Realization of Natural Order through Le Corbusier's Museum Prototype in Chandigarh

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Abstract

This study aims to clarify the design method illustrated in Le Corbusier's museum prototype by analysing the third realization of the "Museum of Unlimited Growth" in Chandigarh, India (1957-1963). According to the analysis of Le Corbusier Plans, Le Corbusier's Carnets (Sketchbooks), and the documents of his correspondence, the author categorizes the transformation process of the prototype into two parts. This analysis found the specialization of the prototype of the "Museum of Unlimited Growth" in the said design method. The symbolism of the central grand hall and the spiral extension were no longer the main themes. Le Corbusier devoted himself to only two elements of the museum prototype: the ceiling equipment for natural lighting and the water drain. In conclusion, this paper points out that the museum in Chandigarh is the architectural expression of the natural order represented by sunlight and water.

Keywords: Le Corbusier; museum; prototype; Chandigarh; nature

1. Introduction

The Chandigarh museum is the third realization of the prototype of the "Museum of Unlimited Growth", characterized by the possibility of the spiral and the fylfot, the extension of volume raised up by the pilotis, and an exhibition space with natural sunlight. Practical studies on the Chandigarh museum were conducted from 1957 to 1963 after the final decision on the construction site. These studies started when Le Corbusier's plan for the Tokyo museum (1959) was almost fixed after the realization of the Ahmedabad museum (1957).

However, the third museum in Chandigarh underwent a different creative process from that of the museums in Ahmedabad and Tokyo. The Chandigarh museum is built on the site Tabula Rasa, integrated in the urbanism of the new city of Chandigarh.

From February to March 1951, Le Corbusier visited India for the first time and decided the fundamental urban skeleton of Chandigarh. According to his rough and definitive sketch, he divided the Capitol (administration area) at the summit, a commercial area in the east and a cultural area in the east separated by a large green belt (Fig.1.). In the culture centre, he planned a complex that included a big theatre, an adjoining "Museum of Unlimited Growth" as a prototype, and an art school. It is certain that the modernistic museum was an indispensable urban facility in Chandigarh from the start of Le Corbusier's urban planning.

Le Corbusier's task as an architect was only to establish the working plans of the Capitol buildings and did not involve urban planning. Such a duty at least did not exist in the contract. Nevertheless, on his
second visit to India, he drew in his sketchbook the "Museum" for permanent exhibition, the "Pavilion" for temporary exhibition, and the "Miracle Box" and "Spontaneous Theater" for dancing. Although his drawings were not for the specific site, he wanted to plan a kind of synthesized art space in the city.

He dealt with the plan for a museum and an art school in the cultural centre from 1957, considerably late from the time the construction project of the Capitol buildings started.

In the initial stage of the development of a concept for the Chandigarh museum, Le Corbusier noted the following at the Atelier Le Corbusier.

We have to also put in hand a rational implantation of the culture centre: Museum, Miracle Box, Applied Art School in Chandigarh. I will send you the clear

Fig. 2. Diagram of the Transformation of the "Museum of Unlimited Growth" in Chandigarh.
plans of routes for pedestrians and tracks connected to the university in the V2 road. As soon as possible, I have to manifest my definitive idea. Take care that the Museum is not the Museum of picture. I would like to place this building in urbanism related to the Five-Year Plans of India.

Many artworks of India were certainly sculpture works, but that was not the reason behind Le Corbusier stating that this "Museum is not the Museum of picture". Le Corbusier's museum was not merely for the collection and exhibition of artworks. His original museum concept was oriented toward a totally urban context, like the project of Mundaneum (1929), with the world museum as an origin of the "Museum of Unlimited Growth". For Le Corbusier, a museum as part of urbanism could not be sufficiently realized in existing historical cities such as Ahmedabad and Tokyo. Chandigarh, without a history of being a city, was suitable for the transplantation of the prototype. Conversely, Le Corbusier had no effective source for a proper museum in Chandigarh, except for the Himalayan mountains, the scorching sunlight, or the regional rain. In fact, in this paradoxical situation, Le Corbusier realized the "Museum of Unlimited Growth" as a prototype in a way different from how the other two museums in Ahmedabad and Tokyo were developed (Sendai, 2015, 2016).

Previous research on Le Corbusier's museum designs discuss the historical value of these works (McClellan, 2008; Jodidio et al., 2010), his sensibility for concrete material in Chandigarh (Gargiani and Rosellini, 2011), or analyse the several formal characteristics of this museum (Ohhata et al., 2009; Watanabe et al., 2010). To the best of this author's knowledge, no research has yet been carried out to discuss the transformation of the museum's spatial composition from the perspective of the prototype (Sendai, 2005, 2012, 2015, 2016).

For the analysis of the transformation of the prototype, this paper uses the following resources: Œuvres completes, the Le Corbusier Plans (304 plans), the Carnets (Sketchbooks), and Le Corbusier's correspondence preserved at the Le Corbusier Foundation. The author categorizes the transformation process of the site plan into three parts (Fig.2.).

2. Creative Process for the Chandigarh Museum

2.1 First Project (23 April 1957 to 5 March 1958)

The first practical study for the Chandigarh museum was conducted around April 1957. It was for the disposition of the buildings in the cultural centre already determined by the city plan.

This site which was between urban roads authorized in the city plan was arranged according to geometrical plantings. The approach to the site was from the northwest side, and there was an "esplanade" with dotted sculptures which was surrounded by the prototypes of the "Museum", "Pavilion", and "Miracle Box". The back of the museum was adjacent to the art school. The spatial composition of the three prototype volumes was a reproduction of Le Corbusier's abovementioned sketch drawn in October 1951 without the "Spontaneous Theater".

In spite of the slender rectangular site, the museum itself was square-shaped with eight spans and was larger in scale than the museum in Ahmedabad, which had seven spans, and that in Tokyo, which had six spans. Such a long span volume in a site limited in scale obscured the sufficient spiral extension of the exhibition space. The northeast corner of the museum certainly suggested the possibility of a spiral extension of the museum. However, a vacant land for future extension was not clearly indicated in the site plan. Annexes by the fylfot extension were also not planned, and the four balconies attached to the museum suggested only the possibility of a fylfot extension. From the start, the adapted prototype of the Chandigarh museum was not perfect.

Like the museum in Ahmedabad, the museum in Chandigarh was supposed to function as a folk museum. However, there is hardly any documentary evidence about the programme of the museum's collection. This suggests that Le Corbusier was indifferent toward the contents of the exhibition or that the museum's collection was not fixed at the time. We can only definitely state that Le Corbusier first tried to adapt a prototype without considering the local context.

Fig.3. One of the First Site Plans of the Museum (23 April 1957)

Fig.4. Organization of the Exhibition Space by Le Corbusier (probably just before 5 March 1958)
A series of plans for the museum was made on 5 March 1958 about a year after the first site plan was established by Atelier Le Corbusier in Paris in April 1957 (Fig.4.).

The section of the pillars was not square-shaped like that in the other museums; it was reformed into the section of a rectangular board wall. The deep depth of the eaves of the portico served to introduce cold air from the front rectangular pond at the cost of the spiral circulation of the visitors and openly led to the grand hall in the central well of the museum.

In the museum in Ahmedabad, the pond was situated in the centre courtyard for climate mitigation and ventilation. In Chandigarh, it was located at the front of the museum, facing the esplanade. This was also the case in the High Court of Justice (1952) at the Capitol. Although the scale and roof form were different, the idea of the deep eaves was also seen in Villa Sarabhai (1951). Moreover, the slope extended in a straight line toward the exhibition space on the upper floor, which was similar to that in the Mill owners' Building (1951) in Ahmedabad.

While interpreting India's climate and transforming the museum prototype, Le Corbusier examined a pyramid-type light device, the same as that which he conceived for the museum in Tokyo, for the grand hall in the central well.19

For the rainwater drainage system, the top lighting that corresponded with the spiral extension of the museum's exhibition space had been broken down.22

The severe rain in Chandigarh did not permit harmony between the spiral circulation of visitors and spiral top lighting in the museum. In fact, there was no hint of Le Corbusier's touch in the spiral or fylfot-type circulation presented in the architectural plans.23

However, it was not completely the same as the one in Tokyo. He also studied the lighting effect of the vault in the small bathroom of Delhi's Red Fort and clearly noted the possibility of applying this effect in the Chandigarh museum (Fig.5.). In this way, for the museum prototype, Le Corbusier gathered practical knowledge from the museums in Ahmedabad and Tokyo and the Red Fort in Delhi, assimilating their local and universal aspects.

On the other hand, there was no sectional study on the pyramid-type light device. Le Corbusier instead studied parallel shed roofs that had the function of lighting the north side and rainwater management.21

The parallel arrangement of the shed roofs accorded with the "wind of the monsoon", and the rainwater was eventually discharged by gargoyles from the outer edge of the gutter onto the ground (Fig.6., upper right).

The project advanced more than three years later.26 The spatial composition presented in collaborator Pierre Jeanneret's plans and his documents in Chandigarh's local office was almost the same as that in the previous plans (Fig.7.).
However, the pyramid-type light device, which Le Corbusier studied but abandoned until 5 March 1958, was unexpectedly adopted again. It was the same as that in the Tokyo museum.

Furthermore, the undecided façade from the ground floor to the upper floor was a glass with irregular mullions called "pans de verre ondulatoires". The grid-frame structure with glass walls was different from the floating volume on the pilotis. The local office at the time preferentially re-examined the lighting problem in the exhibition space rather than the rainwater problem. In this way, the prototype of the Chandigarh museum changed into something unprecedented which was filled with enough light from the ceiling and the glass facade. Although the "pans de verre ondulatoires" of the façades must have caused a problem of uncontrollable strong sunlight, the museum at the time did not have a "sun breaker" to control the sunlight.

2.3 Third Project (27 December 1961 to 11 June 1962)

After the establishment of a series of plans by Pierre Jeanneret in Chandigarh on 14 August 1961, Le Corbusier re-examined the museum façades during his summer vacation. Corresponding with the scale reduction (from eight to seven spans), which was probably due to the client's demand, he replaced the "pans de verre ondulatoires" with solid walls and pilotis, which was a return to the original prototype.

Moreover, the principle of the museum, which specialized in fylfot-type extension, was examined as the connection with the annexes (Fig. 9.); according to the direction of the fylfot, the organic volumes of the Atelier (northeast) was put in the museum and the lecture room (northwest) was connected to the museum. In addition, the front rectangular pond facing the museum was separated from the museum and modified into an independent small circular basin for rainwater drainage. This suggests the abandonment of the concept of cold air circulation using the front pond.

From January to February 1962, the above re-examinations by Le Corbusier were added to the plans made in the Atelier in Paris. The relationship between the museum and its annexes was clearly articulated by the fylfot type. On the other hand, the spiral circulation of the exhibition space was out of the study; the exhibition space was clearly divided into three parts: "permanent exhibition", "temporary exhibition", and "art gallery". Therefore, the disposition of the Y-type top lighting device had already no relation with the spiral circulation of the exhibition space.

Natural lighting from the ceiling is unsuitable for modern museums since, unlike homogeneous artificial illumination, it cannot provide protection of art collections and the condition of the exhibition space. Le Corbusier had already experienced this problem with natural lighting in Ahmedabad and Tokyo. He had tried to solve it at the time by setting up several artificial lighting sources. Nevertheless, in Chandigarh, he did not abandon natural lighting, not even conducting an examination of auxiliary artificial...
illumination for the museum. He was adamant till the end about keeping natural lighting as a theme of his prototype.

In this way, the final plans were established by Pierre Jeanneret in Chandigarh from August to September 1962 (Fig.10.). He mostly followed the plans by Atelier Le Corbusier in Paris, only retouching the "extension scheme". Although the spiral extension as a fundamental idea of the "Museum of Unlimited Growth" was abandoned for the Chandigarh museum, it was incorporated this time. This was probably the conclusion of the meeting between Le Corbusier and Jeanneret, and also explains the strong attachment to Le Corbusier's museum prototype.

On the other hand, after September 1962, Atelier Le Corbusier continued to study the details of the V-shaped lighting-water drain management device: the upper part of a pillar (or a tabular bearing wall) was supported by a cross beam, on which was put another oblique beam, and on this beam the light device with the V-shaped section was set up. It was a more complex device that mitigated sunlight than those in Ahmedabad and Tokyo (Fig.11.).

We did not stop studying since my return from Chandigarh and we have arrived at a very favourable solution which I hope to realize exactly. There is no problem of priority in it. It is me who has been put in charge of making this museum and I benefit from the work in Ahmedabad, Tokyo, Fort-Lamy, and the work which we are making for Germans (General Museum of Unlimited Growth in the volume 2 of the Complete Works and given to my dear Zervos (!). Our solution solves the problem of rainwater which flows into the southeast and northwest. The lanterns are parallel and not spiral, these fabrications are very simple based on the principle of lighting (ATTENTION to the gigantic weight!)

Le Corbusier apparently confirmed the notion of the "Museum of Unlimited growth", but he also seems to have denied it. The parallel light-water devices fixed on the top roof of the museum certainly greatly conflicted with the spiral extension. If anything, the parallel "connection" like the parallel vaults in the Hospital of Venice (1965) would have been possible.

3. Conclusion

As a result of Le Corbusier's studies for the museum located in the new city, the spiral circulation was abandoned. Le Corbusier instead focused on natural top lighting and rainwater management and disregarded the limit of the prototype of the "Museum of Unlimited Growth". In Chandigarh, after he abandoned the spiral extension, leaving the museum without clear circulation connected to the central hall, Le Corbusier planned the adjunct facilities according to fylfot-type extension and used organic modelling as much as possible. He gradually turned the square museum itself into a device which caught the scorching sun and violent rain.

However, the spiral itself was a metaphor of natural "growth" which Le Corbusier found to be a biological shell. Expressing the natural phenomenon of sunlight and rain is not unrelated to "growth".

The severe rain in Chandigarh, incomparable with that in Europe where Le Corbusier lived, poured on the top roof of the museum, fell perpendicularly and dynamically from the gargoyles, and eventually returned to the ground. This vision is opposite to that of a "museum" floating in the sky. Rather than simple "growth" as extension, it is a morphological expression of a repetition of growth and decline as natural order. It was also the vision of the project of the world museum of Mundaneum (1929), which started from the roof, descended spirally to a lower floor, and finally arrived on the ground. As a result, the Chandigarh museum also suggested a return to the starting point of the revolution of Le Corbusier's "museum".
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In contrast with the exhibition space of the museum or the atelier, the material of the façade was still undecided at this point. The design of the roof garden was of a roof garden. The final plan of the project represented a "Spontaneous Theater". We could not find the reason behind this delay. We presume that the "art gallery" in the Chandigarh museum had the same function as the "Miracle Box". However, the atelier which Le Corbusier drew on his sketchbook in October 1951.

The prototypes of the "Miracle Box" and the "Spontaneous Theater" were not adapted in this period. A non-prototypical large-scale theatre might have been the result of Le Corbusier's consideration of the Indian traditional drama.

After India's independence, the national museum was required to be located in the capital New Delhi. It corresponded with Le Corbusier's proposal of the museum in Chandigarh. However, the conserves works in New Delhi's national museum were mostly religious sculptural artworks and crafts in the traditional style. The formulation of the museum in India was not meant for contemporary arts.


AFLEC, F-1-12-447, Note de Le Corbusier à Maisonnier, 1957.4.4. Created by the author. The overlap or the blank for each period depends on the plans conserved in Le Corbusier Foundation. The museum in Chandigarh has many sculptural works, and it seems that from the beginning, the plan of the museum was to mainly include sculptural works. In fact, the inevitable artificial lighting for pictures was not studied in Chandigarh.

Ohhata (2009) and Watanabe (2010) discuss the prototype as a notion for standardization or industrialization of architectural elements. On the other hand, this study focuses more on the spatial composition and the relationship with the specific site, including the fyloïd type circulation.


Le Corbusier, Le Corbusier Plans, DVD Vol. 11, Echelle-1, Tokyo, 2006. In addition to the category of the "musée", the author makes reference to the "centre culturel" (18 plans) and the "urbanisme" (112 plans).


AFLEC, C3-8, F1-11, P3-4, L3-8, Fondation Le Corbusier. Le Corbusier, FLC483B, 1957.4.23 cf., [Le Corbusier], FLC5998A. The plan for the twelfth visit at Chandigarh by Le Corbusier. Le Corbusier noted that this plan was "too expensive" than his general plan.

The final plan of the project represented a "Spontaneous Theater" which Le Corbusier drew on his sketchbook in October 1951. cf., Pierre Jeanneret, FLC4827, 1962.8.27, reçu Le Corbusier, 1962.10.2.

[Le Corbusier], FLC4863, [1958.3.5].

cf., FLC4869, 1958.3.5; [Le Corbusier], FLC4863, [1958.3.5].


Rainwater in the Chandigarh museum without a centre courtyard must have been managed in the outer edge of the museum. The flow of rainwater in this museum was more complicated than that in the Chapel of Ronchamp (1953) which had gargoyles and a shallow basin. In the case of the realization of the Ahmedabad museum project, the study on rainwater management was conducted in a later period (cf., Olek, FLC6951, 1952.11). (Sendai, 2015).

cf., FLC4666, 1958.3.5. About the detail of the top lighting, cf., FLC4857, 1958.3.5; FLC4858, [1958.3.5]; FLC4859, [1958.3.5]. Its shed roof was of the same type as that in the museum in Ahmedabad (cf., Le Corbusier, FLC7002, 1951.9.26; Maisonnier, Le Corbusier, Le Corbusier, FLC6944, 1951.10.9) (Sendai, 2015).

cf., FLC4862, 1958.3.5; [Le Corbusier], FLC4863, [1958.3.5]; [Le Corbusier], FLC4865, 1958.3.5.

[Le Corbusier], FLC4897, [1958.3.5].

cf., FLC4830, 1958.3.5. About the studies of the drain on the roof plan, cf., FLC4855, 1958.3.5. About the section plan showing the grand hall, cf., FLC4856, 1958.3.5. About the elevation plan, cf., FLC4860, 1958.3.5; FLC4861, 1958.3.5.


In addition, such a design of "pans de verre ondulatoires" in Chandigarh was remarkably different from that in the lower part of the Tokyo museum.

cf., [Le Corbusier], FLC4896; [Le Corbusier], FLC4895.

The material of the façade was not studied at this point. The brick wall of the upper part of the pitolia and the "pans de verre ondulatoires" of the lower part were decided to be included during the construction process.


cf., Le Corbusier, Le Corbusier, FLC4885, 1962.1.3. The atelier which functioned for the conservation and maintenance of art collections was also used for the education of the students of the adjoining art school. The top light device of the atelier, like the "claustra", was the same as that in the Chapel of Ronchamp or as that in the first project of the museum in Tokyo (Sendai, 2016). However, the roof with the "claustra" in Chandigarh was not to be realized. cf., Pierre Jeanneret, FLC4846, 1962.9.27, reçu Le Corbusier, 1962.10.2.

In contrast with the exhibition space of the museum or the atelier, the lecture room which was separate from the museum had no opening. cf., [Le Corbusier], FLC4886, [1962.1.3]; [Le Corbusier], FLC4888, [1962.1.3].

The southeast and the southwest corners of the fyloïd-type extension only had balconies (cf., FLC4841, 1962.1.26).

The function of the rooftop of the annex was of a roof garden and was defined as "terrace". It was certainly the replacement of the roof garden of the museum with the natural light device on the roof. However, the roof garden was conceived in the last phase of the realization of the "museum" without exception: such as the water garden in Ahmedabad or the flower pods in Tokyo (Sendai, 2015, 2016).

The "art gallery" in the Chandigarh museum had the same function as the "stand" in the Tokyo museum. (Sendai, 2015).


Pierre Jeanneret, FLC4850, 1962.9.27, reçu Le Corbusier, 1962.10.2. The incorporation of the double cross beam was Le Corbusier's proposition. cf., [Le Corbusier], FLC4900; [Le Corbusier], FLC4960; Oubrerie, FLC4879, 1963.6.11.


Le Corbusier continued to pursue the plastic expression of the rainwater flow. In fact, the other type of the spiral flow of rainwater would be realized in the project of the Church of Firminy (1962).


References