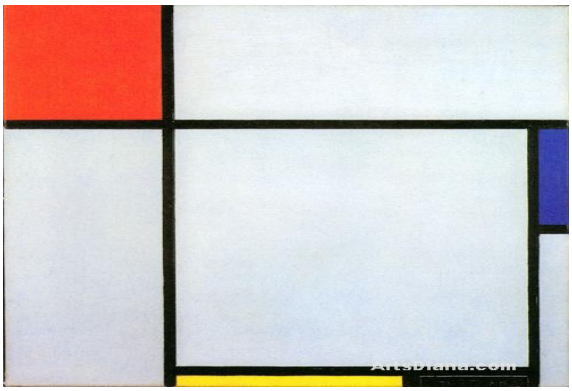

Fig. 2. Mondrian's De Stijl painting.

In 1916, Le Corbusier moved to France and got acquainted with the painter Amédée Ozenfan. Under the influence of Soviet constructivism and the Dutch de Stijl, they jointly proposed the "machine aesthetics" of purism. He commented on modernist painting: "Today, painting is ahead of other arts. Above all, it is in concert with the times. The ideological will be expressed in modernist painting coincides with the spirit of new architecture that Le Corbusier intends to express. For architectural forms, he celebrated geometric forms. He once said, "The fundamental forms are beautiful because they can be clearly recognized," and that "the great problems of modern structure will be solved on the basis of geometry." The modernist painter started the revolution to the traditional painting with the brush in his hand, changing people's understanding of painting. At the same time, Corbusier also profoundly influenced the urban appearance and people's way of life in the 20th century with his passionate architectural philosophy, announcing the arrival of a new era of architecture.

III. Formal Elements and Structural Rules

"Beautiful forms, the variations of forms and the unity of geometrical principles, spread a sense of harmony with extreme depth: this is the art of architecture." In the category of Corbusier's formalism, geometry, proportion, quantity, color, order and simplicity are important components, and simple geometric form is the basic unit of his architectural creation. His design starts from a point. When the point moves, it generates a line; the movement of the line generates a face; and the movement of the face creates a form. The study of line, face and form is the basic elements of its modernist architecture. Corbusier also believed in art and science. He regarded the geometric form of axis and grid as the "regulator" of modern architecture, keeping the structure of architecture in an elegant balance through repetition and rhythm, and making the architecture resonate with people's hearts with proportion and mathematical relations. This thought and technique is still deeply rooted in contemporary design, so the study of formal aesthetics in Corbusier's modernist architectural theory is of far-reaching significance.

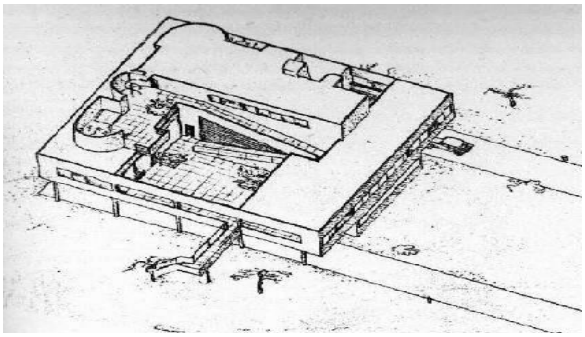

Fig. 3. The Villa Savoye.

The straight line dominated the modernist architecture advocated by Le Corbusier in the first half of the 20th century. It is the most common symbol expressed by the metal form in modern machines, and also the necessary expression way of its "machine aesthetics" theory, which meets the needs of architectural functions and forms in the simplest and most direct way. Corbusier extensively applied straight lines in his early modernist architectural practice, such as "The Villa Savoye", a classic residential architecture (see "Fig. 3"), which is one of the famous representative works in the modern architectural movement. The pure white surface of the building is very flat, and the form is outlined in the simplest straight line. But when looked at it from different directions, the building gives a completely different impression. Corbusier also paid great attention to the treatment of "face" in architecture. "The volume is wrapped in a surface, and the surface is differentiated by the traverse and directrix of the volume, so it shows the individuality of the volume," he said. Therefore, he advocates maintaining the flat surface of the building, which has become one of the characteristics of modernist architecture. In his early architectural works, in order to maintain the pure form of the walls, he treated the doors and windows as the focus of the form, making them as far as possible not to destroy the form, but to become "the manifestation of the form". Geometry has a pure, concise, majestic beauty, giving people a kind of invisible power. Corbusier in his early work "Vers Une Architecture" constantly stressed the perfection of geometric form, "The cube, the cone, the sphere, the cylinder, and the square apex are some of the great fundamental forms in which light is best shown... they are the forms of beauty, the most beautiful forms." Le Corbusier did his search in geometry. He was obsessed with various colors and shapes of cubes, spheres, cylinders and pyramids, searched for a rhythm in the combination and coordination of forms, and sought a pure poetry in a full integration of light and shadow.

Le Corbusier's praise of engineering aesthetics is clear in the opening lines of "Vers Une Architecture". "Engineers are producing the art of architecture because they use mathematical calculations derived from the laws of nature to make us feel in harmony", Pythagoras also explained the concept that "everything in the world can be explained by numbers". The rationalism of the engineers corresponds to Corbusier's concept of "machine aesthetics". In an era when large-scale mechanized production became the dominant force of the society, he believed that buildings following the

order of mathematical or geometric forms could best represent the spirit of the times and conform to the modern development of the society. In his modernist architecture, he made extensive use of reference lines to enhance the understanding of form in the design process, putting objects in space to three-dimensional relationships, as can be seen from "Fig. 4". According to him, "Datum lines are a tool; the choice of datum line and its expression is an integral part of the architectural creation." Datum lines bring perceptive mathematics, which provides intentional concepts about rules. The choice of a reference line determines the basic geometric properties of a piece of work. It is a means of determining the scale and basic impression of a building by mathematical thinking. The concept of datum line has influenced other architects at that time and later generations. It has become a common design method to find symmetrical architectural forms and asymmetrical balance in the datum line. Ludwig Mies Van der Rohe's design of the German pavilion in Barcelona (see "Fig. 5") and Walter Gropius's design of the new Bauhaus building in Dessau in 1926 both represent rhythmic, balanced and asymmetrical beauty through the datum lines.

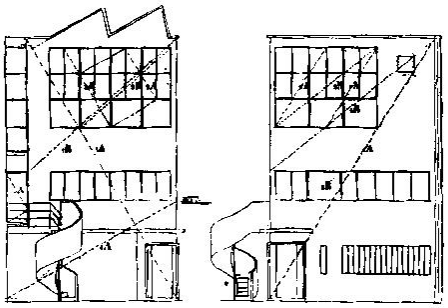

Fig. 4. Asymmetric beauty in the plane of the German pavilion in Barcelona by Mies.

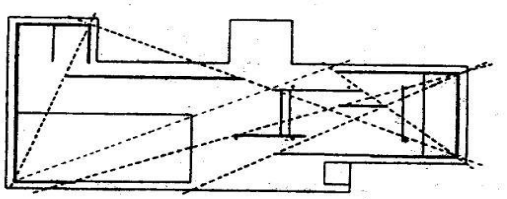

Fig. 5. Application of datum line of Corbusier.

The rhythmic repetition of the division of units under the concept of datum lines and the pursuit of formal beauty are the main formal elements of modern architecture. Repeated regularity is also the main characteristic of the later internationalism style. The repetition of elements on the walls of modernist buildings, the balance generated and the series of symmetries between simplicity and complexity all form a rhythm, as can be seen from "Fig. 6". This is still an important formal structural principle in the design of contemporary architecture. "The datum line is satisfaction in the spiritual realm, which leads to the exploration of exquisite proportions and harmonious proportions. It gives harmony to the work." Under the concept of Corbusier's datum line, the importance of proportion is inevitably derived. In the process of his architectural creation, it is inevitable to open some holes in a surface for doors and windows, and then it is needed to "use your energy to hammer out a perfect unity... sketch guides work..... by adjusting the lines the architect uses a touchable mathematical form, thus providing us with an exciting sense of order." A complex system of proportions is necessary in a modernist building that rejects any superfluous decoration. The conciseness of modernist architecture is not in the absolute sense; it needs to establish some relationship between the parts of the building itself to express its perception effect.

Fig. 6. Marseille Apartments.

The interpretation of unity and change in Corbusier's formal aesthetics is also of great significance to the contemporary design. Unity in modern architecture can be thought of as a visual analogue of form or color, such as the white walls and white columns commonly used by Corbusier. Open space can also be understood as the unity of space, while more changes in space, color and form can be understood as contrast and opposition. After achieving change through differences, the next step is to take into account similarities in nature and deployment in order to achieve change that exists in unity. Thus the architecture achieves a certain harmony in approaching a unity composed of many differences.

IV. Formal Aesthetics Closely Connected with Functionalism

Both formal aesthetics and functionalism belong to the basic source of Corbusier's modernist architectural spirit. When Corbusier's early formal aesthetics is mentioned, attention must be paid to the relation with functionalism. Wright once said, "There is a normal relationship between form itself and use and function." Gropius also said: "When people say that a facade is suitable for its function, the color and proportion of the facade need to have a sense of beauty that can be considered by people." It can be seen that for design, form cannot be separated from function. In his "machine aesthetics", Corbusier emphasized that "modernist architecture" should satisfy functional requirements through empirical forms; as a "machine for living", architecture advocates mass production of residential buildings to meet people's living needs. However, traditional buildings covered with decorative elements cannot meet such demands in a short time and there thus must be an economical and effective way to solve the problem, and the only way to create architecture with the aesthetics of engineers is to meet the requirements of the times. Corbusier did not deliberately

require a certain form of architectural expression, but after solving the problem of architectural function economically and effectively, the formal aesthetics of modernist architecture came into being, and the zeitgeist of modernist architecture developed purely and simply from the basic categories of form and function.

V. CONCLUSION

The formal aesthetics in Corbusier's early modernist architectural theory had a great influence on the architecture of the whole 20th century, and it was continuously extended and developed in the middle and later period of the century. Abstract linear grids are becoming increasingly important in modern architecture, which makes the relationship between parts understandable, both in the treatment of the connecting parts of the facade and in the arrangement of the ground floor plan. And the form of geometric principles became a hot pursuit in the 20th century.

Contemporary architects in the times of Corbusier, such as Ludwig Mies Van der Rohe, Gropius, Wright and Sullivan, developed the modernism formal aesthetics with their own understanding and expression. Ludwig Mies Van der Rohe who strongly advocated the theory that "less is more" was a representative figure of minimalism. He believed that the form itself should be reduced to "almost nothing", only reflecting the basic form of the building, separating form from function to the greatest extent, and eliminating all decorations and historical symbols. The view of minimalism was fully reflected in the Farnsworth' house designed by Mies, built in the 1940s, which was simply a rectangular glass wall. The American Sullivan also advocated a long-term abstinence from decoration. In the second half of the century, Venturi's research on the basic form combination, Louis Isadore Kahn's "cubic appearance", Ieoh Ming Pei's pyramid and the application of geometric forms were all the continuation and development of the aesthetic spirit of modernist architectural form.

REFERENCES

[1] Shao Dazheng. Schema and Spirit: The History and Aesthetics of Western Art [M]. Beijing: China Renmin University Press, 1999-12 289. (in Chinese)

[2] (French) Le Corbusier. Chen Zhihua Trans. Vers Une Architecture [M]. Shaanxi: Shaanxi Normal University Press, 2004-1-1.

[3] (English) David Smith Capon. Wang Guixiang Tans. Le Corbusier's Legacy: Principles of Twentieth-century Architectural Theory Arranged by Category, Volume 2, Architectural Theory [M]. Beijing: China Architecture & Building Press, 2007-01-01.

[4] (Japan) Kenichi Echigo. Nine Prototypes in the Creation of Architecture by Le Corbusier [M]. Beijing: China Architecture & Building Press, 2006-1-1.

[5] (USA) Kenneth Frampton. Zhang Qinnan Trans. Modern Architecture: A Critical History [M]. Beijing: life. SDX Joint Publishing Company, 2004-3.

[6] Wang Shouzhi. A History of Modern Architecture [M]. Beijing: China Architecture & Building Press, 1999-12. (in Chinese)

[7] Luo Xiaowei. History of Foreign Modern and Contemporary Architecture [M]. Beijing: China Architecture & Building Press, 2004-8. (in Chinese)

[8] (Switzerland) Boesiger W. Le Corbusier Complete Works [M]. Shaanxi: Shaanxi Normal University press, June 2005.

[9] (Netherlands) Alexander Tzonis. Jin Qiuye, Wang Youjia Trans. The Poetics of Machine and Metaphor [M]. Beijing: China Architecture & Building Press, 2004-11-1.