

The Application of the Surrounding Landform to the Landscape Design in Japanese Gardens

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Abstract: - In modern cities, people generally have the desire to strike a proper balance between man and nature. This paper aims to discuss the method of using landforms in landscape design, particularly focusing on three functions of the landform: enclosure forming, viewpoint setting, and view setting. We selected Japanese gardens as case studies and adopted a three-layer model to classify a landscape design based on functions of the landform, site planning, and architectural planning. As a result, we have found some common methods of utilizing the unique landform characteristic to form an enclosed space and make viewpoints not to be seen, and to characterize various types of views, as a deep mountain view and a prospect view.

Key- Words: -Landform Characteristics, Japanese garden, Landscape Design, View and Viewpoint setting, Kyoto

1 Introduction

In modern cities, people generally have the desire to strike the proper balance between man and the natural environment through the means of landscape planning or design.¹⁾⁻³⁾

In many traditional Japanese gardens, it is possible to be in close proximity with the natural landscape, even though the garden is situated very close to the city. Previous garden designers seem to have succeeded in properly using the landform characteristics of their surroundings to create natural scenery on a large scale. It is apparent that they excel in gauging the scenic characteristics and potential of the landforms, planning the site, and creating designs to bring to realization this potential.

This brings us to their intention behind using landforms. Many researchers studied Japanese gardens in the past⁴⁾⁻⁶⁾, but they rarely discussed this topic. Concerning European gardens, some researchers such as Steenbergen, Smienk, have been presenting valuable works.⁷⁾⁻⁹⁾

Japanese gardens were traditionally not created merely for the purpose of visual satisfaction; they had greater significance. Gardens were sometimes used as training places by Buddhist monks and also as ideal places for the secluded life. In order to meet these demands, the technique and pattern of landscape designing was sophisticated to the extent that it was capable of showing a large-scale and rich natural

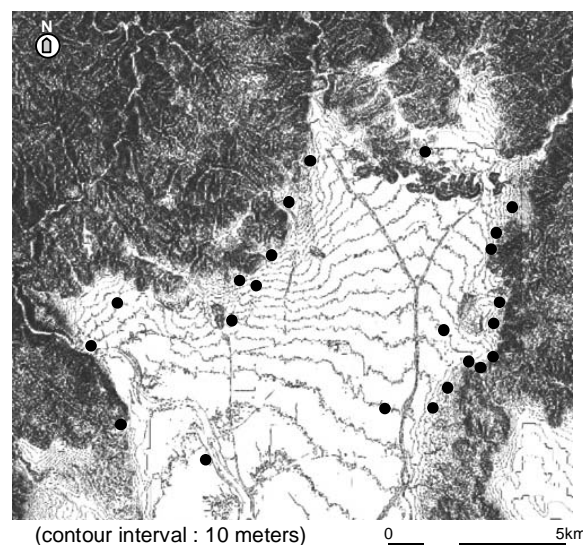


Fig.1 The Location of gardens in Kyoto city

landscape and creating an isolated location for those who wished to remain secluded.

Thus, this paper aims to discuss a method of using landforms in the landscape design. In this paper, by way of case studies, we examined Japanese traditional gardens, Jisho-ji, Jyojyu-in, Nanzen-in, Shuon-an, Sekisui-in, situated in hilly terrains verged to Kyoto city (Fig.1).

2 Three-layer model analysis

Scenery in a garden can be characterized by view settings and viewpoint settings. A view from the viewpoint wherein an observer views the scenery is composed of visual objects and their compositions, especially landforms. And a viewpoint is composed of both landforms and the building. Further, these properties are classified according to three scales and stages of landscape planning—topographic scale, site planning scale, and architectural planning scale—.

2.1 Functions of the landform in Landscape Design

In the Japanese gardens situated in hilly terrains, the surrounding landform characterizes the scenery in a definite manner. Garden designers are required to gauge the unique topographic characteristics of this land and its potential. Fig.2 shows the visual distance and commanding angles of mountains that are measured from different viewpoints in the gardens. Distant mountains tend to be used as visual objects, and close mountains tend to be used for making ambient vision (Fig.3: Ohno, 1993) as elements of space structure. Mountains commanded at a small angle tend to function as a visual object. Moreover, mountains commanded at a large angle tend to serve as the chief element of the spatial structure. Distant mountains that are commanded at a small angle are often used for making borrowed scenery called “*Shakkei*”. This paper focuses chiefly on the ambient vision and spatial functions of close mountains that are commanded at a large angle.

In order to determine potential functions of the landform, we consider three functions: (1) forming an enclosed space, (2) forming a viewpoint, and (3) composing a view with visual objects.

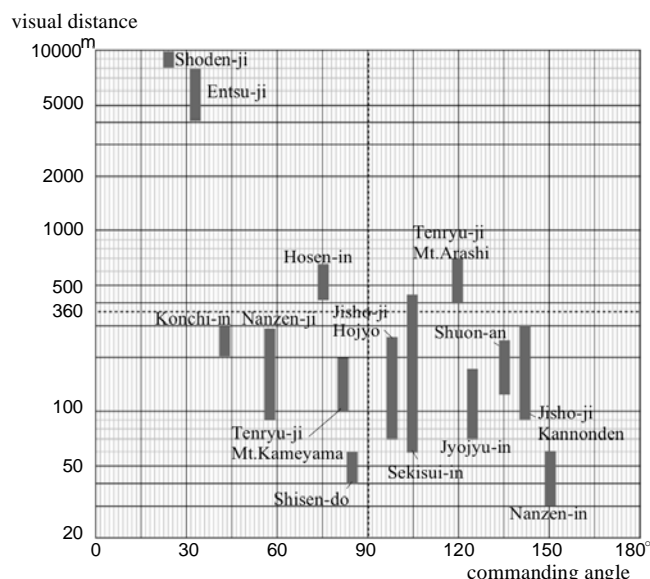


Fig.2 The visual distance and commanding angles of mountains from viewpoints in the gardens

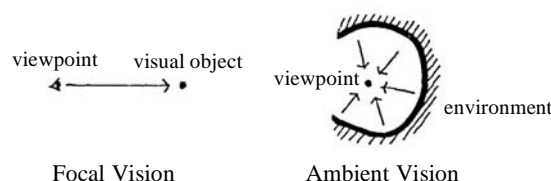


Fig.3 Two types of acceptance of visual information (Ohno, 1993¹⁰)

1. Forming an enclosed space is considered to be the first condition when creating a Japanese garden (Shinji, 1986). We often see Japanese gardens surrounded by mountains or hills. The enclosure may enable the conversion of a protected space into a private retreat. The enclosure can be emphasized and supplemented by landscape planning. It is important to study how site elements and architectural elements

Table. 1 Trichotomic classification of landscape design

Functions of the Landform	Enclosure Forming Viewpoint Forming View Composing	Topographic enclosure and shield Prospect and Refuge potential: overlook, ridge, cliff, terrace Visual objects: shape and surface of a mountain, ravine, field
Site Planning	Enclosure Forming Viewpoint Setting View Setting	Enclosure of fence, hedge, layout of buildings and garden plants Layout and aspect of buildings and gardens Layout of visual objects of a garden, rimming and leading of a view
Architectural Planning	Enclosure Forming Viewpoint Setting View Setting	Enclosure of architectural elements: wall, floor, ceiling, pillar, corner Open and close setting, hiding, screening, height of flooring Rimming a view with architectural elements: window, eaves, piazza

strengthen or weaken its enclosure.

2. Landforms such as perches, ridges, ravines, and cliffs, form a viewpoint and its characteristic of prospect and refuge.

3. Landforms like mountains and hills and their molds compose a view as visual objects.

2.2 Three-layer model of landscape design

In order to understand how to use landforms in landscape design, we propose an original framework of a three-layer model of landscape design. This three-layer model is a trichotomic classification of landscape planning according to its scale and stage: functions of the landform, site planning, and architectural planning. Site and architectural planning are not independent from the surrounding landform characteristics, but are hierarchically related. Site planning is generally subject to landform characteristics, while architectural planning is subject to both landform characteristics and site planning (Fig.4; a three-layer model). Therefore, we first discuss the above-mentioned functions of the landform. Second, we discuss the methods of site planning to realize the topographic potential, such as layout of elements of gardens—buildings and its opening, ponds, trees, paths, and fences—. We then discuss the methods of architectural planning to realize the scenic potential, by focusing on windows, pillars, eaves, piazza, and alcoves. A characteristic of a view is approximately decided by the surrounding landform characteristic. To consider the method of using the surrounding landform characteristics for designing a view, it is necessary to discuss how a view is rimmed from a 360 degrees surrounding view, to discuss its location and view setting.

2.3 Research Method

In this paper, we use 3D visual simulation models of landforms and buildings to analyze spatial and visual characteristics that landforms make. We use two kinds of maps - the 1:500 Present Kyoto City Map at a contour interval of 1 meter, and the 1:2500 Kyoto City Planning Map at a contour interval of 2 meters -, and trace contour lines described on these maps and build 3D landform models by using computer graphics software, AutoCAD Civil 3D. Then we place building models on them by using AutoCAD and FormZ. Besides, we use ArcGIS/Map to show a visible area. For simulation studies of views, we refer to the normal human visual field suggested by Eyama (1977) (Fig.5).

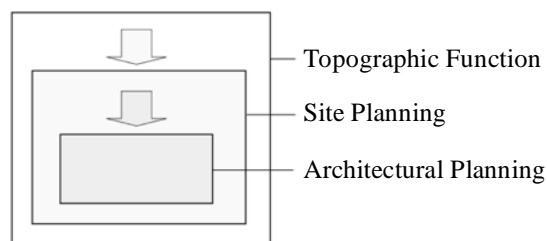


Fig4. A three-layer model of landscape design

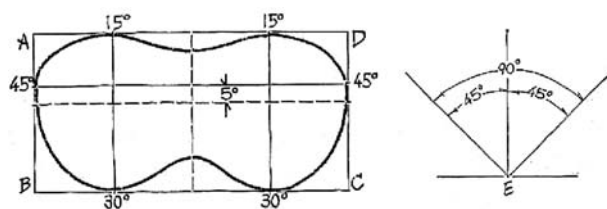


Fig5. Normal human visual field by Eyama (1977)¹¹⁾

3 Applications and analysis

In this chapter, through case studies, we discuss a method of using landforms, focusing on enclosure forming, viewpoint setting, and view setting.

3.1 Jyojyu-in temple garden

The site of Jyojyu-in temple once served as the Akamatsu's villa; in 1469–87, it was converted into a temple, where the monks of Kiyomizu temple resided. “*Tsukiyama teizo-den*,” a book published in 1828, described the garden of this temple as an “elegant and obedient garden.” However, the origin and the designer of this garden are not well known.



Pic.1 Jyojyu-in temple garden -north view-

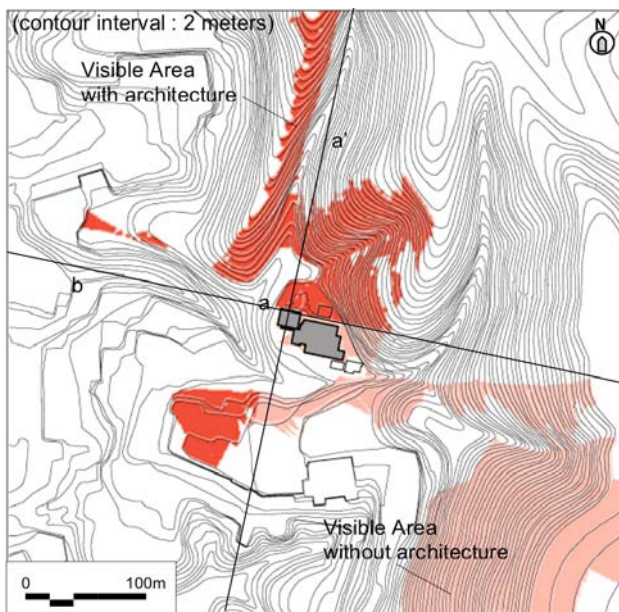


Fig.6 Visible area from the viewpoint of Jyojyu-in

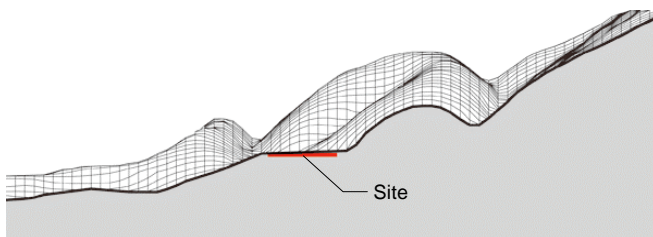


Fig.7 The site of the Jyojyu-in temple garden

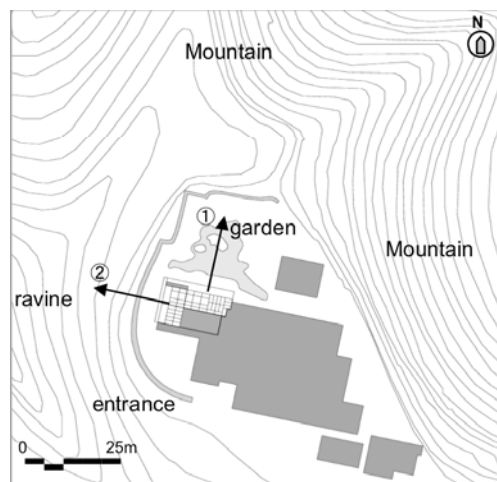


Fig.8 Ground plan of Jyojyu-in

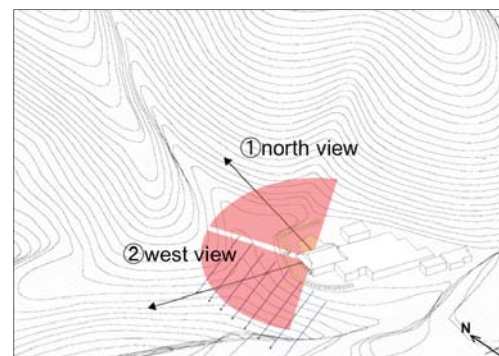


Fig.9 View structure of Jyojyu-in

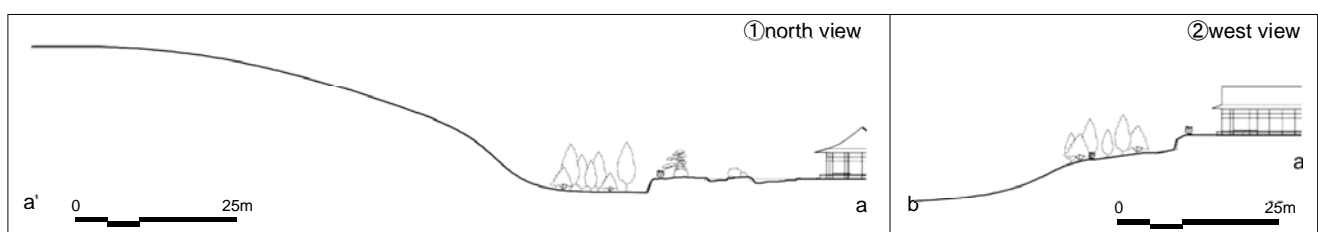


Fig.10 Cross sections of Jyojyu-in to a Mountain

3.1.1 Enclosure Forming

Jyojyu-in temple is surrounded by mountains from the northwest to the north and in the east. The mountains form an enclosed space and converge within a 100–200 m distance (Fig.6). The garden is enclosed by mountain ranges and the building, where the viewpoint is situated, lies to the south of this site. The building is situated in the east-west to create a strongly enclosed space in the north. It is notable that the building leans 12° from north to east. (Fig.6,8) This makes for a stronger enclosure. In this enclosed space, it is possible to develop an open building. The north commands a panoramic view of the mountains, which spread almost 180° and not visible from outside.

3.1.2 Viewpoint Setting

The site is situated on a ridge. The building is situated on the west boundary of a cliff (Fig.7,10). This makes a stronger prospect to the west. Although the site cannot be seen from outside, we can have a closed view of the mountains in the north, and an open view of fields in the west (Fig.9).

3.1.3 View Setting

The building opens to the north and the west, and we have two different views. To the north, we can see the main garden with ponds, clipped plants, a panorama of mountains, and a ravine. Mountains on both sides of a view strengthen the depth of the

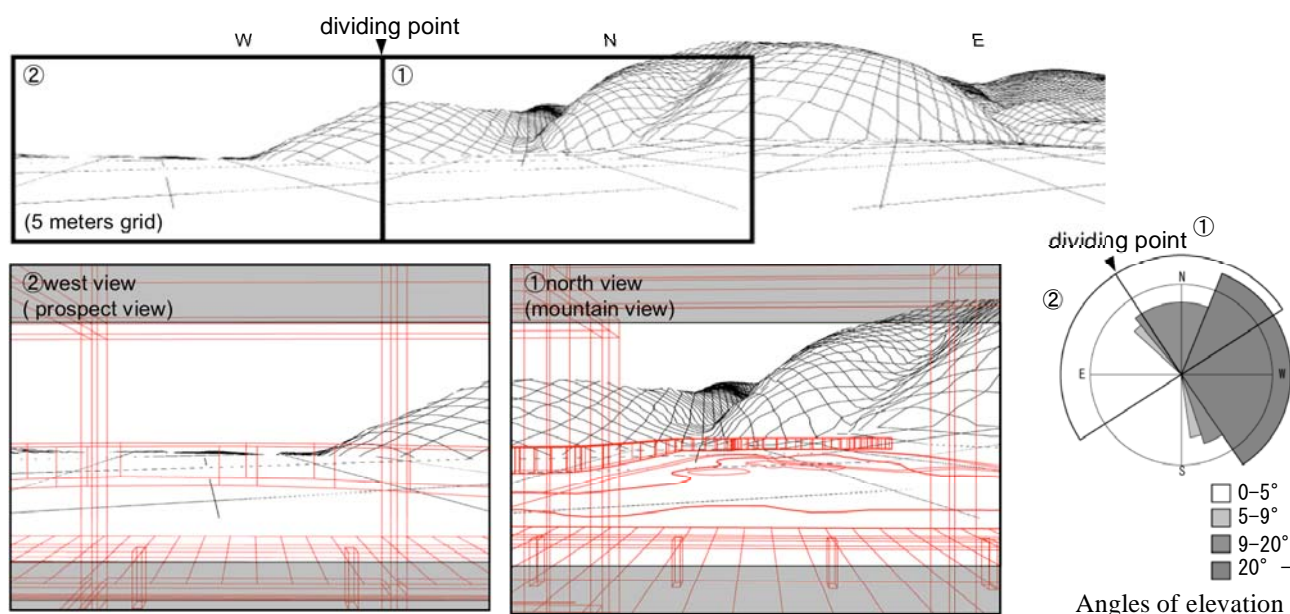


Fig.11 Framing scenery at viewpoints of Jyojyu-in

ravine, and the ravine is seen in the center of the view. Its depth is emphasized by two garden lanterns. Although the site and the garden itself are small, a panoramic and grand view is created by using the verged mountains and ravine in the north. (Fig.11).

To the west, a small and simple garden is designed to emphasize a view of the fields. By using the landform characteristics, a view is completely divided into two different views by the layout of the building and the garden.

3.2 Jisho-ji temple garden

The site of Jisho-ji formerly served as Jodo-ji temple, the *Tendai* sect of Buddhism, in the Heian period. However, it was razed to the ground during a battle between 1467 and 1477. Later, General Yoshimasa Ashikaga chose to reside there and built a mountain

villa with a garden and several lofty buildings around 1482. The garden was largely changed during the Edo period.



Pic 2. A vista view from Hojyo -south view-

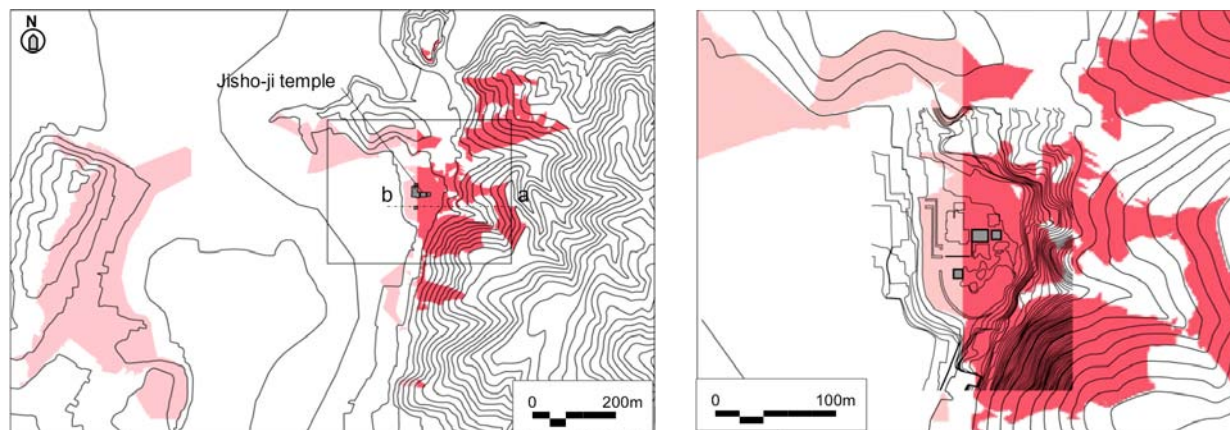


Fig.12 Visible area from the viewpoint of Jishoji, Kannon-den

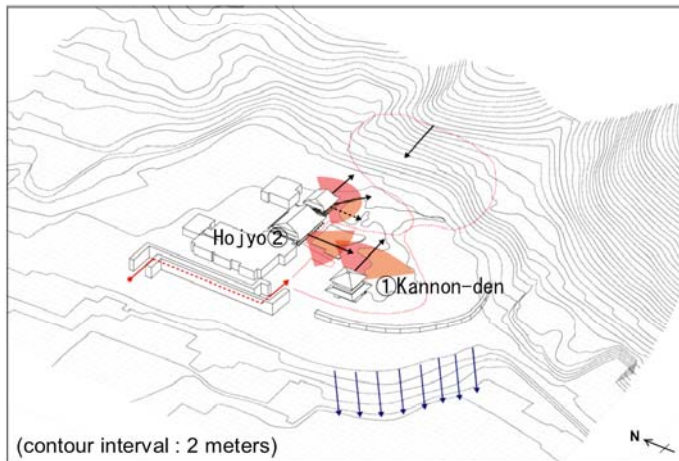


Fig.13 View structure of Jisho-ji

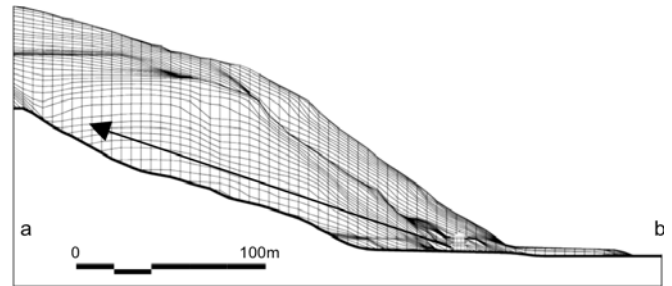


Fig.15 Cross section of Jisho-ji to a Mountain

3.2.1 Enclosure Forming

Jisho-ji is surrounded by mountains in the north and from the east to the south. The mountains form an enclosed space and converge within a 100–300 m distance (Fig.12). The mountains in the east rise steeply. At this site, three buildings are constructed in order to enclose the garden with the mountains. The southern part of the garden is topographically open; however a high tree forest has been planted to fulfill an enclosure.

The buildings in the north are called Togu-do and Hojyo, and that in the west is called the Silver Pavilion or Kannon-den. These are open, albeit only toward the garden. The garden is divided into three parts, accompanying the three buildings. In front of Hojyo, there is a white sand garden enclosed by trees. In front of Togu-do and Kannon-den, there is a pond garden enclosed by trees each other. These three parts are clustered and are invisible to each other.

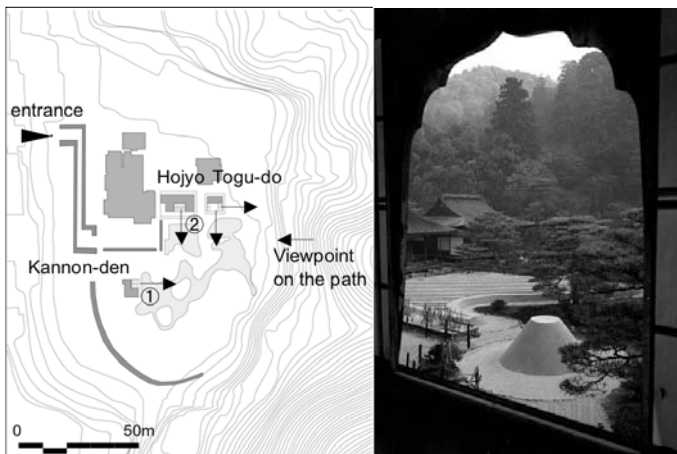
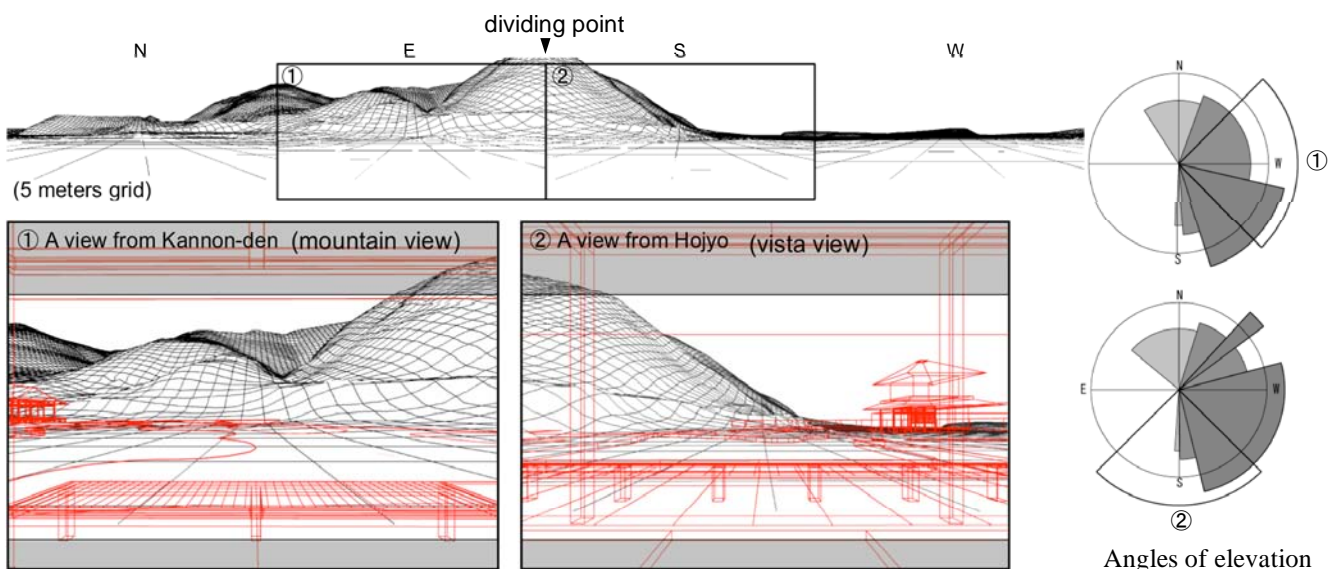
Fig.14 Ground plan of Jisho-ji Pic.3 View from Kannon-den¹²⁾

Fig.16 Framing scenery at viewpoints of Jisho-ji

3.2.2 Viewpoint Setting

The site is situated on a terrace, higher than the surrounding sites (Fig.13). It can be viewed in the west and is invisible from the outside. However, there is no view of the outside from the garden on the ground level. Views from the buildings in the garden mainly face toward the mountains (Fig.15). Instead, there is a winding path that reaches a high spot on the mountain. Here, we finally get a panoramic view of the field and Kyoto city. Formerly, there was a viewing point here; however, now, nothing remains.

3.2.3 View Setting

From all sides of the garden, except on the mountain, we only have a view of the mountains (Fig.11). The setting is intended to be entirely natural. However, the view from each viewpoint is different. The view from Kannon-den mainly comprises high mountains (Fig.16). The *Tsukimachi* mountain, which means “a mountain waiting for the moon”, lies in the central field of vision; the mountain ranges in the north and south give the impression of a folding screen.

The view from Hojyo is a vista view that comprises the slope of a mountain and the Kannon-den building. The view is open to the sky and is moderately enclosed. Its vista view and openness is emphasized by a flat sand garden. The view from Togu-do mainly comprises a pond, which leads to the bottom of the mountain with a waterfall. The mountain is used as a chief element of the garden. These three views differ, although they have the same visual objects. This shows that there are many views and possibilities in using a landform.

3.3 Nanzen-in temple garden

Nanzen-in is one of subordinate temples belonging to the monastery Nanzen-ji. The site once served as the retreat of Emperor Kameyama built in 1264, and the garden was also built around 1278-88.



Pic.4 the main garden of Nanzen-in -south view-

3.3.1 Enclosure Forming

The site is in a pocket closely enclosed by mountains in the east-south-west. The south mountain is 36-60 meters away from the viewpoint, and the west mountain is 12-36 meters away (Fig.17). The building as a viewpoint is laid in the east-west direction to fulfill its enclosure in the south. The south garden, the main garden, continues on the west sub-garden (Fig.18,19).

3.3.2 Viewpoint Setting

The site is situated on a higher place in the precincts of Nanzen-ji temples. The building of the viewpoint on the edge to acquire a prospect in the north. This

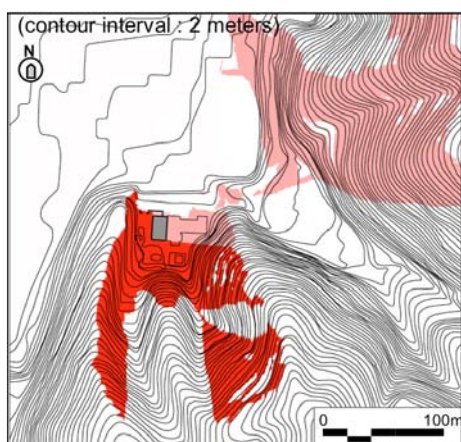


Fig.17 Visible area from the viewpoint of Nanzen-in

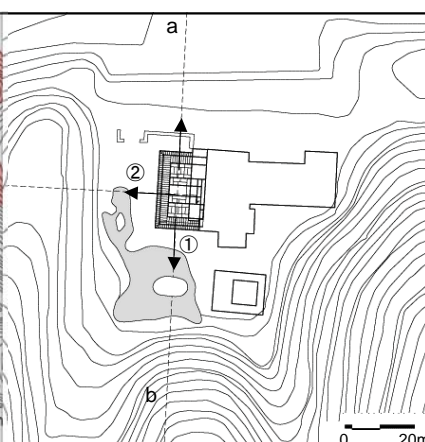


Fig.18 Ground plan of Nanzen-in

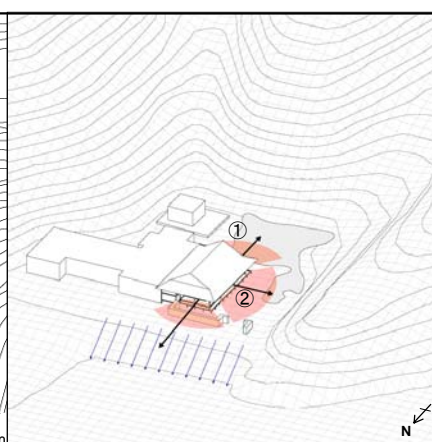


Fig.19 View structure of Nanzen-in

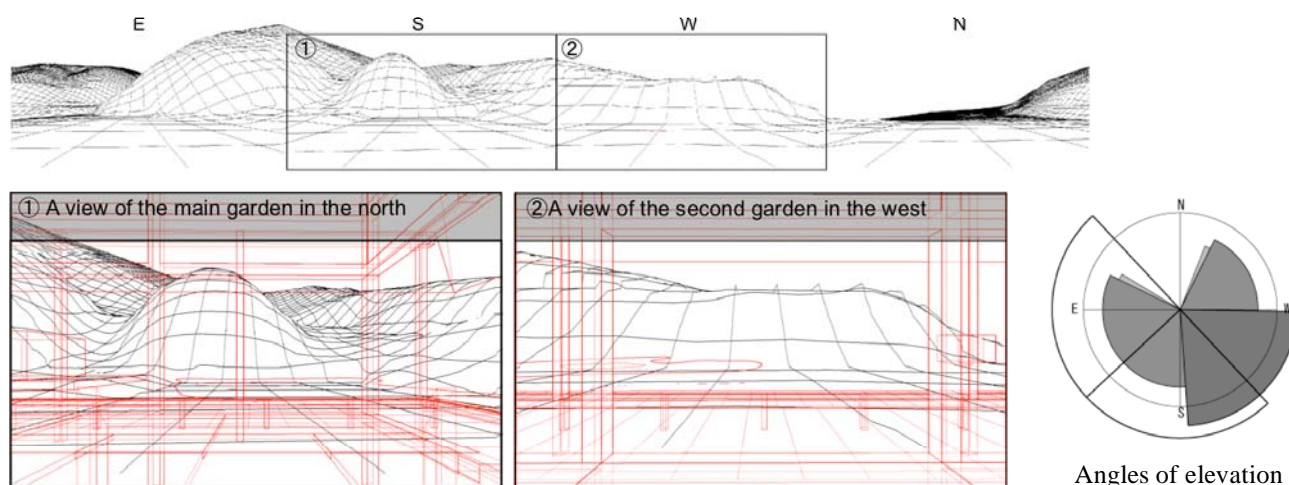


Fig.21 Framing scenery at viewpoints of Nanzen-in

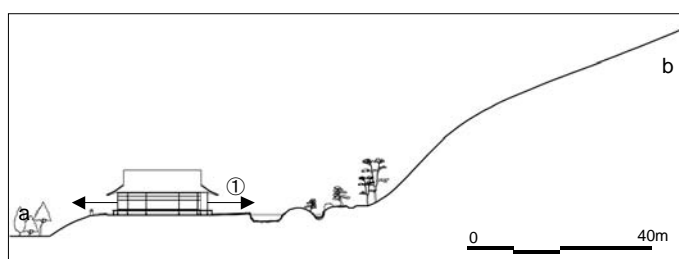


Fig.20 Cross section of Nanzen-in to a Mountain makes the inside of the building not being seen from outside.

3.3.3 View Setting

The building is opened to the south, west and north with verandas. The south view is rimmed to see mountains seen at more than 20 degrees of an angle of elevation, and ravines on both sides. The south view is characterized as a deep nature view, while the north view is opened view. The west view is a view like a folding screen closed on the ridge. Surrounding views are completely divided into three different types of views by using the landform characteristics (Fig.21).

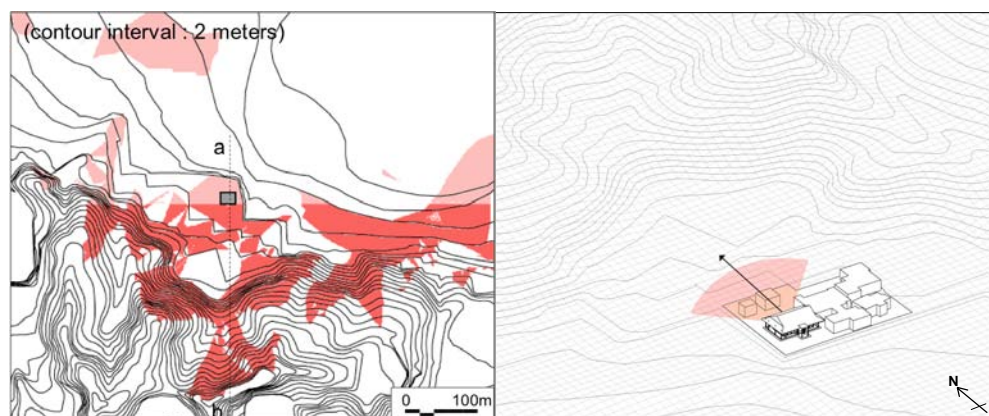
3.4 the Other Gardens

3.4.1 Shuon-an temple garden

Shuon-an is the Zen Buddhism temple built early in the 15th century by Ikkyu. The site once served as Myosho-ji temple. Toshitsune Maeda rebuilt its buildings and gardens in the 17th century. The garden is a typical example of gardens built in the Edo era. The gardens in the south, north and east are characterized in different ways.



Pic.5 the main garden of Shuon-an -south view-

Fig.22 (left)
Visible area from the
viewpoint of Shuon-anFig.23 (right)
View structure of
Shuon-an

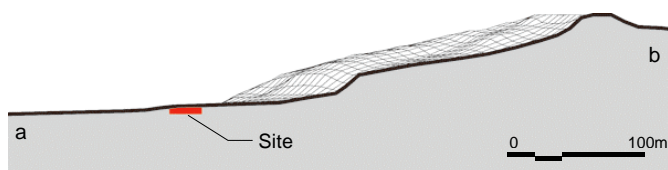


Fig.24 The site of the Shuon-an garden

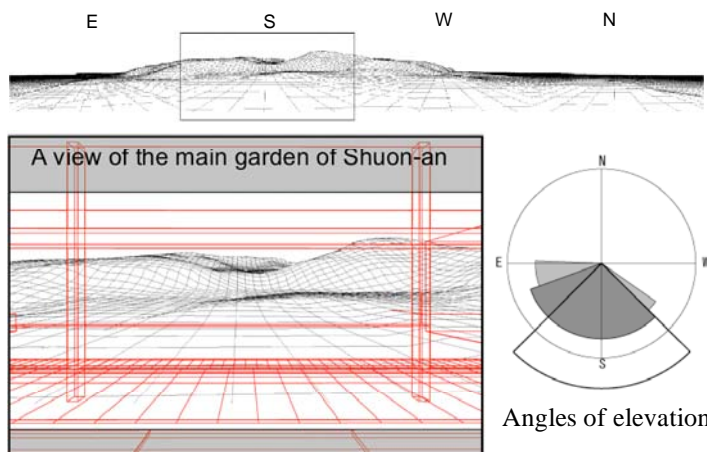


Fig.25 Framing scenery at viewpoints of Shuon-an

The site is situated in a valley between mountains in the south. The main garden is created in the south (Fig.22,23). The building is situated on an elevation, 4 meters higher than the surrounding site in the south and east. This makes the site not be seen from outside.

The surrounding mountains and the building of Hojyo make an enclosed space together. Mountains in the south are 120-240 meters away, and seen at around 10 degrees of an angle of elevation from the viewpoint, Hojyo. Mountains and a ravine in the south are chief elements of the scenery of the main garden.

In the north, we can see no mountains but a large field (Fig.25). The north field outlines the rock garden. These views are completely divided by the architectural setting. We can see two different types of views in the same building, but separately in the south and north.

3.4.2 Sekisui-in (Kodaiji) temple garden

Sekisui-in (Kozan-ji) temple is the temple of the Shingon Sect of Buddhism built early in the 13th century. The site of Sekisui-in, which is one of the buildings of Kozan-ji temple, is situated in deep mountains, and strongly enclosed by them. Around the site, it's not easy to acquire a prospect (Fig.26). Here, the building as a viewpoint is situated on the



Pic.6 A view from of Sekisui-in -south view-

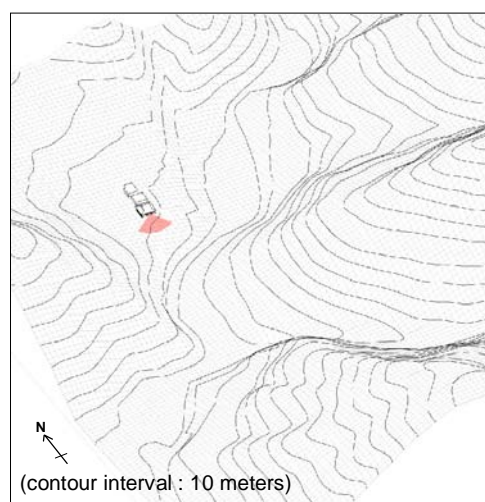


Fig.26 View structure of Sekisui-in

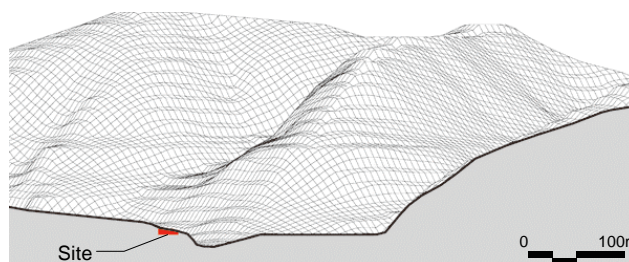


Fig.27 The site of the Sekisui-in garden

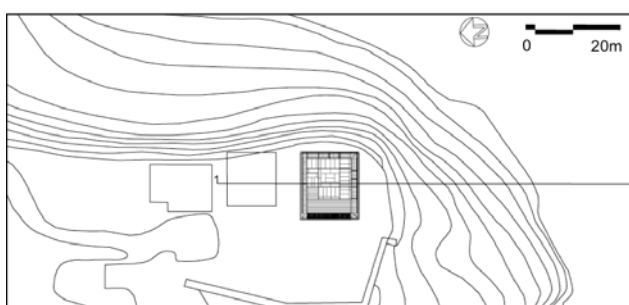


Fig.28 Ground plan of Sekisui-in

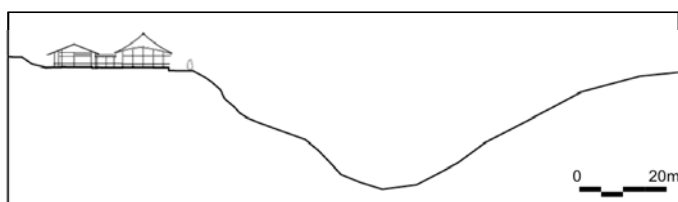


Fig.29 Cross section of Sekisui-in to a Mountain

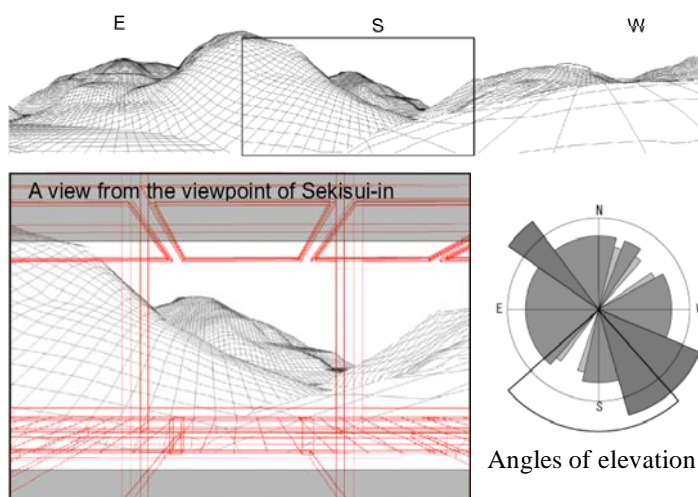


Fig.30 Framing scenery at viewpoints of Sekisui-in

edge of a precipice, and opened only to the south, which is an only direction to acquire a prospect (Fig.27-29). Because of this, we can see an open view even in deep mountains (Fig.30).

4 Conclusion

We have discussed the method of using landforms in landscape design, particularly focusing on three functions of the landform: enclosure forming, viewpoint setting, and view setting. We adopted a three-layer model to classify a landscape design according to its planning scale and stage.

The gardens selected as case studies are those belonging to the Jyoju-in, Jisho-ji, and Nanzen-in, Shuon-an, Sekisui-in temples, which are situated in close proximity to mountains.

Jyoju-in temple garden is close to the city. However, the garden designer used the unique landform characteristic to form an enclosed space and enabled a panoramic view on a large scale without being seen from the outside. Further, site planning and architectural planning provide two different views, the north view is of a deep mountain, and the west view is the prospect view of the field and the city.

Jisho-ji temple garden is also close to the city; however, the garden designer realized a large garden space surrounded by a natural environment to use the landform characteristic. Three viewpoints in each building are designed separately in a cluster and share the mountains as visual objects. One provides a deep mountain view and the other provides an open vista view. The last one provides a view of a pond and a waterfall. Thus, three different views are dramatically designed.

Nanzen-in temple garden is situated in a pocket closely enclosed by mountains, and the building is opened to three directions to acquire three different types of views : a deep mountain view, an open view and a view like a folding screen closed on a ridge.

Shuon-an temple garden is in a valley enclosed by mountains, and the building fulfill its enclosure in the south. The two viewpoints are characterized as a mountain view in the south, and an open view of a field in the north.

Sekisui-in temple is situated in deep mountains and strongly enclosed by mountains. The building is opened to the south, which is the only direction to acquire a prospect.

We have found some common methods of utilizing the unique landform characteristic to form an enclosed space by site planning and architectural planning, and by viewpoint setting and view setting. Viewpoints are often opened to the enclosed space by mountains to acquire the natural landscape and its wide view, and also opened to outside to acquire a prospect without being seen. Views are characterized variously, as a view of deep mountain or ravine, a prospect and a vista by dividing, strengthening, and contracting views.

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