Le Corbusier's Modern Museum Prototype: The Transformation of Unlimited Growth Museums

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Abstract: This paper analyzes how Le Corbusier constructed the prototype of the modern museum according to the concept of Unlimited Growth, and how he interpreted and implemented the prototype in three museums. Through analyzing and comparing the development of the concept of Unlimited Growth and its implementation across three aspects of design, namely modules, space arrangements, and natural lighting, we noticed that Le Corbusier did not limit his design thinking to mere prototypes; instead, through the implementation process, he redefined the core design of the modern museum by transferring the focus from Unlimited Growth to lighting design, which would later become one of the key design issues of contemporary museum design.

Keywords: Le Corbusier, prototype, Unlimited Growth Museum, modern museum.

INTRODUCTION

By designing prototypes for different architectural types and developing the pattern of producing modern architecture as an industrial mass production process, Le Corbusier proposed a new mindset in regards to modern architecture. In response to population growth and urgent demands for housing following World War I, Le Corbusier manifested prototypes of his villa works by promoting the development of housing for low and middle-income families. His design was heavily influenced by the industrial production processes and the contemporary economic milieu. Le Corbusier's Maison Citrohan was exhibited in the Autumn Salon in 1922. Despite the fact that this architectural concept was not employed immediately, Le Corbusier continued developing a prototype derived from Maison Citrohan in his villa works during the 1920s. For example, the Pavilion de l'Esprit Nouveau was developed in 1925, following the concept of standardization and industrial production, as was the Weissenhof house in 1927 and Villa Savoye in 1931 [1].

In addition to houses, Le Corbusier also began experimenting with prototypes for the modern museum with two design projects, the Museum Mondial of Mundaneum in Geneva in 1929 [2] and the Plan for a Contemporary Art Museum in Paris in 1931 [3]. He then proposed a completed prototype of the modern museum in the Unlimited Growth Museum Design Project in 1939 [4]. Le Corbusier applied this prototype to museum works such as the N. C. Mehta Museum at Ahmedabad (1952-57) [5], the Tokyo Museum of Western Art (1957-59) [6], and the Museum and Art Gallery in Chandigarh (1960-68) [7]. To fully elucidate the prototype for the modern museum of Le Corbusier in depth, we will start by discussing the process by which Le Corbusier established the prototype of the modern museum through the Museum Mondial of Mundaneum in 1929 and the Plan for a Contemporary Art Museum in Paris in 1931. Next, we will analyze the Unlimited Growth Museum Design Project in 1939 to identify the design elements of the prototype of the modern museum of Le Corbusier. Finally, we will introduce and compare three design projects that were implemented on site according to Le Corbusier's design elements for modern museum prototypes. This should assist us in better understanding the role that earlier prototypes for the modern museum played in making them what they have become today.

THE INCUBATION OF THE PROTOTYPE

In 1929, Le Corbusier was commissioned to design the World City of Mundaneum in Geneva, a magnificent project proposed by the Belgian lawyer Paul Otlet (1868-1944) [8, 9]. As part of the Project, Le Corbusier suggested the concept of a spiral gallery, which would serve to pay homage to previous architectural forms extending back to the ancient design of the Ziggurat or the Pyramids [10] (Figures **1**, **2**). Furthermore, Le Corbusier announced his ideal design for the modern museum project: The exhibition space of the museum would be formed with a spiral gallery constructed in a specific module. The themes of the exhibitions would be set within this design according to the concept of a free plan that requires visitors to walk in one direction throughout the entire space. The exhibition space

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E-ISSN: 2409-9821/14

would be similar to a raised spiral gallery, and at first glance, the museum resembles a terraced pyramid of receding levels, which are reminiscent of the Ziggurats of ancient Mesopotamia and Iran.

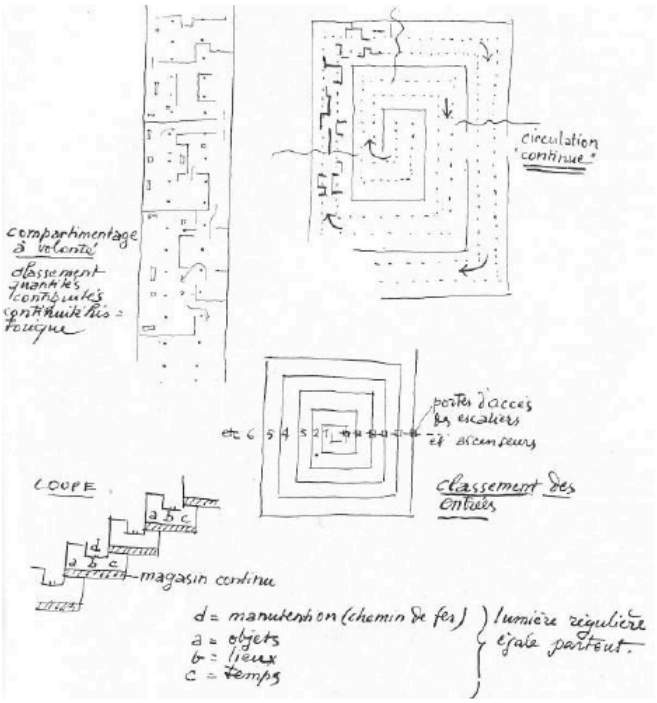

Figure 1: Design drawings, Museum Mondial of Mundaneum.

(Source: Boesiger, W. and Stonorov, O. ed., (1994), Le Corbusier: Oeuvre complète, volume 1: 1910-29, Basel: Birkhäuser, 193).

The Project was attacked by Karel Teige (1900-1951), a major figure in the Czech avant-garde movement and renowned architectural critic. Responding to the World City of Mundaneum Project, which leaned more toward formalism than toward the trend of functionalism in modern architecture, Teige maintained that the only purpose of modern architecture was to think scientifically and to build rationally [11]. However, as a result of our interpretation of the design drawings of Le Corbusier for the Project, we found that Teige's negative comments were somewhat unfounded. In fact, Le Corbusier had started to design an appropriate form and a circulation for the modern exhibition space: a spiral gallery and a circulation that forces visitors to walk along the spiral gallery in one direction, and to wander around exhibits set in a Free Plan. Another important feature of this Project is the raised spiral gallery that contains a Ziggurat, which is contradictory to the dogma of Functionalism in modern architecture. This design revealed Le Corbusier's intent to manipulate symbolic and memorial architectural forms, while expanding on the ambitions of Otlet and uniting the intelligence of mankind in the Museum Mondial of Mundaneum. However, Le Corbusier seems to have been well aware of the problems caused by formalism in the Project, and appears to have begun avoiding it in subsequent museum design projects.

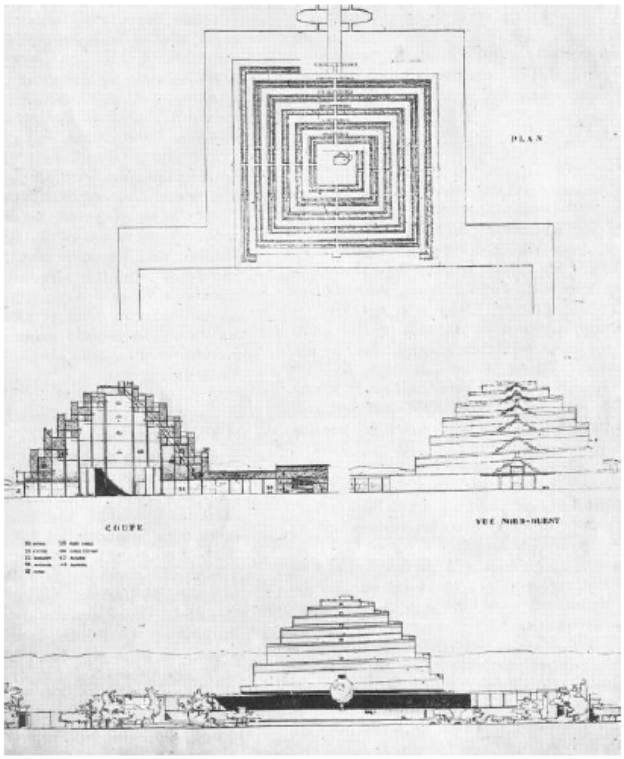

Figure 2: Design drawings of the Museum Mondial of Mundaneum.

(Source: Boesiger, W. and Stonorov, O. ed., (1994), Le Corbusier: Oeuvre complète, volume 1: 1910-29, Basel: Birkhäuser, 193).

The concept and form of the Museum Mondial of Mundaneum then evolved into the Plan for a Contemporary Art Museum in Paris in 1931. In this project, the raw model of Unlimited Growth was constructed. Le Corbusier designed a spiral gallery that extended horizontally, rather than employing the raised Ziggurat of the Museum Mondial of Mundaneum. Furthermore, Le Corbusier interpreted the modern museum as an organism that could extend exhibition space in three stages to make allowances for budget constraints (Figure **3**).

In his Plans for a City University in Rio de Janeiro in 1936 [12] (Figure **4**), we noticed influences rooted in the raw model of Unlimited Growth that had also been included in the Plan for a Contemporary Art Museum in Paris. In the previous two projects, however, Le Corbusier had provided not a detailed architectural

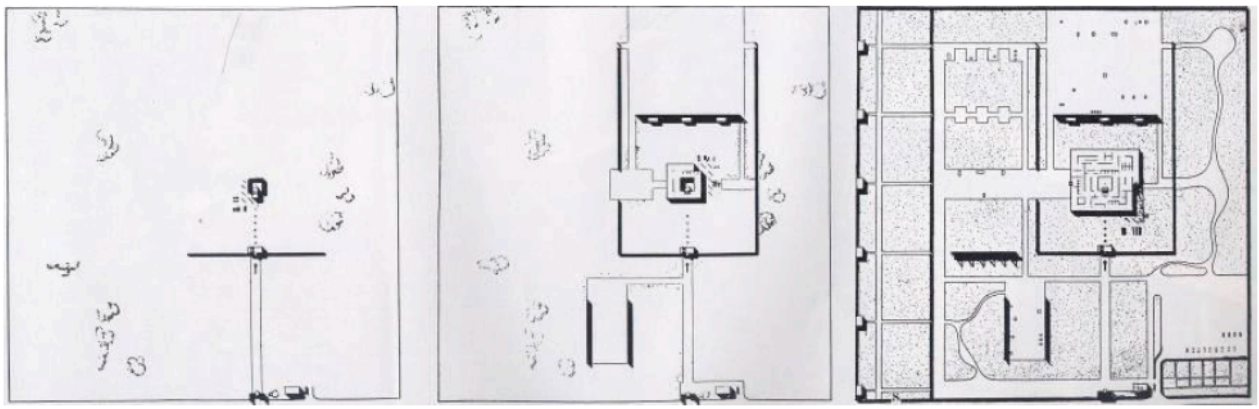

Figure 3: The layouts illustrate the three stages of extension as the budget increased in the Plan for a Contemporary Art Museum in Paris.

(Source: Boesiger, W. ed., (1994), Le Corbusier: Oeuvre complète, volume 2: 1929-34, Basel: Birkhäuser, 73).

form, but only a continuous extension plan, in the site plan. The concept of Unlimited Growth of the modern museum seems to have been just a spiral gallery that extended outwards horizontally. The unlimited spiral circulation could have caused the visitors to lose their way in the spiral maze.

Figure 4: Layout, Plans for a City University in Rio de Janeiro.

(Source: Max, B. ed., (1994), Le Corbusier: Oeuvre complète, volume 4: 1934-38, Basel: Birkhäuser, 43).

THE FORMATION OF THE PROTOTYPE

Basing his design on the Museum Mondial of Mundaneum in Geneva and the Plan for a Contemporary Art Museum in Paris, Le Corbusier gradually developed his interpretation of the modern museum in concept and form. He then established the prototype of the modern museum in the Unlimited Growth Museum Project of 1939 and announced the concept of Unlimited Growth in relation to museum design. While investigating the concept of the Unlimited Growth Museum, we detected two issues within this Project that called for an extended in-depth analysis: the concepts and forms that were derived from the Museum Mondial of Mundaneum in Geneva, and the new concepts and forms from the Plan for a Contemporary Art Museum in Paris.

As we analyzed and compared the drawings of the Museum Mondial of Mundaneum in Geneva and the Plan for a Contemporary Art Museum in Paris, we found that the major difference between the two is Le Corbusier's inclusion of the extension issue in the latter project. Although Le Corbusier developed several design elements in the Museum Mondial of Mundaneum that were expanded upon in the Unlimited Growth Museum, for the most part, he considered the symbolic and memorial aspects of the raised spiral gallery to carry more importance than the issue of extension. This view would be implemented within the horizontal spiral layout in the Plan for a Contemporary Art Museum in Paris, and later in the Unlimited Growth Museum. In contrast, in the evolution from the Plan for a Contemporary Art Museum in Paris to the Unlimited Growth Museum, since Le Corbusier had begun to consider enabling the modern museum to extend the exhibition space organically, thereby developing the concept of Unlimited Growth, the form of the Plan for a Contemporary Art Museum in Paris was found to be strikingly similar to the prototype of the Unlimited Growth Museum.

The prototype design issues of the Unlimited Growth Museum can be divided into the following three aspects: modules, space arrangements, and natural

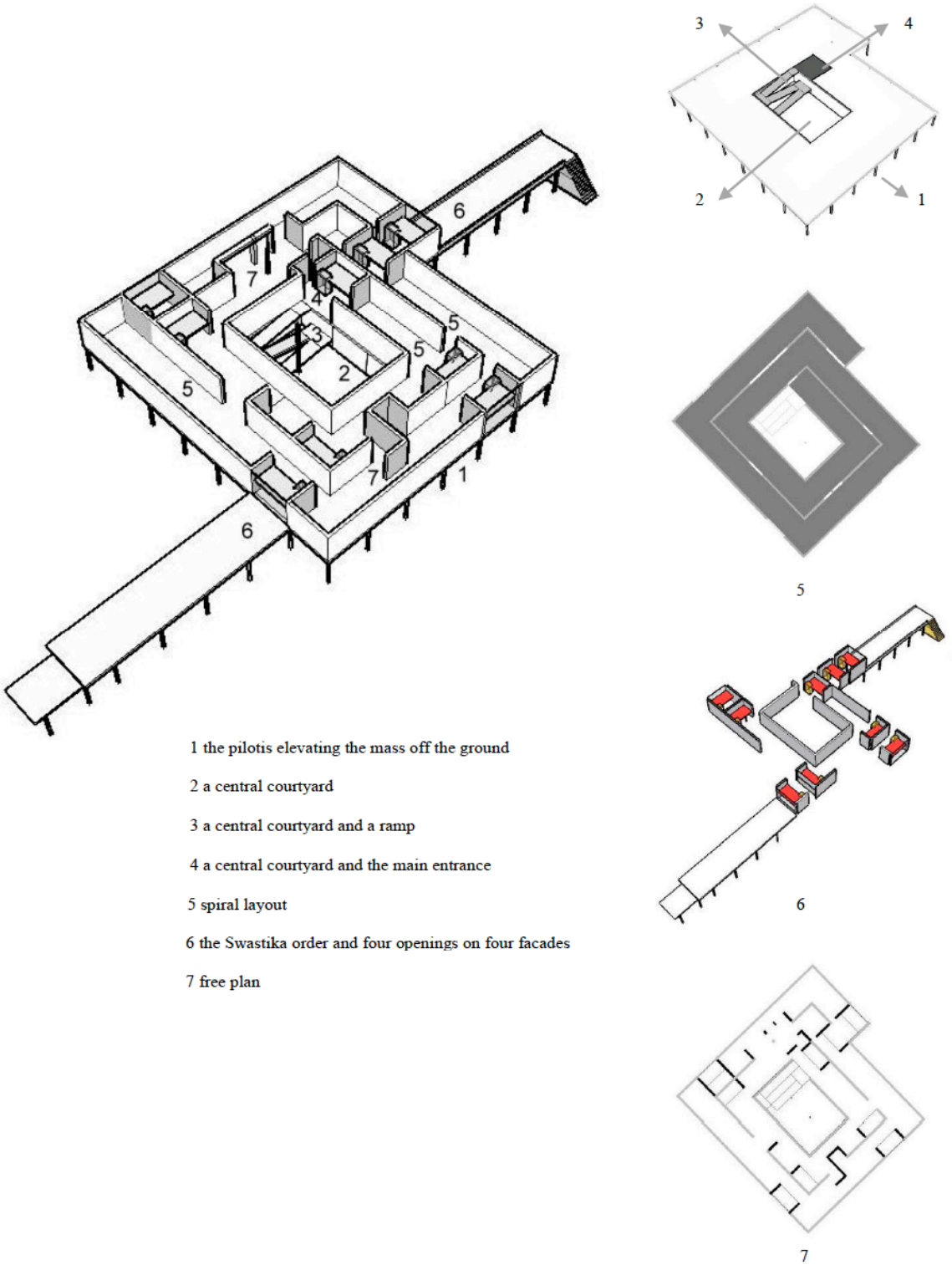

Figure 5: The seven spatial arrangements of the Unlimited Growth Museum. (drawn by the authors).

lighting. Obviously, the idea of horizontal and vertical modules was derived from the Museum Mondial of Mundaneum in Geneva and the Plan for a Contemporary Art Museum in Paris. Moreover, since the space arrangements had been modularized and standardized, the concept of Unlimited Growth had already become practicable. Furthermore, four out of the seven space arrangements were derived from the Mondial Museum of Mundaneum in Geneva and the Plan for a Contemporary Art Museum in Paris. These

Table 1: Design Issues of the Prototype

Design Issues \ Cases		Museum Mondial of Mundaneum in Geneva	Plan for a Contemporary Art Museum in Paris
Modules		•	•
Space Arrangements	the Pilotis Elevating the Mass off the Ground		
	a Central Courtyard	•	•
	a Central Courtyard and a Ramp		
	a Central Courtyard and the Main Entrance		•
	Spiral Layout	•	•
	the Swastika Order and Four Openings on Four Facades		
	Free Plan	•	•
Natural Lighting	Linear Clerestory Windows		

four arrangements included a central courtyard, a main entrance situated at the central courtyard, a spiral gallery centered on the central courtyard that could annex outward without limitations and an exhibition space arranged in a free plan for exhibits and circulation (Figure **5**). Le Corbusier developed practicable modules and space arrangements for the prototype of the Unlimited Growth Museum according to the Plan for a Contemporary Art Museum in Paris. Added to the Unlimited Growth Museum were three new space arrangements: 1) the pilotis elevating the mass off the ground, 2) a ramp connecting the central courtyard and the exhibition space, and 3) the Swastika order in layout and four openings on four facades, as well as linear clerestory windows for natural lighting in the exhibition space (Table **1**). Furthermore, the space arrangements of the pilotis elevating the mass off the ground and the ramp as a vertical route were not exclusively designed for the prototype of the Unlimited Growth Museum. The two new elements added to the Unlimited Growth Museum were the direct result of other architectural prototypes that Le Corbusier had developed during the same period, rather than arising from the Unlimited Growth Museum Project itself.

These two new space arrangements suggested that Le Corbusier intended to rationalize the concept of Unlimited Growth and then develop a practicable form. He employed a Swastika-sign layout so that the four openings on the four facades could open the closed spiral circulation, thus creating a second space order in the spiral circulation. Moreover, Le Corbusier's use of linear clerestory windows for natural lighting in the exhibition space implied that he was more seriously considering the issue of lighting in the modern museum.

However, the Unlimited Growth Museum prototype revealed two problems: the complexity of circulation and the narrow width of the exhibition space. At first glance, the layout of the exhibition space seems to be designed according to the concept of a spiral and Swastika pattern. In fact, in the exhibition space plan, the inner walls were placed according to the idea of a free plan, which broke the continuity of the linear walls that were enclosed in the spiral gallery. This confused the circulation and led to the confusing generation of eight complex nodes that implied more than two exits (Figure **6**).

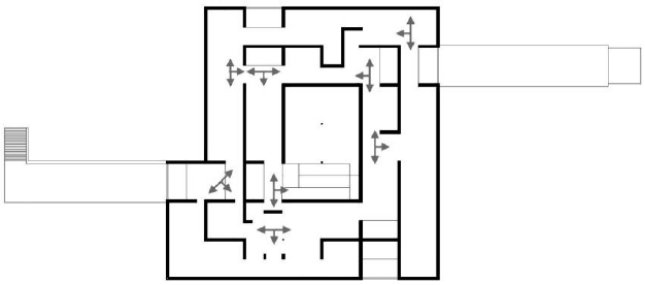

Figure 6: Eight nodes of circulation in the exhibition space of the Unlimited Growth Museum.

(redrawn by the authors).

The narrow width of the exhibition space is another difficulty encountered by the Unlimited Growth Museum prototypical design. Since modern museums exhibits include not only paintings but also other works in a variety of sizes, the width of the horizontal module, seven meters, proved too narrow and made it almost impossible to create decent circulation and spatial qualities. Moreover, Le Corbusier compounded the spiral gallery with the second space order of four linear spaces arranged in the shape of a Swastika, which would add to the complexity of further circulation if the

museum were to require additional exhibition space in the future.

THE IMPLEMENTATION OF THE PROTOTYPE

In the N. C. Mehta Museum in Ahmedabad (1952-57), Le Corbusier finally practiced his concept of the modern museum on site. Shortly thereafter, he also completed the Tokyo Museum of Western Art in Tokyo (1957-1959) and the Museum and Art Gallery in Chandigarh (1960-68). In order to further understand how Le Corbusier applied the prototype of the Unlimited Growth Museum designed in 1939, we analyzed and compared the three existing museums according to the following three design issues derived from the Unlimited Growth Museum prototype: modules, space arrangements, and natural lighting.

Modules

Since the three museums employ the same horizontal and vertical modules and the seven space arrangements, their exhibition spaces are united. This arrangement was in accordance with Le Corbusier's belief that modern architecture should be produced according to the concept of industrialized and standardized modules. Through modularizing the layout, Le Corbusier tried to make the concept of Unlimited Growth practicable. Although the three existing museums were designed according to the same modules established in the prototype of the Unlimited Growth Museum, their layouts, while sharing similarities, differ from that of the prototype. From these deviations, we can infer that Le Corbusier noticed the difficulties in circulation and exhibition space caused by the spiral layout of the prototype. In the plan of the prototype, the layout is a simulated spiral, which adds complexity to the circulation. Furthermore, the seven-meter-wide exhibition space was so narrow that it only served to intensify the confusion of the circulation. In fact, we noticed that the three museums all employ a quadrangle layout, rather than the spiral layout developed in the prototype. Moreover, since Le Corbusier modified the width of the exhibition space from seven meters to 14 meters (two horizontal modules), the spiral gallery was transformed into an open space around a square central courtyard, a further departure from the prototype. Although Le Corbusier also reserved space for annexing exhibition space in the three museums, he gradually altered his belief in Unlimited Growth, which means that this design concept had certain limitations. This became evident when he modified the spiral layout to the quadrangle layout and doubled the width of the exhibition space in the three museums.

Space Arrangements

In keeping with the concept of Unlimited Growth, the layouts of the three museums were the same: The main entrance was placed in the central courtyard, and the four modularized and standardized galleries were arranged around the four sides of the square central courtyard, which finally formed a circulation of four galleries according to the spiral layout. However, the layouts of the three museums employ a quadrangle design, which forms a whole exhibition space that allows placement of exhibits according to a free plan, rather than a spiral gallery. Le Corbusier also

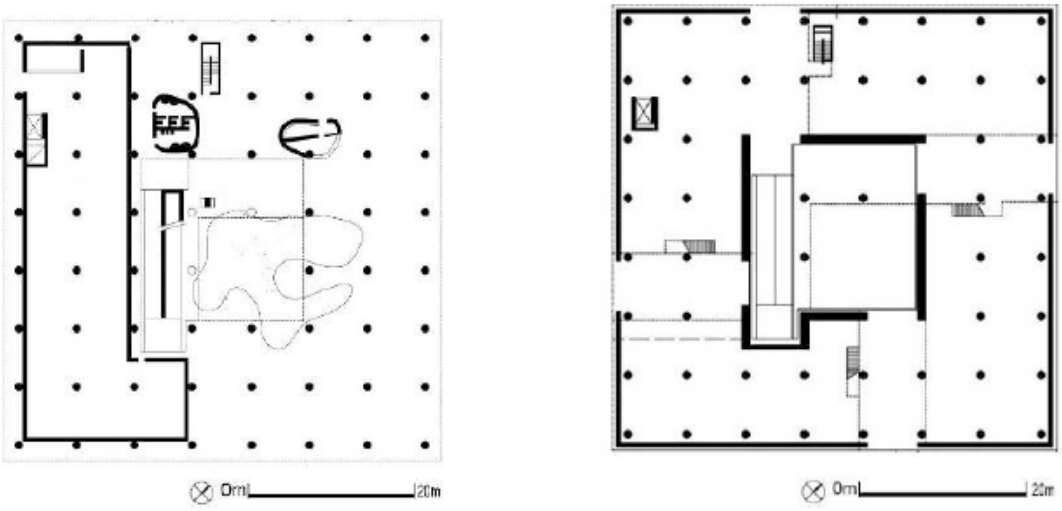

Figure 7: Ground floor plan (left) and first floor plan (right) of the N. C. Mehta Museum in Ahmedabad. (redrawn by the authors).

anticipated another difficulty, that when the museum extended exhibition space, the circulation would be too long. He solved this problem by using four linear spaces horizontally arranged in a Swastika pattern. To illustrate, the N. C. Mehta Museum in Ahmedabad has four linear mezzanines extending in four different directions, centered on the courtyard. This provides for the possibility of building a second floor (the 2.26 meter height mezzanines) to extend the exhibition space (Figures **7-9**). Meanwhile, there are four openings in the interfaces between the four linear spaces and the four facades, resulting in four linear spaces extending outward through the existing museum construction. The Tokyo Museum of Western Art (Figures **10**, **11**) and the Museum and Art Gallery in Chandigarh (Figure **12**) also follow the same pattern of four linear spaces arranged in a Swastika, allowing for both horizontal and vertical extension.

Figure 8: The N. C. Mehta Museum in Ahmedabad. (photo taken by the authors).

Figure 9: The N. C. Mehta Museum in Ahmedabad. (photo taken by the authors).

Among the three museums, only the Tokyo Museum of Western Art has extended the exhibition space. In 1979, Kunio Mayekawa [13] did not annex the exhibition space according to the concept of Unlimited Growth suggested by Le Corbusier, choosing instead to build a new construction in a site next to the existing museum and imitating the appearance of the original one (Figure **13**). The reasons for the museum and the architect choosing not to follow the concept of Unlimited Growth might have been non-architectural or architectural design aspects. The non-architectural design aspect was associated with culture in architecture. To give Le Corbusier his due respect, and out of the concern for architectural culture preservation, the museum and the architect did not destroy or change the original work designed by Le Corbusier. As Le Corbusier was one of the most important architects in the 20th century, preservation of the original work adds historic value to Tokyo's architectural landscape. Furthermore, if the museum followed the concept of Unlimited Growth and annexed new galleries around the existing construction, the two outer staircases designed by Le Corbusier would have to be removed and the original façade covered by the extension (Figure **14**-left). Moreover, since the extension should adhere to the existing construction, as Le Corbusier suggested, the existing construction and exhibits could be damaged by vibration or other effects of construction. In fact, since the extension would completely enclose the old construction, linking the ventilation systems, waterproofing systems and electronic systems of the two would cause difficulties.

Figure 10: The Tokyo Museum of Western Art. (photo taken by the authors).

On the other hand, in the architectural design aspect associated with layout and circulation, the quadrangle gallery, after being extended, would have only one possible circulation, requiring visitors to circulate through the quadrangle gallery either

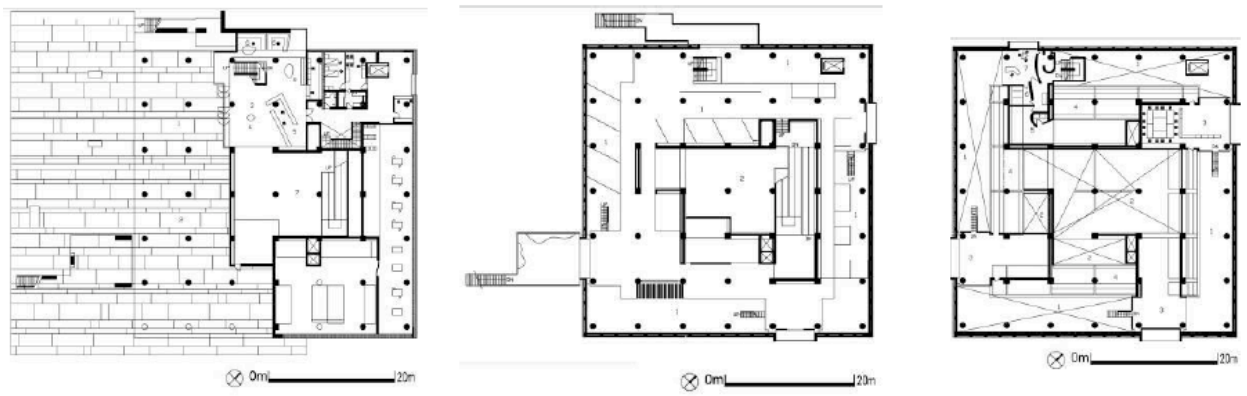

Figure 11: Ground floor plan (left), first floor plan (middle), and mezzanine plan (right) of the Tokyo Museum of Western Art. (redrawn by the authors).

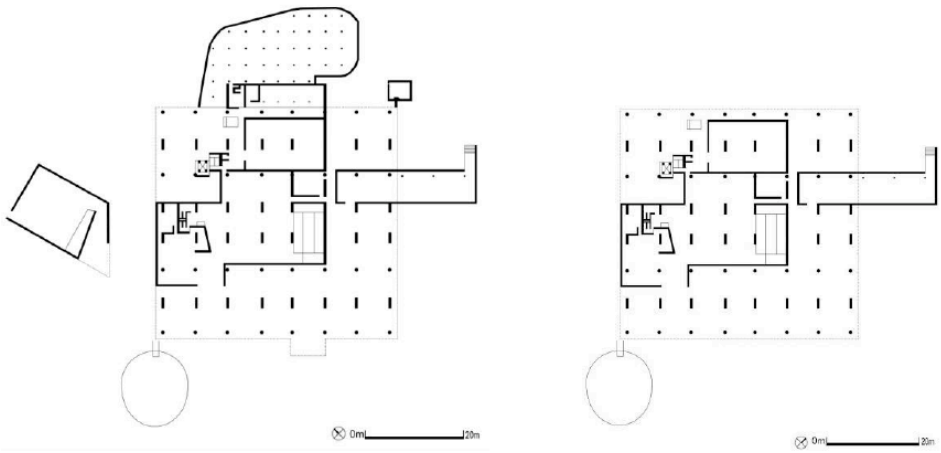

Figure 12: Ground floor plan (left) and first floor plan (right) of the Museum and Art Gallery in Chandigarh. (redrawn by the authors).

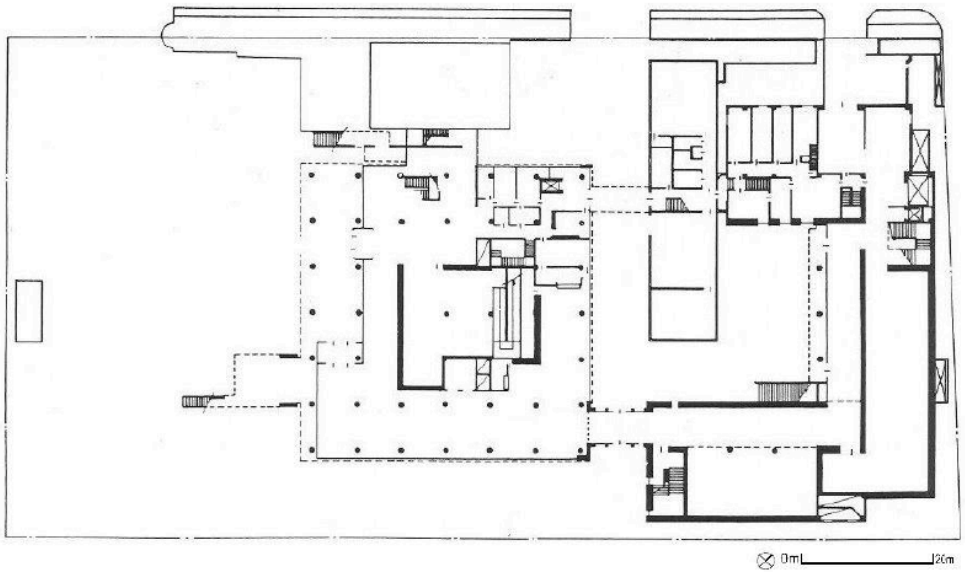

Figure 13: Ground floor plan after the 1979 annexation of the Tokyo Museum of Western Art.

(Source: Adachi, M. ed., (1984), Kunio Maekawa: sources of modern Japanese architecture, Tokyo: Process Architecture Publishing, 96).

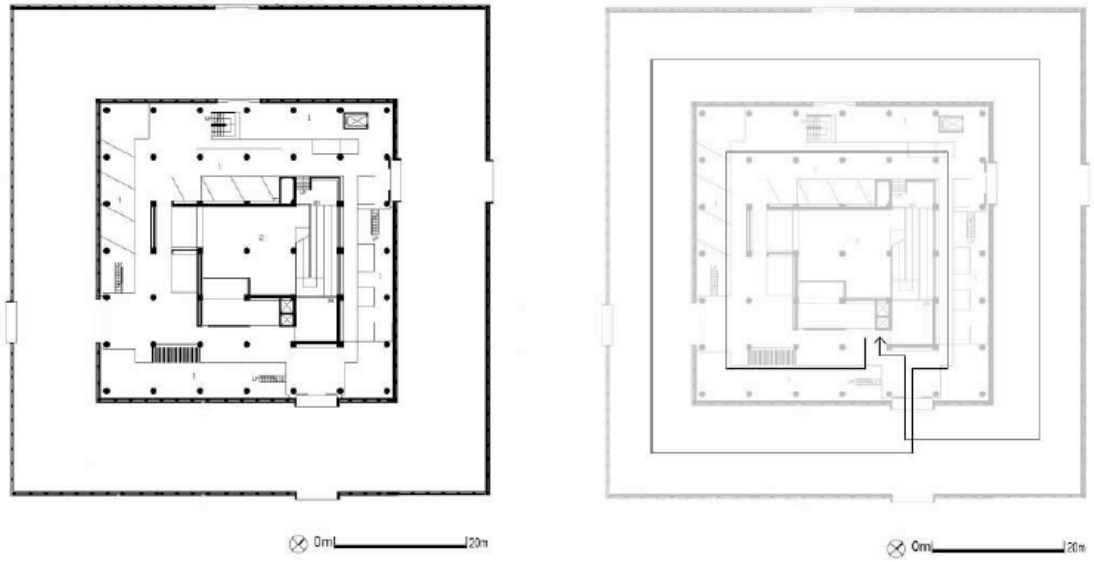

Figure 14: First floor plan projection after the annexation according to the concept of Unlimited Growth (left) and Circulation projection after the annexation according to the concept of Unlimited Growth (right) of the Tokyo Museum of Western Art.

(redrawn by the authors).

clockwise or anti-clockwise (Figure **14**-right). Since the form of the exhibition space was a quadrangular gallery, rather than a series of individual rooms, the visitors could not choose which exhibition room to enter, having instead to walk through all of the exhibitions. The circulation of the Tokyo Museum of Western Art, as designed by Le Corbusier, is simple and clear in indicating that the visitors have to circulate through the quadrangle gallery either clockwise or anti-clockwise (Figure **15**). However, if the museum extended exhibition space according to the concept of Unlimited Growth, the visitors would probably become lost in the spiral gallery when they changed directions to review or avoid a particular exhibition, or to find the main exit or a restroom. Furthermore, since the form of every side of the quadrangle gallery was the same, the visitors could not recognize or identify where they were, which was the correct direction of circulations, or whether these openings led to another exhibition unit or the central courtyard. In addition, since there was only one appropriate circulation, the museum had to establish an easily comprehensible guidance system for the visitors to enter their target exhibition themes or to find the main exit.

Natural Lighting

Although the three museums are similar in modules and space arrangements, their designs and approaches to lighting differ greatly. The three designs seem like a series of lighting experiments for modern museums, and they established three types of lighting that illustrate the evolution of lighting in the modern museum.

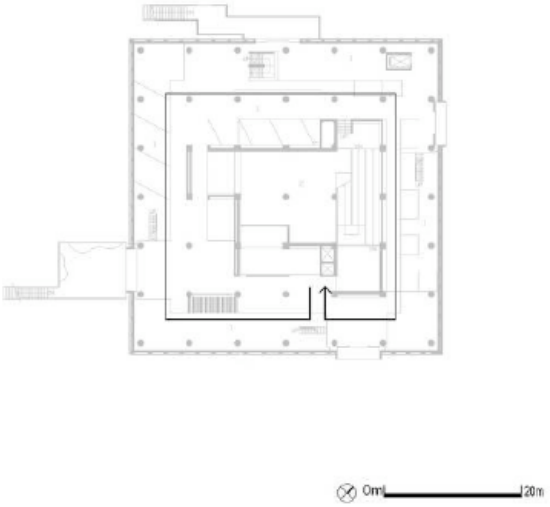

Figure 15: Circulation area of the Tokyo Museum of Western Art.

(redrawn by the authors).

To provide a stable indoor temperature for the N. C. Mehta Museum in Ahmedabad, Le Corbusier blocked the natural light from shining into the exhibition space, which used only artificial lighting. The roof is covered with a botanic pool; a 2.26-meter-high equipment space between the roof and the exhibition space blocks potential heat from the roof or linear light from the Clerestory windows from being reflected into the exhibition space. The exhibition space is lit mostly with direct artificial lighting, and Le Corbusier also tried to

install hidden lamps to shine down on the exhibition space from the equipment space (Figure **16**).

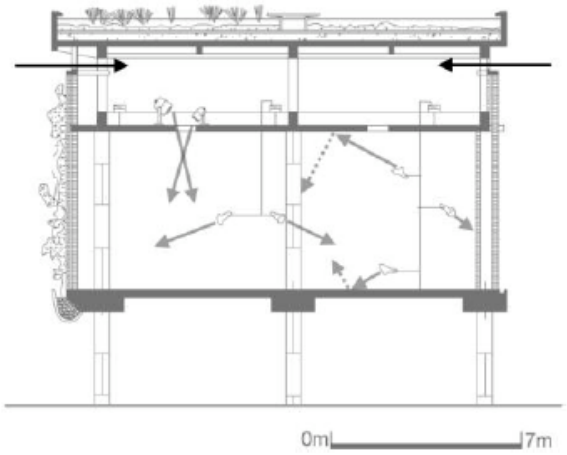

Figure 16: Lighting sections of the N. C. Mehta Museum in Ahmedabad.

natural lighting

artificial lighting

indirect artificial lighting

(redrawn by the authors).

The exhibition space of the N. C. Mehta Museum in Ahmedabad established the lighting type of little natural and mostly direct artificial lighting, but the exhibition space of the Tokyo Museum of Western Art was an advanced experiment in lighting, combining artificial and natural lighting to make up for the deficiency of natural lighting. Furthermore, in terms of lighting management, it also advanced from mostly direct lighting to a combination of direct and indirect lighting. The lighting system of the exhibition space of the Tokyo Museum of Western Art is made up of four linear lighting boxes (equipment rooms) constructed between the exhibition space and the roof. Le Corbusier installed lamps hidden inside the ground glass enclosures of these lighting boxes to supplement the natural lighting (Figures **17-22**). However, in actual application, the original natural lighting system of the Tokyo Museum of Western Art was inefficient. As a result, the Tokyo Museum of Western Art installed lamps on the ceiling close to the exhibition walls (Figure **23, 24**).

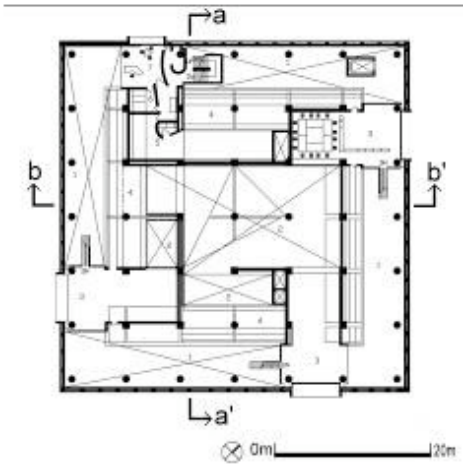

Figure 17: Index of the lighting sections of the Tokyo Museum of Western Art.

(redrawn by the authors).

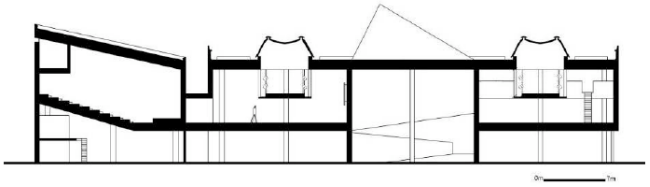

Figure 18: A section of lighting, Tokyo Museum of Western Art.

(redrawn by the authors).

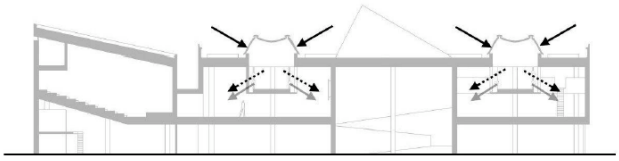

Figure 19: A section of lighting in the Tokyo Museum of Western Art.

natural lighting

artificial lighting

indirect natural lighting

(redrawn by the authors).

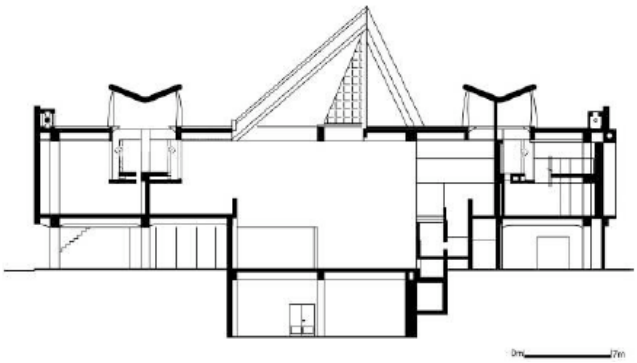

Figure 20: B section of lighting in the Tokyo Museum of Western Art.

(redrawn by the authors).

The lighting system of the Museum and Art Gallery in Chandigarh evolved from combining artificial and natural lighting into a whole natural lighting system. In

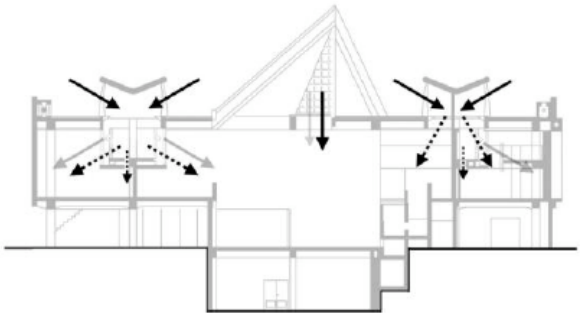

Figure 21: B section of lighting in the Tokyo Museum of Western Art.

natural lighting

artificial lighting

indirect natural lighting

(redrawn by the authors).

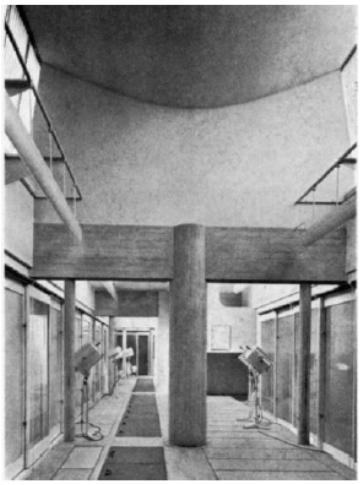

Figure 22: The interior of a lighting box with lamps in the Tokyo Museum of Western Art.

(source: Boesiger, W. ed., (1994), Le Corbusier: Oeuvre complète, volume 7: 1957-65, Basel: Birkhäuser, 190).

Figure 23: The original exhibition space lighting design of Le Corbusier's Tokyo Museum of Western Art. Note the absence of lamps on the ceiling.

(Source: Boesiger, W. ed., (1994), Le Corbusier: Oeuvre complète, volume 7: 1957-65, Basel: Birkhäuser, 186).

addition, after experimenting with direct lighting in the N. C. Mehta Museum in Ahmedabad and combining direct and indirect lighting in the Tokyo Museum of Western Art, Le Corbusier tried to create indirect lighting using panel-pilotis as the major elements in the exhibition space in Chandigarh. Natural light shines through the one meter high, 70 centimeter deep wing plates on the top of the panel-pilotis and then down on the panel-pilotis and exhibition space. This is similar to the Tokyo Museum of Western Art, where natural light first shines through two opposite angles and into a space where the two streams are mixed into one, after which it shines down on the exhibition space (Figures **25-27**). The difference between the Tokyo Museum of Western Art and the Museum and Art Gallery in Chandigarh is that his Chandigarh design has 70 centimeter deep wings at the tops of the panel-pilotis that limit the possibility of high angle natural light

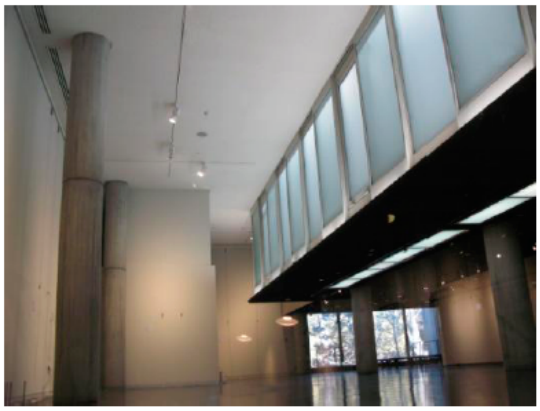

Figure 24: The modified exhibition space lighting design of the Tokyo Museum of Western Art. Note the lamps mounted on the ceiling.

(photo taken by the authors).

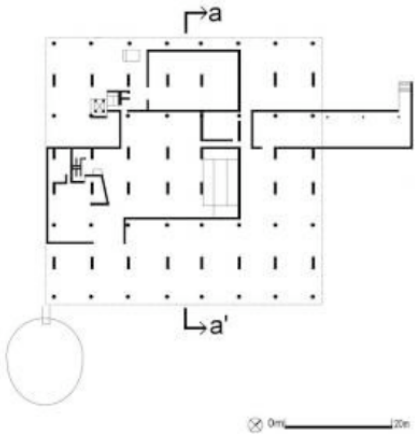

Figure 25: Index of the sections of lighting in the Museum and Art Gallery in Chandigarh.

(redrawn by the authors).

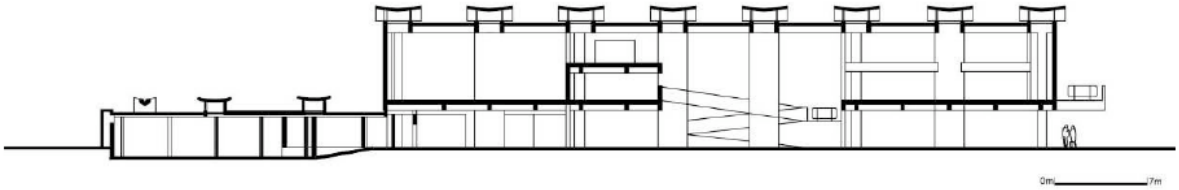

Figure 26: A section of lighting in the Museum and Art Gallery in Chandigarh.
(redrawn by the authors).

shining directly down on the exhibition space. The natural light creates a triple reflection between the panel-pilotis, which creates better indirect lighting than those of the N. C. Mehta Museum in Ahmedabad and the Tokyo Museum of Western Art. As in the case of the Tokyo Museum of Western Art, the original natural lighting in the Museum and Art Gallery in Chandigarh was deemed to be insufficient. Hence, an adequate number of lamps were later installed in the exhibition space of the Chandigarh Museum (Figure **28**, **29**).

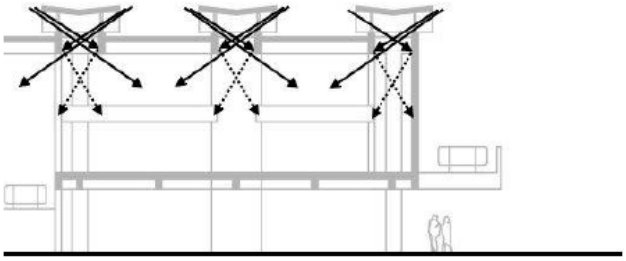

Figure 27: A section of lighting in the Museum and Art Gallery in Chandigarh.

→ natural lighting

⇢ indirect natural lighting

(redrawn by the authors).

Figure 28: The original exhibition space lighting design of Le Corbusier's Museum and Art Gallery in Chandigarh. Note the absence of lights below the clerestory.

(Source: Boesiger, W. ed., (1994), Le Corbusier: Oeuvre complète, volume 8: 1965-69, Basel: Birkhäuser, 97).

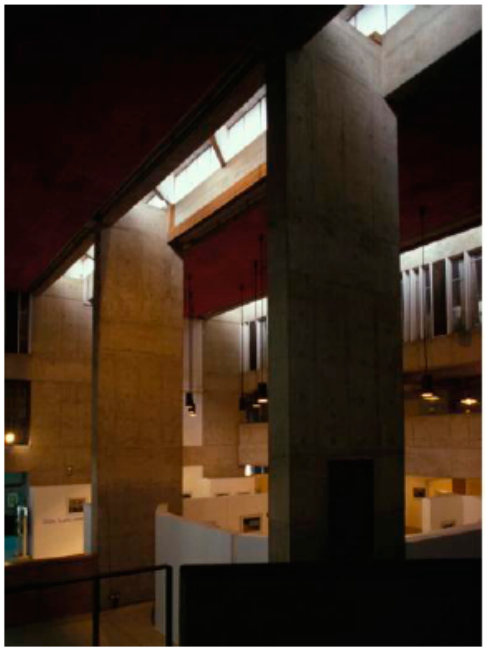

Figure 29: The modified exhibition space lighting design of the Museum and Art Gallery in Chandigarh. Note the additional lighting installed below the clerestory.

(photo taken by the authors).

CONCLUSION

From the Museum Mondial of Mundaneum in Geneva in 1929 and the Plan for a Contemporary Art Museum in Paris in 1931 to Plans for a City University in Rio de Janeiro in 1939, Le Corbusier gradually developed what would become the prototype of the modern museum: the Unlimited Growth Museum. Le Corbusier also implemented the prototype of the Unlimited Growth Museum in the planning and construction of the N. C. Mehta Museum in Ahmedabad (1952-57), the Tokyo Museum of Western Art (1957-59), and the Museum and the Art Gallery in Chandigarh (1960-68). Through analysis of the three design issues of modules, space arrangements, and natural lighting derived from the prototype, it is evident that although Le Corbusier designed all three museums according to the prototype of the Unlimited Growth Museum, he improved on his original design with each implementation.

The three museums were all based on the seven meter horizontal module, the 2.26 meter vertical module, and the seven special arrangements developed from the prototype. However, since Le Corbusier noticed the difficulty caused by the narrow width of the exhibition space and the complexity of circulation caused by the spiral layout when he implemented the prototype of the museum, the width of the exhibition space was extended to two horizontal modules (14 meters). In addition, although the three museums all seem to present the concept of a spiral layout at first glance, we found that the three museums actually employ quadrangular layouts, in which the exhibition space forms a continuous open space arranged in a free plan. The layouts of the three museums all started from a square central courtyard enclosed by four sides with 14 meter wide galleries, which created a square plan and a clearer circulation than that of the spiral layout. Moreover, since the three museums were based on the same modules and layout, the ways in which they implemented the concept of Unlimited Growth were identical.

Through the three aforementioned implementation stages, Le Corbusier's architectural concept of the modern museum gradually transferred the focus from the concept of Unlimited Growth to lighting. He designed the lighting systems of the three museums according to the differences in the locations at which the three museums were located. Accordingly, Le Corbusier was not constrained by his ideal architectural prototype in the design process; instead, he explored essential design issues and continuously modified his prototype.

ACKNOWLEDGEMENTS

This study is supported in part by the Ministry of Science and Technology, Taiwan (MOST 103-2221-E-011-088).

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Received on 03-10-2014 Accepted on 01-11-2014 Published on 20-11-2014

DOI: http://dx.doi.org/10.15377/2409-9821.2014.01.01.2