

# The Roof Garden in Japanese Modern Architecture

From the End of World War II until 1966

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**Abstract:** The purpose of this paper is to clarify the architectural Kansei (sensibility) in Japan since World War II until 1966. Therefore, the authors discuss how the “roof garden,” which did not exist in Japan before then, was transplanted from European Modern to Japanese Modern architecture and how it was applied. In this paper, we adopt the following five indexes: “use,” “building type,” “material,” “structure,” and “location,” using several architectural journals. We have concentrated on the great change in roof gardens in Japanese Modern since 1954 due to the economic growth caused by exceptional procurement during the Korean War, We divided the 1945-1966 period into two parts and analyzed the change in roof gardens by comparing the gardens of each period. As a result, the transitions in the five indexes have become apparent. The roof garden after World War II has been expanding to a range from an international-style architecture seeking the universal rationality to architecture that exceeds rationality and the utilitarian. Moreover, diminishing of the “view,” which had been the subject of roof gardens in the pre-war period due to the high economic growth, has led to fumbling for new functions of the roof garden. In other words, a roof garden in Japan after World War II has been changing in various ways while being involved in the attenuation of architectural kansei (sensibility) of “view.”

**Keywords:** Architectural Kansei, Japanese Modern Architecture, Roof Garden, Economic Growth.

## 1. INTRODUCTION

### 1.1. Purpose

The purpose of this paper is to clarify the architectural Kansei (sensibility) in Japan since World War II until 1966. Therefore, we discuss how the “roof garden,” which did not exist in Japan until then, was transplanted from European Modern to Japanese Modern architecture and applied.

A "roof garden" is created when the ground garden that is considered to be "the external space associated with the architecture" is transferred to the uppermost part of the architecture. By providing the facility on top of the building, the roof garden is perceived in this paper as a place where a function other than maintenance is added to the roof.

We have already analyzed the Japanese roof gardens that were designed since the beginning of Meiji period (Tsukano & Sendai, 2014), the earliest stage, until the end of World War II, to clarify the transition of the roof garden before the war. In those years, the roof garden was transferred from a public purpose to a private purpose that satisfies a personal physical desire. This occurred because of the spread of RC (reinforced concrete) and the control of materials due to the Sino-Japanese war over external factors. Also, the subject of a "view", which is a look at the landscape, was revealed to be immutable.

In this paper, we will analyze comprehensively the roof gardens that were designed after World War II by focusing on all of the roof gardens that were designed during the period of 1945 to 1966.

## 1.2. Method

For primary documents about roof gardens in Japanese Modern architecture, we refer to the three architectural journals: *Shinkenchiku* (Shinkenchiku-sha, 1945-1966), *Journal of Architecture and Building Science* (Architectural Institute of Japan, 1946-1966) and *The international Architecture* (International Architectural Association, 1950-1966), which have been published for many years throughout the pre and post WWII periods. From these documents, we have adopted the following five indexes: "use," "building type," "material," "structure," and "location" that were relied on in the previous study. In addition, focusing the great change in roof gardens in Japanese Modern since 1954 due to the economic growth caused by the exceptional procurement during the Korean War, we divide that period into two parts and analyze the change in roof gardens by comparing those of each period. Incidentally, one of the references, *Kokusai Kenchiku*, terminated publication in mid-1967. Thus, only works completed by 1966 and which can be compared in the same generation, are examined as objects of the research for this paper.

## 1.3. Reviews

There are few studies that thematically analyzed roof gardens from an architectural history point of view. Perhaps, the principal contributing factor was that "architecture" and "garden" had been the main focus. The "roof garden," which was considered to be an intermediate field between "architecture" and "garden," was covered only from the viewpoint of garden history. The term "roof garden" was first used in *Meiji Engeikai Magazine* (Japan Engeikai, 1896). From then on, it referred to the non-ground garden that was accompanied by architecture in garden history. In addition, while investigating the origin of the Japanese roof garden, documents emerged that clarify how the roof garden was introduced from Europe to Japan (Hioki, 1942)(Kondo, 2007). However, these studies do not discuss the transfiguration of the roof garden that was accompanied by modernization. Also, in conducting an historical analysis of Japanese Modern architecture, some studies have mentioned roof garden (Kondo, 2009). However, these are fragmentary discussions that focus on the specific architects who are associated with Japanese Modern architecture. Further to these studies, this paper provides a comprehensive analysis that concentrates on the evolution of the roof garden.

## 2. TRANSFIGURATION OF THE ROOF GARDEN

### 2.1. Use

Table 1: "Use" The number of works

	1945 - 1954	1955 - 1966
Rest	5	51
View	3	4
Play, Sport	4	11
Drying clothe	2	5
Theater	0	4
Arts exhibition	0	5
Other	0	8

#### 2.1.1. Rest

The roof garden at *Shima Kanko Hotel* (Kintetsu Corporation, 1951) was provided with chairs, tables and benches for resting. As represented by *Shima Kanko Hotel*, the planning of the roof garden that was intended to be a place to rest was begun during the early 1950s, and continued thereafter. In addition, roof gardens have been expanding since 1955 as a place not only where one can rest, but also as a place to eat and drink.

"Beer tastes much better when it is drunk during nightfall on the terrace on the second floor" (Shinken-chiku, vol.2, 1959, p.65).

Furthermore, after 1960, roof gardens changed to accommodate longer rests by increasing the comfort they provided by the use of canopies and pergolas as represented by *Asama Motor Lodge* (Ebihara Architects, 1964).

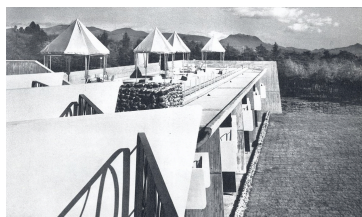


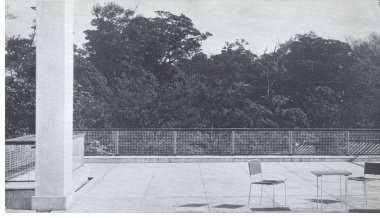
Figure 1: Asama Motor Lodge (Ebihara Architects, 1964)

#### 2.1.2. View

Roof gardens that provide a view were first planned shortly after WWII and have been used continuously ever since. The view from the garden also was considered, such as the variety of urban scenery or of rural scenery. For example, working with a view of the city landscape from the watchtower on the roof garden was suggested for the *Tokyo KoseiNenkin Hospital* (Yamada Mamoru Architects, 1954). The view of the variety of visual objects was considered to be urban scenery and to provide the equivalent of rural scenery.

"The view from the watchtower also was the subject of a tentative proposal from the architectural aspect" (Shinken-chiku, vol.2, 1954, p.12)

However, although the roof garden that was intended as scenery continued to be planned after 1956, what was viewed from it was limited to rural scenery. There were no views of urban scenery planned



**Figure 2:** Iwanami House (Sutemi Horiguchi, 1958)

### 2.1.3. Play, Sports

The roof garden at *M Residence* (Kume Sekkei, 1951) was connected to a child's room on the top floor as a place for children to play.

“The bedroom on the second floor is quiet and bright. The balcony is large and is a place where it is fun to play” (Shinkenchiku, vol.10, 1952, p.24)

An example is *M Residence*, Planning the roof garden that was intended for play and sports began in the early 1950s. Additionally, Roof gardens intended for use as a playground and for sports continued to be planned after 1955. For example, the roof garden of *Meiji University Hall 6-7* (Sutemi Horiguchi, 1958) was used as a substitute for a sports area on the ground's surface.

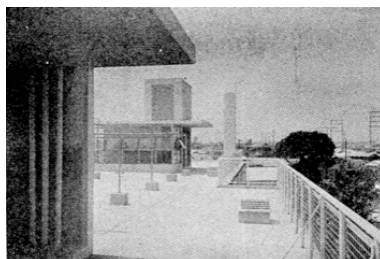
“They required a roof garden for use as a sporting ground and resting area for students that is difficult to achieve at ground surface” (Shinkenchiku, vol.10, 1958, pp.27-28)



**Figure 3:** Meiji University Hall 6-7 (Sutemi Horiguchi, 1958)

### 2.1.4. Drying clothes

It may be inappropriate to bring up “drying clothes” as a theme for “use.” However, an area in which to dry clothes is a new place for workers and housewives and creates an extraordinary space. Therefore, we mention it as one of the subjects.



**Figure 4:** Inflammable Collective Houses of the Bank of Tokyo (MHD Planners, 1952)

*Inflammable Collective Houses of the Bank of Tokyo* (MHD Planners, 1952) is representative of places in which to dry clothes in roof gardens. They had been planned since the early 1950s. In those years and since, the number of such roof gardens that actually were established is small, although the planning of such works continued after 1956. Also, the majority of roof garden spaces



for drying clothes were planned for collective housing, where washing table, washing tanks and the frames for hanging the clothes were set up.

“We set up six common washing spaces for use as convenient spaces in which to dry clothes in the roof garden” (Journal of Architecture and Building Science, vol.1, 1952, p.36)

#### 2.1.5. Theater

Roof garden theaters were not planned before 1954. The only exceptions is that of *Maruei Department Store* (Togo Murano, 1954), which was created for use as a rooftop playing ground that could be changed to an outdoor theater.

“Planning to create an outdoor theater in the roof garden in the future” (Shinkenchiu, vol.4, 1954, p.14)

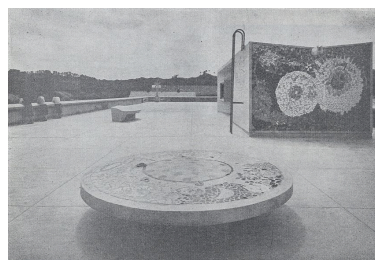
Also, *Kaurashiki City Hall* (Kenzo Tange, 1960) created a stage setting on their roof garden with tiered bleachers and stage scenery. In this way, roof gardens that function as theaters have been constructed occasionally since 1955.



**Figure 5:** Kaurashiki City Hall (Kenzo Tange, 1960)

#### 2.1.6. Art exhibitions

Roof gardens for use in art exhibitions were not planned before 1954 and used only intermittently after 1957, as was the roof garden at *Chuo Koron Building* (Yoshinobu Ashihara, 1957). In addition, roof gardens for an art exhibition represented by *Otaki town office* (Kenji Imai, 1960) and *Okayama Cultural Center* (Kunio Mayekawa, 1962) have varied gradually from simple hardens that featured only sculptures to others that have additional decorations such as benches and water towers.



**Figure 6:** Otaki town office (Kenji Imai, 1960)

Furthermore, the roof garden was often created by involving a prominent artist, as was the Masayuki Nagare in *Tokyo Tenri Kyokan*, which was named “garden of the sleep” (Takenaka Corporation, 1962).

#### 2.1.7. Other

Roof gardens before 1954 were intended for either of the purposes that appear in the articles above. However, after 1955, some gardens were envisioned for transitory purposes. In a typical example, *Hisatsune Residence* (Obayashi Corporation, 1958), it was intended that the roof garden would be used until he building was extended. Consequently, only the frame was built.

“Two rooms could be extended easily” (Shinkenchiu, vol.11, 1958, p.57)

## 2.2. Building type

**Table 2:** “Building type” The number of works

	1945 - 1954	1955 - 1966
House	9	37
Collective house	8	12
School	7	19
Store, Office	8	23
Hospital	2	5
Accommodation	0	16
City hall	1	18
Other	2	38

### 2.2.1. House

The roof gardens on residential houses that are represented by the *Hilltop House* (MHD Planners, 1950) have become widespread since the early 1950s. Most Roof gardens on residential houses were planned as gardens that were associated the room of a one- or two-story house. Also, they were planned to be used as the buffer area between the outdoors and the indoors of an architectural structure or between rooms.

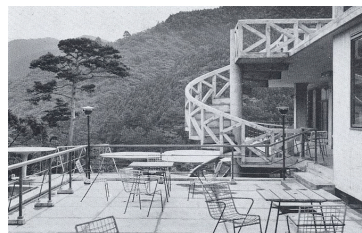
“There was a small roof garden covered with grasses and gravel utilizing a space on the second floor to soften the feeling coming of the apartment like elevation and providing a buffering gap between the bedroom and the living room on the second floor” (Shinkenchiku, vol.5, 1958, p.51)



**Figure 7:** Koshiro Matsumoto Residence (Junzo Sakakura, 1958)

### 2.2.2. Collective house

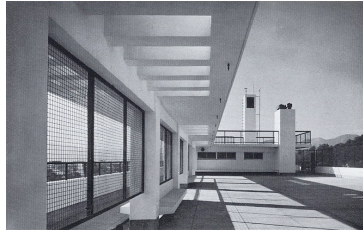
As represented by *Tokio Marine Sendagaya Apartment* (Mitsubishi Jisho, 1951) and *Yawata Iron Kouchi Apartment* (Mitsubishi Jisho, 1958), roof gardens on collective houses were begun in the early 1950s. Since then, they have become widespread. Many of the roof gardens are planned for the upper part of a three- to five-story building. In addition, extra space is created when a room that is assigned to the building's machinery, water tank, and equipment for the machinery and electricity, which are required in the collective house, is opened up as a garden that is dedicated to the residents of the house.



**Figure 8:** Yawata Iron Kouchi Apartment (Mitsubishi Jisho, 1958)

### 2.2.3. School

Like the example of *Joshigakuin* (Nikken Sekkei, 1951), the creation of roof gardens on schools has become widespread since the early 1950s. Before 1954, a primary task in Japan was to build a post-war society and to construct facilities that corresponded to the 6-3 system of education under the New School Education Law. Thus, many schools were constructed and roof gardens planned for use by the students and teachers. Roof gardens, as exemplified by the *Meiji University Izumi campus* (Sutemi Horiguchi, 1961) and *Futabagakuen Shizuoka* (Sutemi Horiguchi, 1964), were created mainly on top of two- to four-story buildings, with their area increasing in size as time passed.



**Figure 9:** Futabagakuen Shizuoka (Sutemi Horiguchi, 1964)

### 2.2.4. Store, Office

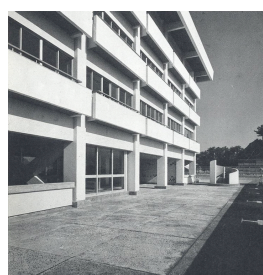
The roof garden that is set on the upper part of the 6th floor of *Tokio Marine Building* (Mitsubishi Jisho, 1950) and the “walking roof garden” that is planned for the upper part of the third floor of *Kobe Bankers Association Building* (Nikken Sekkei, 1951) are examples of the widespread use of gardens on stores and offices. Such roof gardens have become larger and higher since 1955. The one with a flat deck above the ninth floor of the *Palace Side Building* (Nikken Sekkei, 1966) is a typical example.



**Figure 10:** Palace Side Building (Nikken Sekkei, 1966)

### 2.2.5. Hospital

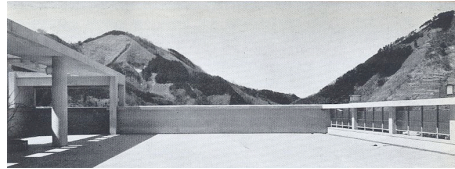
Roof gardens that have been created on hospitals have been planned since 1954. *Kanto Teishin Hospital* (Nippon Telegraph and Telephone Public Corporation, 1954) and *Tokyo KoseiNenkin Hospital* (Yamada Mamoru Architects, 1954) are examples of hospital roof gardens. Such roof gardens are set mainly in the upper part of the fourth- or fifth-story. There have been fewer, new examples since 1955. However, as represented by *Nagasaki prefectural Umabara Onsen Hospital* (Takeo Sato, 1966), the concept has found expression continuously in various heights and styles.



**Figure 11:** Nagasaki prefectural Umabara Onsen Hospital (Takeo Sato, 1966)

### 2.2.6. Accommodation

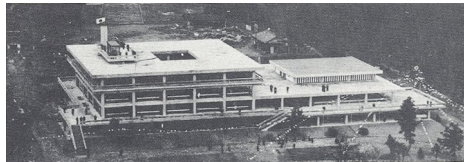
There were no plans before 1954 for a roof garden as accommodation. On the other hand, a lot of such roof gardens were planned in the 1960s, as represented by *Manraikaku* (Shindo Akashi, 1956). Many of the roof gardens planned for use as accommodations were planned as gardens for residents who lived on the upper floors from the third- to fifth-story, as represented by *Tawaraya* (Junzo Yoshimura, 1966).



**Figure 12:** Manraikaku (Shindo Akashi, 1956)

### 2.2.7. City Hall

There were no plans before 1954 for a roof garden on a city hall. On the other hand, the public's interest in roof gardens was recognized after 1955. Consequently, planning for a roof garden at City Hall was undertaken for a full year after 1955. As represented by *Itami City Hall* (Kume Sekkei, 1955) and *Kurayoshi City Hall* (Kenzo Tange, 1957), composite roof gardens were planned at different elevations in public places so that they could be used by the citizens.



**Figure 13:** Kurayoshi City Hall (Kenzo Tange, 1957)

### 2.2.8. Other

The roof garden appear on a variety of other building types, including "community buildings," "department stores," "club houses," "libraries," and "religious facilities." However, roof gardens on other building types were not built before 1954. Planning for them took place in 1955 and later years.

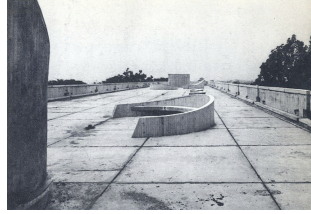
## 2.3. Material

**Table 3:** "Material" The number of works

	1945 - 1954	1955 - 1966
Artificial material	37	130
Natural material	1	37

### 2.3.1. Artificial material

Roof gardens that use artificial materials were built throughout the period of 1945-1966. They were built in a very simple form of construction using tiles and mortar for joint finishing due mainly to material shortages. A typical example is the *Gakushuin University* (Kunio Maekawa, 1960) where the floor materials, the parapet and even the benches are made of concrete as the base material.



**Figure 14:** Gakushuin University (Kunio Maekawa, 1960)

### 2.3.2. Natural material

The roof gardens that use natural materials for finishing were not planned before 1954. On the other hand, from 1955 onward, we have examples that involve flowerbeds and shrubbery in a corner of the roof garden, and the planting of shrubs. *Y Residence* (Ebihara Architects, 1955) serves as an example. *Silk center* (Junzo Sakakura, 1959) and *Sakuragaoka Country Club* (Antonin Raymond, 1960) reproduce earthbound gardens on the roof that have been covered with soil and use a great deal of stone, plants and water. In addition, the roof garden of *Sumai* (Tadayoshi Fujiki, 1965) features an entire garden with wild plants. In this way, roof gardens that use natural materials have been built with increasing diversity as time has passed.



**Figure 15:** Sumai (Tadayoshi Fujiki, 1965)

## 2.4. Structure

**Table 4:** “Structure” The number of works

	1945 - 1954	1955 - 1966
Reinforced Concrete, Steel Reinforced Concrete, Steel	33	165
Wooden	5	2

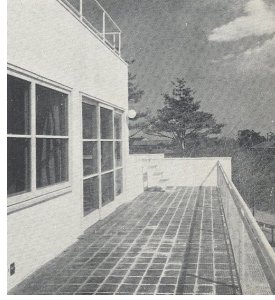
### 2.4.1. Reinforced Concrete, Steel Reinforced Concrete, Steel

Given that people who experienced the terrible devastation caused by air raids were anxious to have noncombustible architecture, RC (reinforced concrete) was used immediately following the end of the war and has been used since on an ongoing basis.

“This is the first full-scale RC structure after the war” (Shinkenchiku, vol.4, 1950, p.99)

In addition, the architect made possible further verticalization of the roof garden, as represented by *Nippon Sogo Bank* (Kunio Mayekawa, 1953), by adopting SRC (steel-reinforced concrete) and an S (Steel) structure. Since 1953, almost all roof gardens have been designed with a reinforced concrete construction or the use of steel-reinforced concrete.

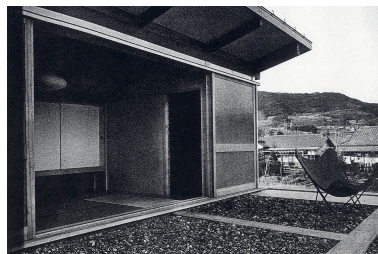




**Figure 16:** Hilltop House (MHD Planners, 1950)

#### 2.4.2. Wooden

Compared to RC, it is clear that wood has less durability and resistance to moisture. However, as represented by *Sherman Residence* (Takashi Matsumoto, 1951), it can be seen that the roof gardens before 1954 were constructed of wood. Instances of roof gardens that were made of wood are mainly on houses. Why it was decided to make the house from wood may have been because of a shortage of other building materials during the period of reconstruction that followed the war. Because conventional building materials were easy to obtain after 1955, the use of wood for roof gardens was not included in the plans. In case of a *Mixed Structure House* (Masako Hayashi, 1962) that used a mixture of wood and concrete block construction, the planning of roof gardens have relied on the concrete block, but not on wood.



**Figure 17:** Mixed Structure House (Masako Hayashi, 1962)

### 2.5. Location

**Table 5:** “Location” The number of works

	1945 - 1954	1955 - 1966
Urban area	29	100
Suburb	10	69

Through the years, the roof garden has continued to be built, regardless of the urban-area/suburb. In addition, it should be noted that during the post-war reconstruction period prior to 1954, there was a relatively lower number of roof gardens constructed in the suburbs since the reconstruction of the urban areas was given priority. Roof gardens in the urban areas were planned mainly for effective utilization of the land. With the increasing number of cars due to economic growth, it is assumed that all available land will be taken by gardens and open space parking areas. On the other hand, many of the roof gardens that were built in the suburbs were built in the hope of attracting customer for commercial purposes.

### 3. RESULT

After analyzing the primary sources, it is clear that the number of roof gardens since 1955 is greater than the number in 1954 and the preceding years. For each of the following subjects, a trend can be seen.

**Use:** Roof gardens were used for practical purposes, such as "Rest," "View," "Play, Sports" and "Drying clothes" throughout the year. However, except for "view", the uses have become more diverse since 1955, and other purposes are contemplated, such as "art exhibitions" and "theater".

**Building type:** Prior to 1954, the priorities for roof gardens plans were "Houses", "Collective houses," "Schools," "Stores," and "Offices" to address the urgent need for postwar restoration, following which, there was a prominent increase in roof gardens for "Accommodation", "City hall" and "others."

**Material:** Prior to 1954, roof gardens were constructed with simple artificial materials. However, after 1955, natural materials, such as water, stone and various plants in soil laid underneath, were used in various forms.

**Structure:** As materials for reinforced concrete were prioritized for use in schools and condominiums, it was inevitable that before 1954, roof gardens on private residences and smaller offices had to be constructed on wooden roofs about which there was still concern for durability and water resistance. On the other hand, as steel and concrete became easily accessible after 1955, almost all roof gardens since have been constructed with RC or SRC.

**Location:** Since their invention, roof gardens have been planned without consideration to site conditions. Roof gardens in the urban areas were mainly planned to make use of the limited availability of land and to replace open squares at ground level. On the other hand, roof gardens in the suburban areas were planned to attract visitors for commercial purposes.

**Table 6:** Transitions of the roof garden

	1946~1954	1955~1966
<b>Use</b>	Rest, View, Play, Sport, Drying clothe	Rest, (View), Play, Sport, Drying clothe, Theater, Art exhibition, Other
<b>Building Type</b>	House, Collective house, School, Store, Office	House, Collective house, School, Store, Office, Hospital, Accommodation, City hall, Other
<b>Material</b>	Artificial material	Artificial material, Natural material
<b>Structure</b>	Reinforced Concrete, Steel Reinforced Concrete, Steel, Wooden	Reinforced Concrete, Steel Reinforced Concrete
<b>Location</b>	Urban area, Suburb	Urban area, Suburb

### 4. DISCUSSION

A direct cause of the surprising increase in the number of roof gardens after 1955 was the rapid economic growth caused by the Korean War's special procurement that started during the end of 1954. In fact, after 1955, roof gardens architecture was often planned as a privilege for the wealthy classes in association with golf course developments, such as clubhouses, and accommodations.



The architectural effects that are absent in ground gardens are being explored for roof gardens. In short, roof gardens were planned in simple and rational forms, regardless of “location” and “structure,” since building materials were in short supply before 1954. On the other hand, roof gardens after 1955 were designed without the restrictions of “structure,” although business benefits, artistic factors and “use” were considered. As a result, “building types” and “materials” became more diverse.

Exceptionally, only the “view” on the “use” is not increased, and the case is limited to the suburbs. Because there was high economic growth, the space in the urban area became crowded with uniform buildings. Not surprisingly, the subject of urban area “view” disappeared. As a result, there were probably various requests, depending on the location. The suburban “roof garden” continues to be discussed in support for the emotion-invoking scenery in front of it. On the other hand, because the roof garden in the city has lost the battle over landscape, it has added a variety of artistic and natural materials within it.

## 5. CONCLUSION

The roof garden after World War II has been expanding to a range from an international-style architecture seeking the universal rationality to architecture that exceeds rationality and the utilitarian. Moreover, diminishing of the “view,” which had been the subject of roof gardens in the pre-war period due to the high economic growth, has led to fumbling for new functions of the roof garden. In other words, a roof garden in Japan after World War II has been changing in various ways while being involved in the attenuation of architectural kansei (sensibility) of “view.”

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