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# PREFACE

## What Can We Gain Through Cultural Exchange?

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### 1. Globalization/culture

The world today is undergoing rapid globalization. People, supplies and financial capital move freely around the world in spite of geographical distances, borders, cultural and religious differences. Japanese factories are relocated abroad to take advantage of a cheaper labor force and lower tariffs. Even agricultural production is going abroad. As Japanese activities are concentrated in Tokyo, depopulation in rural areas is becoming an increasingly serious problem. What can we expect will remain in this country in the future? Culture is one of the keys to recreating a country eroding from globalization.

Having mixed with many other different cultures, Japanese culture has not remained pure. Japan has always been eager to digest and assimilate foreign cultures. Since the middle of the 19th century the Japanese have admired and emulated the lifestyle and culture of the United States and Western Europe. For business to prosper, companies changed their written names from Kanji to English. Many young couples held their weddings in churches although they were not Christians. They took to using desks and chairs and sleeping on beds rather than on futons and tatami mats. Most people no longer wear traditional Japanese clothes but have adopted western clothing, which is both functional and convenient. And so, western culture is assimilated into Japanese culture. Frank Boas's theory of cultural relativism states that there is neither relative superiority nor inferiority among cultures. Yet in the past, the Japanese have at times despised certain cultures.

Today high-rise buildings similar in appearance are constructed at the center of big cities around the world. As a result of westernization, it is hard to find old traditional buildings in Tokyo, as they were demolished and replaced by new and indistinguishable high-rises. This trend of development has homogenized the cities of the world. Modernization of the urban fabric is more pronounced in East Asian countries than in southern nations such as India, quite possibly due to differing religions.

### 2. Global environmental ethics

Mass consumption enables mass production, which, in turn, increases job opportunities and enriches the standard of living. This is a global pattern. Rapidly developing advanced countries, including China, India and many others, strive for a rich life, achievable through mass consumption and mass production. However, as professor Tukio has commented, this trend may exhaust the entire world's supply of oil and metals in 90 years. At this rate we would need 2.5 Earths to satisfy the demand. For the sake of our descendants as well as the health and survival of our planet, we must control our daily consumption. Global environmental ethics are required to control our lives. One example is the symbiosis between man and nature.

## 3. Firmitas/utilitas/venustas

The 1st century B.C. Roman architect Marcus Vitruvius Pollio explained that architecture must possess three qualities: 'firmitas', 'utilitas' and 'venustas'. Today these three qualities can be interpreted as 'strength' to withstand the forces of nature (earthquake, snow, wind etc.) as well as to provide safety from hazards such as fire and to protect human life; the role of 'utility' is to satisfy human requirements; 'beauty' is for the aesthetic appreciation of architecture.

In his theories Vitruvius assimilated Greek architectural thinking, wherein 'venustas' consisted of 'ordinatio(taxis)', 'symmetria', 'dispositio(diathesis)', 'eurythmia', 'decor' and 'distributio (oikonomia)', which mean 'quantitative order', 'commensurable measure system', 'qualitative order', 'aesthetic posture', 'appropriateness' and 'management and economy' respectively. In the Gothic period 'beauty' and 'utility' were sacred. In the Renaissance 'strength' and 'utility' were secondary to 'beauty'. The design of storage and other facilities with only 'firmitas' and 'utilitas' was not the work of architects.

At the end of the 19th century the appearance of various new structural materials, advances in structural engineering based on the progress of analytical mechanics and the complexity of architectural function made it difficult for architects to design according to the conventional concept of beauty based on style. Prior to this, Immanuel Kant had already established the autonomy of 'beauty' as a quality separate from appropriate qualities of 'strength' and 'utility'.

But in the field of fine arts, defining beauty has not been so simple. From the start of the 20$^{th}$ century technology has grown bigger and bigger. Technology was perceived to create beauty. This beauty was referred to as technological beauty. The appropriate qualities of technology are 'strength' and 'utility'. New ideas emerged to explain the relationship between these appropriate qualities and 'beauty'. One such concept was functionalism – the insistence that form follows function. Yet it was art rather than technology that created technological beauty. With the application of conceptual and abstract technology, art materialized itself in concrete technology.

The characteristics of technology are essentially impersonal, abstract, quantifiable and appropriate for serving external purposes. 'Strength' and 'utility' need 'technology'. On the other hand, the characteristics of art are personal and individual. Art exists to satisfy its own goal. The indispensable and necessary reason for art is its aesthetic value. The significance of 'beauty' is in its being. It is enough for 'beauty' to be perceived intuitively.

But Vitruvius did not comment on the relationship between the three qualities. I propose that the three qualities can be compared to three bricks being stacked: the lowest brick being 'firmitas', next up is 'utilitas' and the third is 'venustas'. 'Utilitas' does not exist without 'firmitas' - a house may be utilitarian, yet it should not be inhabited unless it is solid and safe from earthquakes. Without the third brick, 'venustas', a building is just a facility and not architecture. By laying the third brick, the facility is transformed into architecture. Therefore, architecture becomes art by incorporating 'venustas'.

Architectural design can originate from one of three qualities: 'strength', 'utility' or 'beauty'. But we cannot design from more than two qualities at the same time. The initial design from the first quality will give expression to form in the first stage. The second design from the second quality will modify the form of the first stage. We cannot consider one quality as a dependent variable of another quality, as functionalism dictates that form (beauty) follows function.

## 4. Truth/goodness/beauty

Three universal and plausible values are 'truth', 'goodness' and 'beauty'. Immanuel Kant explained 'truth' of understanding in *Critique of Pure Reason*, 'goodness' of reason, to judge the ability of our acts based on the sense of duty, in *Critique of Practical Reason*, and 'beauty' of aesthetic appreciation in *Critique of Judgment*. These could be supplemented with 'sacredness'.

On the other hand, 'firmitas' (strength and safety) signifies mechanical stability and safety from

disaster, and ‘utilitas’ (function and ease of use) assures the best use. So both ‘firmitas’ and ‘utilitas’ are problems solvable by science and technology and thus belong to the search for ‘truth’. By adding the concept of ‘goodness’ to ‘strength’, ‘utility’ and ‘beauty’, we can more clearly understand the problems of architecture. ‘Sacredness’ is also inherent to religious architecture and culture.

**5. Science/art/history**

In the field of science we try to find common rules for various phenomena. Established rules enable us to predict future phenomena. New rules may incorporate existing rules, while those that are obsolete are abandoned.

In the field of art, however, the more original the work, the more people will appreciate it. There are a number of reasons why originality is valued: for instance, foreigners are interested in a Japanese individual who is well versed in his/her culture. Visitors to Japan enjoy traveling to cities with distinctive physiognomies. When the aesthetics of a city are appreciated globally by many people over time, the city takes on a universal existence, which leads to a historical existence. A historical city with a rich cultural heritage integrates the work of many talented architects of diverse periods, as though they had been working in collaboration. For instance, the canals of Venice are lined with exquisite examples of old and beautiful architecture. When architecture possesses the quality of ‘beauty’, it becomes art and may then be assured a place in history. Buildings, such as some modern high-rises, designed with only the qualities of ‘firmitas’ and ‘utilitas’ belonging to the cognitive quality of ‘truth’, will not be assured a historical existence.

**6. Basic needs/derived needs/integrated activities**

People have basic biological needs, as do animals, such as eating and sleeping. However, as people are different from animals, to satisfy basic needs, derived needs are generated. To satisfy derived needs, people built artificial environments, established economic and political organizations, set up legal and educational systems. B. Malinowsky refers to these as cultural responses. He furthermore explains that even such highly derived activities, such as research, art, religion and ethics, are also related to basic needs. But in the argument that I am presenting in this paper, I consider these as integrated activities, each with its own goal and unrelated to basic needs.

**7. Urbanization/understanding different cultures**

The following statements are based on anatomist T. Youro’s work. City is the realization of consciousness. Worldwide urbanization is rapid globalization. Urbanization is called civilization to distinguish it from culture. Urbanization, i.e., civilization, causes friction with the indigenous culture. Civilization is a conscious and objective phenomenon. Verbal language is a form of conscious expression that is managed in the left brain, but is spoken unconsciously in daily life. Yet meaning, when presented verbally, externally, and with full consciousness, can be transplanted to another civilization.

On the other hand, non-verbal language, such as painting and music, originates in the right brain both consciously and unconsciously**.** Culture is complex and multi-faceted, encompassing the conscious and the unconscious. The unconscious content disappears during the transplant between different cultures. ‘Japanese culture and Western learning’ illustrates one example of cultural transplant from the West to Japan in the 19$^{th}$ century.

There is no limit to the discussion of culture, which is both verbal and non-verbal. Before understanding a different culture, one must undertake the very difficult task of being conscious of one’s own culture. Understanding another culture is much more difficult. R. Benedict’s *The*

*Chrysanthemum and the Sword* is an exception, which is famous for its understanding of Japanese culture despite the fact that the author wrote it without first visiting Japan. Different cultures are best understood not only through language but also by living in the culture.

**8. Design collaboration**

While urban centers of the world rapidly tend to be homogenous, what would the result be if each culture could retain its own style of urban design? As an example, let us look at the unique design of a new urban area.

The plan for one of the new residential areas of Borneo-Sporenburg in Amsterdam consists of a row of houses and two linear buildings extending to the sea. A row of houses lines both the canal and the interior street. There are two other linear buildings, one of which lines two waterfront streets and the other sits along one of the waterfront streets and an interior street. The two buildings are subdivided into individual houses having the same form.

A row is not simply subdivided into houses, but each house has its individual character within the row. Each house seems to be designed elegantly and independently by a different architect with apparent harmonious coordination between the architects. The facades are roughly uniform in line, height and width. Fifty percent of spatial capacity is left void in each house. The overall appearance of a row in which each house was independently designed is more vivid than the rows where all the dwellings are the work of one and the same architect. Each house has its unique physiognomy and collectively they are complementary. The townscape consists primarily of rows of town houses, each with its intrinsic properties.

This coordinated design approach to group housing independently designed by multiple architects can also be an example for a cultural exchange method. It is also similar to the design method for Japanese tea houses, where independent design of each column and beam are complementary.

Borneo-Sporenburg, Amsterdam:

LEFT: Houses along the canal. On the left side each house is designed by an independent architect and has an individual character. The overall appearance is more vivid than on the right side of the canal, where all the houses are designed by the same architect.

RIGHT: Houses along the interior street. On the left side each house is designed by a different architect - on the right, by a single architect.

**9. Japanese tea house/stones in the garden**

Repeating the same columns in the Japanese tea house is prohibited. Each column should be independently designed and possess a different physiognomy. Their harmony forms a strong sense of

the tea house as a whole. Each column and beam used comes from a different kind of tree. It is preferable that the raw materials be natural, retaining the bark of a tree and the bend in the trunk. The shape of each window is also different. The ceiling changes its incline and texture depending on expected function and significance, such as the spaces for an honored guest and host.

Each stone in the Japanese garden is positioned to express the stone's natural physiognomy. The feeling and expression of the garden as a whole are produced by the harmony among stones.

LEFT: Tea house at Ohbaiin temple: each column possesses a different physiognomy.

RIGHT: Garden at Chishakuin temple: harmony is achieved through the natural physiognomy of each stone.

**10. Physiognomy of streets**

The French writer and philosopher Jean-Paul Sartre once commented that strolling in New York is easy, because all junctions of streets and avenues are signed and numbered. But it is not easy in New York without these signs. On the other hand, there are no signs on the street corners in old European towns. The physiognomy of each corner tells us where we are.

**11. Globalization of cityscape**

High-rise buildings the world over look similar because they are designed and constructed using universal technologies and materials such as cutting-edge structural engineering, strong construction machinery and high-strength materials made of metal and petroleum products.

In traditional towns, houses were constructed using simply processed regional resources: cutting and milling trees, firing local clay to make bricks. This was in harmony with the natural regional landscape. Various trees, clay and construction methods formed the indigenous culture of each region.

High-rise buildings are different. An artificial interior space, made employing universal materials and methods, is separated from nature and is constructed skyward far from the ground. To create the future cultural city it is indispensable to redesign high-rise buildings and to reconsider the relationship between urban space and nature.

**12. Coexistence between technology and culture**

The difference between technology and culture is in question. The same material when handled by an artist or an engineer takes on a completely different meaning. While a material in engineering is homogenized and quantified by the law of cause and effect, a material in art is personal, depending on

the artistic intent. Natural material touched by the hand of the artist becomes one with the artist's body and inner self. The artist's material can no longer simply be called material.

Different cultures experience and understand materials differently. This was apparent when foreign carpenters were working on the construction of one of my design projects. They cut and planed timbers as if cutting styrene foam. Stone was considered stone only after being shaped into blocks or a rectangular plate. Often foreigners fail to grasp the deeper meaning of objects in nature, asserting that 'things are things' and ridiculing traditional Japanese memorial rituals for things.

But today even in Japan stone and timber in their natural state are no longer useful unless they have been processed and formed through technology. Never has there been a period when nature has been so openly dismissed and looked down upon. This disdain and neglect are clearly the result of homogenization and quantification by the law of cause and effect.

Technology and art should coexist. Yet technology has rapidly become dominant, resulting in a homogenized world. Regeneration of regional and indigenous art, coexisting with technology, will sustain a full and humane global living environment.

### 13. Global advantages of cultural exchange

It should be the role of science and technology to provide people with the tools for a civilized world which ensures a rich life. But science and technology, eager to predict every phenomenon, will, as a result, be the dominant factors in globalization.

In design, the application of science and technology provides architecture with 'firmitas' and 'utilitas'. Without 'firmitas' and 'utilitas', 'venustas' will not exist. But without 'venustas' it is not architecture. Not only are science and technology necessary to civilization, but culture, which encompasses beauty, religion and play, is indispensable for the enrichment of people. It is the character of people that shapes and determines culture.

Ethnocentric people are convinced, sometimes unconsciously so, that the culture to which they belong is by far superior to others. On the other hand, in cultural relativism people have a good understanding of different cultures and their value systems in relation to their own. As a consequence, they have a better understanding of their own culture.

It is a pleasure to observe the collaboration of different cultures, wherein each has an understanding of the other's good qualities. This appreciation is similar to the experience derived when viewing the harmony of a cherry tree with bark intact and bamboo, or when making an arrangement of natural stones of different size and texture. When two objects with different physiognomies are in harmony, together they create a new spatial expression and wholeness. This is the root of polytheistic philosophy, which unconsciously accepts different existences.

Foreign cultural exchange requires not only passing down our traditional architecture and religion to successive generations, but also opening new avenues for our own culture. At the same time, life in all countries must change for the better as a benefit of science and technology. We have to seek methods to coexist with science and technology, leading us to a homogeneous world. Thereby, the culture created will be based on the individual and collective aspirations of the people. This is a challenge for the whole world and also for individuals. The dialectic between civilization and culture has the same roots as the unyielding relationship between 'firmitas and utilitas' and 'vinustas' for each architect.

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# An Inquiry into the Computational Design Culture in Turkey: A Re-Interpretation of the Generative Works of Sedad Hakkı Eldem and İlhan Koman

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**Abstract:** Computational design can be discussed as a phenomenon which has developed throughout the history within distinct forms of art and architecture. As well as its familiar connotations with digital technologies, the research concerning the origins of computational approach provides a better understanding of the contemporary challenges in digital architecture, while stimulating unexpected relations with early dated examples. This paper aims to discuss the computational design culture in the context of Turkey through the disconnected but both well-known works of architect Sedad Hakkı Eldem's theoretical research and sculptor İlhan Koman's form studies. Apart from their common interpretations in Turkish art and architecture discourse, Eldem's "Turkish House Plan Types" and Koman's developable sculpture series are claimed to imply an underlying computational approach. Although Eldem and Koman are two leading figures who shared entirely distant interests and had worked in two different disciplines, their highlighted works in this study are re-interpreted and discussed as potential examples of the two faces of one computational approach.

## 1. Introduction

### 1.1. AIM OF A HISTORICAL PROSPECT

Digital-based design and its manifold implications in architecture have been frequently discussed with emphasize on their novelty. Particularly in the recent decades of architectural discourse a "digital revolution" is announced which calls for a radical detachment from the conventional modes of architectural paradigm. It is undeniable that technological innovations in digital tools have provided a rising interest in the experimental researches that are opening unforeseen perspectives to architecture, by both practical and conceptual means. However, it is still worth to ask if the underlying paradigm of digital architecture is totally "new" to architecture and what the premises of a computational design approach detached from improvements in digital technology can be.

As Antoine Picon (2010) puts it, "Confronted with massive technological change, a common temptation is to focus on the present only, as if what is happening was without roots in the past." From such a critical point of view, not only the historical thresholds in the development of computer technology but also the distant seeds of the underlying computational approach seem to be important research fields.

In contemporary architecture theory, the historical research into the origins of computational perspective has rare but remarkable examples. One of them is Antoine Picon's studies for they evoke critical thinking on the common conception of digital architecture. In his recent book *Digital Culture in Architecture,* including a historical overview of digital culture and design, Picon (2010) defines his ambition as to "map the main issues linked to the development of digital design." Another significant theoretical point of view can be found in Mario Carpo's very recent book *The Alphabet and the Algorithm*. In this book, Carpo (2011) develops a theoretical basis for the history of digital architecture through the changing concept of identical. He reviews the unfolding of digitally based design and construction by setting a perspective through the rise and fall of the paradigm of identical from the Renaissance. Another noteworthy research belongs to Altino Joao de Magalhaes Rocha (2004) who suggests that, his PhD dissertation titled *Architecture theory 1960-1980: Emergence of a Computational Perspective,* "reveals and reflects upon some of the cultural, historical and technological contexts that influenced the emergence of a computational practice in architecture."

Based on similar purposes, but covering a limited and a more specified field, this paper introduces the distant seeds of computational thinking in the unique context of Turkish art and architecture. Turkey -by its nature, a different context in regard to being not a center of technological development for many historical reasons- seem to have peculiar thresholds in terms of its integration with computer culture. For the field of architecture and design, in the first sense, it seems reasonable to accept that the ideas are translated along with the transfer of digital technology. However, a more thorough insight will show that an important accumulation, increasingly in the recent decades, can be revealed highly in academic field as well as it is possible to discover earlier works that contain computational qualities in different forms.

1.2 A BRIEF HISTORY OF DIGITAL-BASED DESIGN

During 1960s and 1970s, particularly in the both sides of Atlantic, the computational approach was experimented by some leading architects mostly with emphasize on the notions of patterns, systems and networks. (Picon, 2010) For this period, Christopher Alexander's works based on the identification and combination of patterns is frequently marked as the leading theoretical studies. In addition, cybernetics was an important path where Gordon Pask was the most important figure with his innovative works on cybernetic-oriented architectural research. (Picon, 2010)

However, computers' involvement in the field of architecture and design is usually started by the attempts in digital design studios dated back to early 1990s. In its first encounter, computers are used in architecture mainly as a tool for maintaining a better drafting and representation capability. Besides, the very different nature of designing within digital medium is soon realized and discussed with enthusiasm in architectural discourse, giving way to works set in a multi-layered conception of the possibilities offered by digital technologies.

In present, the use of digital technologies in architecture has an impact throughout the entire processes of design and building practices both in the levels of conception and materialization. For instance, beginning from the conceptual phase until its materialization, design process can be "seamlessly" realized within digital medium where the relation of form, structure and material is inherently re-shaped. The whole conception of design process is due to change by gaining a non-linear and a generic quality, and usually discussed through concepts like difference, variability and performance.

In the history of digital based design, one of the most remarkable challenges has been in the field of form where the term "blob" is used to characterize the unusual complex geometries. The complex forms that were hardly considered and constructed before, are made possible by the use of computers in design and manufacturing. As architectural theorist Branko Kolarevic (2003) states, digital design medium proves itself as a generative tool in the derivation and transformation of form. During the design process in digital medium, instead of defining the physical mass or the boundaries of the surface of the object, operational procedures that will generate the form – algorithms – can be set up. Form can be designed as a "family of objects" that can be defined digitally, computable and can change relationally; thus, consists of the countless possibilities of form.

Besides the increasing variation of architectural forms, the underlying computational paradigm has other potentials that are still explored. In its contemporary digital sense, computational design approach is related to parametric design and algorithmic processes. Architects like Kostas Terzidis and Karl Chu are trying to find out how can architecture be closer to programming by a more active use of software. (Picon, 2010) Terzidis (2006), in his book *Algorithmic Architecture*, makes a clear distinction of computation and computerization, which are the two terms usually confused. Computerization defines the effective use of the computer as a tool in the storage and operation of the data. The technical capacity of speed, memory or other developable qualities is related with computerization. On the other hand, computation is the procedure of dealing with the computable amount of data and calculating, so computation is related with the determination of something by mathematical or logical methods. Terzidis (2006) underlines the characteristics of computation by relating it with the concepts of rationalization, reasoning, logic and algorithm. He states that "the dominant mode of utilizing computers in architecture today is that of computerization; entities or processes that are already conceptualised in the designer's mind are entered, manipulated, or stored on a computer system." (Terzidis, 2006) While, most of the architects stay in the limits of computerization, some of them experiment with a computational approach through using algorithms by "scripting".

By the use of scripting, the constraints of the software are not strictly determinist to the design. For example, instead of the limitations emerge by the obligatory use of any three dimensional representations in a software or utilization of paths pre-determined, the scripting language allows a more open-ended process through relational thinking. In a sense, the relations that are set by the architect through parameters are allowed to be "formless". The code contains all information about each of the possible variations. Terzidis (2006) states that algorithms are not end-product, but they are rather a vehicle for exploration. He argues that "what distinguishes these processes from common "problem-solving" is that their behaviour is often non-predictable and that frequently they produce patterns of thought and results that amaze even their own creators."(Terzidis, 2006)

Computation defines computational thinking procedure which necessitates defining mathematical relations, an algorithmic problem solving process. Computational design proceeds as a research process of design problem that is defined upon a digital serial of relations. (Çolakoğlu and Yazar, 2007) Computational design process is not the process of reaching a single and finished solution of a design object. It requires designing the form in the interval that is defined by relations between parameters. Digital technology makes this process easier, faster, and accessible.

Computation can be emphasized as a design research area that became widespread with digital technologies but that can also be operative without using the computer as a tool. Defining the form relationally in an operational logic system means being part of a computation experience. This situation requires thinking the form as an abstract mathematical equivalent, outside of the world of meanings that it implies. Form's property of being digitally definable creates a concept of form that does not contain any representative reference except itself. In this approach, the fundamental task of design is not about deciding what the end product will look like or what it represents, but what is decisive is relational fiction that makes the form into being.

As well as its obligatory non-representative character, computation is dominantly related with the notions of variable, relational, generative and developable. Although the design media and tools may change, the works that consist of a computational approach coincide within the procedures of abstraction, rule finding, generation of a relational system over set parameters and definition of the range of parameters.

**2. Early Examples of Computational Design: Two Different Contexts**

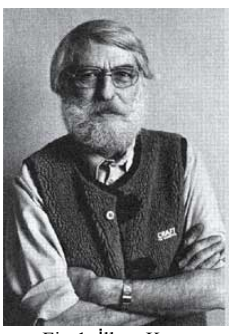

Fig 1. İlhan Koman

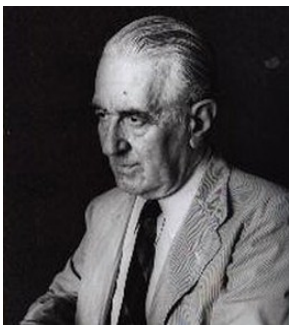

Fig 2. Sedad Hakkı Eldem

The examples discussed in this paper should be evaluated as fragments which will be deemed as disconnected for some justifiable reasons, rather associated here by the computational design approach they are claimed to share potentially. Despite of the differences that can be proved in several contexts, there exist a few common points between the life span of these two important figures –Sedad Hakkı Eldem and İlhan Koman. Even their disciplines and working periods do not coincide at all, they had been the leading pioneers of their period, and their works are still discussed from different perspectives.

The more obvious connection between the careers of Eldem and Koman is that both had been graduates of Academy of Fine Arts, with its present name Mimar Sinan University where Eldem graduated in 1928 and Koman in 1951. Also, both had been professors at their departments: Koman between the years of 1951 and 1958 and Eldem between 1928 and 1978.

Another point they share is their visits to Western countries where they had experiences that influenced their future work and interests. For example, Koman's first radical attitude towards the conventional figurative art work had first occurred in his Paris years. Koman went to Paris in 1951 as a student at Académie Julien with a scholarship. (Artun, 2007) However he did not carry on the lessons there, because he was not satisfied with the figurative art education using models. Rather, he was very interested in the avant-garde movements and abstract art. Likewise, Eldem had also been awarded by a scholarship by which, succeeding his graduation from Academy in 1928, he visited England, France and Germany. It was an opportunity for him to develop his ideas about the forms and expectations about the Modern Architecture.

It is not possible to cover the entire motivations behind Eldem's and Koman's innovative and generative works, yet within the limits of this study some related instances are mentioned above. The following parts will focus on the methodology of their selected works, detached from the other possible contextual arguments they consist potentially.

## 2.1 SEDAD HAKKI ELDEM AND "TURKISH HOUSE"

### *2.1.1. An Overview of Eldem's Study on Turkish House*

Sedad Hakkı Eldem is probably one of the most famous and explored architects in Turkey, where his studies are still remarkable in the Turkish architecture history. One of the reasons of ongoing research may be related to the fact that Eldem had been a great collector of both his own practice and other architectural documents including vernacular examples of housing and other historical buildings. His study consistently had been developed on documentary analysis of architectural examples, including building surveys and photography.

The 'Turkish house' was defined by Eldem as the "house type, which was located within the borders of the Ottoman Empire, in the Anatolian and Rumelian regions, that existed with its own peculiar characteristics for a period of five hundred years." (Eldem, 1983) Eldem's systematic studies include a totally thousand and five hundred houses from different regions, evaluated according to their plan types.

Eldem's purpose on studying the documentary outcome of vernacular housing was his ambition to combine the traditional aspects with a Modern language. His architecture is usually argued as a response to the socio-cultural context of its era shaped by the tension between modernity and tradition under the effect of Westernization. (Uysal, 2004) As Sibel Bozdoğan (1987) points out, "The Turkish house type would be the source of "cultural" and "national" identity for his modern Turkish architecture. It is also possible to clearly observe the same argument in Eldem's words:

"We must first gain an understanding, become familiar with the values of our own culture and architecture and learn to love them and be proud of them. Only after structuring the foundations with the help of knowledge and sensitivity can we design our own new style." (Eldem, 1983)

Eldem's studies on the Turkish House covered a long period of his profession. Besides his motivation on design that had been exemplified by many of his built works, the reason behind his long life building survey studies is argued by İhsan Bilgin (2008) as related with his ambition to find out repetitive elements. As Bilgin (2008) points out, the major quality of Eldem's relievo studies is his pure drawing style, by which he tried to distinguish from the historical aspects and the secondary ones. Esra Akcan (2009) interprets the studies of Eldem on the systematical documentary of the vernacular house defined by texts and photography, presenting the subjective drawings that can be used in archives and studying a typological map out of them, as well as publishing all the outcome to share with colleagues, as a translation of these structures to a modern language. On the other hand, Uğur Tanyeli (2007) offers a critical stance on Eldem's abstraction process in Turkish House Types. Tanyeli discusses that Eldem "invents a universal category of Turkish house which has a national validation, out of a vernacular house architecture that is local in its own definition." (Tanyeli, 2007) Tanyeli states that:

"His aim was not to shed light on the vernacular traditions of Turkey, rather was to invent a central Turkish House tradition. Not only he denies the local aspects of Turkish house, but also he ignores the variability of the housing made up of differences in social status. His Turkish House is a "classless" house that spreads from the village house to the Topkapi Palace. In order to achieve that, the proceeded typological historicism neglects particularly the planimetric details by abstracting." (Tanyeli, 2007)

### *2.1.2 The Computational Aspects of "Turkish House Plan Types"*

The abstraction process in Eldem's studies is held by the utilization of grid, which serves for a basis for the planimetric schemas. As Özbil (2002) suggests, "the grid allows for the abstraction and standardization critical for Eldem's compositional method." Furthermore, Eldem states that "Typical modular features of the Turkish House have the capacity to be regenerated in contemporary design principles...as a system of structure, the Turkish House presents a tradition for contemporary architecture" (Eldem, 1983)

Fig 3. The Matrix of Planimetric Organizations of the 'Turkish house: the plan type with an outer sofa

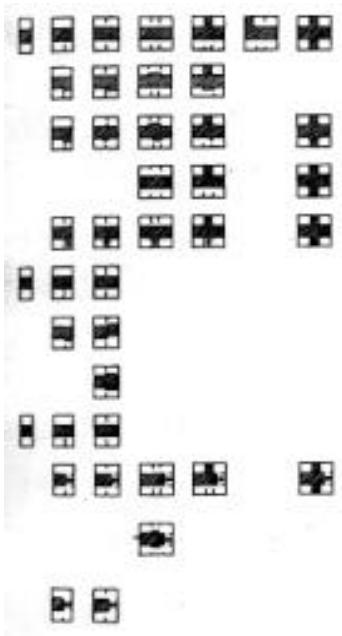

Fig 4. The Matrix of Planimetric Organizations of the 'Turkish house: plan type with an inner sofa

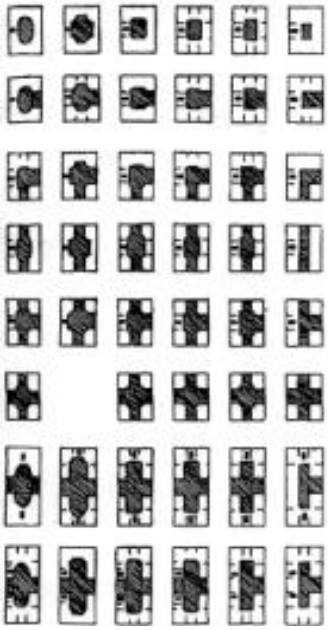

Fig 5. The Matrix of Planimetric Organizations of the 'Turkish house: plan type with a central sofa

These abstracted plan types are explored due to the planimetric organization of *sofa* which is a special form of hall, constituting the distributive space and the focal point of the traditional house. Eldem had grouped the plan types in four basic categories: the plan type without a *sofa*, the plan type with an outer *sofa*, the plan type with an inner *sofa*, and lastly the plan type with a central or an oval *sofa*. (Bozdoğan, 1987)

Out of these abstracted four plan types, Eldem composed a matrix which consists of the possible forms evolved from the same planimetric type. Sibel Bozdoğan (1987) discusses the utilization of type in Eldem's work through the definition of two different notions of type. Bozdoğan (1987) suggest that the first notion of type is the static outcome of documentary analysis or rather the ideal that Eldem aimed to reach at. Rather, in the second one, the first is operated as a methodological and compositional device to direct future designs. (Bozdoğan, 1987)
Bozdoğan's statement is a very crucial interpretation of Eldem's matrix of planimetric typology, for it is highlighted as a developable, generative tool in the production of new variations. Furthermore, as indicated by Bozdoğan (1987), the type as the static outcome of the first implication, which appeared as the result of compositional analysis, was utilized in the second implication as a *'generative tool'* for a methodological design approach.

Eldem's approach in Turkish House Plan Types typological matrix can be related to the use of shape grammars which is a contemporary research field in digital-based design. As introduced by Gülen Çağdaş (1996), the shape grammars are used to generate languages of architectural design. Ranging from implicated on different subjects such as Chinese Lattice Gardens (Stiny, 1977), Palladian villa plans (Stiny and Mitchell, 1978), Japanese Tearoom Plans (Knight, 1981) to Greek vase motifs (Knight, 1986), as Çağdaş (1996) points out, the common point of the works implying a shape grammar method is to regenerate the patterns of the products which belong to various languages of designs in a generative approach.

Furthermore, Gülen Çağdaş, in her study *A Shape Grammar: The Language of Traditional Turkish Houses* (1996) has introduced a parametric shape grammar which generates the plans of traditional Turkish houses. Based on the abstracted two-

dimensional plan types generated by Eldem, Çağdaş introduces a shape grammar concerning the possibilities in the formal world of a vernacular architecture. (Çağdaş) In a similar context, Birgül Çolakoğlu's studies on Hayat house type found in Sarajevo, Bosnia Herzegovina also introduces a re-interpretation of vernacular housing typology by the use of shape grammars. Similarly, Belinda Torus's studies on Mardin vernacular housing, introduces a parametric model in which different potential plan types are generated based on a rule-based design method. (Torus, 2008) As Çolakoğlu (2001) claims, shape grammars define a rule-based design method, expressed as algorithm that describes the computational mechanism for composing shapes, utilizing symbols, geometry and algebraic operations. (Çolakoğlu, 2001)

As to be found in Eldem's approach, computational procedures are open-ended by their nature. The abstracted amount of data set in a mathematical operation is open to a re-development and re-interpretation process succeeding the initial study. It is the potential of any computational study is to be made up of algorithms which are understood as abstract and universal mathematical operations that can be applied to almost any kind of any quantity elements. (Terzidis, 2006)

## 2.2 İLHAN KOMAN AND DEVELOPABLE SCULPTURE SERIES

İlhan Koman's work of art is usually cited with its modern connotations by art historians. However it should be accepted that Koman's work varies according to the materials used, the scale and the design approach he had developed in various periods of his art work. Although Koman had always been interested in engineering and curious about mathematical concepts, he had intensely worked on mathematical–based forms after 1970s.

Koman studied the forms inspired by mathematics predominantly between the years of 1970-1986 in Stockholm. Sculpture series such as *Hyperforms*, *Polyhedra and Derivatives*, *Infinity -1 Series* and *Pi Series* can be marked as examples of that period. In these years, although computer was not a widespread technology, some early experimental studies on computer are known as well. While he had not used computer technologies in his works, Koman's approach in his formal studies imply the elements that can today be set and developed by digital technologies.

Like *π*, *3D Moebius*, *Hyperform* and *Infinity* consist of series of different, yet identical forms that are derived from the same single formula. Being definable as digital codes today; these forms can be reproduced at different scales by being derived from each other according to the formula they use.

The equivalent of this approach in contemporary digital design discourse can be found in the definition of 'parametric design'. Parametric design implies an approach in which the possibilities of architectural form that are more than one are defined. Mathematical definitions of almost infinite number of probabilities are possible for the same object using parameters. As Branko Kolarevic (2003) argues "What is expressed in parametric design is not the shape of the specific design, is but the parameters. By appointing different values to parameters, different objects and configurations can be created."

It can be claimed that regarding form as a multiple and derivative concept cannot be valid without the potentials of digital medium. Yet İlhan Koman's approach on form accommodates a remarkable exception: Although they were not produced using digital technologies, Koman's form series are results of a computational and relational thinking system. In Koman's series, which presents an approach that overlaps with the form conception of contemporary digital architecture and design discourse, as an answer to one simple question on form, there is a series of forms deriving from a single formula.

In the field of form, the traces of transformation—often associated with the use of digital technologies—can be searched in the works of İlhan Koman who studied form through numbers, in other words, explored the formal solutions to mathematical problems. Koman's form studies, in which he interprets mathematical concepts with his unique artistic approach, can be reconsidered in the scope of digital design studies, so that they can contribute to the contemporary discussions on art, architecture and design.

The design object existing independently of any kind of representation, resemblance relations, by the nature of digital and computational design, can be found in Koman's works. On the consideration of Koman's form researches on material as "works not going beyond abstract beauty" by some commentators, Orhan Koçak (2007) expresses: "These works' abstractness is at best related to the fact that they do not resemble anything in nature. But except this fact, they are quite concrete; they have abandoned the rule of resemblance, they are only themselves." The *Pi Series* may exemplify this discourse.

### *2.2.1 The Computational Aspects of π + π + π + π +…*

The *Pi Series* that İlhan Koman produced with materials such as paper and sheet metal between 1980-83 in Stockholm can be defined as a serial of form created with the rule of expanding surface of a circle with multiples of the π value, without changing its radius. In his article about this serial, written in 1983, Koman grounds his basic idea on mathematician Euler's (1707–1783) theorem that proves the possibility of 720 degree surfaces such as 2π. Koman states that:

"I asked myself what a surface that is more than 1π would look like; even how it would be with more πs. This serial is the answer to this. If a circle section is added in a two dimensional circle, circle will rise and become three dimensional. The more angle of the section is increased, the more curve becomes larger. When the angle of the section becomes 1π, surface will be formed from 2π and will become another form. 3π, 4π, etc. new forms will exist – in these forms not only an axis but full opposite symmetry does exist. Many numbers of πs will create a sphere like form."(Koman, 1983)

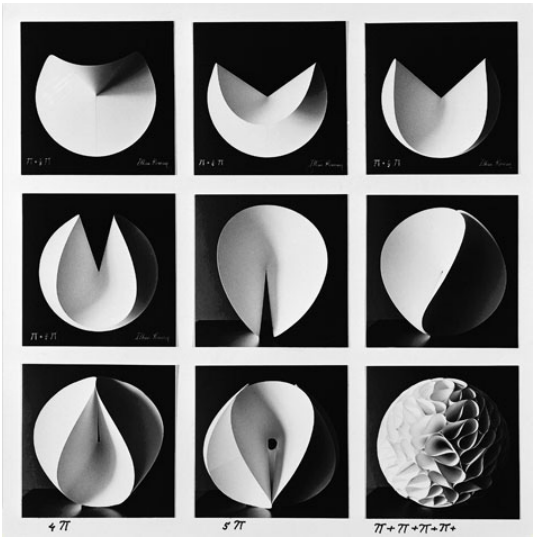

Fig. 6 Nine variations from π + π + π + π +… series (Photograph: Tayfun Tuncelli)

In the same text, Koman claims that creation of a sphere by endless number of Pi's would result in a new definition of the sphere and that new definition could be used in theoretical physics. As an example of the developable surface, the fundamental principle of the Pi Series is also used in Frank Gehry's Bilbao Guggenheim Museum Project in 1990s. Similarly, in respect to its capability of minimum volume when folded, Koman offers that Polyhedra -a mathematical innovation that had also been patented- can be used in space applications. Relying on these examples, it can be claimed that Koman designed his works as fully functioning models –prototypes- which are the results of a design research.(Özsel Akipek and Kozikoğlu, 2007)

Designing his works as prototypes entails the re-production of them at different times and in different places in large scale. In correlation with contemporary design processes, Koman's form series include the potential for being a digital prototype next to being designed as material prototype reproducible in large scale. For instance, in digital medium, Pi can be suggested to gain the capability of production in different scales with various material choices through the integrated seamless design and manufacturing process. The re-production process in Koman's form serials does not operate by imitating, resembling or replicating but needs an analysis of the digital codes of the form. For Koman's works of art, even material or digital, every reproduction process includes a new research process in which the initial step by Koman is extended in different layers.

Koman (2005) stated that: "The content I expect to see in a work of art must be part of a chain, the last link of which is always open to welcome the newcomer. Just like concepts of science. All in all, I would like to be able to make the art of 'the enabling link'." In accordance with his expectation, Koman's works are placed at the heart of contemporary research in the fields of mathematics, art and design. In their paper called "Developable Sculptural Forms of İlhan Koman", Ahmet Koman, Tevfik Akgün and Ergün Akleman (2006) explore the developable surfaces including their use in recent architectural examples and mention successive studies on the *Pi Series*. As highlighted in this paper, the form of *Pi* seems to be an anonymous discovery which can also operate as an instrument to other sub-discoveries. The reproduction potential of *Pi* both in material and digital medium also supports this suggestion. The interpretation of Koman's work as an early example of computational design not only provides to understand his work in a different point of view, but also contributes to expand the content of concept of computation.

## 3. Conclusion: Two Faces of a Computational Approach

Having distinct contexts, both studies introduced in this paper can be claimed to have issues related to an underlying computational approach, but in two different ways. İlhan Koman, in developable form studies such as Pi Series, used a simple form of algorithmic equation to reach a formal expression. He was consciously aware of that his form research was not only about any artistic concerns, but also his inventions have the potentials to be developed for other future uses in science or engineering. This exceptional attitude of Koman proves itself in his emphasize on mathematical concepts and implications of computational procedures to his work of art.

On the other hand, Sedad Hakkı Eldem's methodological studies are shaped for a more determinist purpose related with his own design practice. He used the abstracted typological matrix to form a basis out of the repetitive elements of vernacular architecture. His aim was to show the possible combination of various evolving types that are possible to be re-interpreted with the elements of Modern architecture.

In contemporary design practices, it is possible to find similar practices for both of the mentioned works. In the present reproduction process of Koman's works, the computational aspects are being used. For example, Mehmet Göğüş who is producing some of İlhan Koman's work has discovered their availability in digital medium as parametric equations. Besides conventional material reproduction, he tries to experience a digital reproduction process out of the algorithmic expression of Pi Series in digital medium.

Furthermore, Eldem's matrix in Turkish House is already adapted to a shape grammar implication whose parameters and rule-sets can be re-composed several times. Based on a similar approach, it is also possible to mention other contemporary works either concerning housing or collected data of any kind from other fields.

The research into the generative works of Sedad Hakkı Eldem in Turkish House Plan Types and İlhan Koman in developable form series provides to reveal some unexpected traces of a computational approach which is usually confused with the possibilities offered by digital technologies. This pair of works associated with contemporary practices in this study is not the only possible path for the exploration of the origins of computational design culture.

**Acknowledgements**

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# A Comparative Study on Conceptual Similarity and Differences between Traditional Houses of Japan and Turkey

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**Keywords:** Japanese house, Turkish house, room, dwelling

**Abstract:** The purpose of this study is to make a conceptual analysis of the rooms of traditional residential architectures of Japan and Turkey in order to find out and compare cultural reflections of Turkish and Japanese ways of life on their own houses. To focus the discussion, this research has been arranged around certain themes and concepts. In Chapter 2, this study provides an outline of the basic characteristics of traditional architectures of Japan and Turkey. Chapter 3 contains comparison of some basic concepts that have been used to define characteristics of traditional rooms. The first section of this chapter is devoted to the meaning and comparison of the concept of 'simplicity' in traditional lifestyles. In the following sections, introversion and extroversion characters of the rooms and the reflection of climatic factors in Japanese and Turkish house types are studied comparatively. In conclusion, a preliminary outline of the outcomes of the comparative study is given. Special attention is given to the relation between the traditional lifestyles of the occupants and the reflection of lifestyles in their rooms.

## 1. Introduction

The purpose of this study is to make a conceptual analysis of the rooms of traditional residential architectures of Japan and Turkey in order to find out and compare cultural reflections of Turkish and Japanese ways of life on their own houses. A comparative analysis was made to establish similarity and differences of conceptual approaches in the two countries by examining their peculiar ways of dwelling.

Japanese house is among the most well-known examples of world's vernacular architectural heritage which shares certain similarities with the modern movement of 20th century in some points of its design approaches such as mobility, minimalism, functionality, lightness, transparency, flexibility, standardization etc. Influence of traditional Japanese architecture on the process of modern art and architecture of the 20th century has already been emphasized by many architects and researchers from across the world. [1] Frank Lloyd Wright is the most famous architect who designed houses strongly influenced by the traditional architecture of Japan (though he himself claimed to have been influenced only by Japanese paintings). (Collins, 1998)

Above mentioned concepts have also been referenced as the featuring characteristics of traditional Turkish architecture by some scholars. Sedat Hakkı Eldem is the first architect who pointed out these features of the Turkish house that present a tradition for contemporary architecture. (Eldem and Ertuğ, 1981) The same notion has been emphasized in the book titled "Türk Evi-The Turkish House" (Yürekli and Yürekli, 2005) by the authors when reviewing the Turkish house in terms of universal concepts. That is to say although their forms are characteristically different in essence, it is still possible to say that Turkish architecture bears some conceptual resemblances to Japanese architecture or vice versa. Comparison of the forms and plan types of traditional houses has intentionally been excluded from the scope of this study. There are very few researches on the comparison of architectural features of Japanese and Turkish houses. Eldem and Ertuğ's article "A Comparative Spatial Analysis of Turkish and Japanese Dwellings" (1981) was the first attempt in this respect. Another important contribution was made by Satsuki Matsushita with his MSc thesis on the "Comparative Study of the Structure of Traditional Timber Housing in Turkey and Japan." (2004) In the book titled "Turkish house-A concise re-evaluation" (Yürekli & Yürekli, 2005), authors devoted a sub-chapter to the discussion and comparison of conceptual characteristics of Japanese and Turkish house. Aligül Ayverdi's surveys on the Japanese Architecture (1963, 1967, 1972) enabled researchers to make comparisons between Japanese and Turkish architectures. But, what has not been thoroughly examined is the reflection of similar or different life styles that lay behind the parallel attitude in their conceptions of dwelling. Günay (2005) has rightly placed an emphasis on the significance of evaluating house plans with the prevailing lifestyle of the time as in the following quote: "*The plans of the houses were designed in accordance with the lifestyle of the period, and the plans can only be understood in relation to that life style*." In the light of this understanding, this research will differ from the previous researches since materialistic properties of both house types will not be compared. Rather, reflections of users' ways of life in the inner space of a house—room—will be studied comparatively.

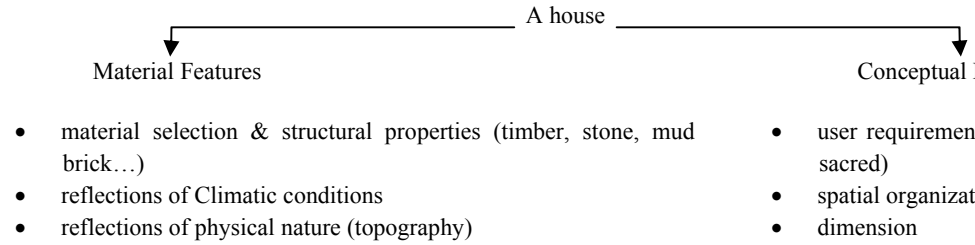


Fig 1. A schematic analysis of a room

To focus the discussion, the author of this research has arranged the text material around certain themes and concepts on the analysis of traditional rooms. Rooms of the traditional houses of Japan and Turkey are the best places where one can clearly see and compare reflections of the above mentioned concepts. The primary characteristic of the room in the Turkish house, according to Küçükerman (2007), is that of a unit serving specific purposes within the house. This can also be valid in case of traditional Japanese architecture as noted by Werner Bleser (1958) in his "Japan Dwelling Houses." What the most appreciated argument about Japanese house was, according to Bleser, "*the* perfect harmony of the room with the Japanese way of life."

The focus has mainly been on the comparison of space formation between Japan and Turkey. This research will be done in the following way: after an introduction, in chapter II this study provides an outline of the basic characteristics of traditional architectures of Japan and Turkey. This chapter starts with analyzing origins and contents of both house types. Then in the third section of this chapter, role of women in traditional houses of Japan and Turkey are discussed respectively. The following chapter (Chapter III) contains comparison of some basic concepts that have been used to define characteristics of traditional rooms in Turkey and Japan. The first section of this chapter is devoted to the meaning and comparison of the concept of simplicity in traditional lifestyles. In the following sections, introversion and extroversion characters of the rooms and the reflection of climatic factors in Japanese and Turkish house types are studied comparatively.

## 2. Comparison of Basic Characteristics of Turkish and Japanese Houses

Basic characteristics of a house can be analyzed in two distinctive ways as analyzing material culture and Conceptual (spiritual) properties. The first way requires analysis of a house in terms of material selection, reflections of climatic conditions and physical nature of the region. The second way, which is much more effective in creating domestic atmosphere of a house's inner space, means to analyze users' living styles by focusing on spatial organization, dimensions and user requirements that can be profane and/or sacred. Especially, necessity of being in accordance with the prevailing social values of a time has always been one of the most motivating powers that lay behind of space formation process. (See fig.1) This study mainly focuses on clarifying and comparing conceptual features of Japanese and Turkish traditional houses.

### 2.1. ORIGINS OF TURKISH AND JAPANESE HOUSES

This brief outline of the basic characteristics of traditional houses of Japan and Turkey starts with a definition of origin of the house types.

Firstly, Sedat Hakkı Eldem in his book "Türk Evi Plan Tipleri" (1968) (Typology of the Turkish House), and then Küçükerman (1978) investigated the typological evolution of the Turkish House by regarding the sofa (the sofa, to Küçükerman, is an area providing access between the various rooms and has a varied technical terminology in Turkish 'Sergah, sergi, sayvan, çardak, divanhane, hayat' etc.) and the rooms as the fundamental elements creating the Turkish house.

It has generally been accepted that origins of traditional Turkish house (Türk Evi) took their roots from the tent structure of nomadic way of life. (Küçükerman 1978, Goodwin 1971) Küçükerman (1978) says in his seminal book that "*Like the tent each room is a medium for various activities such as sitting, working, eating, sleeping etc.*"

Origins of the most well-known architectural features of traditional Japanese house, which were highly praised by the leading figures of the 20th century modern movement, such as recessed alcove (tokonoma), built-in desk and shelves, wall-to-wall tatami mats, sliding screens to divide interior space (fusuma), wooden-lattice exterior sliding doors covered with translucent rice paper (Shoji) are the basic characteristics of Shoin Style of the Muromachi Period. (1333-1573) Shoin means "drawing room." Shoin rooms, used as studies in the living quarters of monasteries and later, more formal Shoin style rooms were developed for entertaining important guests in the villas of Shoguns. In the Edo period (1603-1867) the Shoin Style gave rise to the Sukiya Style, in which numerous variations were added to suit the taste of the owner. (Young, 2004)

Japanese architecture based on evolutionary development process, which might be rephrased as a refinement process. Bruno Taut, who stayed in Japan for three and half years (1933-1936) and wrote many articles and books about Japanese art, architecture and social life, described this refinement process in one of his sketches (Taut, 1935), in which the main route begins with the Shrines of Ise, then via Tea-culture reaches to "modern quality' in the Katsura Detached Palace. (Dündar, 2006) ( fig. 2)

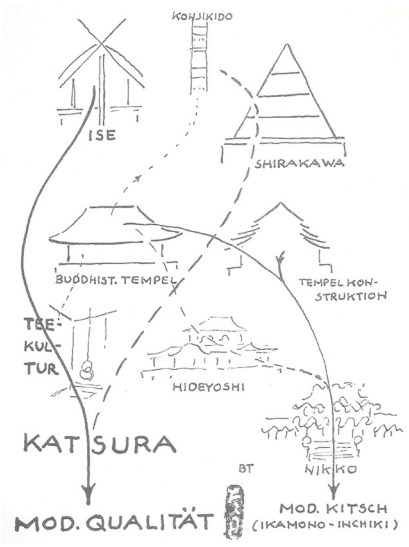


Fig 2: Taut's sketch (1935) showing the refinement process of Japanese architecture.

Regarding the origins of traditional houses of Japan, Ise Shrine (Shinto belief) and Tea culture (Zen belief) were considered as the main impetus to reach so called universal modernity concepts in the lateral centuries. Influence of these examples was not limited to the features of the formal characteristics of the building types, rather their influences were much more deeply rooted in the philosophy of life of the people. The basic reflection of this philosophical attitude can easily be seen in modest—unpretentious—daily life of Japanese people.

## 2.2. CONTENTS OF TURKISH HOUSE AND JAPANESE HOUSE

The name of the Türk Evi (Turkish House) does not represent all types of vernacular architecture in Turkey. As it is well known, each region of Turkey has its own vernacular architecture that reflects the characteristics of the region including life styles, beliefs, physical and climatic conditions etc. Regarding the specific name of Turkish house type (Türk Evi), Doğan Kuban (1976) points out to a specific geographical region as the mountainous areas that circle the mid-Anatolian Plateau and the Balkans. (Yürekli and Yürekli, 2005)

It shouldn't be forgotten that especially being on a trade route crossroads where different cultures interacted with one another led people who live in different climatic and natural conditions to construct their houses in the same typology of Turkish houses in general. In other words, vernacular houses of Turkey can be divided into three distinctive groups as the houses that located on trade routes and houses that represent rural life and the others. Küçükerman (2007) too classified Turkish houses in three main groups as follows: village houses, urban houses, other types of Anatolian houses. Traditional Turkish vernacular houses of rural communities are not included in the scope of this paper.

"Dwelling house of old Japan proceeds from an entirely different set of premises—technical, economic, social and mental—from those obtaining in the West." (Schmidt, 1958) Although the name of 'traditional Japanese house' represents a wide range of buildings in different form from different period and region, in contradistinction to the case of Turkish house, it still covers common features such as the wooden construction method with a post and beam structure, multifunctional usage of the rooms and spatial organization. The regional differences of the Japanese house can clearly be seen in fig.3, which was previously used by Matsushita (2004) to describe the variation in the plan types, style, the form of the village and the structure.

Sizes of the Turkish houses quite differ from a region to a region. Not to mention, characteristics of a region is not the only determiner of size differences of traditional houses. Different spatial variation patterns can be seen at Turkish Houses of different sizes. The most visible variation is the differentiation between the spaces for male and female.

Economic state of a family in a private and a community in general is one of the factors that effects size of houses in a region. House of a wealthy family is larger and has more complicated spatial organization by comprising Haremlik section (Women's quarter) reserved for the family members and Selamlık section (Men's quarter) reserved for the men, some of which have an independent entrance door and separate primary facilities.

Nevertheless, Küçükerman (1978) claimed that "*economic factors did not have very much influence on the shape and size of the Turkish house in Anatolia.*" To him, the basic principles of the room concept and form do not show significant variations arising out of economic factors.

The same attitude can also be seen in Japanese traditional houses. Even though there is a direct relation between wealth and degree of elaboration in the construction of the building and its rooms, the basic principles of room—daily life styles of users—do not change much at all. Japanese houses are generally small in size and one story, except in cities, where two stories are the rule; the first floor serving for the shop or store, and for general business, the second floor being devoted to the private apartments of the family. (Houghton, 1877)

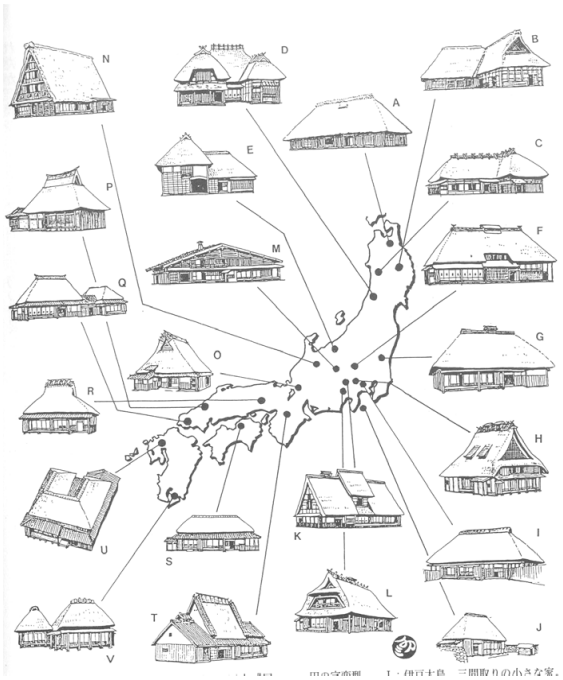


Fig 3. Regional differences of the Japanese house
(Source: Nishiyama, 1989: 118)

## 2.3. WOMAN'S ROLE IN THE HOUSE

In Turkish House, contrary the situation in Japan, "*room is the space isolated at the most from the exterior world.*" (Yürekli, 2005) This is also one of the most easily recognizable aspects of religious belief of users.

Patriarchal family structure, in which men (especially father) is considered as the only authority in the family, is another common feature between traditional Turkish and Japanese life styles. Reflections of this common feature are quite different on traditional houses of Japan and Turkey. In both cases, the best places in the house are reserved for the man, for instance in Turkish house, the selamlık section (başoda), which is easily accessible without disturbing the family, (Günay, 2005) has the most windows making it brightest room in the house and richly decorated ceiling.

Woman's role in the spatial organization of the houses of Japan and Turkey are quite different from each other. The most noticeable aspect in the spatial organization of traditional Turkish house, where social spaces for men and women are separated from each other, is the reflection of religious beliefs, customs and Islamic rituals that implemented by dwellers. Contrary the situation in Turkey, the domestic position of an average Japanese woman was superior to that conceded to her sisters in other Eastern countries and there was perfect freedom in domestic and social life among the Japanese-males and females enjoying each other's society. (Houghton, 1877)

In daily life of traditional Turkish family, most of woman's life was spent indoors while man spends most of his time in outdoors. After emphasizing this situation in daily life of Turkish

family, Küçükerman (2007) when explaining reason of having an individual garden with full of plants and tree, claimed that "*...in a sense the Turkish house has been designed for the woman, providing her with separate areas for her work, leisure and social relations*."

## 3. A Conceptual Comparison between the Rooms of Traditional Houses in Turkey and Japan

This chapter contains comparison of some basic concepts that have been used to define characteristics of traditional rooms in Turkey and Japan. Comparison of the general characteristics between traditional houses of Japan and Turkey, the significance lies in the similarity of multipurpose usage of a room for various daily activities as sitting, eating and sleeping. Activity of sitting also includes several occasions such as gathering for work, leisure or social relations.

The floor plays an important role in the multipurpose usage of the rooms in Japan and Turkey. In both countries, outdoor shoes are not allowed in the house as the part of their custom. At the entrance gate of houses, shoes are taken off to keep the floors clean. This custom of taking shoes off is still highly prevailing in most of the houses in Turkey and Japan. The origin of this custom bases on the same simple desire to keep floor covering materials clean. (Tatami in Japan and carpet or rugs in Turkey are very sensitive to any kind of dirt.)

As have been mentioned in the previous chapter, traditional Japanese house is an evolution of religious building of Shinto, which is Japan's indigenous belief. That means the house itself is a sacred place in a way where various kind of religious and custom rituals take place in time. A traditional house itself in Turkey does not imply sacredness. However, rooms should be kept clean all the time since occupants perform obligatory religious rituals of Islam as the part of their private daily life in their house.

### 3.1. CONCEPT OF SIMPLICITY IN WAY OF LIFE

"*The true beauty of a room lay in the vacant space enclosed by roof and walls, rather than the roofs and walls themselves.*" Lao tse (the ancient Taoist scholar) (Quoted by Alexandra Black in the Japanese House, architecture and interiors, 2000)

Room in Turkish house by itself is an independent space that provides all requirements of daily life. This is also valid for traditional Japanese architecture that fulfills its function in the most appropriate level. Although the floor covering materials in the traditional house of Turkey and Japan are quite different from each other—carpet (or rug) in Turkey; Tatami in Japan—users' living styles share close similarity. Floor is the most functional part of the house since it hosts basic activities of daily life—seating for different occasions, eating on a low-rise tray and sleeping on mattress that is placed on the floor.

The so called modularity of Japanese houses starts with the standard size of a Tatami, which is 'the name of the mats which entirely cover the floor of the rooms and upon which it is forbidden to tread in shoes.' (Schmidt, 1958) That is, tatami is the smallest unit of the Japanese house. "*The mat (tatami) takes the place of several articles of furniture deemed necessary to houses in other lands. It is a carpet, chair, and table by day, and a bed at night.*" (Houghton, 1877)

Room is the smallest and repeated dwelling unit that consists of standard facilities for daily life in traditional Turkish house. The relationship between users and the room in traditional Turkish architecture is almost the same as that between the users and their rooms in traditional Japanese architecture. Both show great proximity in the multipurpose usage of a room in accordance with the 'simple life styles' of their users. Living style of dwellers is one of the most important arguments that characterize not only the functional but the spiritual peculiarities of traditional room. Regarding simplicity in living styles of the dwellers of traditional houses in Turkey, Güney (2005) wrote that "*There was simplicity in everything. They sat on the floor, worked on the floor, spread their mattresses on the floor and ate sitting on the floor.*" In Turkish house, each room is an independent unit with its own service area, which gives the Turkish house its specific character. (Küçükerman, 2007)

Residential architecture of Japan and Turkey shares another common approach in having a built-in utility areas such as cupboards, closet for bedding and shelving. Taking the advantage of using wall inserted utility areas, the house contained very little furniture. Güney (2005) clearly indicated the philosophy of life based on contentment with very little as the source that led people to create this simple and highly appreciated design solution.

The motivations lay behind this simplistic attitude are not the same. Although there is a similarity in using concept of simplicity between the traditional Turkish house and Japanese house, perceptions of this concept are quite different from each other. This notion has been explained by Yürekli (2005) in the following words: "*the simplicity in the Turk Evi is related with reminiscence of the nomadic life style, and consists of compressed functional layering. On the other hand the simplicity of the Japanese house is related with the worldview and beliefs of the Japanese people."*

Multifunctional usage of a room in Turkish house style is the clear reflection of the nomadic culture. This was interpreted as a minimalist attitude by Yürekli (2005). They had to maintain all facilities of the time as simple as possible. Nomadic way of thought has always been an indispensable part of traditional living style in Turkey. Furthermore, nomadism continued to be the dominant pattern even after settled agriculture was established. In Turkey, there has always been a long tradition of having seasonal inner-spaces to meet the severe climatic conditions of summer and winter.

Whereas the reason of simplistic attitude in Turkish House is highly functional (profane) that has originated from the conditions of nomadic life style, simplicity in Japanese house is mostly the reflection of the users' philosophy of life that is the sum of religious belief (Zen and Shinto) and customs. Functionality in Japanese architecture in general consists of spirituality in itself. Religious belief in Japan, one of the basic teaching of which is contentment with very little, is the main source creating simplicity in every aspect of people's daily life. The concept of simplicity in Japanese thought, to Bruno Taut (1935), goes far beyond the boundaries of architecture and art, and should be discussed in the context of Tea-Culture. (Dündar, 2006)

### 3.2. THE CONCEPT OF PRIVACY IN WAY OF LIFE: INTROVERSION OR EXTROVERSION

Contrary the case in traditional Japanese architecture, contradiction between the interior and exterior is one of the chief characteristics of the Turkish House. (Küçükerman, 2007) According to Günay (2005), religious thought and customs were the main factors for the isolation of house from the outside world. The similar thinking can also be seen in Küçükerman's (2007) following words: "*The Islamic outlook also had its influence on the basic principles of the Turkish house and its rooms in Anatolia and reflected its introverted way of life and limited solutions to outside relationships.*"
In other words, interior-exterior relationship was reduced to

minimum to keep the privacy of the family life. The family concept was the most important social unit in Turkish socio-cultural life. "*The interior-exterior relationship of the rooms is limited since most of the occupants time is spent out of doors. From inside and outside it gives the impression of portability*." (Küçükerman, 2007)

Interior-exterior relationship in traditional Japanese room is quite original among other vernacular houses of the world. Schmidt (1958) clearly expressed this feature of Japanese architecture in the following words: "*Since the Japanese room is completely empty and enclosed by sliding screens, so that it is not actually shut off from the outside, there is perfect unity between the interior and the garden."* The continuity between inner space and outer space is one of the significant characteristics of traditional Japanese house. That is, walls are not as important in defining space of a Japanese room as in case of a room in traditional Turkish house. Construction process is also quite different between the two. In Japanese architecture, after erecting posts the roof comes first prior to the walls which do not, in fact, show the properties of ordinary walls. These are the sliding screens (Shoji) which can also easily be removed from their frames. During the hot and humid summer season, these sliding doors are opened wide to let the cool breeze flow through the house. Roofs are much more important in Japanese architecture to characterize a room than the walls. In Turkish architecture "the room is characterized by its walls." (Yürekli, 2005)

Japanese feeling for nature was the fundamental source in the formation of unique relationship between interior and exterior spaces. Perception of nature in Japanese thought is completely different from that of the Western counterpart. Being united with nature was the necessity of their belief for Japanese people in their dwellings.

Another important determiner for this kind of exceptional relationship with nature was the unique perception of privacy (personal space) in Japanese traditional life style. Privacy concept in both societies shows great differences. It is sometimes suggested that there was no conception of privacy in Japanese culture. Houghton (1877) put an emphasis on the lack of privacy concept when he wrote "*All Japanese houses, except the castles and mansions of the nobility, are directly on the street, and are so universally kept open during the day,…"*

Another significant difference between the residential architectures of Japan and Turkey can be seen in their space configuration in which Turkish house shows the characteristics of intra-spatial relationship whereas Japanese house represents inter-spatial relationship. The most easily recognizable example of this sort of space configuration in traditional Turkish house is the place named as sofa which differentiates in its border and contains several sub-spaces of different functions. (Eyüce, 2005) The sofa, a hall, is the most important section of the house, which links the various rooms of the house. Other than linking the rooms, sofa[2] is used for various activities as dining, sitting, working, or even a sleeping. (Günay, 2005)

In summary, traditional Turkish house represents introverted way of life whereas traditional Japanese house represents extravorted way of life. There is a common point in these contrasting approaches that they both have mainly been influenced by the prevailing religious thought and customs of their times—while Islamic thought and customs were the basic source for introverted character considering family privacy as a major concern, indigenous religion of Japan (Shinto) and Zen belief were the basic sources for extroverted character of Japanese house creating exceptional idea of interior-exterior relationship.

### 3.3. REFLECTIONS OF CLIMATIC FACTORS

The climate of Japan is predominantly temperate, but due to the large north-south extension of the country, it varies greatly in different regions. Generally, northern Japan experiences a cool-temperate climate, central Japan is temperate, while southern Japan has a sub-tropical climate. (Fong et al., 2007)
Japan is hot in summer, and cold in winter. However, Japanese houses were basically built to deal with the severe climatic conditions of the summer season, which is a rather long, hot and humid. There are only minor differences between a typical traditional house in Hokkaido, the extreme north, and Kyushu, the extreme south. (Rapoport, 1969) There are seldom any chimneys in Japanese houses. In cold weather, or for cooking, the fire, which is invariably of charcoal, is sometimes kindled in a shallow pit walled up from the ground; but oftener the fire is in an earthen or metal brazier sitting on the floor. (Houghton, 1877) That is to say, heating is inadequate in traditional Japanese houses. Residents have adapted to low temperatures in winter by changing their behavior rather than by controlling the room temperature by heating. (Sawashima and Matsubara, 2004) Central heating does not exist in traditional Japanese house. During the winter season, residents heat themselves by wearing thick clothes and using small moveable heating elements like iroi, which was installed in the hall played a role of a fireplace in Japanese house. (Fig.4) Since the hall had function of a common space, family always gathered around the fire for eating, working and chatting. Thus the irori was used for multiple purposes such as cooking, lighting, warming the house, and drying the wet clothes." (Matsushita, 2004)

Fig 4. Irori in Traditional Japanese House
(Source: Murata&Black, 2000)

Turkey is situated in the temperate Mediterranean climatic and geographical zone. (Eşiyok, 2006) Significant tempretature differences between summer and winter in Turkey chracteristically influenced the spatial organization and use of the Turkish house. Reactions of users to the temprature differences in turkish house can be classified into the three main groups. "*The first reaction the weather turning cold is for the person to heat himself and gain protection. It was the person rather than the room which was heated*." (Küçükerman, 2007) The best example of this attitude can be observed in the room called Toyhane of the traditional houses of Divriği. Toyhane was the hall where everything was done, meals were eaten, guests were entertained, and various ceremonies were held especially in winters. (Matpum, 2010; Şenol, 2007) The most interesting part of this room—Toyhane—was the sitting area called Kürsübaşı

which had an oven (tandır) in the middle. There was a wooden table placed 60-70 cm high above the fire place and covered with two guilts (Kürsü Yorganı) where the family sat around and lay their legs underneath for heating themselves.

Interestingly, an approach very similar to this traditional facility (Kürsübaşı) was used for heating in all of the traditional Japanese houses. As Nakagami (1994) stated the idea of space heating was completely foreign to most Japanese until the 1960's. Prior to that time, 'kotatsu,' which is a table with a padded quilts around the sides under which a coal fired, kerosene heater was placed, was used in the living or dining area of the house. Families would spend much of the evening eating and socializing around the kotatsu. (Wilhite and Nakagami and Murakoshi, 1996) Kürsübaşı in traditional Divriği Houses in Turkey and kotatsu in traditional Japanese house were used not only for heating but for socializing as well.

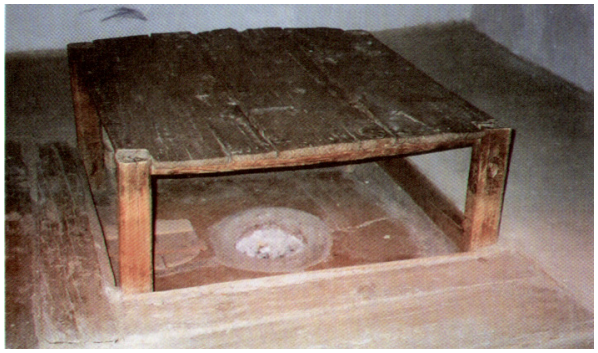

Fig 5. Toyhane in Traditional Turkish House in Divriği
(Source: Şenol, 2007)

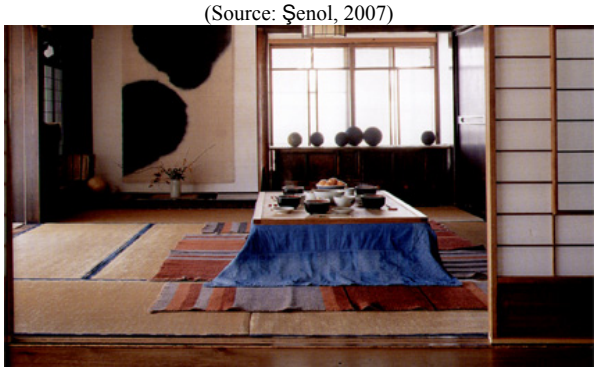

Fig 6. Kotatsu in Traditional Japanese House
(Source: Murata&Black, 2000)

Fig 7. Toyhane in Traditional Turkish House in Divriği
(Source: Şenol, 2007)

The second reaction of the dwellers of Turkish house was to heat the room's interior. "*When it became impossible to heat a room sufficiently the occupants had to move to a better protected and more easily heated room in another part of the house. The concept of winter room is based on these foundations…*" (Küçükerman, 2007) Material selection also reflects the effect of whether conditions. Winter rooms are mostly placed on the ground floor, which is built of stone, while summers are spent on the upper floors, which are of wood. (Petherbridge, 1978)

The third reaction of dwellers to deal with the severe weather conditions of the winter season in Turkey was to move to another house capable of providing them with a more suitable environment. The custom of living different houses at different times of the year can still be observed in many parts of Anatolia. (Küçükerman, 2007)

Although climatic conditions of summer seasons are different from each other—since the humidity in Japan is much higher than in most Western countries including Turkey—one of the common properties of the both houses is that they are designed for summer season. (Yürekli & Yürekli, 2005)

## 4. Conclusion

Room in Turkish house by itself is an independent space that provides all requirements of daily life. This is also valid for traditional Japanese architecture that fulfills its function in the most appropriate level. Floor is the most functional part of the house in Japan and Turkey since it hosts basic activities of daily life—seating for different occasions, eating on a low-rise tray and sleeping on mattress that is placed on the floor.

Residential architecture of Japan and Turkey shares another common approach in having built-in utility areas such as cupboards, closet for bedding and shelving. Taking the advantage of using wall inserted utility areas, the house contained very little furniture.

The basic conceptual similarity between the rooms of traditional houses in Japan and Turkey is the simplicity in occupants' ways of life. Occupants of both Japanese and Turkish rooms were living a life of total contentment with very little. A major conclusion of this comparative study is that the motivations lay behind of this simplistic attitude in their lifestyles differ from each other since functional necessities of nomadic period were the fundamental impetus for development of Turkish house, whereas religious belief in Japan, basic teaching of which is contentment with very little, was the main source for creating simplicity in every aspect of people's daily life. In other words, the reason of simplistic attitude in Turkish House is highly functional (profane) that has originated from the conditions of nomadic life style. Simplicity in Japanese house is mostly the reflection of the users' philosophy of life that is the sum of religious belief (Zen and Shinto) and customs.

Economic factors did not have very much influence on users' daily life styles of both traditional architecture of Turkey and Japan. The basic principles of room in both houses do not change much at all arising out of economic factors.

Traditional Turkish house represents introverted way of life whereas traditional Japanese house represents extroverted way of life. There is a common point in these contrasting approaches that they both have mainly been influenced by the prevailing religious thought and customs of their times. Japanese feeling for nature was the fundamental source. Perception of nature in Japanese thought is completely different from that of the Western counterpart. Being united with nature was the necessity of their belief for Japanese people in their dwellings. Another important determiner for this kind of exceptional relationship with nature was the unique perception of privacy (personal space) in Japanese traditional life style. Privacy concept in both societies shows great differences.

Roofs are much more important in Japanese architecture to characterize a room than the walls. That is, walls are not as important in defining space of a Japanese room as in case of a

room in traditional Turkish house.

There is a very interesting common feature between dwellers of traditional Divriği Houses in Turkey and dwellers of traditional Japanese houses in their unique reaction to cold weather. Both dwellers heated themselves rather than the room by using a specially designed table, which was named as *Kürsübaşı* in Divriği houses and *Kotatsu* in Japanese houses. *Kürsübaşı* in traditional Divriği Houses in Turkey and *Kotatsu* in traditional Japanese houses were used not only for heating but for socializing as well.

Finally, in light of the above mentioned points, it is possible to say that traditional residential architectures of Japan and Turkey bear close similarities in terms of some basic concepts. Although the motivations lay behind these concepts are characteristically different from each other, there still exist a common point in these different approaches that they both have mainly been influenced by the prevailing religious thought and customs of their times.

**Endnotes**

1. For instance, see Bruno Taut's 'Houses and People of Japan,'1935; Peter Collins's 'Changing Ideals in Modern Architecture,'1998; William J.R. Curtis's 'Modern Architecture since 1900,' 1982.

2. Plan types of traditional Turkish house are defined according to the position of sofa in the house as the outer sofa, inner sofa and the central sofa. For more details please see Küçükerman (1978), Günay (2005).

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# Functions of Mountains in Visual Composition of Christian Paintings in the Chora Church

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**Keywords:** Byzantine, Chora Church, Christian painting, mountain, element, scene, background

**Abstract:** This paper clarifies the functions of mountains in the visual composition of the Christian paintings in the Chora Church. We enumerated the elements of each painting, traced their outlines, and made "explanatory drawings." In each explanatory drawing, we divided each painting into scenes, which we analyzed and discussed to determine the relationships between the mountains and the backgrounds of the people. In the Christian paintings in the Chora Church, the mountains comprise the area with special meaning and divide one painting into different scenes and one scene into different areas. In the paintings, the mountains are drawn as "frames" that divide the world.

## 1. Introduction

In Europe, people[1] were historically expressed as the main theme of paintings. Paintings whose themes expressed the beauty of nature were first categorized as a genre after the 16th century. However, even before that, nature was painted not as the main theme but in the background or along with something else. What meaning does nature have in paintings before it was recognized as a potential main theme?

In the medieval age, Christian paintings comprised the majority of European paintings. Christianity profoundly affected people in medieval Europe and supported a world view. Sacred art vividly reflected the mindsets of the people. Christian paintings of medieval Europe provide a glimpse of the era's view of nature.

We studied the Christian paintings in the Chora Church[2] because they are masterpieces of Byzantine art and were painted in the center of the Christianity world in medieval Europe. This paper clarifies the functions of mountains in the visual composition of these paintings to identify the medieval European view of nature. Clarifying the functions of mountains in visual composition leads to learning their meaning in medieval Europe and the fundamental relationship between people and nature. This research offers numerous suggestions about the view of nature in medieval Europe.

## 2. Related Works and Position of Research

There is much historical research on Christian paintings in medieval Europe. Underwood (1966-75) and Ousterhout (2002) are well-known works on Christian paintings in the Chora Church.

In European paintings, much research on paintings has focused on the post-Renaissance where nature was drawn, and most of these paintings are drawn in perspective. In contrast, the paintings in the Chora Church and many other Byzantine paintings are not drawn in perspective, but two-dimensionally. Their visual composition is greatly different. In this context, to the best of our knowledge, no research exists on the functions of mountains in the visual composition of Christian Paintings in the Chora Church. And, many previous studies say that nature was not a beautiful landscape in medieval Europe, but there are many unclear points. This research consider medieval European view of nature in detail and visually.

## 3. Research Method

### 3.1. Analysis Object

In the Chora Church, mosaics are drawn in the naos and in the inner and outer narthexes. Frescoes are drawn in the parekklesion. In the naos, there are only three paintings, including "Jesus Christ." The cycles of the lives of the Virgin can be found in the inner narthex, and the cycles of the lives of Christ can be found in the outer narthex. Other paintings, including the Old Testament or "Christ in Judgment," are drawn in the parekklesion[3]. Here, based on "The Art of the Kariye Camii" (Ousterhout, 2002), which counts 94 Christian paintings of the Chora Church, we analyzed 16 paintings where mountains[4] are drawn (Figs. 1-16)[5].

### 3.2. Analysis Outline

We enumerated the elements[6] of each painting, traced their outlines, and made "explanatory drawings." People, mountains, architecture, trees, animals, and so forth are drawn as the elements; people are the main themes in all 16 paintings. Mountains, which also occupy a large area in each painting, are drawn in parallel with the other elements or as background behind other elements. We divided each explanatory drawing into scenes based on the narrative to determine the relationships among the elements. Next, we analyzed and discussed the functions of mountains in the visual composition to see the relationships between the mountains and people's backgrounds[7].

In explanatory drawings, such numbers as "①" indicate different scenes. When more than one mountain is drawn on a single painting, they are called mountain I, mountain II, and so forth.

## 4. Analysis

Next we enumerate the elements of each painting, trace their outlines, and make explanatory drawings. We divide each explanatory drawing into scenes (Figs. 1-16).

In Fig. 1, "Joseph Dreaming; Journey to Bethlehem," Joseph and the Virgin journey from Nazareth to Bethlehem for the Roman census. While asleep, Joseph is visited by an angel (scene ①), the Virgin and a companion have a conversation (scene ②), and Joseph, the Virgin, and a man make a journey (scene ③). The buildings on the left of the mountain show Nazareth. In Fig. 2, "Nativity of Christ," the birth of Christ is drawn. The Virgin is at the center of mountain I, and Christ is inside a cave in mountain I (scene ①). Christ in the bath and two women are at the lower left of mountain I (scene ②), Joseph is asleep at the lower right of mountain I (scene ③), angels are at the left of mountain II (scene ④), and shepherds are visited by an angel on the right of mountain II (scene ⑤). Fig. 2 is "displaying standard Byzantine features" (Ousterhout, 2002, p. 49). In Fig. 3, "Journey of the Magi; Magi before Herod," the Magi ride horses from the East to Jerusalem by following the star (scene ①) and lay gifts before Herod (scene ②). In Fig. 4, "Flight of Elizabeth," a soldier threatens to kill Elizabeth and John with his sword for "the Massacre of the Innocents,"[8] but they miraculously escape when a mountain opens up and hides them. Elizabeth and John are inside a cave in the mountain (scene ①). In Fig. 5, "Joseph Dreaming; Return of Holy Family," an angel informs Joseph in a dream that it is safe to return from Egypt to Palestine (scene ①). Christ, the Virgin, and Joseph journey to Nazareth (scene ②). The buildings on the right show Nazareth. In Fig. 6, "John the Baptist Bearing Witness," John gestures toward Christ and proclaims Christ's divinity to the people (scene ①). In Fig. 7, "Temptation of Christ," the Devil challenges Christ to prove his divinity by changing stones into bread (scene ①). Christ is offered the kingdoms of the world (scene ②). The Devil takes Christ to a mountaintop to show him the kingdoms (scene ③). The Devil challenges Christ to prove his divinity by casting himself down unharmed (scene ④). In Fig. 8, "Christ Healing a Blind and Dumb Man," Christ with St. Peter see a blind and dumb man. Christ gestures toward the afflicted man and heals him (scene ①). A mountain is drawn on their right. In Fig. 9, "Two Blind Men," Christ and two apostles see two blind men. Christ gestures toward the seated blind men and heals them (scene ①). A mountain is drawn on their left. In Fig. 10, "Jacob Wrestling Angel; Jacob's Ladder," Jacob wrestles with the angel (scene ①) and dreams of a ladder leading to heaven that angels ascend and descend (scene ②). In Fig. 11, "Moses and the Burning Bush," at the foot of Mt. Sinai, God appears to Moses who removes his sandals before the Burning Bush. An angel, Christ and the Virgin is above the bush (scene ①). In Fig. 12, "Bearing of the Ark of the Covenant," three priests bear the Ark, represented as a triangular-shaped box, to Solomon's temple. The temple is inside a cave in the mountain (scene ①). In Fig. 13, "Bearing of the Sacred Vessels," two priests carry the sacred vessels, the seven-branched candlestick, and the stamnos of manna (scene ①). In Fig. 14, "Solomon and All Israel," Solomon, the king of Israel, leads the elders of Israel (scene ①). In Fig. 15, "Raising of Widow's Son," Christ sees a funeral cortege at the town of Nain. Christ raises the widow's son who is wrapped in a sheet. The buildings on the right show Nain (scene ①). In Fig. 16, "Anastasis," Christ descends into hell to redeem the souls of the righteous people of the Old Testament led by John. Christ grabs Adam and Eve by their wrists and lifts the people from hell (scene ①).


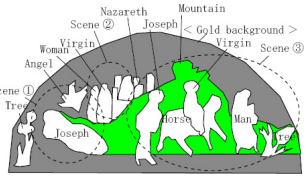


Fig. 1 Joseph Dreaming; Journey to Bethlehem: (mosaic) picture (left) explanatory drawing (right)


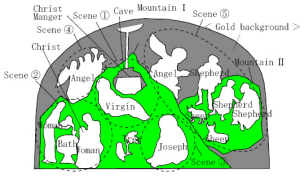


Fig. 2 Nativity of Christ: (mosaic) picture (left) explanatory drawing (right)


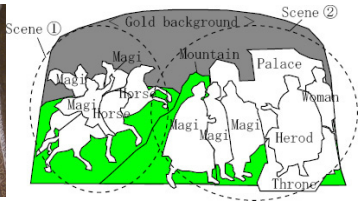


Fig. 3 Journey of the Magi; Magi before Herod: (mosaic) picture (left) explanatory drawing (right)


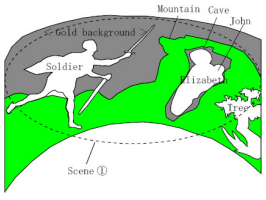


Fig. 4 Flight of Elizabeth: (mosaic) picture (left) explanatory drawing (right)


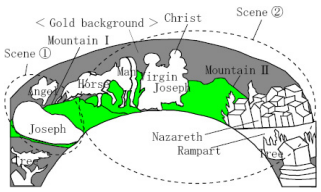


Fig. 5 Joseph Dreaming; Return of Holy Family: (mosaic) picture (left) explanatory drawing (right)


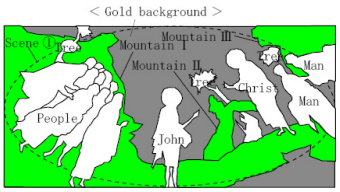


Fig. 6 John the Baptist Bearing Witness: (mosaic) picture (left) explanatory drawing (right)


Fig. 7 Temptation of Christ: (mosaic)
picture (left) explanatory drawing (right)

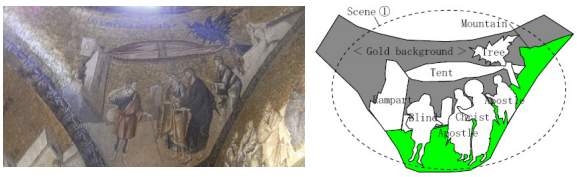


Fig. 8 Christ Healing a Blind and Dumb Man: (mosaic)
picture (left) explanatory drawing (right)

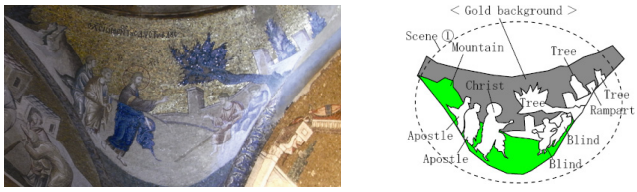


Fig. 9 Two Blind Men: (mosaic)
picture (left) explanatory drawing (right)

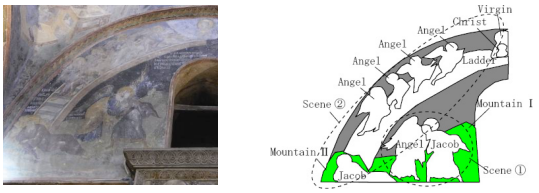


Fig.10 Jacob Wrestling Angel; Jacob's Ladder: (fresco)
picture (left) explanatory drawing (right)

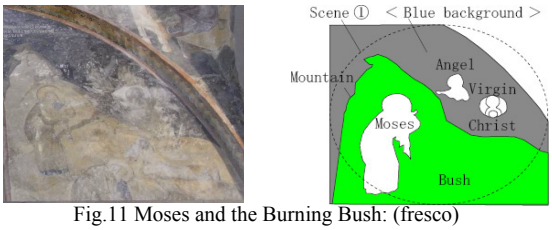


Fig.11 Moses and the Burning Bush: (fresco)
picture (left) explanatory drawing (right)


Fig.12 Bearing of the Ark of the Covenant: (fresco)
picture (left) explanatory drawing (right)

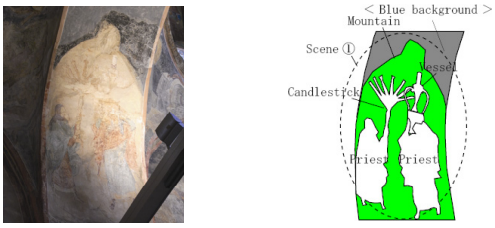


Fig.13 Bearing of the Sacred Vessels: (fresco)
picture (left) explanatory drawing (right)

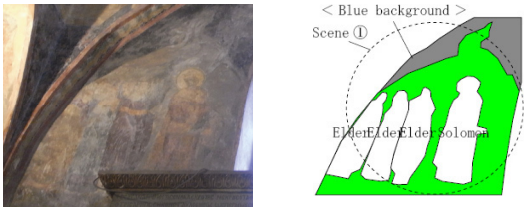


Fig.14 Solomon and All Israel: (fresco)
picture (left) explanatory drawing (right)

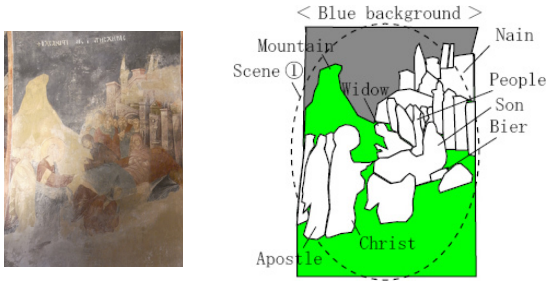


Fig.15 Raising of Widow's Son: (fresco)
picture (left) explanatory drawing (right)

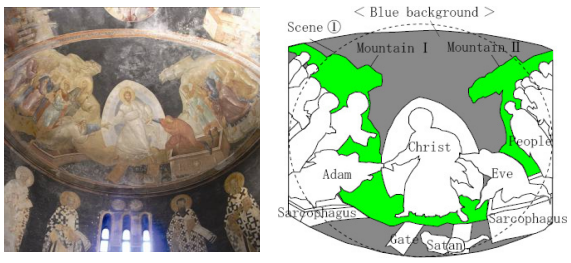


Fig. 16 Anastasis: (fresco)
picture (left) explanatory drawing (right)

## 5. Results and Discussion

Here, we analyze and discuss the functions of mountains in the visual composition to see the relationships between the mountain and the people's backgrounds. A list of the analysis objects and the functions of mountains in the visual composition in each painting are summarized in Table 1.

### 5.1. Mountains that comprise an area

In Figs. 1-7 and 10-16, a mountain is in a person's background.

In Fig. 1, the mountain is in the background behind the Virgin and Joseph who are on a dangerous journey from Nazareth to Bethlehem. The mountain is in the background behind Joseph who is listening to an angel. In Fig. 2, mountain I is in the background behind the newborn Christ, the Virgin, Joseph, and a woman. The mountain seems to protect Christ inside the cave. Mountain II is in the background behind the shepherds who are listening to an angel. In Fig. 3, the mountain is in the background behind the Magi on a dangerous journey from the East to Jerusalem. In Fig. 4, the mountain is in the background behind Elizabeth and John who are in front of the soldier. The mountain again seems to offer protection, this time to Elizabeth and John inside the cave. In Fig. 5, mountain I is in the background behind Joseph who are listening to an angel. In Fig. 6, mountain I is in the background behind the people in front

Table 1: List of Analysis Objects and Results

| Fig. | Title | | Functions of Mountains in Visual Composition | |
|---|---|---|---|---|
| 1 | Joseph Dreaming; Journey to Bethlehem | Mountain | comprisse an area of the Virgin and Joseph | Mountains that comprise an area |
| | | | Divides scene ① into areas of mountain and gold background | Mountains that divide one scene into areas |
| | | | Divides scene ③ into areas of mountain and gold background | Mountains that divide one scene into areas |
| | | | Divides scenes ② and ③ | Mountains that divide one painting into scenes |
| 2 | Nativity of Christ | Mountain I | comprisse an area of Christ, the Virgin, Joseph and the woman | Mountains that comprise an area |
| | | | Divides scenes ① - ③ and ④ | Mountains that divide one painting into scenes |
| | | | Divides scenes ① - ③ and ⑤ | Mountains that divide one painting into scenes |
| | | Mountain II | Divides scene ⑤ into areas of mountain and gold background | Mountains that divide one scene into areas |
| 3 | Journey of the Magi; Magi before Herod | Mountain | comprisse an area of the Magi | Mountains that comprise an area |
| | | | Divides scene ① and ② | Mountains that divide one painting into scenes |
| 4 | Flight of Elizabeth | Mountain | comprisse an area of Elizabeth and John | Mountains that comprise an area |
| | | | Divides scene ① into areas of mountain and gold background | Mountains that divide one scene into areas |
| 5 | Joseph Dreaming; Return of Holy Family | Mountain I | comprisse an area of Joseph | Mountains that comprise an area |
| | | | Divides scene ① into areas of mountain and gold background | Mountains that divide one scene into areas |
| | | | Divides scene ① and ② | Mountains that divide one painting into scenes |
| 6 | John the Baptist Bearing Witness | Mountain I | comprisse an area of the people | Mountains that comprise an area |
| | | | Divides scene ① into areas of mountain and gold background | Mountains that divide one scene into areas |
| 7 | Temptation of Christ | Mountain I | comprisse an area of Christ | Mountains that comprise an area |
| | | | Divides scene ① into areas of mountain and gold background | Mountains that divide one scene into areas |
| | | | Divides scene ① and scene ② | Mountains that divide one painting into scenes |
| | | Mountain II | Divides scene ① and ② | Mountains that divide one painting into scenes |
| | | Mountain III | Divides scene ① and ② | Mountains that divide one painting into scenes |
| 8 | Christ Healing a Blind and Dumb Man | Mountain | Divides fig.8 and fig.9 | Mountains that divide one painting into scenes |
| 9 | Two Blind Men | Mountain | Divides fig.8 and fig.9 | Mountains that divide one painting into scenes |
| 10 | Jacob Wrestling Angel; Jacob's Ladder | Mountain I | comprisse an area of Jacob | Mountains that comprise an area |
| | | | Divides scene ① into areas of mountain and blue background | Mountains that divide one scene into areas |
| | | Mountain II | comprisse an area of Jacob | Mountains that comprise an area |
| | | | Divides scene ② into areas of mountain and blue background | Mountains that divide one scene into areas |
| 11 | Moses and the Burning Bush | Mountain | comprisse an area of Moses | Mountains that comprise an area |
| | | | Divides scene ① into areas of mountain and blue background | Mountains that divide one scene into areas |
| 12 | Bearing of the Ark of the Covenant | Mountain | comprisse an area of the priests | Mountains that comprise an area |
| 13 | Bearing of the Sacred Vessels | Mountain | comprisse an area of the priests | Mountains that comprise an area |
| 14 | Solomon and All Israel | Mountain | comprisse an area of Solomon and the elders of Israel | Mountains that comprise an area |
| 15 | Raising of Widow's Son | Mountain | comprisse an area of Christ and the apostles | Mountains that comprise an area |
| 16 | Anastasis | Mountain | comprisse an area of the people | Mountains that comprise an area |
| | | | Divides scene ① into areas of mountain and blue background | Mountains that divide one scene into areas |

of Christ and John. In Fig. 7, mountains I, II, and III are in the background behind Christ in front of the Devil. In Fig. 10, mountain I is in the background behind Jacob who is wrestling with the angel, and mountain II is in the background behind Jacob who is lying. In Fig. 11, the mountain is in the background behind Moses who is in front of an angel, Christ and the Virgin. In Fig. 12, the mountain is in the background behind the priests with the Ark, possibly protecting the temple inside the cave. In Fig. 13, the mountain is in the background behind the priests holding the sacred vessels. In Fig. 14, the mountain is in the background behind Solomon and the elders of Israel. In Fig. 15, the mountain is in the background behind Christ and the apostles. In Fig. 16, mountains I and II are in the background behind Adam, Eve and the other people being lifted from Hell by Christ.

As exemplified above, a mountain's ridge line comprises one area within which a person is enclosed. For example, in Fig. 2, "Nativity of Christ," mountain I comprises an area, within which the newborn Christ and the Virgin in scene ①, Christ and women in scene ② and Joseph in scene ③ are enclosed, is in the backgrounds behind a miracle of the birth of Christ. Furthermore, there is a cave in the mountain where Christ is drawn inside; the mountain seems to protect the newborn Christ. The mountain's function comprises an area with a special meaning that is different from its surroundings. Sometimes mountains are drawn as places that offer protection.

### 5.2. Mountains that divide one scene into areas

In Figs. 1 and 2, 4-7, 10, 11, and 16, a mountain is the background behind a person; gold or blue is the background behind another person[9].

In Fig. 1, scene ①, the mountain is in the background behind Joseph, and the background is gold behind the angel. In Fig. 1, scene ③, the mountain is in the background behind Joseph and the Virgin, and background is gold behind the man. In Fig. 2, scene ⑤, mountain II is in the background behind the shepherds, and the background is gold behind the angel. In Fig. 4, the mountain is in the background behind Elizabeth and John, and the background is gold behind the soldier. In Fig. 5 scene ①, mountain I is in the background behind Joseph, and the background is gold behind the angel. In Fig. 6, mountain I is in the background behind the people, and the background is gold behind Christ and John. In Fig. 7, scene ①, mountain I is in the background behind Christ, and the background is gold behind the Devil. In Fig. 10, scene ①, mountain I is in the background behind Jacob, and the background is blue behind the angel. In Fig. 10, scene ②, mountain II is in the background behind Jacob, and the background is blue behind the angel. In Fig.11, the mountain is in the background behind Moses, and the background is blue behind an angel, Christ and the Virgin. In Fig. 16, mountains I and II are in the background behind the people, and the background is blue behind Christ.

As exemplified above, one person is drawn in the area of a mountain; another is drawn in the gold or blue background. In other words, the ridge line of the mountain divides one scene into areas of mountain and gold or blue backgrounds. For example, in Fig. 11, "Moses and the Burning Bush," the ridge line of the mountain divides the scene into the area of mountain in the background behind Moses and the area of blue background behind an angel, Christ and the Virgin. The area of the mountain indicates that Moses is in the earthly world, the area of blue background indicates that the angel, Christ and the Virgin are in the world of God and not the earthly world. A miracle that God appears to Moses is expressed on the whole. The mountain's function divides one scene into different areas. Furthermore, the background behind angels is either gold or blue, and no mountain is in the background behind them. In other words, a person in front of angels is drawn in the area of a mountain, and the angels are drawn in the gold or blue background areas.

### 5.3. Mountains that divide one painting into scenes

In Figs. 1-3, 5, and 7, a mountain is in people's background and more than one scene is drawn.

In Fig. 1, the mountain is in the background behind Joseph and the Virgin in scene ③. Scene ② is on the left of the mountain. In Fig. 2, mountain I is in the background behind Christ and the Virgin in scene ①, Christ and the women in scene ② and Joseph in scene ③. Scene ④ is on the left of mountain I, and scene ⑤ is on the right of mountain I. In Fig. 3, the mountain is in the background behind the Magi in scene ②. Scene ① is on the mountain's left. In Fig. 5, mountain I is in the background behind Joseph in scene ①. Scene ② is on the right of mountain I. In Fig. 7, mountain I is drawn between scenes ① and ②, mountain II is drawn between scenes ② and ③, and mountain III is drawn between scenes ③ and ④.

As exemplified above, one scene is unfolded before the mountain; another is unfolded behind the mountain. In other words, the mountain's function divides one painting into different scenes. For example, in Fig. 3, "Journey of the Magi; Magi before Herod," the mountain divides the painting into scene ① that the Magi ride horses to Jerusalem and scene ② that they lay gifts before Herod. The Magi are drawn in both scenes; different scenes are unfolded on the sides of the ridge line of the mountain.

Figures 8 and 9 are connected by a gold background. A medaillon is drawn in the center of Figs. 8 and 9, and mountains are drawn on each side of it. Fig. 8 is drawn on their left, and Fig. 9 is drawn on their right. These mountains divide different paintings just like dividing different scenes.

As described above, in the Christian paintings in the Chora Church, the mountains comprise areas with special meaning. They are considered to be places where we connect to the world of God, function as "frames" divides the earthly world and the world of God. They divide one painting into different scenes and divide one scene into different areas, function as "frames" divides the narrative in the paintings. The mountains are drawn as frames that divide the world in the paintings.

## 6. Conclusion

This paper clarified the functions of mountains in the visual composition of the Christian paintings in the Chora Church. We enumerated the elements of each painting, traced their outlines, and made explanatory drawings. In each explanatory drawing, we divided each painting into scenes. Next, we analyzed and discussed the relationships between the mountains and the backgrounds. In the Christian paintings in the Chora Church, the mountains comprise areas with special meaning. They divide one painting into different scenes and divide one scene into different areas. The mountains are drawn as frames that divide the world in the paintings.

## Endnotes

1. In this paper, we treated Christ, the Virgin, and angels as "people" because they are drawn as human figures.
2. The Chora Church (The Church of St. Savior in Chora), which is in Istanbul, Turkey, was probably built in the 6th century. It was rebuilt by Isaak Komnenos in the early 12th century. When restoration and renovation were undertaken by Theodore Metochites around 1316-21, the Church was decorated with mosaics and frescoes. After the 15th century, the Church was used as a mosque called "the Kariye Camii" and is now a museum. The cleaning and conservation of the mosaics and frescoes were undertaken by the Byzantine Institute of America in the 1950s (Underwood, 1966-75).
3. Paintings "The Annunciation," "The Nativity of Christ," "The Baptism of Christ," "The Transfiguration of Christ," "Crucifixion," and so forth are considered to have been in the naos, but they are not existent (Lowden, 2000, p. 416).
4. In this paper, we defined a mountain as a rugged ground that greatly rises and excluded a smooth ground that only slightly rises.
5. In this paper, the titles of the paintings are based on "The Art of the Kariye Camii" (Ousterhout, 2002). Figs. 1-7 are mosaics in the outer narthex, Figs. 8 and 9 are mosaics in the inner narthex, and Figs. 10-16 are frescoes in the parekklesion. In "Joachim in the Wilderness" in the inner narthex, a mountain is drawn, but the relationship between the mountain and the theme is unclear, we didn't study it as an exception. Two pictures are painted as "Moses and the Burning Bush" (Fig. 11) in the Chora Church, we studied one appeared in "The Art of the Kariye Camii" (Ousterhout), another is hereinafter described.
6. One main purpose of the Christian paintings in medieval Europe was to faithfully express a Biblical content (Wakakuwa, 2000, p.104). Such drawn elements are comparatively rare.
7. In this paper, "background" refers to what is drawn around the outline of a person. However, exceptions are hereinafter described.
8. After learning of the birth of Christ, Herod tried to murder all infants under two in Bethlehem.
9. In Figs. 1 and 5, Joseph listening to the angel protrudes from the area of the mountain to the area of the gold background. In Fig. 2, the shepherd listening to the angel protrudes from the area of the mountain

to the area of the gold background. In Fig. 7, Christ tempted by the Devil protrudes from the area of the mountain to the area of the gold background. In Fig. 10, Jacob wrestling with the angel protrudes from the area of the mountain to the area of the blue background. In Fig. 16, Adam and Eve lifted from Hell protrude from the area of the mountain to the area of the blue background. A person whose background is the mountain protrudes from the area of the mountain to contact the person in the area of the gold or blue backgrounds. In another "Moses and the Burning Bush" (Fig. 11), an angel, Christ, and the Virgin are drawn before a mountain, but in the area that is different from it. They seem to be on vines.

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The pictures in Figs. 1-16 are by Asst. Prof. Dr. Murat Dündar of Bahçeşehir Üniversitesi in Istanbul, Turkey. The other figures and tables were made by the authors.

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# An Evaluation of Urban Dichotomies in the Third World Metropolis Istanbul

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**Keywords:** collage city, third world metropolis, peak and ruined zones, in-between, urban dichotomy, public space

**Abstract:** Today's third world metropolis can be described as a segmented, fragmented collage city, where its texture consists of many successions of social and spatial dualisms. These dualisms (dichotomies) realize in the form of city in city (Ungers, 1997), in other words city in-between deployments, totally an anarchical (not-hierarchical), postmodern morphology, which is contemporarily composed by divided, disrupted, crystallized public spaces – in-betweens. Istanbul as a "third world" metropolis is a dynamic open system, where complex, multiple economical, social and physical conditions are overlapped. Still the city is a focus point of social and spatial dichotomies and their genuine contradictions particularly in the last thirty years. This "city" has immediate varieties of expectations from the urban transformation design projects with regard to the authenticities and identities its typical dichotomies. In this sense, the basic principles of urban transformation strategies should be concepted on an equal, productive and common urban public space, which enables the redefinition / reconstruction / reorganization of the in-between regions between the conflicted "ruined and peak" zones and in the crystallized third world metropolis Istanbul. First of all, this paper aims to discuss comparative the concept "the third world metropolis" and analyze its social and spatial aspects, which also endures fragmentation in Istanbul. Accordingly the contemporary transformation process of Istanbul from the Ottoman Empire capital to the industrial modern republic city and eventually to the post-modern (collage) third world metropolis of multi-layered social and physical conditions and their dichotomies, their contradicted situations and their in-between spaces in Istanbul will be evaluated. The underlying reasons of these contradictions and eventual outcome of the peak and the ruined zones in Istanbul and their border district's / in-between spatial typologies will be classified. In the conclusion, this paper argues about the future of the city Istanbul accordingly and makes suggestions about the basic principles of urban transformation strategies regarding the equal, productive and common urban public space, which enables the redefinition / reconstruction / reorganization of the in-between regions by integrating the conflicted "ruined and peak" zones and unification of the crystallized collage third world metropolis Istanbul.

## 1. Introduction: Third World Metropolis

"I saw two cities in one. One was for the dovetails, the other was belonging to the mice."

Marco Polo

"For the ones they are in darkness, and the others are in light, and you see the ones in brightness, those in darkness drop from sight."

Berthold Brecht

The increasing global economic rivalry between its core countries, which proceeded clearly during the second half of the twentieth century (Chandra, 2000), created a hard social differentiation between the rich (powerful, global, modern, flexible, moveable, originally bourgeois, ethnically accepted or acknowledged, permanent insider) and the poor (weak, local, traditional, static, originally peasant, ethnically un-accepted or ignored, permanent outsider) in the world society and a physical disintegration between their settlements especially around the contemporary world but certainly on the regions in the third world metropolises (Pfeiffer, 1994).

The continual tension and the conspicuous polarization between the rich and the poor – the insider and the outsider – triggers the systematical dissociation of the estranged poor, foster adjoining "peak" zones (transformable convertible capitalist spaces within their optimum physical and social high profiled conditions / situations such as gated communities, shopping malls, office buildings, culture centers, first class restaurants and entertainments clubs, private education campuses) of the global richness and residual "ruined" districts, where the permanent native poverty located communally (Kofman, 1998).

In the twentieth century capitalist city, in other words in the metropolis as a permanent and independent renovated system of archaic and anarchic indicators and symbols (Lefebvre, 1973), each un-transformable system, unchangeable public and its unconvertible capitalist space or aggregation of spaces or regions should stay as ruined urban zones. In this context, with the concept of "ruined urban zones", it has been mentioned as either physical or social low profiled situations of being bereft of sources or inequitable, uncontrolled distributions of sources and

getting slummier, which means being also defective for the worldwide challenge in the global capitalist competition.

Mainly the districts of poverty but also the ecologically dead regions, ancient urban structures, contaminated industrial zones such as harbors and docks and their environments can be defined as today's "ruined" pieces of the metropolises. These urban pieces are produced without considering the social and physical innovations and are described as an un-affirmative spatial emptiness including the economical dilemma.

In this sense, there are mostly two kinds of remarkable regions particularly in the third world metropolises described by the current capitalism, "ruined and peak" zones, as a common worldwide complication, which are either ignored by the capitalism or it has completely been deployed. These from-each-other isolated, polarized regions, namely islands of contradicted situations and their in-betweens designate today's social and physical shape of the big city as a collage system of fragmental morphology framed by many typical cleavages (Andrusz, 1996). In other words today's third world metropolis can be described as a segmented, fragmented city, where its texture consists of many successions of social and spatial dualisms. These dualisms (dichotomies) realize in the form of city in city (Ungers, 1997), in other words city in-between deployments, totally an anarchical (not-hierarchical), postmodern morphology, which is contemporarily composed by divided, disrupted, crystallized public spaces.

Today's Istanbul as a "third world" metropolis is a dynamic open system, where complex and multiple economical, social and physical conditions are overlapped. Still the city is a focus point of social and spatial dichotomies and their genuine contradictions particularly in the last thirty years. Istanbul's geographical condition (slope topography and the physical relationship with the sea), also endures this fragmented structure. All these aspects create ruptured crystallized public spaces consisted of many cleavages, islands of rich (mostly (post) modern or traditional, powerful, moveable, global, insider) and poor (mostly traditional, weak, static, introverted, local, outsider) settlements and their natural or artificial borders (Koolhaas, 1994), where serious problematic, antagonist, unequal, unproductive encounters are experimented by the peak and the ruined zones in Istanbul.

## 2. The Contemporary Development Process of the Conflicted City Istanbul

The last hundred years of Istanbul can be defined as the century of collective amnesia (Bilgin, 2010), beginning with the forgetting of the most recent past including the dramatic succession of renewals and transformations, which constituted the evolution process of the Ottoman Empire capital from a multi-cultural / layered fragmented city first to a powerful but static and mostly introverted industrial big city of the republic then to a dynamic multi-faced almost schizophrenic third world metropolis while each period erasing what came before.

The development process which occupied the last hundred years includes the First World War, the waning of the Ottoman Empire and the establishment of the Turkish Republic, three different global economical and cultural waves and their impacts in the decays 1950s, 1980s (urban implosion, (Bilgin, 2010) and 2000s (the pressure of global between 1980's and 2000's, (Korkmaz, 2010). This was also the modernization period of the city which preserved Istanbul's privileged place on the global stage and gave way to a transformation from the city of consumption (from consumption to production city) into a business, finance, health, education and entertainment metropolitan center (from overgrown industrial city to urban region). Istanbul has grown approximately fifty times during the last century, merged, re-divided and many social and physical conflicted situations / dualisms or in other word urban dichotomies in form of oil stains conceptualized by the rich and poor settlements have been constituted particularly since 1960s. The polarization and the segregation started to sharpen all around the metropolitan region and spread in the directions west, east and north between the Black and the Marmara Sea along the legendary crack Bosporus. The slope topography also designated the typically dualistic morphology of the city particularly from the beginning of the 17$^{th}$ century.

The transformation process of Istanbul from a traditional fragmented empire capital into a multi-faced metropolitan region and the history of main social and physical polarization during the last hundred years can be describe in four different sections according to the political, social and cultural changes in the region and around the world.

### 2.1. ISTANBUL 1910-1930: FROM OTTOMAN CAPITAL TO REPUBLIC CITY

Istanbul grew beyond its fifth century walls which surrounded the historical peninsula, in a fragmented un-continuous patchwork – disconnected urban patterns and the city spread along the Istanbul Bosporus in north – east direction and around the Golden Horn on the west (European) side and in Uskudar and Kadıkoy regions on the east (Asian) side during the Ottoman period. The conflicted situation between rich / poor constituted already from the beginning of 18$^{th}$ century during the Ottoman period.

Istanbul's natural cosmopolitan character as the capital of an empire increased during the second half of the nineteenth century in tandem with its integration into European-centered world capitalism. Colonialism, reaching its height, had created a globalizing situation and the flow of information had gathered speed. The palace had become bourgeois, intellectuals had acquired public visibility, preferences had begun to follow global tendencies and images had begun to hybridize (Akin, 2010). People's minds shuttled back and forth between the localism of nationalism and the pluralism of the world. Most rich people who were generally in relation with the empire palace occupied the regions on the west – east shore line along the Bosporus and the poor population settled beyond the coast line on the east (Asian side, Uskudar) and west regions (along the west old city walls on the historic peninsula Eminonu and around the Golden Horn, Halic Sea).

The transformation process of Istanbul from imperial capital to republican city began with the agonizing end of the Ottoman Empire – the waning of Empire after the First World War. This war, occupation, destruction by fire, migration, massacre, and starvation years triggered the abandonment of Istanbul and lost of the half of the population.

With the establishment of the Turkish Republic after the militarist revolution the modernizing and secularizing regulations followed one upon the other in education, in the legal system, and in the bureaucracy (Akin, 2010). Istanbul had modernized according to the government's urban interventions in this space and time compression period which gave time for the preparation of the city for the 20$^{th}$ century. This was a political enterprise beyond the hybridization of ordinary life and the alterations in

the city's physical infrastructure and morphology which occurred at the beginning of the period.

Longing for the western (European) compact urbanity, the national government's ideology composed an integrated holistic city in other words constructing "the national house of dreams" (Akin, 2010) from the discontinuous pattern of the empire capital by providing the fundamental infrastructure and public transportation which connected the island formed regions and held the city together.

The abandonment of the old regime's prestige zones (the abandonment of the past) such as the Historic Peninsula Eminonu caused a rupture with the new distinguished neighborhoods which shared out Istanbul in a disjointed concept. The city kept enlarging episodic in the east - west direction mainly.

The poly-ethnic fabric of the old imperial seat gave way to a singular totality in the nation state's second city (Akin, 2010). The social and physical divisions started to sharpen during that period. Istanbul is divided into four regions shared out by the different social populations. The conflicted situation composed particularly between the historic peninsula and the Galata region by the religious – secular, modern – traditional and different ethnical polarization and their mostly isolated settlement strategies dominated the city in general. The Golden Horn Sea is the natural border in between which created the dichotomies such as homogenous / heterogeneous, national / not national and their urban and architectural diversification on the both sides.

The high profiled (rich and high educated) population preferred to settle in the villages along the Bosporus coast line on the European and Asian Side and the low profiled population who are mostly immigrant workers accommodated temporary in the historic peninsula Eminonu.

## 2.2. ISTANBUL 1930-1950: CREATION OF THE MODERN CITIZEN

Istanbul, awaiting reconstruction and renewal, inherited by the government of the young Turkish Republic was a city largely clustered around the historical center (historical peninsula), but mostly dispersed along the shores of the Istanbul Bosporus and the Marmara Sea, its macro form extended from the center to the periphery in a fragmented dispersed urban morphology (Bozdogan, 2010). The anticipated republican intervention would come in mid 1930's and accelerated the renovation of the city in the 1940s, it would transform Istanbul from an ancient imperial consumption capital into a modern city of production by erecting factories along the Golden Horn and in the periphery of the city.

The Republic's radical project of modernity (creation the modern citizen) was spatialized in Istanbul, as much in the recreational spaces of everyday life, as in the monumental public buildings such as cultural centers, education or national sports buildings marked state-sponsored "top-to-bottom modernization", residential buildings, summer resorts as castles of everyday secular life, places like beaches, neighborhood parks, casinos which also made the definition of the desired new face of Istanbul required clean, gentrified public spaces necessary for the visualization of the ideal of a homogenous society composed of modern, secular, well educated and healthy individuals who would have fully internalized republican ideology.

The primary planning agenda was to connect the dispersed fragments of the city by establishing the basic infrastructure of the modern metropolis which was necessary for the revitalization of the city's stagnating economy regarding the first master-plan completed by Martin Wagner and Henry Proust who also wanted to turn Istanbul from static to dynamic city by constituting the transportation networks.
The high income groups showed interest to the new axes such as Taksim – Sisli planned by Wagner and Proust and to the regions along the Bosporus and the Marmara Sea coast line on the Asian Side which transformed into the peak zones of the city.

Istanbul would begin attracting population from Anatolia after 1940 and concomitantly, the first slum settlements (urban ruined zones occupied by the low profiled migrants) would emerge on the newly developed peripheral areas near the new factories. Due to its topography, Istanbul tended towards decentralization and dispersion and residential neighborhoods were increasingly farther from business centers. Istanbul's population was still below the one million mark before the onset of the massive migration from rural Anatolia, the Istanbul of 1930-1950 was a relatively tranquil city where housing had not yet become a problem (Bozdogan, 2010).

Istanbul continued to expand in the east-west direction in an episodic composition completed by polarized patterns occupied by the economical and cultural conflicted populations. At the end of the beautification process of Istanbul according the government's modernity principles, the main characteristics of the dichotomies based on the secular / religious, rich / poor, being a Istanbul citizen (modern insider) / coming from Anatolian rural (traditional outsider).

The high profiled modern citizen of Istanbul lived in the villages on the Bosporus coast line and in the new core region constituted between Galata and Sisli districts after the abandonment of the historic peninsula Eminonu. The low profiled population accommodated mostly in the historic peninsula Eminonu and in the peripheries of the Asian Side.

## 2.3. ISTANBUL 1950 - 1980: FIRST GLOBAL WAVE – OIL ENGAGED POLITICS

Turkey became the member of NATO and the Turkish government's capitalist politics were oriented to the USA and related to the general oil politics around the world. Accordingly, the social and physical conditions in Turkey constituted regarding the capitalist global impacts. The government in 1950s wanted first of all to spectacle its power all around the country and Istanbul was the right place to start and show its prestige. The government wanted to control the city by providing the accessibility all around the city and give way to the efficient commercial activities around the city. The main aim was to maintain the city and to create a fluent morphology for the optimum production – consumption relation. Especially the discontinuous of east – west part of the city was a great handicap for commercial treatments. The oil engaged politics of the new government propose a city shaped by motorways connecting the regions to each other. Generally, the enterprises of the government caused to the transformation of Istanbul from pedestrian oriented production city to the vehicle oriented consumption city where the social and physical dichotomies pluralized.

In summary the capitalist enterprises of the democrat party (the government in 1950s) caused to the "urban implosion" which

points to how import – substitution macroeconomic policies and domestic – market oriented industrialization affected the shaping of urban space and the production forms and mechanisms of the built environment (Bilgin, 2010). These policies distinguished characteristics on the social plane in terms of the forming of an organized – disorganized working class, the emergence of the differentiation between white-collar and blue-collar workers, the rise of the middle class, the forming and establishment of new models of consumption, the reconstructing of civil society and politics, and mass culture and modes of consumption. Istanbul, which had been a subdued port city while the capital city Ankara was rising between 1930-1950, became the center of attention for post-1950 social, political, and cultural change when protectionist and import-substitution policies were put into place (Bilgin, 2010). The rapid change in norms and patterns of consumption was a distinguishing characteristic of this period when the industrial society was built. While the differences between modes of consumption peculiar to social strata became less marked during this process in Istanbul, new classes started defining themselves through new signs, brands, and lifestyles. Many post-1980 developments may be interpreted as continuations of this process (Bilgin, 2010).

The government's development operations in Istanbul annihilated the traditional morphology on the historic peninsula and demolished the relation between the sea and the city and triggered the polarization between the populations living in Istanbul and the physical and social dichotomies all around the city. The urban macro-form and transportation infrastructure which easily met the needs of the first half of the twentieth century underwent radical changes at the beginning of the 1950s and became "topsy-turvy" in terms of space due to the increase in urban population and in both intra- and inter-urban infrastructures (Bilgin, 2010). Particularly between the years 1950 – 1980 Istanbul's urban macro-form was shaped by contiguous growth, it is merged and re-divided completely in east-west and north-south directions. The Bosporus Bridge erected in the year 1973 which connected the east and west but transformed the east part (Asian Side) into the dormitory of the city, and the west part (European Side) into a huge working and entertainment place and created the most peculiar, dominated, unique dichotomy of Istanbul.

The physical conditions of the dichotomies during the period 1950-1980 in Istanbul based on the social (bourgeois – provincial, modern – traditional, secular - religious, high profile educated – low profile educated, high income – low income populations) dualisms and their natural (sea – slope topography) and artificial ( highways) in-betweens which designated the morphology of the city.

The high profiled modern population (high income and educated) continued to share out the core of the European Side of the city, the Bosporus villages. They created and occupied the Marmara Coast line on the Asian Side (Kadikoy – Bostanci axis) and the Yesilyurt – Yesilkoy districts on the European Side as the new peripheries of Istanbul. The low income population kept living in the peripheries of both sides of the city, away from the sea near the working places. The middle class settled in Uskudar. The high income ethnical and religious minority preferred generally the Bakirkoy district, Taksim - Sisli axis. The low income minorities stayed in the historical peninsula on the European Side. The first slum cities settled close to the factories usually on the European Side, especially in 1960s. Some of the religious minorities lived in the core of Kadikoy province and almost all of the high income religious minorities (Jews and Christians) and Muslim citizens erected summerhouses in the prince's islands in the Marmara Sea.

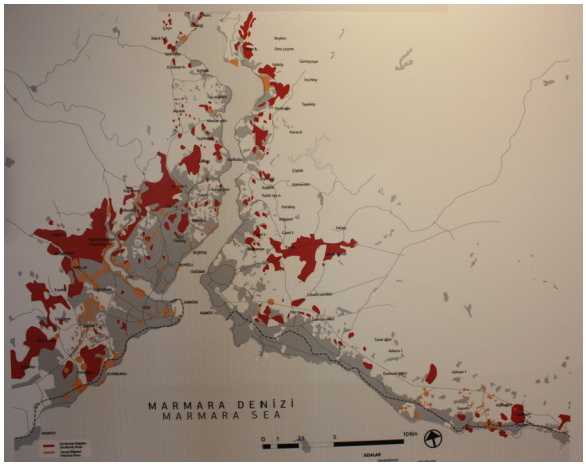


Fig 1. The peak zones (high profiled population) in grey – the ruined zones – slum settlements in red in 1960

## 2.4. ISTANBUL 1980 - 2010: SECOND GLOBAL WAVE

In the 1980s after the collapse of the Soviet Union Turkey had exhausted its potential for industrialization through import substitution. The social equilibrium based therein began to unravel in the 70s. The crisis coincided with the worldwide energy crisis, and caused horrific socio-economic unrest; it came to an end traumatic in every sense with the 1980 coup. This meant setting sail for a social restructuring fraught with tension, dominated by polarization and ostracism-without having established the kind of inclusive social structuring ruled by a populist politics which relies upon broad-based compromise. This transformation in Turkey occurred in tandem with globalizing movements, and would rapidly transform Istanbul, locomotive of industrialization, as well. Starting in the late 80s, the existing industry in the city, especially the "fordist" industry, was removed Istanbul to "edge cities", forming an urban region. The city swiftly de-industrialized, specialized in service industry, and the white collar work force grew (Korkmaz, 2010).

Istanbul entered the twentieth century as an "imperial city" and after a long period of floundering appeared again on the world stage in the twenty-first century as a "global city". Istanbul was ranked on the GeWC 2008 list as an "alpha" city; "very important world cities binding their principal economic regions to the world economy" (Korkmaz, 2010). With the momentum gathered from the restructuring process following the earthquake of 1999 and the financial crisis of 2001, Istanbul grew beyond its role as the unrivaled center of attraction in Turkey to become an alluring "star" on the world stage. Istanbul became a more attractive place for real estate investment than ever before. Construction of public space was surrendered to the profitable investments and packages of the entertainment industry, making it attractive to real estate capital. Urban management became the keyword of urbanization dynamics (Korkmaz, 2010).

Two concepts characterizing the processes of urbanization in post -1980 Istanbul – differentiation and diversification – may also be said to characterize changes and transformations in the actors, who have imagined, constructed and claimed to the city. As a result of a sort of compromise between all actors (especially between rich and poor), Istanbul was equipped with two types of anonymous fabric, one woven of apartment buildings and the

other of "gecekondu" (shanties – slum city). A ferocious urbanization dominated by vacancy, dissolution and ostracism.

In brief, quantitative implosion between the years 1950 – 1980 followed by global explosion in the middle of 80s. During the period 1980 – 2010 Istanbul expanded in the east – west, and north direction episodic. The patchwork morphology constituted of many social and physical dichotomies of the city. The socio-cultural polarization between the populations, segregations, evaporation of the urban poor and forced evictions, gentrification politics and urban transformation scenarios accordingly dominated the contemporary city culture. Istanbul transformed from an industrial city into a borderless urban region as the most expanded, dense, economical powerful, social multi-layered metropolis in Turkey including many contradicted situations and their in-betweens.

Until the beginning of 2000s the high profiled population moved to the nearest peripheries of both sides of Istanbul to live in the villas in the gated communities and to be together with the nature. The low profiled population accommodated either in the core of the city or settled in the remote peripheries. From the beginning of 2000s there are social and physical gated communities, in other words fragmented, polarized city in city conceptualized adjoining but not integrating islands (peak and ruined zones / designed heaven and hell) constituted by both sides, the high and low profiled populations shared out the core and peripheries of the city.

Fig 2. Map of the new morphology of the first main dichotomy based on economy: most rich population in red, middle class in orange, poor population in yellow presented, 2000s

## 3. Typology of Dichotomies in the Third World Metropolis Istanbul

Istanbul as today's third world metropolis / as a dynamic open system, because of its cosmopolitan overgrown population, social and physical dualisms, its collage morphology where complex and multiple economical conditions are overlapped, shares typical characteristics with the other third world metropolises such as Mexico City in Mexico, Rio de Janeiro in Brazil, Cairo in Egypt, Johannesburg in the Republic of South Africa, Mumbai in India or Shanghai in China (Smith, 2000). These are as follows;

Transformation from the industrial city into the multi-economical urban region / Locomotive for the country's development, developer city – strategic position for the country (the one and only urban region because its economical – social – physical differences to the rest) / Prestige region / political case study for the government / Multi-ethnical, multi-cultural, international but polarized dense population / Continuous immigration from the rest of the country / Social and physical traumas in the urban history / Unusual geography – extraordinary physical conditions / Continued, uncontrolled physical development of the borderless city – urban region / Urban dichotomies (social and physical dualisms, peak and ruined zones and their natural – artificial in-between) / Fragmented urban structure – morphology in oil stains form, discontinued segmented pattern / Delayed or inadequate infrastructure / Unfinished urban transformation scenarios, projects and applications / forced evictions, decentralization and evaporation of the poor population / Gated communities – political correct, economical stolen, isolated, unshared, passive public space / Housing projects (absence of residential reserve or housing speculations) / Crime / religion / film industry

Istanbul, as a temporary and/or permanent collage of ambiences of socially dense accumulations and deserted spaces describe the composition of physically disintegrated regions and the cleavages – in other words borders in-betweens. The borders can be either natural (Istanbul Bosporus as the legendary crack between the Asian (east) and the European (west) Side, Golden Horn – Halic Sea between the historic peninsula Eminonu and the Galata Region; slope topography between the periphery and the core – Marmara – Bosporus shore) or artificial (highways parallel to the Marmara and the Black Sea shores in direction west - east, physical barricades such as walls around gated communities).

In brief, this city is splited off in terms of topography, spatial and spatial usages, morphology, demography and semantics. Contextually, the typological qualification of some of the main social (cultural, economical) and physical dichotomies and the analysis of their characteristics in Istanbul for the core, periphery and close environments are as follows;

### 3.1. DICHOTOMIES IN GENERAL

#### *3.1.1. Dichotomies: South - North*

**Peak / ruined zones:** Residential districts along the coast line – near the Istanbul Bosporus and the Marmara Sea in Asian and European side (**peak zones**, high income people) / Residential districts along the highways parallel to the sea (**ruined zones**, districts of poverty/low income):
**Differentiation context:** social (cultural and economic)
**In-Between:** highways (artificial border)
**Locality:** regions between D-100 highway and the Marmara Sea coast line (south), between highways D-100 and E-6 (center), between E-6 highway and the Black Sea coast line (north)

Table 1. Comparison of South / North

| Between the Marmara Sea Coast Line / D-100 highway (south) | Between D-100 / E6 Highways (center) | Between the E-6 Highway / the Black Sea Coast Line (north) |
|---|---|---|
| **Social** | | |
| • modern | • post - modern | • postmodern / traditional |
| • republic citizens | • first generation immigrants | • last generation immigrants |
| • secularist | • secularist – religious | • religious |

| | | |
|---|---|---|
| • since 1940 | • since 1960 | • since 1990 |
| • innovative bourgeois | • semi-provincial | • conservative provincial |
| • high educated | • educated | • low educated |
| • high income | • middle income | • low income |
| • vote against the government since 2002 | • mixed since 2002 | • vote for the government since 2002 |
| | **Physical** | |
| • flat topography | • flat topography | • steep topography |
| • semi dense urbanity | • dense urbanity | • rare urbanity |
| • architectural and urban design as majority | • architectural and urban design as minority | • architectural and urban design as minority |
| • grid | • grid | • organic |

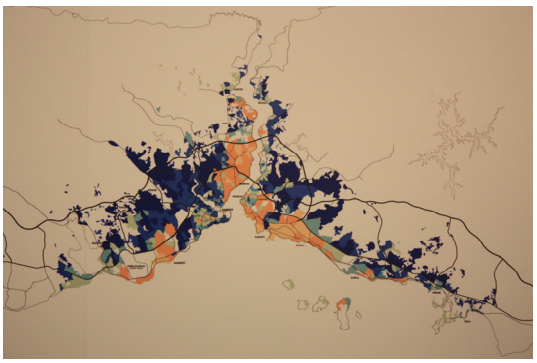

Fig 3. Map of the new morphology of the second main dichotomy based on social power: high profiled - educated population in orange presented (voted against the last government), low profiled - educated population in dark blue presented (voted for the last government)

*3.1.2. Dichotomies: East - West*

**Peak / ruined zones:** Periphery and the core of the European side (peak zones) / Periphery of the Asian side (ruined zones)
**Differentiation context:** multifunctional, accommodation, working, entertainment, expensive accommodation, cosmopolite (European Side) / mono-function, mono-demographic, cheap accommodation – dormitory of the city (Asian Side)
**In-Between:** Bosporus strait (natural border)
**Locality:** core – periphery (Asian Side), core – periphery (European Side)

3.2. DICHOTOMIES IN LOCAL

*3.2.1. Dichotomies: Galata District / Historical Peninsula Eminonu*

**Peak / ruined zones:** Galata District (peak zone) / Historical Peninsula (ruined zone)
**Differentiation Context:** condemned historical city / actual usage, population differences in day and night / density
**In-Between:** Golden Horn (natural border)
**Locality:** core (European side)

Table 2. Comparison of Galata / Historical Peninsula Eminonu

| Galata District | Historic Peninsula Eminonu |
|---|---|
| **Socio-cultural** | |
| • early modern | • traditional |
| • early modern settlements of Turkish Republic | • symbol of Ottoman Empire settlement |
| • secularist | • Islamic |
| • early settlements of religious minorities | • mono – Islamic demography |
| • innovative bourgeois | • conservative provincial |
| • multi - cultural | • mono - cultural |
| **Physical** | |
| • steep topography | • steep topography |
| • monumental silhouette | • monumental silhouette |
| • grid morphology | • organic morphology |

*3.2.2. Dichotomies: Tepebasi District / Kasimpasa District*

**Peak / ruined zones:** Tepebasi District (peak zone) / Kasimpasa District (ruined zone)
**Differentiation Context:** economy, demographic changes (cosmopolite– mono-demographic)
**In-Between:** slope topography (natural border) / Halic Docklands (artificial border)
**Locality:** core (European side)

Table 3. Comparison of Tepebasi / Kasimpasa

| Tepebasi District | Kasimpasa District |
|---|---|
| **Socio-cultural** | |
| • modern | • traditional |
| • early modern settlements of Turkish Republic | • symbol of Ottoman Empire settlement |
| • secularist | • Islamic |
| • early settlements of religious minorities | • mono – Islamic demography |
| • innovative bourgeois | • conservative provincial |
| • multi - cultural | • mono - cultural |
| **Physical** | |
| • steep topography | • steep topography |
| • monumental historical buildings | • no monumentality |
| • grid morphology | • organic morphology |

*3.2.3. Dichotomies: Taksim District / Tarlabasi District*

**Peak / ruined zones:** Taksim (peak zone) / Tarlabasi District (ruined zone)
**Differentiation Context:** economy, elite profiled – low income population, density / emptiness
**In-Between:** boulevard (artificial border)
**Locality:** core (European side)

Table 4. Comparison of Taksim / Tarlabasi

| Taksim District | Tarlabasi District |
|---|---|
| **Socio-cultural** | |
| • modern | • modern / postmodern |
| • early modern settlements of Turkish Republic | • symbol of Ottoman Empire settlement |
| • secularist | • multi - religious |
| • early settlements of religious minorities | • immigrants |
| • innovative, high profiled bourgeois | • low profiled immigrants |
| • multi – cultural elitist production, entertainment | • poverty, crime |
| • flexible population density | • dense population |
| **Physical** | |
| • semi steep topography | • steep topography |
| • monumental historical buildings | • no monumentality, needs renovation |
| • grid morphology | • organic morphology |

*3.2.4. Dichotomies: Laleli District / Fatih District*

**Peak / ruined zones:** Laleli District (peak zone) / Fatih (ruined zone)
**Differentiation Context:** economy, multi / mono cultural, cosmopolitan / mono-demographic
**In-Between:** boulevard (artificial border)
**Locality:** core (European side)

Table 5. Comparison of Laleli / Fatih

| Laleli District | Fatih District |
|---|---|
| **Socio-cultural** | |
| • modern | • traditional |
| • early modern settlements of Turkish Republic | • symbol of Ottoman Empire settlement |
| • secularist | • Islamic |
| • early settlements of religious minorities | • mono – Islamic demography |
| • innovative bourgeois | • conservative bourgeois |
| • multi – cultural | • mono – cultural |
| • criminal, entertainment, trade, changeable population | • religion, pray, static population |
| • rich and poor together | • rich and poor together |
| • working | • accommodation |
| **Physical** | |
| • flat topography | • steep topography |
| • no monumentality | • monumental historical buildings |
| • grid | • organic morphology |

*3.2.5. Dichotomies: Levent District / Gultepe District*

**Peak / ruined zones:** Levent District (peak zone) / Gultepe District (ruined zone)
**Differentiation Context:** economy
**In-Between:** boulevard (artificial border)
**Locality:** old periphery – new core (European side)

Table 6. Comparison of Levent / Gultepe

| Levent District | Gultepe District |
|---|---|
| **Socio-cultural** | |
| • modern | • postmodern |
| • late modern settlements of Turkish Republic | • illegal settlements |
| • secularist | • Islamic |
| • high profiled population (rich and high educated) | • low profiled population (poor and low educated) |
| • innovative bourgeois | • conservative provincial |
| **Physical** | |
| • flat topography | • steep topography |
| • no monumentality | • no monumentality |
| • grid morphology | • organic morphology |

*3.2.6. Dichotomies: Kadıkoy District / Uskudar District*

**Peak / ruined zones:** Kadikoy District (peak zone) / Uskudar District (ruined zone)
**Differentiation Context:** economy, social – culture:
**In-Between:** The Haydarpasa Harbor, cemetery, military quarter and Marmara University buildings
**Locality:** core of the Asian side, periphery of the city

Table 7. Comparison of Kadikoy / Uskudar

| Kadikoy | Uskudar |
|---|---|
| **Socio-cultural** | |
| • modern | • traditional |
| • early modern settlements of Turkish Republic | • symbol of Ottoman Empire settlement |
| • secularist | • Islamic |
| • early settlements of religious minorities | • mono – Islamic demography |
| • innovative bourgeois | • conservative provincial |
| **Physical** | |
| • flat topography | • steep topography |
| • no monumentality | • monumental historical buildings |
| • grid | • organic morphology |

## 4. Conclusion: Future of the City

As an actual result, the collage (de-) construction of conflicted fragmental zones generally in Istanbul is more visible, the peak but especially the ruined zones are increasing obviously, borders in-between are getting deeper and the social tension based on economical and cultural, ethnical and religious polarizations between the two nations of peak and ruined lands are growing continuously. Istanbul is growing and expanding episodic in oil stains form to the east, west and north. The last master – plan, completed in 2009 and acknowledged by the government, proposes the third bridge, which crosses the Istanbul Bosporus. It connects the northern east and west sides of the city and will probably demolish the urban landscape and forests of the city and trigger the environment pollution. The inadequate infrastructure and the transportation network cannot hold the urban region together (everyday 300 automobiles join the traffic in Istanbul). The housing speculations demolish the identity of the unique morphology, nature and consume the land and infrastructure. The 25 or 30 percent of the buildings in Istanbul will be hardly demolished after a possible earthquake in 30 years and the city needs an immediate preparation program. Still the 80 percent of the civil building production is completed without any architectural or urban professional knowledge and only the 3 percent of the urban and architectural design competitions have been applied since 1980.

After an examination of the urban transformation applications particularly in Istanbul, it is not hard to assert that such urban operations have increased the fragmented collage of cultural and physical dichotomies. The urban transformation projects have triggered the constitutions of the gated communities and their polarized islands. In this condition, they have deepen the cleavages between the "peak and ruined" regions in the city. Istanbul as a contemporary third world metropolis has immediate varieties of expectations from the urban transformation projects in regard to the authenticities and identities its typical dualistic morphology.

The principles of an urban transformation scenario should consider of a compact city shape without the social and physical polarizations and provide equality on social and physical levels. Within the context of the fundamental objective of the scenario it should produce Istanbul within its genuine social and physical setting and sew ruptures and cleavages related to prosperity and poverty, and to decrease the difference between the dichotomies. In this regard, after the completion of the transformation project the region should be able to integrate itself to the city. The integration mentioned within this context necessitates a fair, productive and sharing public conception and a strong redefinition of space for the city being perceived as a total entity.

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# Spatial Analysis of *Toyhane* in Traditional Divriği Houses

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**Keywords:** Divriği houses, *Toyhane*, spatial analysis, Turkish residential architecture

**Abstract:** Traditional Turkish houses have been discussed in many studies. However, very limited research has been carried out on Divriği although it has an important place in traditional residential architecture of Turkey. In Divriği house, there has been a unique space named as *toyhane* that never existed in other Turkish houses. In this case, there appears a necessity to study underlying reasons shaping the architecture of Divriği houses and forming the space, *toyhane*. Purpose of this paper is to make a spatial analysis of *toyhane* by relating to Divriği's culture and housing architecture. In this context, *toyhane*s existing in various Divriği houses will be formally and functionally analyzed. The paper indicates reflections of culture and natural environment on space formation and it will contribute to raise awareness of the traditional houses and spaces of Divriği which are disappearing today.

## 1. Introduction

Traditional Turkish houses have been discussed in many studies (Yürekli and Yurekli, 2005; Bektaş, 1996; Kuban, 1995; Eldem, 1954). However, Divriği had little chance to exhibit its unique traditional residential architecture even though it has many successful examples of these types of houses. Originality of Divriği houses and urban fabric is interpreted by Necdet Sakaoğlu (historian, author) as; *Divriği is like a blind point, a dead end. It is difficult to go there; a man will go and return. Therefore, absolutely distinctive part of a civilization has remained there* (Çekül Vakfı, 2010).

Divriği's vernacular architecture has to be original but primitive since it was a place left to oneself throughout the centuries. Besides, there were some difficulties in finding construction materials in that environment. But, all these challenges could not prevent the development of the architecture in Divriği. Sakaoğlu (1978) expressed, in other words, that *people should have imagined the wealth in the poverty.*

*Toyhane*, a space shaped around the culture in Divriği, attracts attention in these houses. The *toyhane* which is not seen even in close geographies, reflects the cultural richness with its spatial diversity. It gives an idea about people's way of life, way of coping with difficulties and sense of beauty in Divriği. Therefore, it is important to examine *toyhane* in terms of its spatial features.

In order to reach a better understanding of the formation of Divriği houses, a brief description about geographical, historical and cultural characteristics of Divriği will be given in Part Two. Part Three will outline general features of traditional Divriği houses while *Toyhane* will be spatially analyzed in detail in Part Four.

## 2. General Information about Divriği (Physical, Historical and Cultural Features of Divriği)

Divriği, a town of Sivas, is located in the region border of Central Anatolia and Eastern Anatolia of Turkey (Sefer, 2005). Erzincan, Kangal, Zara and İmralı, Malatya locate in the east, west, north and south of Divriği, respectively (Fig.1). Its altitute is 1050-m above the sea level and it occupies an area of 2935-km² (Ünlüdil, 2005). Divriği has 26 districts in the town center and 111 villages. The town population is 23240 people for the year 2000 (Sefer, 2005).

Divriği has steep and rough topography (Fig. 2, 3). It is surrounded by high mountains on the north and west that hinder the communication with the neighborhoods. It is approximately three-hour distant to nearby city centers, even to Sivas. Railway and highway transports are available due to today's technology for going out of the town (Ünlüdil, 2005). There are risks of natural disasters such as earthquake and flood that Divriği had experienced in the past. The town has terrestrial climate that in winters, it is heavy snowy and cold; while in summers, it is hot and dry. The mountains accommodate sparse foresty of oak, juniper and pine trees. The regions' economy is based on agriculture, stockbreeding and iron mine. Mining is the most important economic activity in Divriği since the town is quite rich in underground sources (Şenol, 2007).

Divriği's documented history dates back to 9$^{th}$ century (Sakaoğlu, 1978). Divriği had different namings in its history, one of those is *Divrik* that takes part in the travel book of Evliya Çelebi (a traveller in 17$^{th}$ century). It had a strategical significance in history like a firm fortress on a high hill. It was dominated by Byzantines in 1100-1250, then by Turks


Fig 1. Turkey political map (http://maps.turkeyodyssey.com/turkey_political_map_2006.jpg)

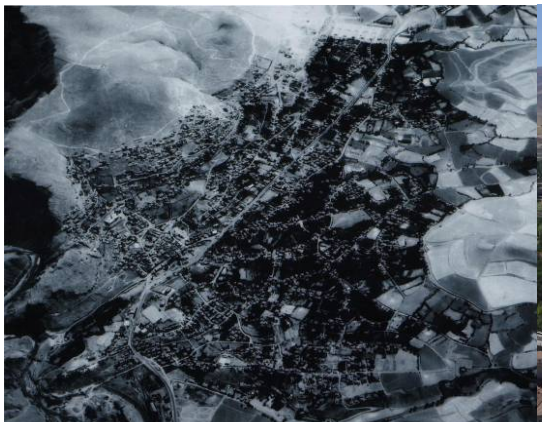

Fig 2. Aerial photo of Divriği (Sefer, 2005)

Fig 3. General view of Divriği (2010, Sinem Kültür)

(Mengücekoğulları) for a while until 1381. In this era, Mengücekoğulları (a beylic in Anatolia) constructed a large number of architectural monuments, among them, the unique architecture of Divriği Ulu Cami ve Darüşşifası (the Great Mosque and Hospital of Divriği) is remarkable. It carries the traces of Seljuk era and is the first Turkish building inscribed to UNESCO's World Heritage List. Divriği was invaded by Egyptian Memluks in 1381, then it came under the rule of Ottoman Empire in 1516. Divriği became a town under Sivas by the proclamation of the Turkish Republic (Ünlüdil, 2005).

The way of life in Divriği took shape under the effects of the geography and the climate as well as Islam religion, customs and traditions and family structure. As a result of the limited systems of transport and communications, the traditional life style was highly confined and enduring in Divriği. As people in Divriği lived in accordance with their beliefs and customs, most of the districts were founded around a mosque, most of the buildings were designed considering the direction of kibleh[1] and certain sections were reserved for men and women in most of the houses. Large families composed of different generations lived in those houses. As in most regions of Anatolia, in Divriği, men worked outside while women got busy doing the housework. Gathering for religious festivals, for preparing winter meals, for wedding or funeral ceremonies has an important role in social life of Divriği. Some of these customs and traditions can still be seen in Divriği.

### 3. Traditional Residential Architecture in Divriği

Housing history in Divriği begins in the castle which is the oldest monument in Divriği. In time, the people (Armenian, Greek and Turkmen) who could not be accommodated in the castle started settling around the castle. Houses were built as one-storey until the end of 17th century. *Hımış* (nogged-frame) technique that wood carrying holes are filled with mud bricks, was used in building these houses (METU MATPUM, 2010).

Fig 4. Traditional Divriği houses: Sancaktar House, Tevrüzlü House, Mühürdarzade House (Ünlüdil, 2005)

Although Divriği houses reflect the architectural traditions of the 13th century-Anatolian Seljuks in some aspects, the houses that could reach today are the Ottoman houses dating from the 19th century (Ünlüdil, 2005). Today, in Divriği, there are 120 traditional houses regarded as cultural assets by the Ministry of Culture and Tourism.

As Küçükerman (1973) stated there is a strong correlation between the structure of the society and the manner of formation of the house and its rooms. To this respect, traditional Divriği houses have an introverted structure that courtyards and gardens are organized behind walls. Houses are situated facing kıbleh with their one facade. They are designed in accordance with the economical-social status and the sense of privacy of the family—restricted amount of contact with the outside world. The large families used to live in these houses carrying on their traditions. Possibilities of a family come up as main factors that specify plan, material, floor height and construction type of a building. Thereupon, one-storey houses were built as adobe masonry constructions, whilst houses which were rich in material and plan were constructed with nogged-frame technique.

There had been no adjoining houses in Divriği until 20th century. Each house with its own garden and field was located on a large detached land (Fig. 4). The foremost concern in situating the houses used to be the kibleh since it is a matter of belief to consider the kibleh not only during praying but also during sleeping, sitting or going out (Sakaoğlu, 1978).

Traditional Divriği houses generally have two-storeys. The ground floor usually consists of stable, granary, pantry, winter rooms, and kitchen while the upper floor accommodates summer and winter rooms, council-hall (*divanhane*), coffee owen (*kahve ocağı*) and guest room. There are also special parts like *nimseki* and *toyhane* that are not found in other Anatolian houses (METU MATPUM, 2010).

First entering from a huge door to a courtyard that is framed by high walls, then going upstairs by an outdoor stair, are typical plan characteristics of Turkish house. Hall (*sofa*) in Turkish house becomes smaller and different in name (*divanhane*) in Divriği house but it is used for similar reasons like doing daily housework and relaxing especially in summer. Sections for men (*selamlık*) and women (*harem*) can be seen in the houses of wealthy families (Sözen, 2006).

In traditional Divriği houses, room is named as *göz* and a unit of measure, *mağ* (3x3-m) is used in construction. Thus, houses are called as for instance three-*göz* and eight-*mağ* in order to indicate number of sections and approximate dimensions of a house.

Traditional Divriği house is famous with its wooden decoration on ceilings, doors, stores and cupboards and plaster decoration on cookers and plant stands. Built-in furniture including various functions such as storing, bathing, etc. was ornamented in harmony with the interior decoration of the house.

Wood and adobe are nondurable materials against environmental conditions. Being earth-roofed is also a factor that shortens the life of a house. Therefore, the history of the houses that can be seen in Divriği dates back only to 19th century (Sakaoğlu, 1978).

### 3.1. PLAN TYPES OF DİVRİĞİ HOUSES

There are three types of houses in Divriği having inner halls, inside and outside halls or central halls (Fig. 5). The house having no hall as one of the types of Turkish houses is not found in Divriği (Bektaş, 1996).

**Houses with inner halls** (*iç sofalı evler*) are usually one-storey. There exists a *toyhane* in the middle of the house.

**Houses with inside and outside halls** (*iç ve dış sofalı evler*) have separated sections for men and women. There appear separate courtyards for summer and winter uses.

**Houses with central halls** (*orta sofalı evler*) have mostly two storeys. There is no *toyhane* in this type of houses (METU MATPUM, 2010).

### 3.2. MAIN SPACES IN DİVRİĞİ HOUSES

Divriği houses respect the basic principles of space formation of Turkish house. They can be considered in the group of Central Anatolian houses because Divriği houses reflect the history, culture, economy, way of life and technology of the Turkish community living in this region (Sözen, 2006).

Main spaces in Divriği house are described briefly as following (Fig. 6-8):

**Courtyard (*Avlu*) and Main Gate (*Cümle Kapısı*):** Courtyard is the first part while entering from the street to the house through main gate. If the house has a large plan and is divided into *harem* and *selamlık*, the courtyard provides the connection with a secondary door between these two units.

***Ayaz* and Garden:** *Ayaz* is the second courtyard in front of the *harem* and reserved for only women. It also provides a passage between the courtyard and the garden. The main components of *ayaz* are outside kitchen, oven, granary, woodshed, stable, toilet and *örtme*. The garden is very important in social life of Divriği that establishes the neighbourhood relations. The tradition of garden houses still survives (METU MATPUM, 2010).

***Örtme*:** It is a semi-open space in front of the *harem* entrance in the *ayaz*. It is generally rectangular or square shaped in plan (Fig. 6).

**Council-hall (*Divanhane*):** Hall *(sofa)* in Turkish house is named as council-hall (*divanhane*) in Divriği house. It is a semi-open space attached to the entrance of the *selamlık*. It has a rectangular or square shape. One side of the council-hall is open, the other sides are surrounded by walls and the entrance of the *selamlık.* There is a small corridor connecting the hall with the other rooms (Şenol, 2007).

**Men's Section (*Selamlık*):** Among the functions of a room, the most important one is the assembly of men (Küçükerman, 1973). The *selamlık* has generally two storeys and is located on the street side (Şenol, 2007).

**Women's Section (*Harem*):** As a reflection of the social values, this section was designed with less care when compared to the

1 2 3

Fig 5. Plan types-houses with inner halls(1), inside and outside halls(2) and central halls(3) (Şenol, 2007)

*selamlık* (Küçükerman, 1973). The *harem* is usually one-storey and situated near the garden (Şenol, 2007).

**Main-Room (*Başoda*):** Main room (*başoda*) is the primary part of the *selamlık*. It is named as summer room (*yaz odası*) after 1850s. It differs from the other spaces with its many windows and ceiling ornamentations. It is composed of *aşağı seki*, **Winter room (*Kış odası*):** As spaces are designed considering the climatic conditions, there appears a winter room in traditional Divriği houses. It has a rectangular plan and one or two clerestories on its walls. The clerestory admits limited daylight, therefore it is usually dim inside (Fig.7).

***Yıldız Köşkü* (*Cihannuma*):** *Cihannuma* in Turkish house named in Divriği as *yıldız köşkü* (lantern tower). It is the third floor that is connected to *selamlık* with a stairs. It can be rectangular, polygonal and circular in plan. It functions as a relaxation room and provides the landscape of Divriği (Fig. 7).

*kilimüst*ü and *nimseki*. *Nimseki* has rectangular plan and is 45-50-cm above the ground. It was the place that young men gathered and listened to talks and guests were hosted at nights. There appears no *nimseki* in Divriği houses after 1850 (Sakaoğlu, 1978) (Fig. 6-7).

**Kitchen:** Kitchen has the name *ocaklık* in Divriği houses. There is an inside kitchen in *harem* section. Besides, there is a little stove (*kahve ocağı*) for serving coffee to guests located close to the main room.

**Outside Kitchen:** Outside kitchen has a *tandır* which cooking is done. This kitchen is used during special events such as weddings.

**Stairs:** There are outdoor and indoor wooden stairs called as *ayakçak* in Divriği. The outdoor stairs attaches to an area called *ayakçakbaşı* at the entrance of the *divanhane* (Sakaoğlu, 1978).

Fig 6. Inside of a summer room, *Örtme* in harem, Plaster plant stand (Ünlüdil, 2005)

Fig 7. Inside of a *yıldız köşkü*, Inside of a winter room, Inside of a summer room (Ünlüdil, 2005)

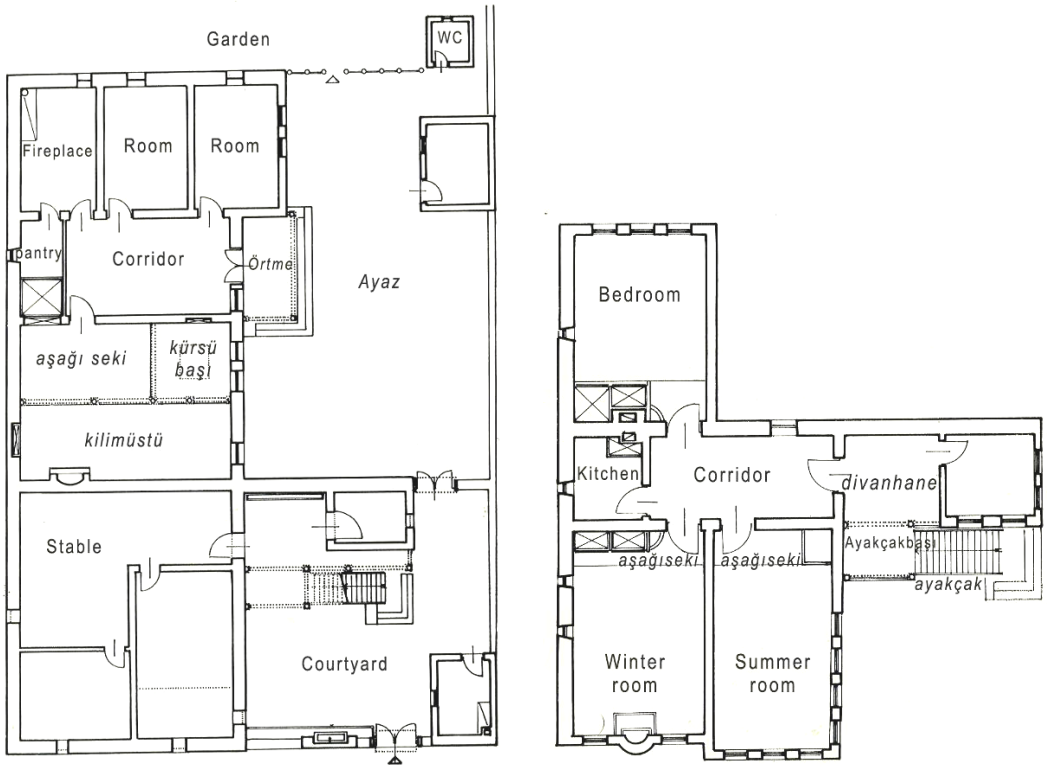


Fig 8. Hafislioğlu Ebubekir Efendi House-ground floor plan, first floor plan (Sakaoğlu, 1978)

**4. Toyhane**

*Toyhane* is the most significant unit that gives an identity to the traditional Divriği houses. *Toyhane* is a living space peculiar to Divriği houses. It was a multi-functional hall in which everything was done especially in winters, meals were eaten, guests were hosted and kids and elders slept at nights. It is thought that, due to the similarity between the names, *toyhane* has a close relation with *tabhane* which is a room or a hall of a house organized for use in winters at Seljuk era. As being large and functional enough for holding ceremonies like weddings, guest visits, circumcisions, funerals; *toyhane* is considered as the living room of the house. The *toyhane* traditions existed until the second quarter of 20$^{th}$ century (Özen, 2000).

4.1. SPATIAL ANALYSIS OF *TOYHANE*

*Toyhane* is located mostly in ground floor at women's section (Fig. 9). In town houses or houses having no divided sections for men and women, it also functions as *harem.* Its plan shows similarities with the main-room.

As one of the features of Turkish house, in *toyhane*, there are different parts due to different steppings. These parts are; lower stone base (*aşağı seki*), *kilimüstü* and *kürsü başı* (Fig. 9). *Toyhane* is approximately four small room-sized. If *toyhane* is assumed as 54-m², 9-m² of its area is occupied by *kürsübaşı* and 18-m² is reserved for *aşağı seki* (Özen, 2010). *Toyhane* is supported by 3-5 posts depending on the size of the room (Fig. 10) (Şenol, 2007).

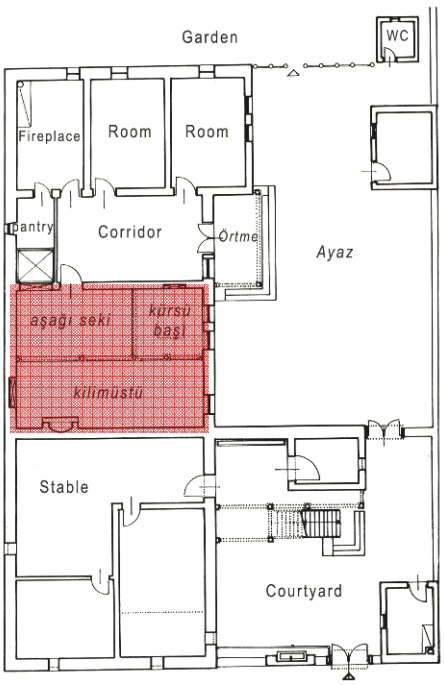


Fig 9. Hafislioğlu Ebubekir Efendi House-ground floor plan-*toyhane is highlighted* (Sakaoğlu, 1978)

Fig 10. *Toyhane* in Tevrüzlü House (Şenol, 2007)

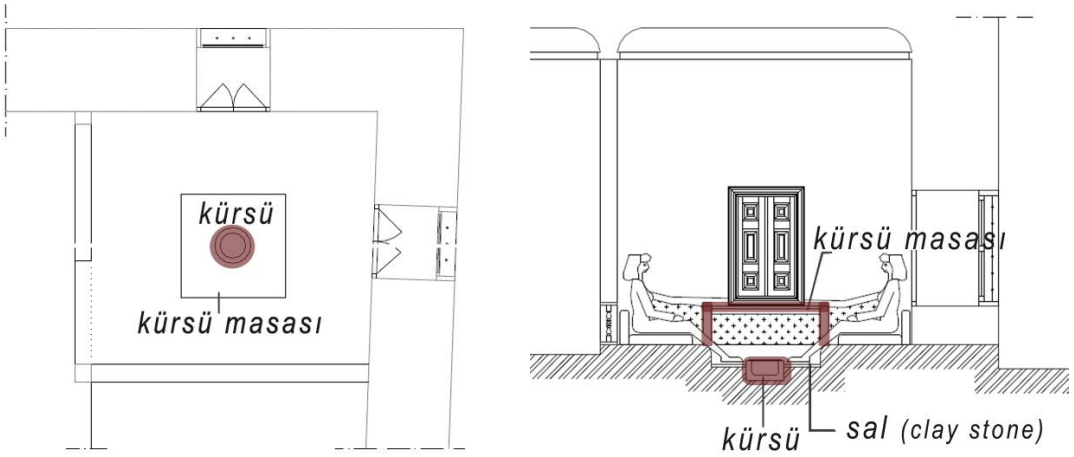


Fig 11. *Kürsü başı in Toyhane-plan, section (Sefer, 2005)*

**Lower stone base (*aşağı seki*)** is generally square-shaped in plan and located at the entrance. It is covered with *sal* (thin, smooth and shiny clay based stone). In this part, there is a low shelf (*suluk*) that keeps some belongings like water-pan, washbowl and soap.

***Kilim üstü*** has a rectangular-shape in plan and located one-step above the lower stone base (*aşağı seki*). It attracts attention with its plain and functional wooden decoration of its closet and elegant balustrades (Şenol, 2007).

**Kürsü başı**, is square-shaped and seems to be the main lounge. It has this name because of the heating unit, *kürsü*, in the middle of the space. *Kürsü* was the place around which the family gathered for eating and chatting. At most 10 people can sit around the *kürsü* (Özen, 2000). *Kürsü başı* is furnished by carpets, pillows and mats in a way that is called as *yuvalama* (Fig 12). They are furnished in accordance with pleasures and possibilities of families. There are built-in closets in *kilimüstü* for putting the goods (Şenol, 2007).

At the center of the *kürsü başı* there is a stone firepan (*ateşlik*) buried in the ground for 25-35-cm. Fire brand is put on this firepan from hearthstone located in *kilimüstü*. There is a wooden table (*kürsü masası*) which is placed 60-70-cm above the firepan, is covered with two quilts (*kürsü yorganı*). In order to remove the gloomy atmosphere of the winters, vivid colors are mostly preferred (Şenol, 2007; Sakaoğlu, 1978) (Fig. 12).

*Kürsü* had been used for heating until 1960s. There were limited number of stove-heated houses and heating stoves were used only in official buildings in 1940s (Özen, 2000).

*Toyhane* is lightened via two windows located at the wall of *kürsü başı*. In some *toyhane*s, there are also clerestories in the other parts. The *kürsü* and the few openings on the walls points out that the design of *toyhane* has concerns for saving on the firewood and protecting from the cold (Özen, 2000).

## 4.2. *TOYHANE* IN DİVRİĞİ HOUSES

*Toyhane* forms the essential space of the house except for the houses having central halls. In order to focus on the spatial potentials of *Toyhane*, it is exemplified in some of Divriği houses.

***Toyhane* in Mühürdarzade House:**

Mühürdarzade House was constructed at middle of the 19th century. It was restored in line with the requirements but it could manage to reach today preserving its plan features and appearance (Ünlüdil, 2005). It has a *toyhane* situated in the ground floor. The *toyhane* occupies approximately 50-m² area (Fig. 13). It has five windows, one of them is in *kürsü başı* and the rest of them are on the walls of *kilimüstü*. There is also one clerestory on the wall of *kürsü başı*. Thus, this *toyhane* can be regarded as well-lit, relatively. On the south side of *toyhane*, built-in closets hide a large space behind. They are very well-designed as they include a bath and a large area for storing the goods. The closets, the doors, the balustrades, the posts, the ceiling are all wooden. It can be said that the whole wooden decoration is plain and in harmony (Fig. 14).

Fig 12. *Kürsü başı in Hacı Nafisli House (Şenol, 2007)*

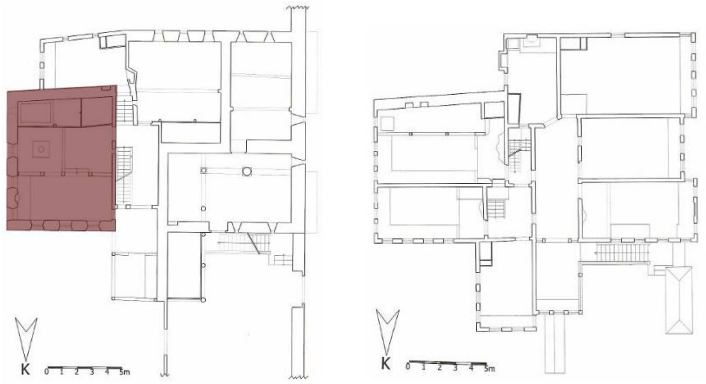

Fig 13. Mühürdarzade House-Ground and First Floor Plan-*Toyhane* is highlighted (Ünlüdil, 2005)

Fig 14. *Toyhane* in Mühürdarzade House (2011, Murat Dündar)

Fig 15. Arıstakzade House-Ground and First Floor Plan-*Toyhane*s are highlighted (Ünlüdil, 2005)

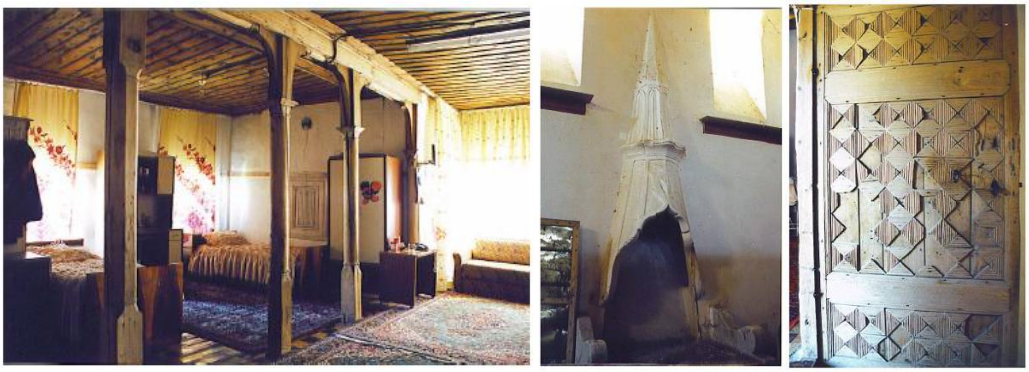

Fig 16. Toyhane in Arıstakzade House (Ünlüdil, 2005)

***Toyhane* in Tevrüzlü House:**

It was constructed at the beginning of the 20th century. *Toyhane* is in the *harem* section in the ground floor (Fig. 17). Its *toyhane* has special wooden ornamentation on the ceiling. *Kürsü başı* has the most adorned decoration among the others. There is a large closet stretching out along the north wall, also there is a niche on the east wall (Fig. 18). The ground of the *kilimüstü* and *kürsübaşı* which used to be *sal* (clay stone) covered, is then converted to concrete removing the *kürsü* (Ünlüdil, 2005).

***Toyhane* in Sancaktar House:**

Sancaktar House was built at the beginning of the 20th century. In the house, the *toyhane* has relationships with both indoors and outdoors (Fig. 19). In this way, it acts as a service and a transition area. The door appearing as a closet (Fig. 19) connects *toyhane* to the inner sections of the house.

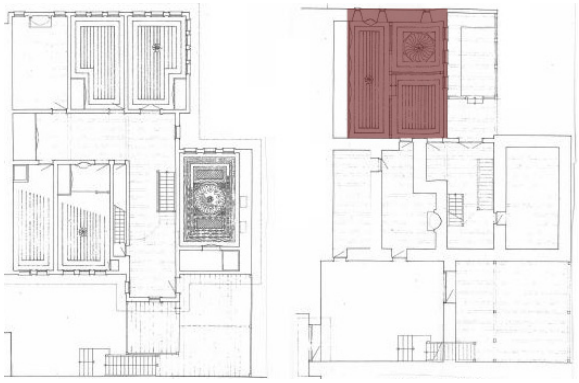

Fig 17. Tevrüzlü House-first and ground floor plan (Sefer, 2005)

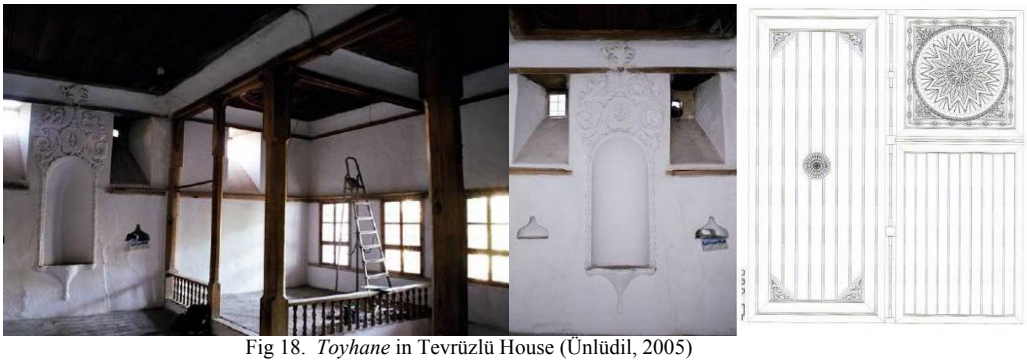

Fig 18. *Toyhane* in Tevrüzlü House (Ünlüdil, 2005)

Fig 19. *Toyhane* in Sancaktar House (2011, Murat Dündar)

## 5. Conclusion

*The increasing desire for comfort that accompanied the technological developments led to changes in the family structure and a trend towards the nuclear family. As a result, there appear comfortable flats reflecting financial competence and a modern life style. In short, the world has become uniform, the regional characteristics are disappearing* (Günay, 2005).

*With time, society has changed, the form has changed, and what has not already changed, is rapidly disappearing toda*y (Küçükerman, 1973).

Confirming the statements of Günay and Küçükerman, after mid 1920s, it is seen that Divriği has moved away from its unique housing architecture and tried to keep up with the requirements of the times in respect of material, style and technique. In one of his studies, Özen (2000) underlines the housing in Divriği as; Divriği houses in his memory (1946) were adobe constructed, earth-roofed houses. In 1950s tile-covered houses increased in number and concrete masses started to take place of adobe structures.

*Toyhane* lost its initial shape and started to accommodate new functions in parallel with these developments. Being organized as the largest space in the house, toyhane was divided into rooms such as sitting room, bedroom, etc. in order to meet the modern demands. Large houses belonging to large families were divided into two or more for use of different nuclear families, so the relations of *toyhane* with the other sections of the house changed. It could not maintain its spatial characteristics since *kürsü* was not present in *toyhane*. Heating stoves and central heating started to be used in houses. Therefore, the upper part of *kürsü* was covered and ground of *kürsü başı* was leveled. Moreover, the decoration of *toyhane* lost its integrity. There became no need to have a closet for bathing because of the bathrooms.

As mentioned in previous chapters, the *toyhane* appears to be the most essential space in Divriği houses. If the cases are examined, it can be seen that the *toyhan*es located in various houses differ in spatial features. Size of space reserved for *toyhane*, economical status of family and aesthetic concerns are some of the factors effecting the formation of the *toyhan*e. It is obvious that the *toyhane* had been the space important for the unity of the family and the conservation of the traditions in Divriği.

## Acknowledgements

I would like to express my great appreciation to Naci Yüce for his valuable assistance in visiting the traditional Divriği houses. I also would like to thank to my parents, Keriman-Mustafa Kültür, for sharing their precious memories and experiences about Divriği.

## Endnotes

1. Kıbleh is the side to which Muslims should face while they are praying.

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# Contrastive Characters of Spatial Composition Process between Architecturally Trained and Untrained Students

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**Keywords:** spatial composition process, Inductive Logic Programming, Progol, Architectural Space Montage Technique, classification rule, architectural design, spatial schema, architecturally trained student, untrained student

**Abstract:** Inductive logic programming was applied to the analysis of spatial composition processes using an architectural space montage technique. The complexly structured data of the spatial composition processes that consist of many objects, their relationships, and their attributes were modeled with first-order logic. One architectural space montage technique experiment was conducted on 14 architecturally trained students and on 14 untrained students. These experimental cases were analyzed by Progol, which is one ILP system. 513 rules for the trained students and 458 for the untrained students were found. By comparing these rules, we found contrastive characteristics between the two groups from four points of view: (1) extension method of chain of miniatures, (2) relationship as basic unit of composition, (3) type of miniature, and (4) multiplicity of rules.

## 1. Introduction

In this study, the process of architectural design was analyzed by inductive logic programming (ILP) (Muggleton and Raedt, 1994; Lavrac and Dzeroski et al., 1999), which is a machine learning technique based on first-order logic that executes inductive reasoning and generalizes the results from examples to generate new concepts.

In various contexts, it has been reported in the domain of phenomenology or developmental psychology that humans have unconscious spatial schemata that enable them to recognize space (Merleau-Ponty, 1945; Piaget, 1963). In support of this theory, it has been proposed that the human design process is affected by such schemata that appear as the compositional patterns of such architectural elements as walls, furniture, buildings, and so on (Schulz, 1971; Bollnow, 1963). These spatial schemata and compositional patterns could be important factors to form culture. To create an architectural space suitable for human recognition, to re-interpret existing architectures and to understand culture, we must find the latent patterns of spatial composition affected by the spatial schemata from a psychological point of view. This is currently a key issue in the architectural field.

From the above context, this study investigates the patterns in the initial process of architectural design, which visualizes individual mental images. We previously focused on discovering the peculiar patterns of the architectural design process of architecturally trained and untrained individuals (Sugiura and Okazaki, 2002) and the relationship among their patterns and Japanese architecture and landscapes (Sugiura and Okazaki, 2011). This paper focuses on the contrastive characteristics between two groups.

Several studies on architectural design patterns have been done. For example, the Shape-Grammar was defined as a set of production rules that can generate floor plans in F. L. Wright's architectural style (Koning et al., 1981). The Shape-Grammar, however, does not reflect the actual design process. In this paper, actual design processes using an architectural space montage technique (ASMT) were analyzed.

ASMT was developed by one of the authors to elucidate the fundamental patterns of spatial composition that exist in human beings. In an experiment using ASMT, participants composed architectural spaces by placing such miniatures as walls and furniture at a scale of 1:50 on a white board (Fig. 1). In this study, we regarded a spatial composition process using this method as an initial process of architectural design, which is the process of visualizing individual mental images.

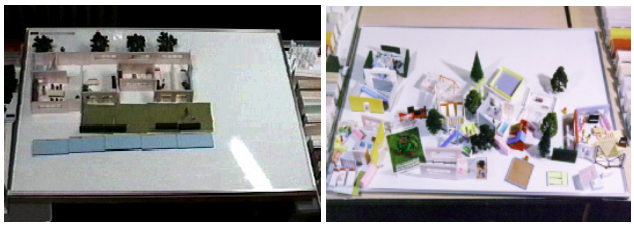


Fig. 1. Examples of models constructed using ASMT by an undergraduate (left) and a kindergartener (right)

In one ASMT experiment, dozens to hundreds of miniatures can be placed. Moreover, a newly placed miniature has many relationships to the previously placed miniatures. It is difficult to discover patterns by only relying on human inspection in such complexly structured data as those in the spatial composition process. Therefore, in this study, we applied Progol, one ILP system, to identify the latent patterns of the spatial composition process in ASMT. ILP has been applied to various fields, including finding the patterns from spatial relational structures (e.g., graphic design of magazine (Chiba, 1999), room arrangements in a house (Mizoguchi, 1995), and molecular models (King, 1995)). However, there has been no study that tried to apply ILP to learning from such structures that include ordinal relationships as the spatial composition process.

In the rest of this paper, brief overviews of ASMT and Progol are given in Sections 2 and 3. In Section 4, the spatial composition process is modeled with the Entity-Relationship (ER) model and described with first-order logic. In Section 5, the spatial composition processes by architecturally trained and untrained students are analyzed. The results of ASMT experiments and rules discovered by Progol are shown. From these rules, contrastive characteristics are discussed between the two groups in Section 6. Finally, our conclusions and future work are stated in Section 7.

## 2. ASMT

ASMT was originally developed in the context of psychotherapy. Clinical psychological analysis has been undertaken on the characteristic patterns of the spatial compositions formed by schizophrenic patients, elementary school children, mentally handicapped children, and kindergarteners (Okazaki et al., 1992a, 1992b, 1997, 1999). In ASMT, since architectural space is composed by placing three-dimensional miniatures, participants are not limited by their drawing ability and can readily express a 3D architectural space. Moreover, we can clearly observe the steps in the design process.

The types of miniatures used in ASMT differ slightly depending on the experimental groups. In this study, we prepared the following 44 kinds of miniatures (Fig. 4): six kinds of styrene walls of different lengths (1800, 2700, 3600, and 5400 mm) and various colors (blue, red, yellow, green, white, gray, pink, ivory, cream, mint, and grain) with various openings, mirror walls and glass walls in lengths of 3600 and 5400 mm with the glass walls in various colors (blue, orange, and clear), columns, twelve kinds of furniture (e.g. table, sofa, carpet, shelf), six different sanitary fixtures (e.g., sink, toilet, bathtub), four different human figures, a dog and a cat, six types of vegetation (e.g., grass, conifers, broadleaf trees, hedges), and five different architectural elements (e.g., balcony, stairs). Fig. 2 shows examples of these miniatures.

In the experimental setting and procedure, a white board (60 by 90 cm) was placed horizontally on a desk in the experimental room. Two smaller white boards (45 by 30 cm) were placed on both sides of the larger board with miniature walls arranged on top of the boards. The other miniatures were displayed on a shelf.

Subjects constructed a model of their “dream” house on the large white board. The experiment ended when they informed the experimenter that they were finished. The state of the model in the experiment was constantly recorded by video camera.

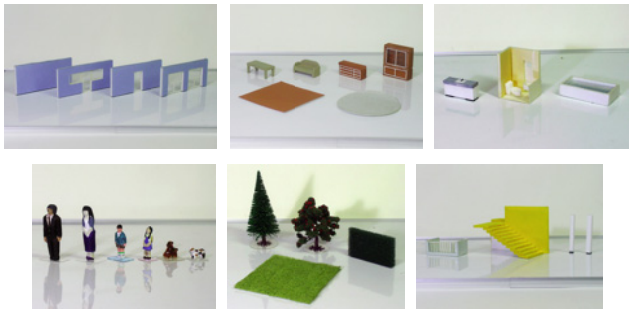


Fig. 2. Miniatures used in ASMT experiment: walls, furniture, sanitary fixtures, human and animal figures, vegetation, and architectural elements

## 3. ILP and Progol

Progol, which is one ILP system created by Muggleton (1995), combines Inverse Entailment with general-to-specific search through a refinement graph and allows arbitrary Prolog programs as background knowledge and arbitrary definite clauses as examples. Input data to Progol consist of a set of positive examples $E+$, a set of negative examples $E-$, a set of background knowledge $BK$, and the mode declarations used by Progol to guide the process of constructing a generalization from examples. From these data, hypotheses are constructed as Horn clauses.

Hypothesis $H$ is complete if $\forall\ e \in E+$: $BK \cup H \models e$, where “$\models$” means logical entailment. Hypothesis $H$ is consistent if $\forall\ e \in E-$: $BK \cup H \not\models e$. Hypotheses can predict whether unknown examples belong to positive or negative examples.

In this paper, one version of Progol, P-Progol 2.7.5, was used. P-Progol was implemented by Srinivasan and Rui in Prolog based on the Progol algorithm (1999).

## 4. Modeling of Spatial Composition Process

To logically describe the design process, we defined a unit of the spatial composition process as miniature placement with relationships to the previously placed miniatures. The spatial composition process is a set of miniature placements.

### 4.1. DATA MODEL

The spatial composition data by ASMT are complexly structured and are collections of architectural objects with geometric relationships. The spatial composition process data were modeled with the ER model (Chen, 1976), a well-known semantic data model. An example of the representation of the spatial composition process using an ER data model is shown in Fig 3. A placed miniature corresponds to an entity. A geometric relationship occurs among the newly placed and existing objects. Each placed miniature has three attributes: type, the angle between the miniature and the white board’s long side, and the ordinal number of the placement occurrence. Each relationship has three attributes: the relation type, the connecting point, and the difference between the ordinal numbers attached to the objects. In addition, the IS-A hierarchies of the attributes based on the inclusion relation among concepts are known in advance (Figs. 4 and 5).

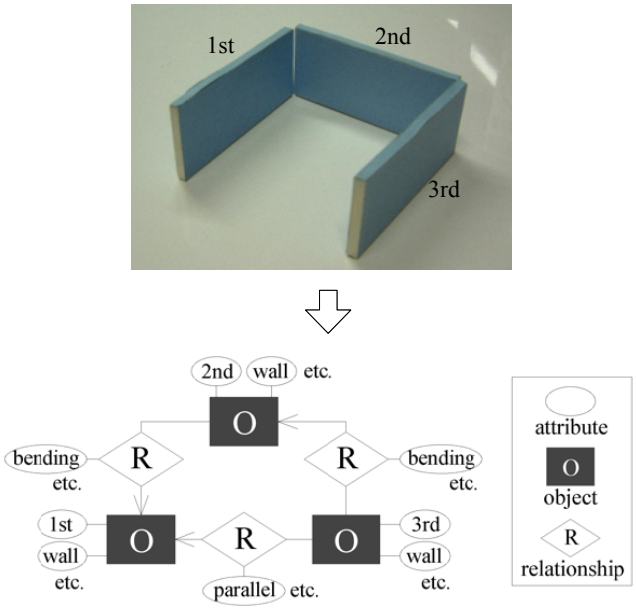



Fig. 3. Example of representation of spatial composition process using ER data model

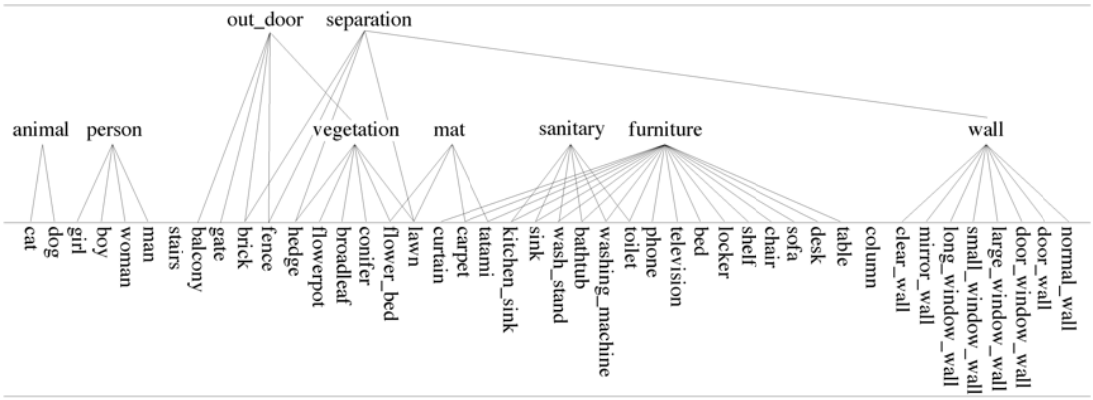



Fig. 4. Hierarchy of object types

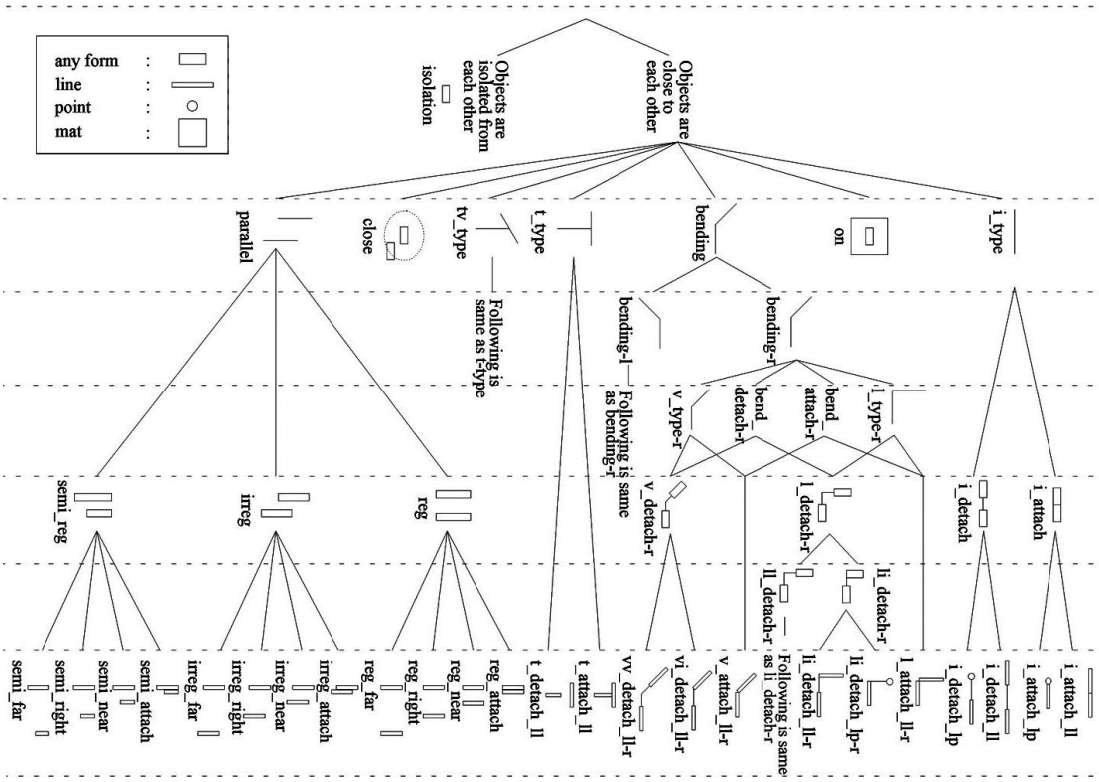



Fig. 5. Hierarchy of relation type

## 4.2. FIRST-ORDER REPRESENTATION

The spatial composition process modeled as an ER model is described as clauses in first-order logic. A predicate *placement* was defined for each placement, predicates *type* and *angle* were defined for each miniature, and a predicate *relation* was defined for each relationship. The information described with *placement* is used as an example, and the information described with *type*, *angle*, and *relation* is used as background knowledge. An example of the description is shown in Fig. 6.

```
placement(1001).
placement(1002).
      ⋮
placement(1091).
placement(1092).
```

```
type(1001,lawn).
angle(1001,0).
relation(1001,isolation,none,no_dif,no_obj).
type(1002,lawn).
angle(1002,0).
relation(1002,close,none,1,1001).
      ⋮
type(1091,broadleaf).
relation(1091,li_detach_lp-l,top,32,1059).
relation(1091,li_detach_lp-l,top,31,1060).
type(1092,door_wall).
angle(1092,90).
relation(1092,li_detach_ll-l,top,42, 1050).
relation(1092,t2_touch,top,36,1056).
```

Fig 6. Description of spatial composition process

## 5. Analysis

### 5.1. RESULTS OF ASMT EXPERIMENTS

One ASMT trial was individually conducted with 14 university students trained in architectural design and 14 untrained university students. The participants composed their “dream” house (Fig. 7).


Fig. 7. Results of ASMT experiments with architecturally trained (left) and untrained students (right): ID, participant ID, working time T (min.) of experiment, number of placements PN

### 5.2. LEARNING METHOD

Progol induced rules from the following two kinds of input data:

(1) Placements by the trained students were set as positive examples and those by the untrained students were set as negative examples.

(2) Placements by the untrained students were set as positive examples and those by the trained students were set as negative examples.

The rules induced from input data (1) and (2) indicate the characteristic patterns of the trained students and untrained students.

### 5.3. RESULTS OF PROGOL LEARNING

As a result, 513 and 458 rules were found from data (1) and (2). The rules, whose *Cov* and *CM* were more than 0.5% and 2/14, were regarded as common rules, where *Cov* means the coverage of the rule and *CM* is the number of members whose placements were set as positive examples and were covered by the rule. The numbers of common rules of the trained and untrained students were 30 and 28. The common rules of each group are shown in Tables 1 and 2.

## 6. Discussion

### 6.1. VALIDATION OF RULES

We measured the classification accuracy of unknown examples, which had not been used for Progol learning, using five-fold cross-validation (Weiss, 1990). The 28 experimental cases (Fig. 7) were split into five folds. Each fold contains cases by groups of the same number. The examples containing four folds were set as training examples from which Progol induced rules. The examples contained in the remaining fold were used for validation and classified as negative or positive using the induced rules. The above procedures were repeated five times while changing the combination of the folds. The predictive accuracy of positive examples $PA^+$ and negative examples $PA^-$ was calculated by $PA^+ = TP/P$ and $\mathrm{PA}^- = \mathrm{TN/N}$, where $TP$ is the number of correctly classified positive examples, TN is the number of correctly classified negative examples, $P$ is the total number of positive examples for training, and $N$ is the total number of negative examples for training. The average of $PA^+$ and $PA^-$ was calculated by $F = 2P^+P^-/(P^+ + P^-)$. The predictive accuracies of the rules of the trained and untrained students were 0.510 and 0.541.

Table 1-1. Rules of trained students: IDs of rule *RID*, number of positive examples covered by rule CE, coverage of rule Cov (%), number of members whose placements are covered by rule CM, description of rules, and diagram of rules

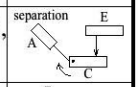
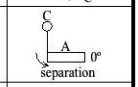
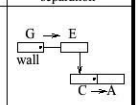
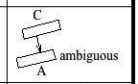
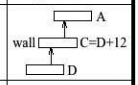
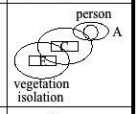
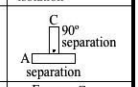
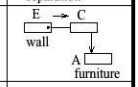
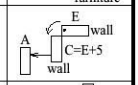
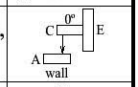
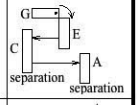
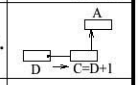
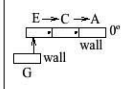
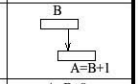
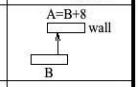
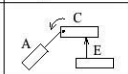
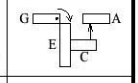
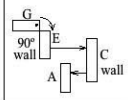
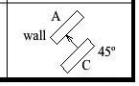
| *RID* | *CE* | *Cov* (%) | *CM* | Description of rules | Diagram |
|---|---|---|---|---|---|
| *Rt1* | 83 | 4.61 | 6/14 | placement (A):-type (A, column). |   |
| *Rt2* | 23 | 1.28 | 4/14 | placement (A):-type (A, separation), relation (A, vi_detach-r, root, B, C), relation (C, irreg, right, D, E). |   |
| *Rt3* | 23 | 1.28 | 7/14 | placement (A):-type (A, separation), angle (A, 0), relation (A, li_detach-lp, none, B, C). |   |
| *Rt4* | 20 | 1.11 | 7/14 | placement (A):-relation (A, i_attach, top, B, C), relation (C, irreg, right, D, E), relation (E, i_detach, top, F, G), type (G, wall). |   |
| *Rt5* | 20 | 1.11 | 2/14 | placement (A):-angle (A, ambiguous), relation (A, irreg, right, B, C). |   |
| *Rt6* | 19 | 1.05 | 5/14 | placement (A):-relation (A, irreg, left, B, C), type (C, wall), relation (C, irreg, left, 12, D). |   |
| *Rt7* | 18 | 1.00 | 4/14 | placement (A):-type (A, person), relation (A, close, none, B, C), relation (C, close, none, D, E), type (E, vegetation), relation (E, isolation, none, F, G). |   |
| *Rt8* | 17 | 0.94 | 6/14 | placement (A):-type (A, separation), relation (A, t_attach, root, B, C), type (C, separation), angle (C, 90). |   |
| *Rt9* | 16 | 0.89 | 8/14 | placement (A):-type (A, furniture), relation (A, irreg, right, B, C), relation (C, i_detach, top, D, E), type (E, wall). |   |
| *Rt10* | 16 | 0.89 | 4/14 | placement (A):-relation (A, irreg, left, B, C), type (C, wall), relation (C, bend_attach-l, root, 5, E), type (E, wall). |   |
| *Rt11* | 15 | 0.83 | 8/14 | placement (A):-type (A, wall), relation (A, irreg, right, B, C),angle (C,0), relation (C,t_attach,left,D,E). |   |
| *Rt12* | 15 | 0.83 | 7/14 | placement (A):-type (A, separation), relation (A, irreg, right, B, C), type (C, separation), relation (C, irreg, left, D, E), relation (E, bend_attach-r, top, F, G). |   |
| *Rt13* | 14 | 0.78 | 5/14 | placement (A):-relation (A,irreg,left,B,C), relation (C,i_detach,top,1,D). |   |
| *Rt14* | 13 | 0.72 | 7/14 | placement (A):-type (A, wall), angle (A, 0), relation (A, i_attach, top, B, C), relation (C, i_attach, top, D, E), relation (E, irreg, left, F, G), type (G, wall). |   |
| *Rt15* | 13 | 0.72 | 9/14 | placement (A):-relation (A, irreg, right, 1, B). |   |
| *Rt16* | 13 | 0.72 | 9/14 | placement (A):-type (A,wall), relation (A, irreg, left, 8, B). |   |
| *Rt17* | 12 | 0.67 | 5/14 | placement (A):-relation (A, vi_detach-l, root, B, C), relation (C, irreg, left, D, E). |   |
| *Rt18* | 12 | 0.67 | 5/14 | placement (A):-relation (A, irreg, left, B, C), relation (C, t_attach, right, D, E), relation (E, bend_attach-r, top, F, G). |   |
| *Rt19* | 12 | 0.67 | 7/14 | placement (A):-relation (A, irreg, left, B, C), type (C, wall), relation (C, irreg, right, D, E), type (E, wall), angle (E, 90), relation (E, bend_attach-r, top, F, G). |   |
| *Rt20* | 12 | 0.67 | 3/14 | placement (A):-type (A, wall), relation (A, irreg, left, B, C), angle (C, 45). |   |

Table 1-2. Rules of trained students (continuation of Table 1-1)

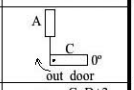
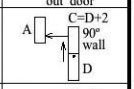
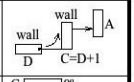
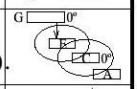
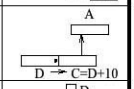
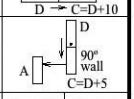
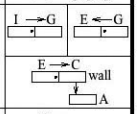
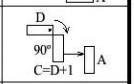
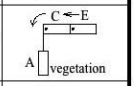
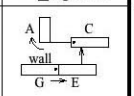
| *RID* | *CE* | *Cov* (%) | *CM* | Description of rules | Diagram |
|---|---|---|---|---|---|
| *Rt21* | 12 | 0.67 | 7/14 | placement (A):-relation (A, li_detach-r, root, B, C), type (C, out_door), angle (C,0). |  |
| *Rt22* | 11 | 0.61 | 4/14 | placement (A):-relation (A, irreg, left, B, C), type (C, wall), angle (C, 90), relation (C, i_attach, top, 2, D). |  |
| *Rt23* | 11 | 0.61 | 5/14 | placement (A):-relation (A, irreg, right, B, C), type (C, wall), relation (C, li_detach-l, top, 1, D), type (D, wall). |  |
| *Rt24* | 11 | 0.61 | 2/14 | placement (A):-relation (A, close, none, B, C), angle (C, 0), relation (C, close, none, D, E), relation (E, irreg, right, F, G), angle (G, 0). |  |
| *Rt25* | 10 | 0.56 | 3/14 | placement (A):-relation (A, irreg, left, B, C), relation (C, i_attach, top, 10, D). |  |
| *Rt26* | 10 | 0.56 | 4/14 | placement (A):-relation (A, irreg, left, B, C), type (C, wall), angle (C, 90), relation (C, i_attach, root, 5, D). |  |
| *Rt27* | 10 | 0.56 | 2/14 | placement (A):-relation (A, irreg, right, B, C), type (C, wall), relation (C, i_attach, top, D, E), relation (E, i_attach, root, F, G), relation (G, i_attach, top, H, I). |  |
| *Rt28* | 10 | 0.56 | 6/14 | placement (A):-relation (A, irreg, right, B, C), angle (C, 90), relation (C, bend_attach-r, top, 1, D). |  |
| *Rt29* | 10 | 0.56 | 5/14 | placement (A):-type (A, vegetation), relation (A, li_detach-l, root, B, C), relation (C, i_attach, root, D, E). |  |
| *Rt30* | 10 | 0.56 | 7/14 | placement (A):-relation (A, li_detach-r, root, B, C), relation (C, irreg, left, D, E), relation (E, i_attach, top, F, G), type (G, wall). |  |

Table 2-1. Rules of untrained students: IDs of rule RID, number of positive examples covered by rule CE, coverage of rule Cov (%), number of members whose placements are covered by rule CM, description of rules, and diagram of rules

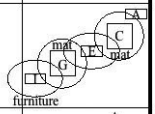
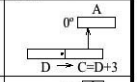
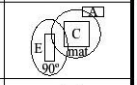
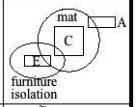
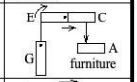
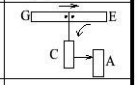
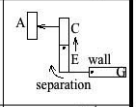
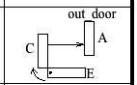
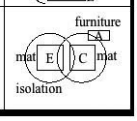
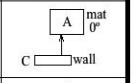
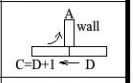
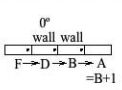
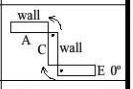
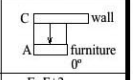
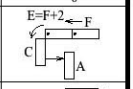
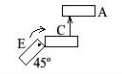
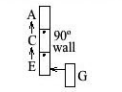
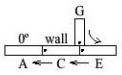
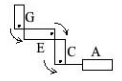
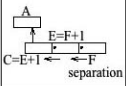
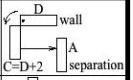
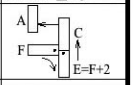
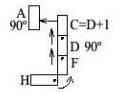
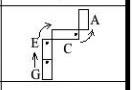
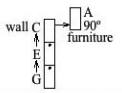
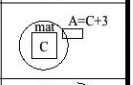
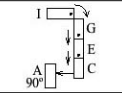
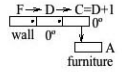
| *RID* | *CE* | *Cov* (%) | *CM* | Description of rules | Diagram |
|---|---|---|---|---|---|
| *Ru1* | 56 | 3.35 | 8/14 | placement (A):-relation (A, close, none, B, C), type (C, mat), relation (C, close, none, D, E), relation (E, close, none, F, G), type (G, mat), relation (G, close, none, H, I), type (I, furniture). |  |
| *Ru2* | 29 | 1.73 | 4/14 | placement (A):-angle (A, 0), relation (A, irreg, left, B, C), relation (C, i_attach, top, 3, D). |  |
| *Ru3* | 27 | 1.61 | 8/14 | placement (A):-relation (A, close, none, B, C), type (C, mat), relation (C, close, none, D, E), angle (E, 90). |  |
| *Ru4* | 26 | 1.56 | 6/14 | placement (A):-relation (A, close, none, B, C), type (C, mat), relation (C, close, none, D, E), type (E, furniture), angle (E, 0), relation (E, isolation, none, F, G). |  |
| *Ru5* | 25 | 1.50 | 5/14 | placement (A):-type (A, furniture), relation (A, irreg, right, B, C), relation (C, i_attach, top, D, E), relation (E, li_detach-r, top, F, G). |  |
| *Ru6* | 21 | 1.26 | 8/14 | placement (A):-relation (A, irreg, right, B, C), relation (C, li_detach-l, root, D, E), relation (E, i_attach, top, F, G). |  |
| *Ru7* | 21 | 1.26 | 4/14 | placement (A):-relation (A, irreg, left, B, C), relation (C, i_attach, top, D, E), type (E, separation), relation (E, li_detach-r, root, F, G), type (G, wall). |  |
| *Ru8* | 20 | 1.20 | 8/14 | placement (A):-type (A, out_door), relation (A, irreg, right, B, C), relation (C, bend_attach-r, root, D, E). |  |
| *Ru9* | 20 | 1.20 | 7/14 | placement (A):-type (A, furniture), relation (A, close, none, B, C), type (C, mat), relation (C, close, none, D, E), type (E, mat), relation(E, isolation, none, F, G). |  |

Table 2-2. Rules of untrained students (continuation of Table 2-1)

| *RID* | *CE* | *Cov* (%) | *CM* | Description of rules | Diagram |
|---|---|---|---|---|---|
| *Ru10* | 14 | 0.84 | 4/14 | placement (A):-type (A, mat), angle (A, 0),<br>relation (A, irreg, left, B, C), type (C, wall). |  |
| *Ru11* | 13 | 0.78 | 6/14 | placement (A):-type (A, wall), relation (A, bend_attach-l, top, B, C),<br>relation (C, i_attach, root, 1, D). |  |
| *Ru12* | 13 | 0.78 | 4/14 | placement (A):-relation (A, i_attach, top, 1, B), type (B, wall),<br>relation (B, i_attach, top, C, D), type (D, wall), angle (D, 0),<br>relation (D, i_attach, top, E, F). |  |
| *Ru13* | 13 | 0.78 | 8/14 | placement (A):-type (A, wall), relation (A, bend_attach-l, top, B, C),<br>type (C, wall), relation (C, bend_attach-r, root, D, E), angle (E, 0). |  |
| *Ru14* | 13 | 0.78 | 7/14 | placement (A):-type (A, furniture), angle (A, 0),<br>relation(A, semi_reg, right, B, C), type(C, wall). |  |
| *Ru15* | 13 | 0.78 | 5/14 | placement (A):-relation (A, irreg, right, B, C),<br>relation (C, bend_attach-l, root, D, E), relation (E, i_attach, root, 2, F). |  |
| *Ru16* | 12 | 0.72 | 2/14 | placement (A):-relation (A, irreg, left, B, C),<br>relation (C, bend_attach-r, top, D, E), angle (E, 45). |  |
| *Ru17* | 12 | 0.72 | 5/14 | placement (A):-relation (A, i_attach, top, B, C), type (C, wall),<br>angle (C, 90), relation (C, i_attach, top, D, E),<br>relation (E, irreg, left, F, G). |  |
| *Ru18* | 11 | 0.66 | 5/14 | placement (A):-angle (A, 0), relation (A, i_attach, root, B, C),<br>type (C, wall), relation (C, i_attach, root, D, E),<br>relation (E, bend_attach-l, root, F, G). |  |
| *Ru19* | 11 | 0.66 | 6/14 | placement (A):-relation (A, li_detach-l, root, B, C),<br>relation (C, bend_attach-r, top, D, E),<br>relation (E, bend_attach-l, root, F, G). |  |
| *Ru20* | 11 | 0.66 | 4/14 | placement (A):-relation (A, irregular, left, B, C),<br>relation (C, i_attach, root, 1, E), relation (E, i_attach, root, 1, F),<br>type (F, separation). |  |
| *Ru21* | 11 | 0.66 | 6/14 | placement (A):-type (A, separation), relation (A, irreg, right, B, C),<br>relation (C, bend_attach-l, root, 2, D), type (D, wall). |  |
| *Ru22* | 10 | 0.60 | 4/14 | placement (A):-relation (A, irreg, left, B, C),<br>relation (C, i_attach, top, D, E), relation (E, bend_attach-r, top, 2, F). |  |
| *Ru23* | 10 | 0.60 | 3/14 | placement (A):-angle (A, 90), relation (A, irreg, left, B, C),<br>relation (C, i_attach, top, 1, D), angle (D, 90),<br>relation (D, i_attach, top, E, F), relation (F, bend_attach-l, top, G, H). |  |
| *Ru24* | 10 | 0.60 | 9/14 | placement (A):-relation (A, bend_attach-l, top, B, C), type (C, wall),<br>relation (C, bend_attach-r, top, D, E), relation (E, i_attach, top, F, G). |  |
| *Ru25* | 9 | 0.54 | 4/14 | placement (A):-type (A, furniture), angle (A, 90),<br>relation (A, irreg, right, B, C), type (C, wall),<br>relation (C, i_attach, top, D, E), relation (E, i_attach, top, F, G). |  |
| *Ru26* | 9 | 0.54 | 9/14 | placement (A):-relation (A, close, none, B, C), type (C, mat),<br>relation (A, close, none, 3, C). |  |
| *Ru27* | 9 | 0.54 | 3/14 | placement (A):-angle (A, 90), relation (A, irreg, left, B, C),<br>relation (C, i_attach, root, D, E), relation (E, i_attach, root, F, G). |  |
| *Ru28* | 9 | 0.54 | 6/14 | placement (A):-type (A, furniture), angle (A, 0),<br>relation (A, irreg, right, B, C), angle (C, 0),<br>relation (C, i_attach, top, 1, D), angle (D, 0),<br>relation (D, i_attach, top, E, F), type (F, wall). |  |

### 6.2. COMPARISON OF TWO GROUPS

By comparing the rules of the trained and untrained students, four contrastive characteristics (Table 3) were found from the following two viewpoints:

1. Attributes of miniatures and relationships that are referred to in rules
2. Compressibility of the information with generalization and predictive precision of rules

The details of these characteristics are discussed in the following subsections.

#### *6.2.1. Extension method of chain of miniatures*

Ten of the 30 rules of trained students, *Rt2-4*, *9*, *13*, *17*, *21*, *23*, *29*, and *30*, refer to noncontact relationships that indicate that the miniatures don't touch each other (e.g., "irreg," "vi_detach," "i_detach," and "li_detach"). On the contrary, only 4 of the 28 rules of untrained students, *Ru5-7*, and *Ru19*, refer to noncontact relationships. 21 of the 28 rules of untrained students, *Ru2*, *5-8*, *11-13*, *15-25*, *27*, and *28*, refer to contact relationships that indicate that the miniatures touch each other (e.g., "i_touch" and "bend_attach"). Only 11 of the 30 rules of trained students, *Rt2-4*, *9*, *13*, *17*, *21*, *23*, *29*, and *30*, refer to contact relationships. Fig. 8 illustrates these differences, which suggest that trained students have a marked tendency to expand the chain of miniatures by noncontact relationships and untrained students are more likely to expand the chain of miniatures by contact relationships.

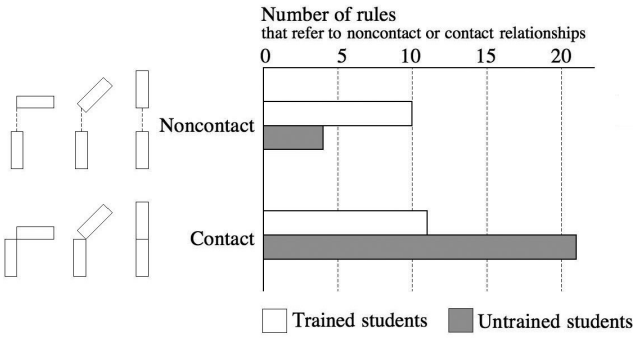



Fig. 8. Comparing numbers of rules that refer to noncontact or contact relationships

#### *6.2.2. Relationship as basic unit of composition*

Five rules of untrained students, *Ru11*, *12*, *20*, *23*, and *28*, indicate that a miniature is placed with an "i_attach" relationship with a miniature that was just previously placed. This tendency suggests that direct composition is a basic unit of the spatial composition process for untrained students.

On the contrary, rules *Rt6*, *12*, *19*, and *24* of the trained students show that three miniatures were frequently placed with "semi_irreg" or "irreg" relationships, indicating miniatures that are parallel to each other. This tendency suggests that parallel composition is a basic unit of the spatial composition process of trained students.

#### *6.2.3. Types of miniatures*

In both groups, the type of miniature most frequently referred to in their rules is "wall." A contrastive characteristic appears in the second most frequently type of miniature mentioned, "separation," in the rules of trained students (*Rt2*, *3*, *8*, *12*). In the rules of untrained students, the second most frequently referred to types are "furniture" (*Ru1*, *4*, *5*, *9*, *14*, *25*, *28*) and "mat" (*Ru1*, *3*, *4*, *9*, *10*, *26*), which have equal ranks. The type "separation" includes such vertical planes as walls, fences, and hedges, and "mat" includes such horizontal planes as carpets, grass, and tatami mats. From above, the process of enclosing and separating spaces with walls characterizes trained students, and making the surrounding living environment using furniture or mats characterizes untrained students.

#### *6.2.4. Compressibility of information and predictive accuracy of rules*

In the Progol learning of the process of architecturally trained students, 1708 of 1801 positive examples were generalized. 513 rules were constructed, and 93 positive examples were not generalized. This result means that information of the spatial composition process by architecturally trained students was compressed by generalization. Compressibility $C$ is calculated by $C = (GP - R)/P$ , where $GP$ is the number of positive examples generalized, $R$ is the number of rules, and $P$ is the total number of positive examples. Large compressibility means that the spatial composition process by positive groups has strong regularity. The compressibility of trained students is $(1708 - 513)/1708 = 0.664$. For untrained students, 1509 of 1672 positive examples were compressed into 458 rules. The compressibility is $(1509 - 458)/1672 = 0.629$. We infer from this comparison of the compressibility of the two groups that the spatial composition process by trained students has stronger regularity than by untrained students.

By comparing the predictive accuracy of the two groups mentioned in Section *6.1*, we recognize that predicting placements by trained students is more difficult than by untrained students.

We can interpret the differences of compressibility and predictive accuracy between the two groups as follows. Since architecturally trained students have strong regularity of spatial composition, many and various patterns appear in their processes. But their rules are so various that predicting their arrangements is difficult. In contrast, untrained student have less regularity of spatial composition and identical patterns appear many times in their processes; their arrangements are comparatively easy to predict.

Table 3 Contrastive characteristics between trained and untrained students

| | Trained | Untrained |
|---|---|---|
| extension method of chain of miniatures | out of contact | in contact |
| relationship as basic unit of composition | parallel | straight |
| type of miniature | separation | mat and furniture |
| multiplicity of rules | multiple | less multiple |

## 7. Conclusions

Inductive logic programming (ILP), which is a machine learning technique that executes inductive reasoning, was applied to the analysis of spatial composition processes using an

architectural space montage technique (ASMT).

The complexly structured data of spatial composition processes that consist of many objects, relationships between them, and their attributes were modeled in first-order logic.

One ASMT experiment was conducted with 14 architecturally trained students and 14 untrained students. These experimental cases were analyzed by Progol, which is an ILP system. 513 rules for the trained students and 458 for the untrained students were found. From these rules, contrastive characteristics were defined between the two groups from four points of view: (1) extension method of chain of miniatures, (2) relationship as basic unit of composition, (3) type of miniature, and (4) multiplicity of rules. In the future, we will analyze the spatial composition process among different cultures using our proposed method.

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# Eye Movements while Ascending and Descending Staircases in Koshien Hotel: Comparison with Architecture Studio

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**Keywords:** eye movement, staircase, Koshien Hotel, visual perception, ambulation, occluding edge, fixation

**Abstract:** We conducted experiments in which participants wearing an eye camera ascended and descended two staircases in the former Koshien Hotel designed by Arata Endo and one staircase in the Architecture Studio, a contemporary university building. Analyses and discussion, which concentrated on the relationship among footings, visible occluding edges, distributions of eye movement direction, and total fixation time by fixation spot, found similarities and differences of eye movement directions and fixation spots among the staircases. The staircases in the Koshien Hotel were probably designed for rich spatial experiences while ascending them due to great changes of eye movements. However, they were also designed for changes of eye movements while descending them.

## 1. Introduction

We grasp such living spaces as architectural and urban spaces and gardens through visual perception and ambulation. We cannot walk without visual perception, and we cannot grasp intricately shaped spaces without ambulation. Visual perception and ambulation share a coordinative relationship.

Our ability to discriminate fine details drops markedly outside of a central area within two or three visual degrees of the retina. Eve movements are therefore essential for human visual perception. We previously conducted experiments with an eye camera and studied eye movements while walking in a maze (Kitahama et al., 1999; Okazaki, Kitahama et al., 2000; Suzuki, Sugai et al., 2002), subway stations (Suzuki, Okazaki and Tokunaga, 2001; Suzuki and Okazaki, 2002a, 2002b), a garden of a tea ceremony room (Nakamura et al., 2002), and urban streets around a train station (Suzuki, Okazaki and Ikeou, 2004; Ikeou et al., 2004). We found discriminative eye movements including fixations on the edges called the "occluding edges" by Gibson (1979), changes of the movements before and after path-learning, and differences of spatial characteristics. In recent years, other researchers have also studied and reported eye movements in living spaces including train stations (Yamamoto et al., 2003; Kido et al., 2006), underground shopping malls (Takenouchi et al., 2004; Hikosaka et al., 2006), public libraries (Fujiki et al., 2006), streets (Chibata, 1999; Watanabe et al., 2003; Miura et al., 2005; Kawamura et al., 2007; Kagami et al,, 2007; Miura, 2010), gardens (Sakai et al., 2004; Kinoshita et al., 2007), and landscape areas (Sugano et al., 2007; Yokoyama et al., 2007, 2009).

In this paper1, we conducted experiments in which participants wearing an eye camera ascended and descended the staircases in two buildings on the Kami-koshien Campus of Mukogawa Women's University. The results showed the similarities and differences between the eye movements on the staircases in the former Koshien Hotel, a modern Japanese architectural masterpiece, and the staircase in the Architecture Studio, a contemporary university building completed in 2007.

The Koshien Hotel was designed by Arata Endo and completed in 1930. Endo studied architectural design from Frank Lloyd Wright, and together they designed the Imperial Hotel and the Yamamura House. Wright considered and designed modern architecture based on the relationship between nature and humans. Many researchers (Manson, 1958; Stewart, 1987; Nute, 1993; Meech, 2001; Aguar et al., 2002) have noted that Japanese ukiyo-e prints, gardens, and architecture strongly influenced Wright's thoughts and works. Endo inherited Wright's thoughts and also considered and designed modern architecture in Japan.

The staircases of the Koshien Hotel have expressive interiors that progressively unfold while ascending or descending them. These spatial structures have similarities to many of Wright's works and are in contrast to the western traditional box-buildings he tried to destruct (Wright, 1955). They also have similarities to Japanese shoin-style architecture and gardens, including the Katsura Imperial Villa and the Ninomaru Palace at Nijo Castle and the approaches to Japanese temples and shrines, including Shisen-do and Daitoku-ji Koto-in Temples reported by Kinoshita et al. (2007). Therefore, this study approaches not only the spatial characteristics of the Koshien Hotel but also Japanese traditional spatial structure that progressively unfolds during walking.

## 2. Methods

### 2.1. EXPERIMENT

#### *2.1.1. Experimental routes*

The experiments were conducted on the routes in the former Koshien Hotel and the Architecture Studio on the Kami-koshien

Campus of Mukogawa Women's University (Fig. 1).

The route in the Koshien Hotel has a quarter-turn staircase from the first to the second floor and a straight-flight staircase from the second to the third floor (Fig. 2). Both staircases are 3.18 m high with low ceilings and are positioned between walls. The scenery in both staircases darts in and out of pedestrian's vision. The bottom corners of the walls in the staircases have ornamental baseboards.

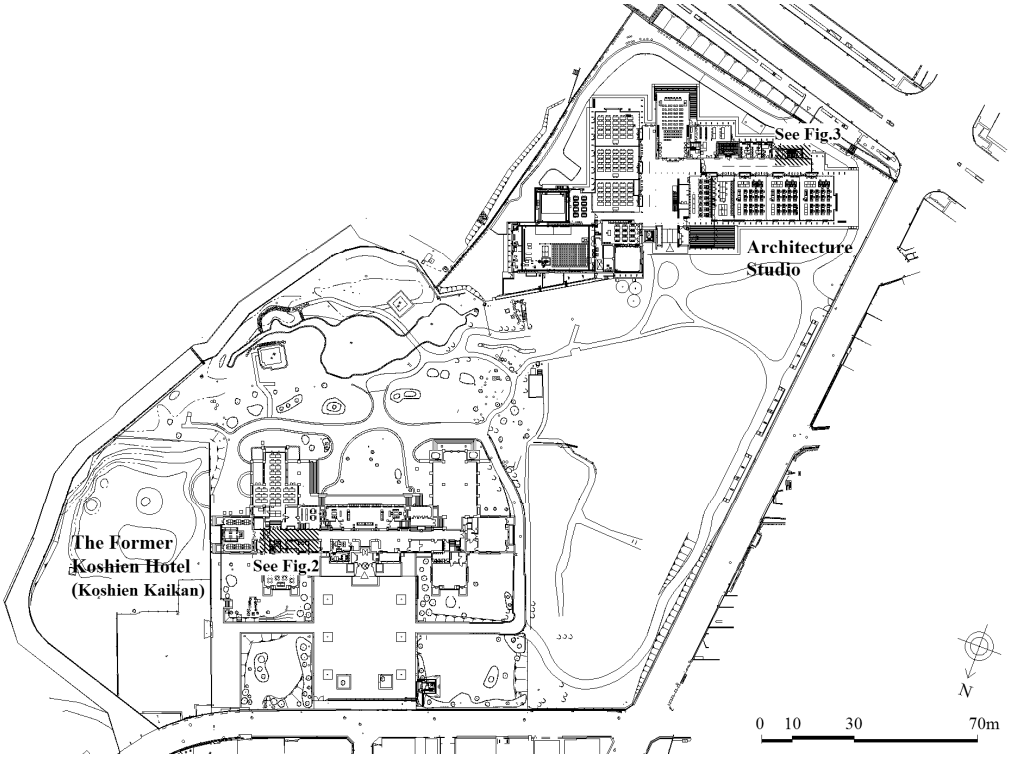



Fig. 1 Kami-koshien Campus of Mukogawa Women's University

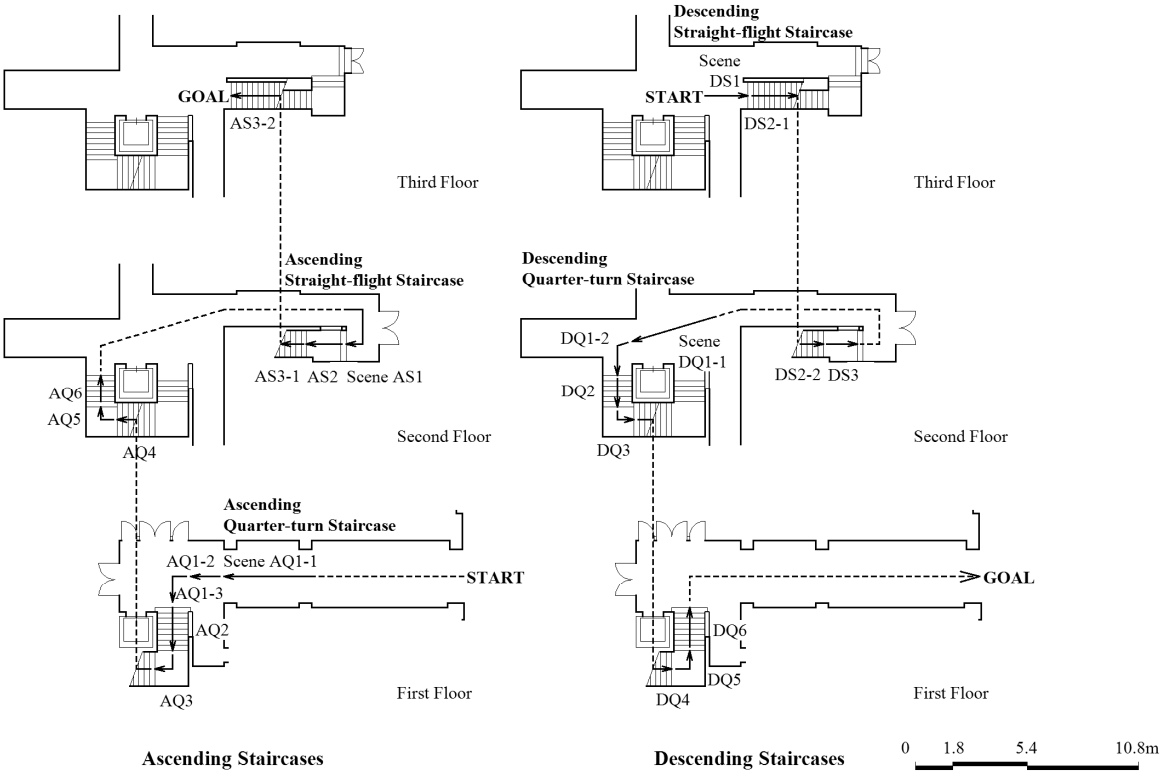



Fig. 2 Experimental route and scenes in ascending and descending staircases in former Koshien Hotel

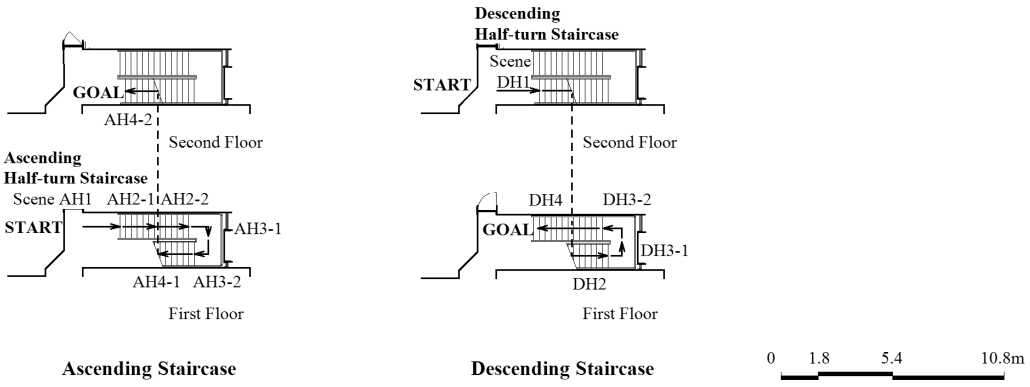



Fig. 3 Experimental route and scenes in ascending and descending staircase in Architecture Studio

The route in the Architecture Studio has a half-turn staircase from the first to the second floor (Fig. 3). It is 4.5 m high with higher ceilings than in the Koshien Hotel and walls outside but not inside it. Unlike in the Koshien Hotel, since there is no ceiling hiding ahead, pedestrians can see the scenery over the banisters on the route in the Architecture Studio.

*2.1.2. Participants*

Participants AK, EH, KA, KM, MH, and MN were students and staff of the Department of Architecture at Mukogawa Women's University and usually use both buildings.

*2.1.3. Procedure*

In a room at the Architecture Studio, the participants wore an NAC EMR-8B eye camera (with a 115º lens) and a backpack with the controller, battery, and Panasonic NV-GS100K-S video camera to record the data of the eye camera. After the eye camera was calibrated in the room, they ascended and descended the staircase in the Architecture Studio (Fig. 3). After walking to the Koshien Hotel, they ascended and descended its staircases (Fig. 2).

Before ascending and descending the staircases, they were indicated to walk step by step. While ascending and descending them, the experimenter shot them from behind on a Panasonic NV-G300-S video camera. At the end of the experiment, the experimenter checked the eye mark on the eye camera to correspond with the eye movements.

2.2. ANALYSIS

*2.2.1. Fixation*

The data of the eye camera recorded by the video camera were loaded into NAC EMR-dFactory Ver 1.2 analysis software. Eye movements were comprised of fixation and saccade. While ascending and descending the staircases, eye marks oscillated not only in saccade but also in fixation. In this analysis, we considered eye mark movements within 3.0 visual degrees per fixation and input the criterion into the software.

*2.2.2. Eye Movement Direction*

Eye movement directions were calculated from the vectors expressing the movements of the fixation points on the eye camera and sorted into eight classes: up, upper-right, right, lower-right, down, lower-left, left and upper-right.

*2.2.3. Fixation Spot*

We watched video footage of the eye camera and defined the location of all fixation points in the staircases as fixation spots and categorized them into the previously reported 14 classes (Suzuki and Okazaki, 2002b). We also added another class called "Banisters" for the half-turn staircase in the Architecture Studio (Tables 1 and 2). The occluding edge (Gibson, 1979) is the edge whose one side can be seen but not the other side. As previously reported (Suzuki, Okazaki and Tokunaga, 2001; Suzuki and Okazaki, 2002b), we observed not only the edges of the walls but also those of the landing and the stairs, and those of the ceilings.

*2.2.4. Scene*

As previously reported (Suzuki and Okazaki, 2002b), we divided the scenes while ascending and descending the staircases based on their footing and visible occluding edges (Figs. 2 and 3 and Tables 3-8). The footing was divided into landing and stairs. We only analyzed the occluding edges related to the path selections of the participants. The edges were selected by the pedestrians in the Simulation Model for Pedestrian Movement (Okazaki and Matsushita, 1981, 1993). Close relationships were previously found among the path-selections, path-learning, and fixations on the occluding edges of walls (Kitahama et al., 1999). However, the occluding edges in this analysis include not only those of the walls but also those of the landing and the stairs under the route and those of the ceilings over the route (Suzuki, Okazaki and Tokunaga, 2001; Suzuki and Okazaki, 2002b).

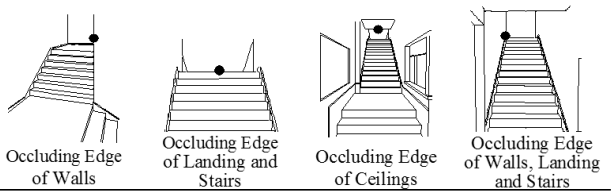
In experiments at a subway station (Suzuki and Okazaki, 2002b), all visible occluding edges were analyzed because the route was unbranched and unknown by the participants. In these experiments, on the other hand, the participants had already learned the routes, and the route in the Koshien Hotel was branched. We ignored the edges unrelated to the path selections, with the exception of the scenes at the end of the routes.

**3. Results**

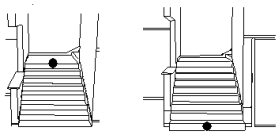
The distributions of the eye movement directions and the total fixation time by fixation spot in every scene are shown in Tables 3-8. If more than one fixation spot of the same class is visible in the scene, it is distinguished as Notes 2, 6, 7, 9, 10, 13 of Tables 3-8.

Table 1 Classification of fixation spots while ascending staircases

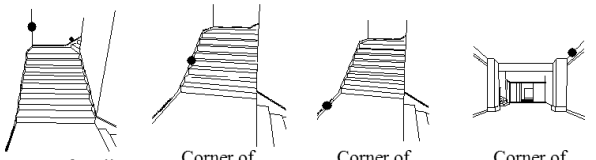
**(a) Occluding Edges**




**(b) Top or Bottom Stair**




**(c) Corners**




**(d) Wall, Banisters, Stairs, Landing or Ceiling**

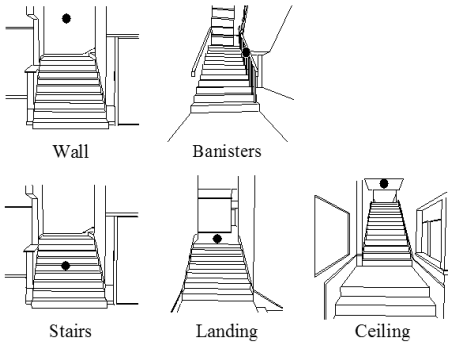
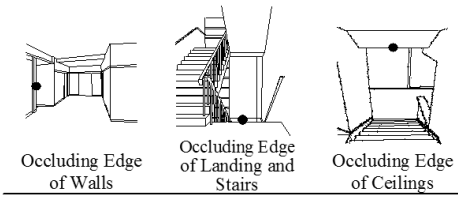
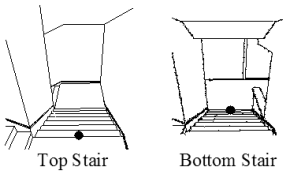



Table 2 Classification of fixation spots while descending staircases

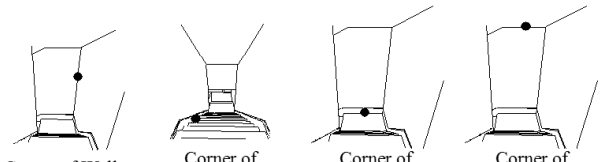
**(a) Occluding Edges** [1)]



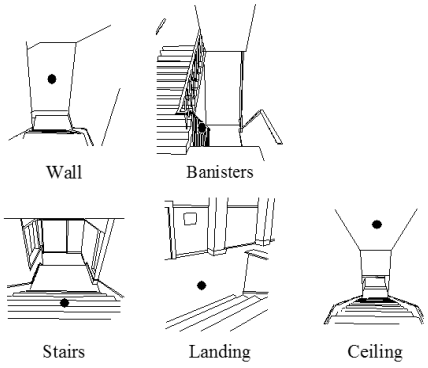

**(b) Top or Bottom Stair**




**(c) Corners**




**(d) Wall, Banisters, Stairs, Landing or Ceiling**




**Note**

1) As previously reported (Suzuki and Okazaki, 2002b), fixation on the "Occluding Edge of Walls, Landing and Stairs" was not found while descending the staircases.

## 3.1. ASCENDING

### *3.1.1. Ascending Quarter-turn Staircase in Koshien Hotel* (Table 3)

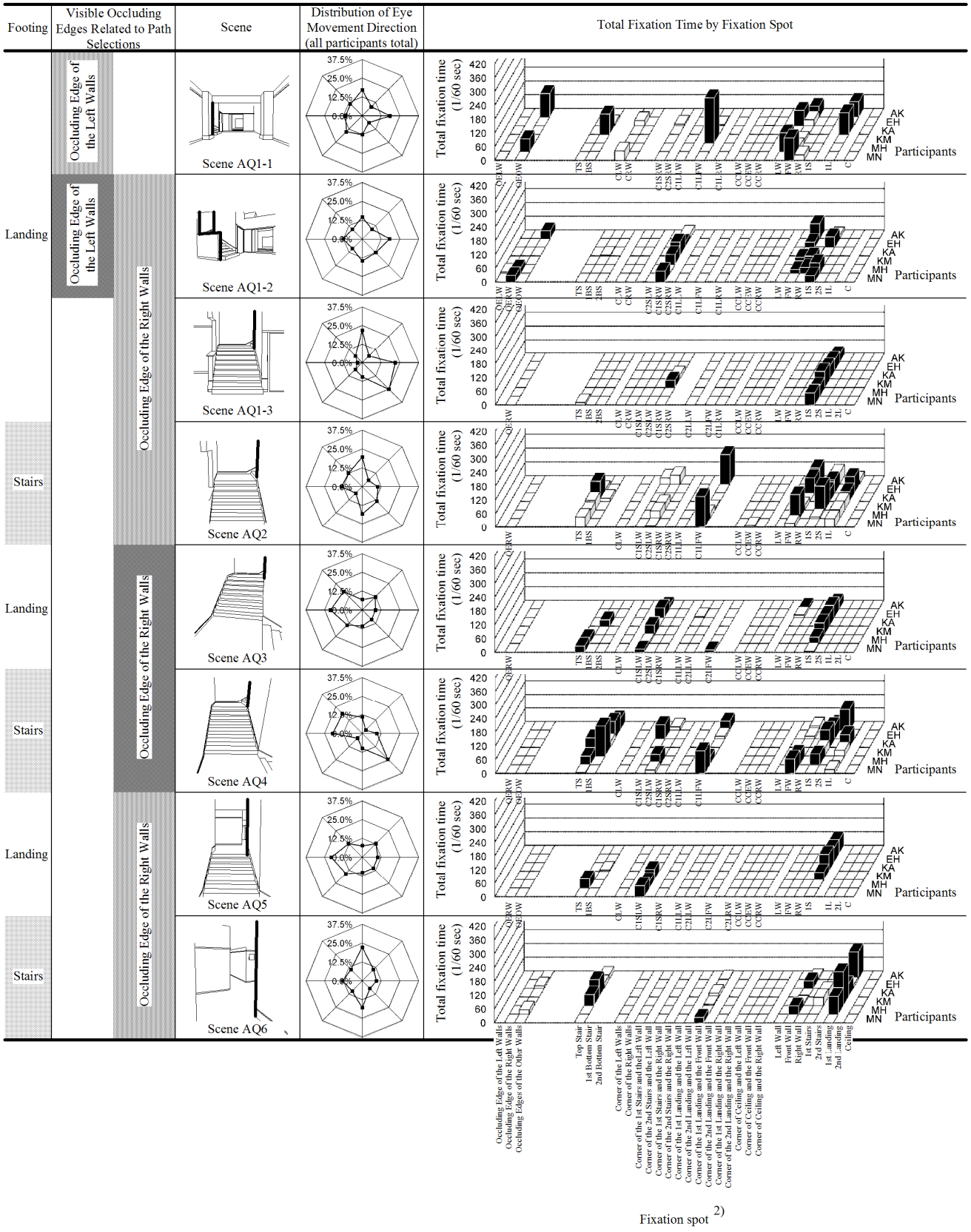
On the stairs, many up-and-down eye movements occurred such as Scenes AQ2 and AQ6. Many movements to the lower-right and upper-left occurred, exceptionally in Scene AQ4, where the stairs were ascending had been covered by the previous occluding edge of walls, and the following stairs were still covered by the present edge. The lower-right was the direction to the following stairs, and the upper-left was the opposite direction from them. Many movements in the directions were not found in Scene AQ2 on the stairs uncovered by the previous edge and Scene AQ6 on the last stairs of the staircase.

There were great differences in the fixation spots among the participants and in Scenes AQ2 and AQ4. However, some fixations occurred on the "Top Stair," the "Bottom Stair," the "Corner of Stairs and the Left Wall," the "Corner of Landing and the Front Wall," the "Front Wall," the "1st Stairs," the "2nd Stairs," and the "Landing." In Scene AQ6 on the last stairs of the staircase, fixations tended to focus on the "Landing," which was the next floor.

On the landing, many eye movements opposite the participant turns occurred in Scenes AQ1-2, AQ1-3, AQ3, and AQ5 during and just before the quarter-turn. These denote right turns in Scenes AQ1-2 and AQ1-3 and left turns in Scenes AQ3 and AQ5. In addition, many upward movements and those to the lower-right occurred in Scene AQ1-3 just before ascending the first stairs. It was difficult to identify a trend for them in Scene AQ1-1.

There were some differences in fixation spots among the participants in Scene AQ1-2 just before approaching the first stairs. However, many fixations occurred on the "Corner of the 1st Stairs and the Right Wall," the "Front Wall," and the "1st Stairs." From Scene AQ1-3, they tended to focus on the "1st Stair" in the scenes on the landing. They also focused on the "Corner of the 1st Stairs and the Left Wall" in Scenes AQ3 and AQ5 on the landing between the two stairs.

Table 3 Relationship among scenes defined by footing and visible occluding edges, distributions of eye movement direction and total fixation time by fixation spot while ascending the quarter-turn staircase in Koshien Hotel




**Notes**

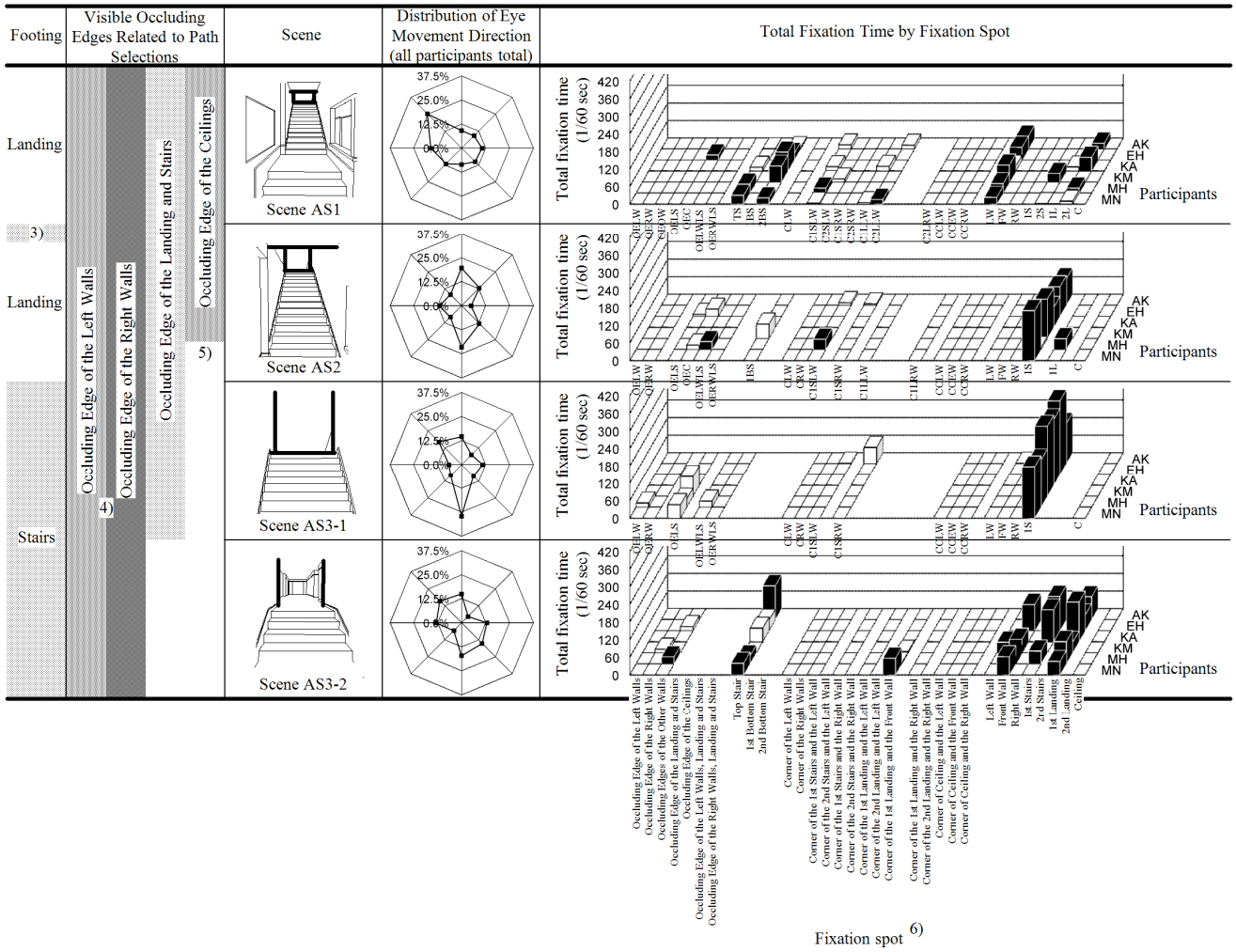
2) Black bars indicate the fixation spots on which the participants fixated longer than the white bars in the scene. The spots were selected by Otsu's method (Otsu, 1979), which is an unsupervised discriminant analysis. No bar indicates that the spot is invisible in the scene.

If more than one fixation spot (Table 1) of the same class is visible in the scene, it is distinguished as below:

(a) Occluding Edges: The "Occluding Edge of Walls" relating to the path selections is defined as the "Occluding Edge of the Right Walls" or the "Occluding Edge of the Left Walls." The other edges are defined as the "Occluding Edges of the Other Walls."

(b) Top or Bottom Stairs: The front top stair is defined as the "1st Top Stair" and the second as the "2nd Top Stair." The same applies for the bottom stairs.
(c) Corners: The "Corner of Walls" bordering the "Right Wall" described in (d) is defined as the "Corner of the Right Walls" and bordering the "Left Wall" as the "Corner of the Left Walls." The "Corner of Stairs and Wall," the "Corner of Landing and Wall" and the "Corner of Ceiling and Wall" are defined in terms of "Wall," "Stairs," "Landing," and "Ceiling," as described in (d). The corner bordering the following stairs and the wall on their right side is exceptionally defined as the "Corner of the 1st Stairs and the Right Wall" in Scenes AQ1-1 and AQ1-2, unlike the definition of the walls in (d).
(d) Walls: On the stairs, the wall in front of the stairs is defined as the "Front Wall," and the wall orthogonal to them defined as the "Right Wall" or the "Left Wall." The other wall in the distance is included in the "Front Wall." On the landing, the wall in the scene preceding on the stairs is defined in the same way as on the stairs. In Scenes AQ1-1 and AQ1-2, the wall bordering the "Occluding Edge of the Left Walls" is defined as the "Left Wall," the wall side of the following stairs as the "Front Wall," and the wall on the right side of the "Front Wall" as the "Right Wall" based on the next path selection.
Stairs and Landings: The front stairs are defined as the "1st Stairs," and the second stairs are defined as the "2nd Stairs." The same applies for the landings.

Table 4 Relationship among scenes defined by footing and visible occluding edges, distributions of eye movement direction and total fixation time by fixation spot while ascending the straight-flight staircase in Koshien Hotel




**Notes**
3) Scene AS2 could not be divided into two scenes based on the footing because the time on the stairs with only two steps was too short to determine between on them and on the landing.
4) Because the staircase was ascended just before the arrival at the GOAL, we couldn't determine which occluding edges of walls were related to the path selection. Therefore, both edges are shown in the Table.
5) Scene AS2 could not be divided into two scenes based on the "Occluding Edge of the Ceilings" because the edge gets out of the range of the eye camera in the scene.
6) For the meanings of the black, white, and no bars, see Note 2 of Table 3.
If more than one fixation spot (Table 1) of the same class is visible in the scene, it is distinguished as below:
(a) Occluding Edges: For the "Occluding Edge of Walls", see Note 2. The same applies for the "Occluding Edge of Walls, Landing and Stairs."
(b) Bottom Stairs: See Note 2.
(c) Corners: See Note 2.
(d) Walls: In Scene AS1, the walls are defined in the same way as in Scene AS2. In the other scenes, see Note 2.
Stairs and Landings: See Note 2.

### *3.1.2. Ascending Straight-flight Staircase in Koshien Hotel* (Table 4)

On the stairs in Scenes AS3-1 and AS3-2, many up-and-down eye movements occurred. In Scene AS3-1 while ascending to the occluding edge of the landing and the stairs, fixation spots tended to focus on the "Stairs." In Scene AS3-2 after the next floor appeared, there were some differences among the participants. However, they tended to focus on the "Landing," which was the next floor. In addition, many fixations occurred, including on the "Top Stair," the "Front Wall," and the "Stairs."

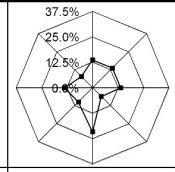
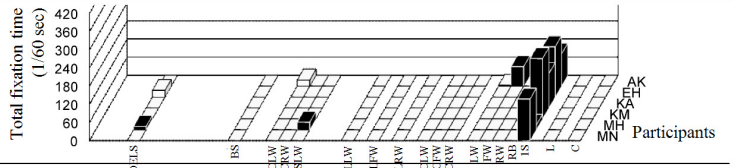
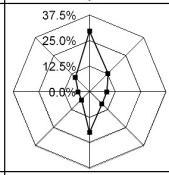
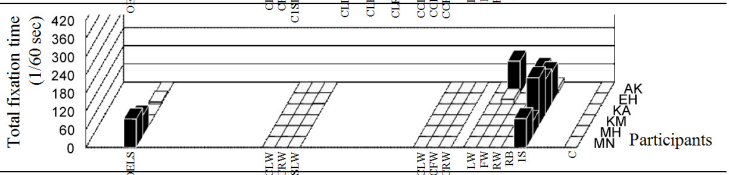
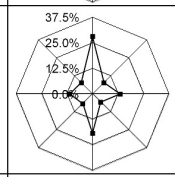
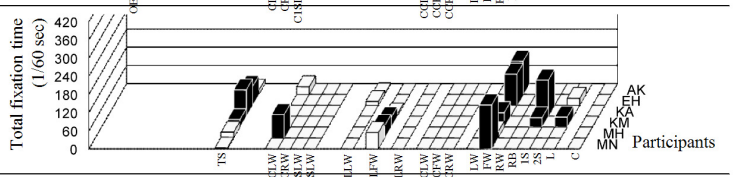
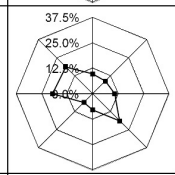
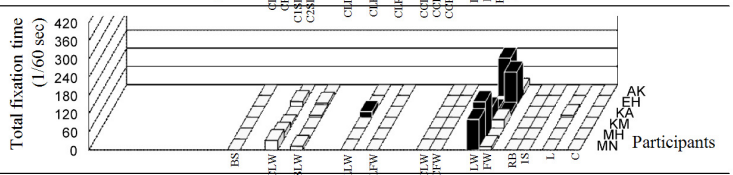
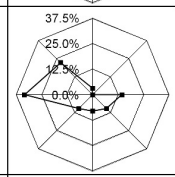
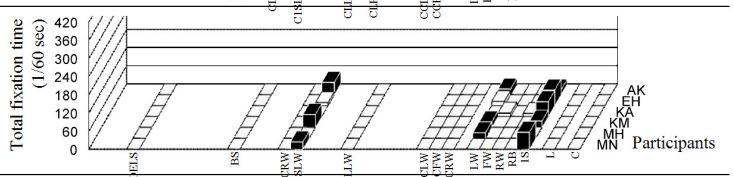
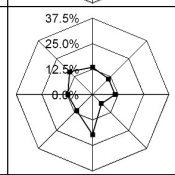
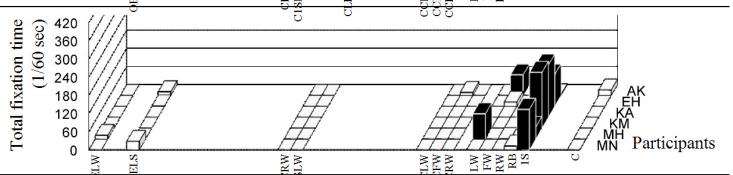
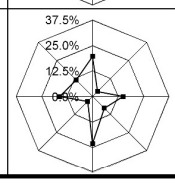
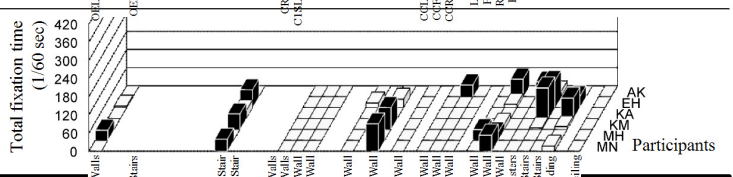
On the landing, many movements to the upper-left, which was the opposite direction from the next stairs, occurred in Scene AS1 during 180° turns and while approaching stairs. In this

scene, there were some differences in the fixation spots among the participants, although they tended to focus on the "2nd Bottom Stairs" and the "Left Wall." In Scene AS2 just before ascending the long stairs, many up-and-down movements occurred, just as in Scenes AS3-1 and AS3-2 on the stairs. The participants were seemingly affected by the stairs with only two steps in the scene. In this scene, the spots tended to focus on the "Stairs."

*3.1.3. Ascending Half-turn Staircase in Architecture Studio* (Table 5)

On the stairs, many up-and-down eye movements occurred in Scene AH2-1 at the beginning of the ascent of the first stairs. In Scenes AH2-2 and AH4-2 after the landing appeared, many right-and-left movements also occurred. In Scene AH4-1, their directions were between Scene AH3-2 described below and Scene AH4-2.

Table 5 Relationship among scenes defined by footing and visible occluding edges, distributions of eye movement direction and total fixation time by fixation spot while ascending the half-turn staircase in Architecture Studio

| Footing | Visible Occluding Edges Related to Path Selections | Scene | Distribution of Eye Movement Direction (all participants total) | Total Fixation Time by Fixation Spot |
|---|---|---|---|---|
| Landing | Occluding Edge of the Landing and Stairs | Scene AH1 |  |  |
| Stairs | Occluding Edge of the Landing and Stairs | Scene AH2-1 |  |  |
| Stairs | Occluding Edge of the Landing and Stairs | Scene AH2-2 |  |  |
| Landing | Occluding Edge of the Landing and Stairs | Scene AH3-1 |  |  |
| Landing | Occluding Edge of the Landing and Stairs | Scene AH3-2 |  |  |
| Stairs | Occluding Edge of the Left Walls | Scene AH4-1 |  |  |
| Stairs | Occluding Edge of the Left Walls | Scene AH4-2 |  |  |

**Notes**

7) For the meanings of the black, white, and no bars, see Note 2 of Table 3.
If more than one fixation spot (Table 1) of the same class is visible in the scene, it is distinguished as below:
(c) Corners: See Note 2. The corner bordering the following stairs and the wall on their left side is exceptionally defined as the "Corner of the 1st Stairs and the Left Wall" in Scene AH3-1, unlike the definition of the walls in (d).
(d) Walls: In Scene AH3-1, the wall ahead of the following stairs is defined as the "Right Wall," the wall side of the stairs as the "Front Wall," and the wall on their left side of the "Front Wall" as the "Left Wall." In the other scenes, see Note 2.
Stairs: See Note 2.

The fixation spots tended to focus on the "Stairs" in Scenes AH2-1 and AH4-1 when the top stair was the occluding edge. In Scenes AH2-2 and AH4-2 after the landing appeared, there were great differences among the participants and scenes. They occurred on the "Top Stair" and the "Front Wall."

On the landing, many right-and-left eye movements and those to the upper-left occurred in Scenes AH3-1 and AH3-2 during half-turns. In Scene AH3-1 during the first quarter of the turn, many movements to lower-right and upper-left also occurred. The lower-right was the direction to the following stairs, and the upper-left was the opposite direction from them. The fixation spots tended to focus on the "Left Wall" in Scene AH3-1. In Scene AH3-2 during the last quarter of the turn and just before ascending the stairs, there were some differences among the participants. However, they tended to focus on the "Stairs."

In Scene AH1 at the beginning of the ascent, downward eye movements were slightly more common than the other directions, and fixation spots tend to focus on the "Stairs."

### 3.2. DESCENDING

#### *3.2.1. Descending Quarter-turn Staircase in Koshien Hotel* (Table 6)

In Scene DQ1-1, identifying a trend of eye movement directions was difficult. In Scene DQ1-2 just before descending the first stairs, many movements occurred to the right, which was the opposite direction from the staircase.

From Scenes DQ2 at the beginning of the descent to DQ4 before the next floor appeared, many right-and-left movements occurred whether on the stairs or the landing. In addition, their directions in Scene DQ4 were between Scenes DQ3 and DQ5 described below.

In Scenes DQ5 and DQ6 after the next floor appeared, movements occurred to the right and lower-right, which were the direction of the GOAL in Fig. 2. In Scene DQ5, those to the upper-left, which was the opposite direction of the GOAL, also occurred.

The fixation spots tended to focus on the walls by Scene DQ5 before descending the last stairs. In Scenes DQ2 and DQ4 on the stairs, many fixations occurred on the "Front Wall." On the landing, they occurred on the "Right Wall" in Scenes DQ1-2 and DQ3 before the next floor appeared. In Scene DQ5 after the next floor appeared, they occurred on both walls.

In Scene DQ6 on the last stairs of the staircase, fixations tended to focus on the "Landing," which was the next floor.

#### *3.2.2. Descending Straight-flight Staircase in Koshien Hotel* (Table 7)

In Scene DS1 at the beginning of the descent, many upward eye movements occurred. In Scene DS2-1 on the stairs before the occluding edge of the ceiling disappeared, in Scene DS3 on the landing between the long and short stairs with only two steps, many up-and-down movements and those to the upper-left and lower-right occurred. Upper-left was the intermediate direction between upward and to the next staircase, and lower-right was the opposite from the direction. Although Scene DS2-2, which was on the stairs and after the occluding edge of the ceiling disappeared, was between Scenes DS2-1 and DS3, it was difficult to identify a trend of their directions.

There were great differences in fixation spots among the participants by Scene DS2-2 late in their descent of the long stairs. However, some fixations occurred in Scene DS1 on the "Occluding Edge of the Left Walls," the "1st Bottom Stair," the "Corner of the 1st Stairs and the Left Wall," the "Corner of the 3rd Landing and the Right Wall," the "Corner of Ceiling and the Right Wall," the "Left Wall," the "Right Wall," and the "2nd Stairs." In Scene DS2-1, they occurred on the "Occluding Edge of the Front Ceilings," the "1st Bottom Stair," the "Left Wall," the "Right Wall," the "1st Stairs," the "2nd Stairs," and the "1st Landing." In Scene DS2-2, they occurred on the "Occluding Edge of the Left Walls," the "Occluding Edge of the Other Walls," the "Corner of the 2nd Landing and the Right Wall," the "2nd Stairs," the "2nd Floor," and the "Ceilings.".

In Scene DS3 on the landing between the long and short stairs, fixations tended to focus on the "2nd Landing," which was the next floor.

#### *3.2.3. Descending Half-turn Staircase in Architecture Studio* (Table 8)

In each scene, many right-left eye movements occurred whether on the stairs or the landing. In addition, many up-down movements occurred in Scenes DH2 and DH4 on the stairs, and many upward movements occurred in Scene DH3-1 during the first quarter of the half-turn.

Fixation spots tended to focus on the walls in each scene. In Scene DH1, many fixations occurred on the "Front Wall," the "Right Wall," and the "Corner of the Right Walls" bordering the two walls. In Scenes DH2 and DH4 on the stairs, they occurred on the "Front Wall." In addition, some fixations occurred on the "Corner of the 1st Landing and the Front Wall" and the "Right Wall" in Scene DH4 on the last stairs of the staircase. In Scenes DH3-1 and DH3-2 during half-turns on the landing, many fixations on the "Right Wall" occurred.

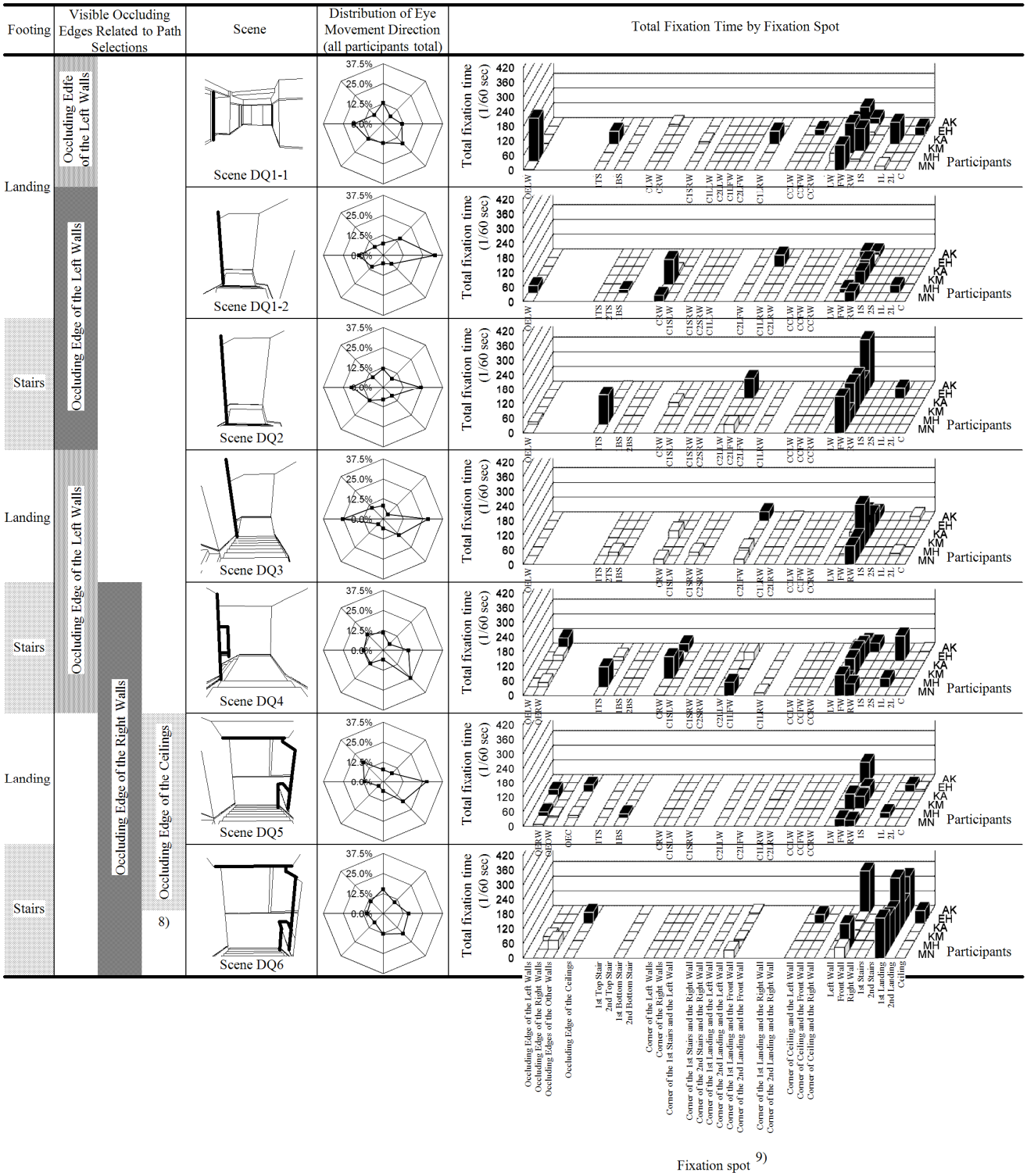
## 4. Discussion

### 4.1. ASCENDING STAIRCASES

The results showed that whether the following landing appeared, on the stairs or the landing, straight or turn ambulation influenced the eye movement direction and the fixation spots of the participants while ascending the staircases.

On the quarter-turn staircase in the Koshien Hotel, the directions changed widely among the scenes. Many up-and-down movements occurred in Scenes AQ2 and AQ6 on the stairs, those to the right in Scenes AQ1-2 and AQ1-3 during left turns, and those to the left in Scenes AQ3 and AQ5 during right turns. On the straight-flight staircase, many up-and-down movements occurred in all scenes after AS2 because of ambulation without any turns.

Table 6 Relationship among scenes defined by footing and visible occluding edges, distributions of eye movement direction and total fixation time by fixation spot while descending the quarter-turn staircase in Koshien Hotel




**Notes**

8) Scene DQ6 could not be divided into two scenes based on the "Occluding Edge of the Ceilings" because the edge gets out of the range of the eye camera in the scene.

9) For the meanings of the black, white, and no bars, see Note 2 of Table 3.

If more than one fixation spot (Table 2) of the same class is visible in the scene, it is distinguished as below:

(a) Occluding Edges: See Note 2.

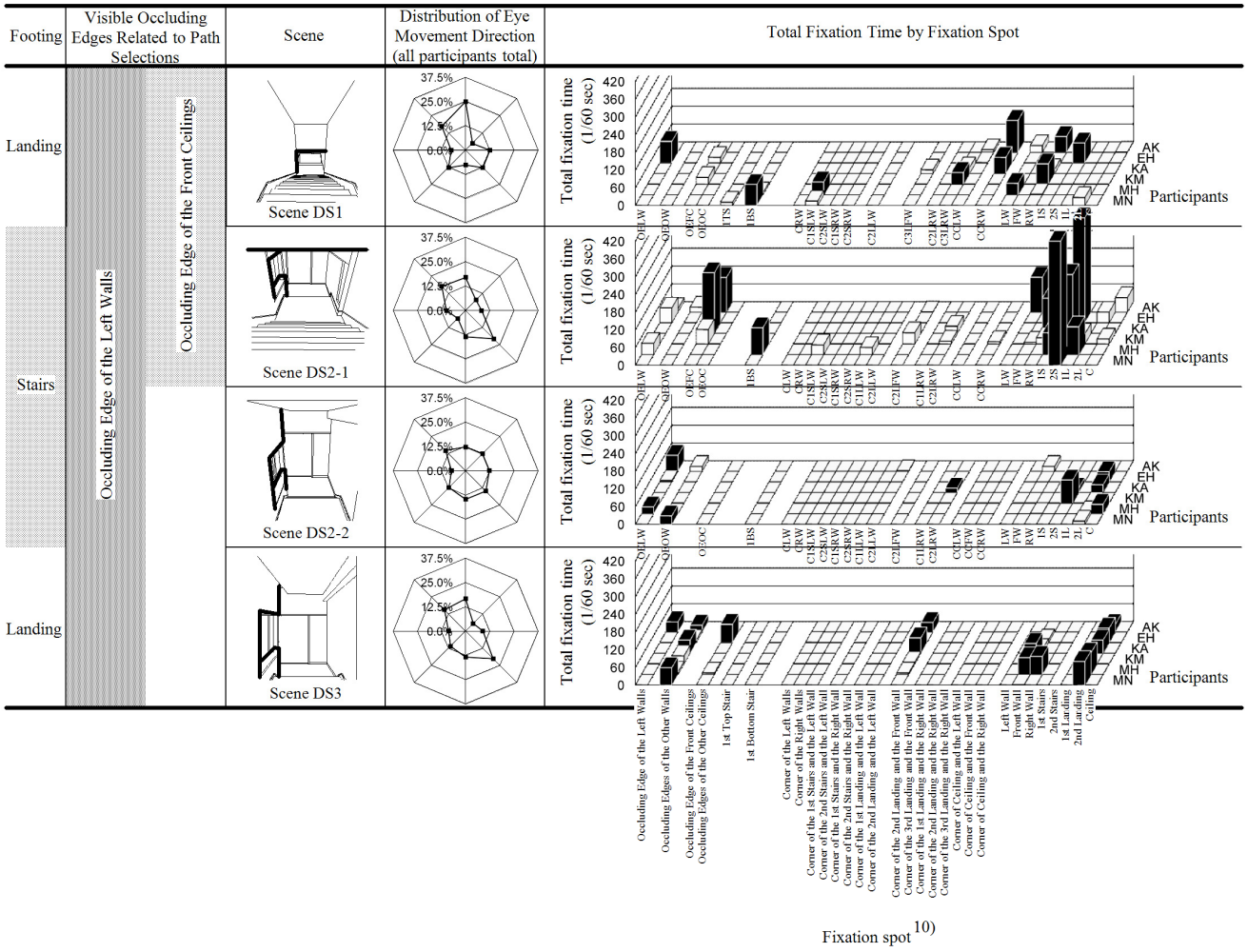
(b) Top or Bottom Stairs: See Note 2.

(c) Corners: See Note 2. The corner bordering the following stairs and the wall on their right side is exceptionally defined as the "Corner of the 1st Stairs and the Right Wall" in Scene DQ1-1, unlike the definition of the walls in (d).

(d) Walls: In Scene DQ1-1, the wall bordering the "Occluding Edge of the Left Walls" is defined as the "Left Wall," the wall side of the following stairs as the "Front Wall," and the wall on the right side of the "Front Wall" as the "Right Wall" based on the next path selection. For the other scenes, see Note 2.

Stairs and Landings: See Note 2.

Table 7 Relationship among scenes defined by footing and visible occluding edges, distributions of eye movement direction and total fixation time by fixation spot while descending the straight-flight staircase in Koshien Hotel




**Notes**

10) For the meanings of the black, white and no bars, see Note 2 of Table 3.

If more than one fixation spot (Table 2) of the same class is visible in the scene, it is distinguished as below:

(a) Occluding Edges: For the "Occluding Edge of Walls," see Note 2. The "Occluding Edge of Ceilings" related to the path selections is defined as the "Occluding Edge of the Front Ceilings." The other edges are defined as the "Occluding Edges of the Other Ceilings."

(b) Top or Bottom Stairs: See Note 2. However, the "2nd Top Stair" and "2nd Bottom Stair" are included as "2nd Stairs" described in Note 2 because there are only two stairs, which see too small to determine the fixation spots of the top and bottom of the stairs in Scenes DS1 to DS2-2.

(c) Corners: See Note 2.

(d) Walls: In Scene DS3, the wall is defined in the same way as in Scene DS2. In the other scenes, see Note 2.

Stairs and Landings: See Note 2. In Scene DS1, the "3rd Landing" is also defined. However, it is included as the "Corner of the 3rd Landing and the Front Wall," the "Corner of the 3rd Landing and the Right Wall," or the "2nd Stairs" because the landing among the corners and stairs see too small to determine the fixation spots of the landing in the scene.

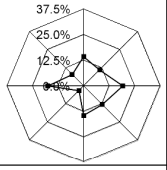
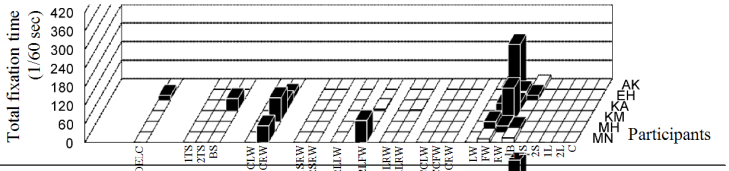
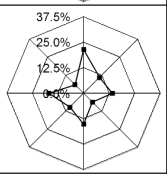
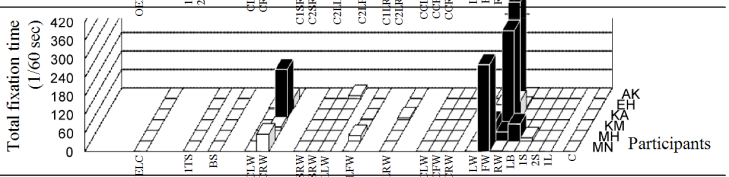
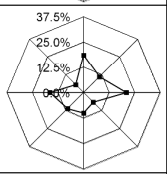
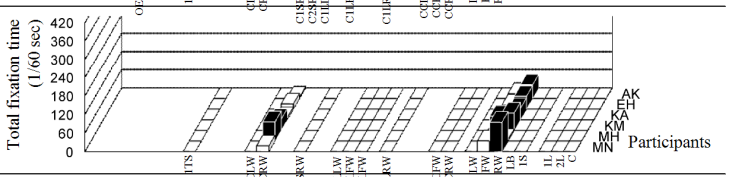
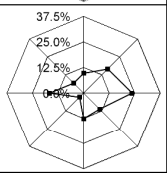
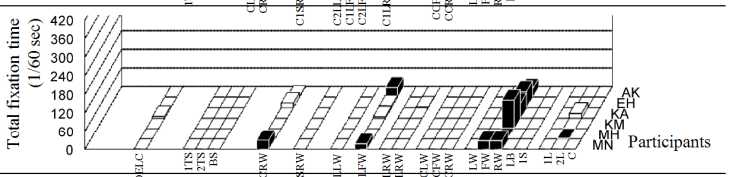
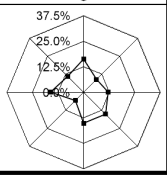
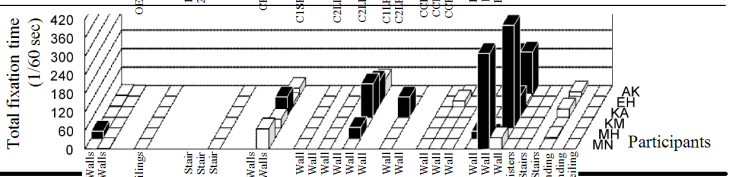
On the half-turn staircase in the Architecture Studio, many up-and-down movements also occurred in Scenes AH2-1, AH2-2, and AH4-2 on the stairs, and those to the left in Scenes AH3-1 and AH3-2 during right turns, as in the Koshien Hotel. However, many right-and-left movements also occurred in Scenes AH2-2 and AH4-2, and their intermediate distribution appeared in Scene AH4-1. The differences among the scenes were clearer while ascending the staircases in the Koshien Hotel than in the Architecture Studio.

The fixation spots in the Koshien Hotel tended to focus on the following stairs in Scenes AQ1-3, AQ3, AQ5, and AS2 just before ascending the stairs, the stairs in Scene AS3-1 while ascending to the occluding edge of the landing and the stairs, and the next floor in Scene AQ6 after they appeared as a result of turn ambulation. In the other scenes, there were great variations in the spots among the participants, and the variations created differences among the scenes.

In the Architecture Studio, they also tended to focus on the following stairs in Scene AH1 just before ascending the stairs, and the stairs ascended to the occluding edge of the landing and the stairs in Scenes AH2-1 and AH4-1. In Scenes AH2-2 and AH4-2, the landing appeared after the occluding edge of the landing and the stairs disappeared, and in Scene AH3-2 the following stairs appeared as a result of turn ambulation; there were such great variations as the Koshien Hotel. However, those focused on the wall in Scene AH3-1 were not found in the Koshien Hotel.

The clear differences of eye movement directions among scenes in the Koshien Hotel were influenced by the stairs positioned between walls, and the paucity of fixation focused on wall was influenced by the low height of the stairs in the quarter-turn staircase.

Table 8 Relationship among scenes defined by footing and visible occluding edges, distributions of eye movement direction and total fixation time by fixation spot while descending the half-turn staircase in Architecture Studio

| Footing | Visible Occluding Edges Related to Path Selections | Scene | Distribution of Eye Movement Direction (all participants total) | Total Fixation Time by Fixation Spot |
|---|---|---|---|---|
| Landing | Occluding Edge of the Left Ceilings 12) | Scene DH1 |  |  |
| Stairs | Occluding Edge of the Left Ceilings 12) | Scene DH2 |  |  |
| Landing | 11) | Scene DH3-1 |  |  |
| Stairs | Occluding Edge of the Left Walls / Occluding Edge of the Front Walls; Occluding Edge of the Left Ceilings 12) | Scene DH3-2 |  |  |
| | | Scene DH4 |  |  |

Fixation spot 13)

**Notes**

11) Because Scene DH4 was just before the arrival at the GOAL, we couldn't determine which occluding edges of walls were related to the path selection. Therefore, both edges are shown in the Table.

12) In Scenes DH2 and DH4, "Occluding Edge of the Ceilings" related to the path selections is visible on the left side. Therefore, the edge is shown as "Occluding Edge of the Left Ceilings" in the Table. However, the scenes could not be divided into two scenes based on the edge because it gets out of the range of the eye camera in the scene.

13) For the meanings of the black, white, and no bars, see Note 2 of Table 3.
If more than one fixation spot (Table 2) of the same class is visible in the scene, it is distinguished as below:
(a) Occluding Edges: The "Occluding Edge of Walls" relating to the path selections is defined as the "Occluding Edge of the Left Walls" or the "Occluding Edge of the Front Walls." The "Occluding Edge of Ceilings" is defined as the "Occluding Edge of the Left Ceilings."
(b) Top Stairs: See Note 2.
(c) Corners: See Note 2. The corner bordering the following stairs and the wall on their right side is exceptionally defined as the "Corner of the 1st Stairs and the Right Wall" in Scene DH3-1, unlike the definition of the walls in (d).
(d) Walls: In Scene DH3-1, the wall ahead of the following stairs is defined as the "Left Wall," the wall side of the stairs as the "Front Wall," and the wall on the right side of the "Front Wall" as the "Right Wall." In the other scenes, see Note 2.
Stairs and Landings: See Note 2.

## 4.2. DESCENDING STAIRCASES

The results showed that regardless whether the next floor appeared, straight or turn ambulation influenced the eye movement directions and the fixation spots of the participants while descending the staircases. In contrast to ascending them, the differences of the directions and spots between the stairs and the landing were not clear while descending them.

On the quarter-turn staircase in the Koshien Hotel, many eye movements occurred to the right in Scene DQ1-2 during left turns, many right-and-left movements occurred in Scenes DQ2 and DQ3, and to the lower-right in Scene DQ6 after the next floor appeared and the start of descending the last stairs. Their intermediate distribution occurred in Scenes DQ4 and DQ5. The differences of eye movement directions among scenes were clearer while ascending the staircases than descending them. On the straight-flight staircase, low right-and-left movements occurred in every scene, and the differences of their directions

among scenes were not so clear while descending it.

On the half-turn staircase in the Architecture Studio, many right-left movements appeared in every scene. Although there were a few differences among such scenes as additional up-and-down movements in Scenes DH2 and DH3-1, they were not clearer than ascending it.

The fixation spots in the Koshien Hotel tend to focus on the walls ahead or the right side, opposite the direction of ambulation while descending the quarter-turn staircase. On the straight-flight staircase, there were great differences among the participants. They tended to focus on the next floor in the last scene of both staircases in Scenes DQ6 and DS3.

In the Architecture Studio, the fixation spots tended to focus on the walls ahead or the right side while descending the half-turn staircase, as in the quarter-turn staircase in the Koshien Hotel. They tended to focus on the walls not only in or before Scene DS3-2, but also in the last scene, Scene DH4.

In both the Koshien Hotel and the Architecture Studio, the differences of eye movement directions and fixation spots among scenes were not so clear while descending. The spots tended to focus on the next floor in the last scenes of both staircases in the Koshien Hotel. Because these phenomena were not found in the Architecture Studio, they might be influenced by the shortness of the last stairs in both staircases in the Koshien Hotel.

The staircases in the Koshien Hotel were mainly designed for rich spatial experiences while ascending them due to great changes of eye movements. However, they were also designed for changes of eye movements while descending them, such as concentrated fixations on the next floor. The approaches to Japanese temples and shrines, including the Shisen-do Temple and Fushimi Inari Taisha Shrine, share similar characteristics.

## 5. Conclusions

We conducted experiments in which participants wearing an eye camera ascended and descended the quarter-turn and straight-flight staircases in the former Koshien Hotel and the half-turn staircases in the Architecture Studio. We clarifird the following:

1) While ascending the staircases, whether the following landing appeared, on the stairs or the landing, straight or turn ambulation influenced the eye movement direction and the fixation spots of the participants.

2) The differences of eye movement directions and fixation spots among scenes were clearer while ascending the staircases in the Koshien Hotel than in the Architecture Studio. The differences might be influenced by the stairs positioned between walls in the Koshien Hotel.

3) While ascending the half-turn staircases, the fixation spots tended to focus on the wall during the first quarter of the half-turn on the landing in Scene AH3-1. However, these phenomena were not found in the quarter-turn staircase. They might be influenced by the higher stairs in the Architecture Studio than in the Koshien Hotel.

4) While descending the staircases, whether the next floor appeared, straight or turn ambulation influenced the eye movement direction and the fixation spots of the participants. In contrast to ascending them, the differences of the directions and spots between the stairs and the landing were not clear while descending them.

5) The differences of eye movement directions and fixation spots among scenes were clearer while ascending the staircases than descending them, especially in the Koshien Hotel.

6) In the last scenes while descending both staircases in the Koshien Hotel, fixation spots tended to focus on the next floor in the last scenes. However, since these phenomena were not found in the Architecture Studio, they might be influenced by the shortness of the last stairs in both staircases in the Koshien Hotel.

The staircases in the Koshien Hotel were apparently mainly designed for rich spatial experiences while ascending them due to the great changes of eye movements. However, they were also designed for some changes of eye movements while descending them, such as the concentrated fixations on the next floor in the last scenes. The approaches to much Japanese traditional architecture such as temples and shrines share similar characteristics.

## Acknowledgements

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## Endnotes

1. This paper contains the drastically-revised contents of our previous papers (Suzuki, Uemura et al., 2008a, 2008b, 2009a, 2009b, 2010; Hirano et al., 2010; Suzuki, Okazaki and Uemura, 2011).

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# Leisure Activities at the Kawara Imperial Villa of Retired Empress Meishō: Through Comparison with the Shugakuin Imperial Villa

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**Keywords:** imperial villa, leisure activity, The Kawara Imperial Villa, The Shugakuin Imperial Villa, the early modern age of Japan

**Abstract:** The purpose of this paper is to clarify the ways Japanese imperial villas were used. The villas that were studied are the Kawara and Shugakuin Imperial Villas, which were built in the early modern age. The peculiarity of Kawara Imperial Palace is clarified through those comparisons. The historical materials studied are mainly diaries written in that period. Consider its tendency and feature through the research on frequency of visit, the season, and type of leisure activity. The court culture at the early modern age has influenced a traditional Japanese culture considerably. Research such a court culture is important for understanding the Japanese culture in Asia. This paper verifies one example of Japanese imperial architecture and is expected to be useful in the field of international comparative studies.

## 1. Introduction

The Shugakuin and Katsura Imperial Villas are famous imperial villas of the early modern age in Japan. Many studies and books have been published about them [1]. They were constructed in the suburbs of Kyoto, the former capital of Japan, and both still exist. Retired emperors and aristocrats visited them many times in the early modern age. Visiting villas is one aspect of Japanese culture. As discussed in this paper, the Kawara Imperial Villa was also such a villa, even though that fact is hardly known because the villa no longer exists and its construction details are hazy. In the early modern age, the Kawara Imperial Villa was used by Retired Empress Meishō (1624-1696), who was the 109th emperor and the 7th of eight empresses in Japanese history. It was also located in Kyoto, but outside the urban wall built on the city's border. The history of its construction is unknown, and after the death of Retired Empress Meishō, an aristocrat became the owner [2]. The Kawara Imperial Villa is located beside the Kamogawa River, on which there is now a large hospital. Based on the research of Dr. Matsui, this paper scrutinizes the leisure activities at the Kawara Imperial Villa and compares them to the Shugakuin Imperial Villa to clarify its architectural features.

## 2. Purpose

Studies on the Shugakuin and Katsura Imperial Villas have greatly influenced many academic and practical fields. Both villas have been precisely researched, especially in modern times. Much research by foreigners on both villas has focused on international Japanese architecture. Our research on the Kawara Imperial Villa clarifies Japan's court culture in the early modern age, which is meaningful in the fields of architectural and cultural history. Historical research on modern times is also substantial. Imperial villas are places to escape from daily life for leisure activities. Considering such usage paradoxically suggests a retired emperor's daily life. Comparisons to the Shugakuin Imperial Villa effectively identify the uniqueness of the Kawara Imperial Villa for learning about the common features of both villas. We expect our research to become basic historical materials for studies in other fields because it considers the space of imperial villas from an architectural perspective.

Fig 1. pavilion and pond, the Shugakuin Imperial Villa

## 3. Method

This paper analyzes the content of leisure activities, the times of visits, and their tendencies from diary descriptions and considers the utility/usage of the Kawara Imperial Villa. A diary called “Mujo-hoin-nikki,” written by Princess Tsuneko in the 17th century, is one important document to learn about court culture in the early modern age. This diary, which covers more than 30 years, is used in many fields other than architecture [3]. The Imperial Princess frequently visited the Kawara Imperial Villa with Retired Empress Meishō. Many events took place at the villa. By comparison to the Shugakuin Imperial Villa, which was built by Retired Emperor Gomizuno-o (1596 -1680), we can consider the characteristics of the visitors to the Kawara Imperial Villa. Our analysis clarifies the differences of both villas and considers the cause of those differences from the characteristics of the owner and the location. On the other hand, the aspects shared by the two villas are also clarified to consider why the facility/institution was constructed. This will be a question of architecture principle. The tendency of the leisure activities at the Shugakuin Imperial Villa refers to past research.

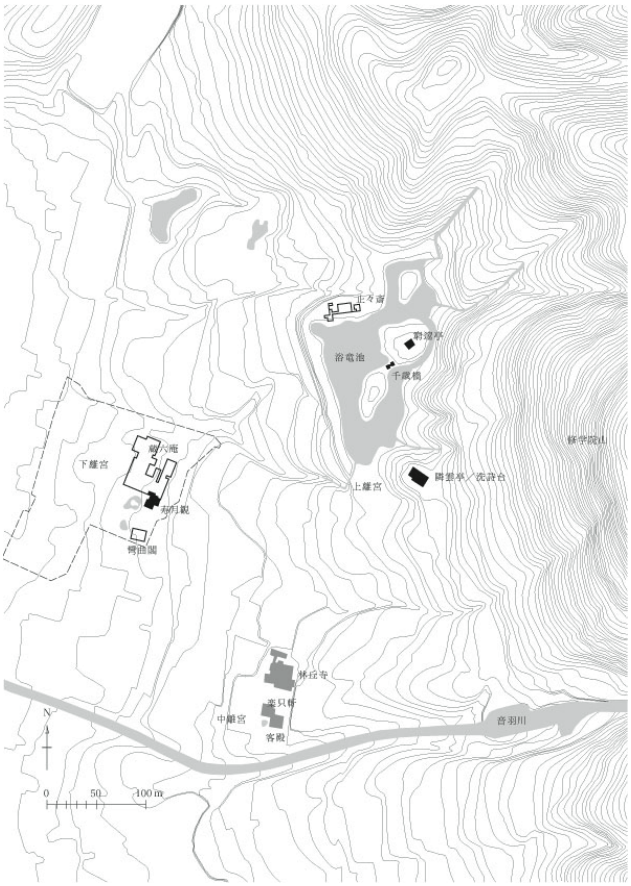


Fig 2. Site Plan of the Shugakuin Imperial Villa

## 4. Result

### 4.1. The Kawara Imperial Villa

The Kawara Imperial Villa, which no longer exists, used to be located at the Kamogawa riverside 1 km east of the Imperial Palace in the center of Kyoto. It was only owned by Retired Empress Meishō, the daughter of Retired Emperor Gomizuno-o. The dairy archives used in our research were “Mujouhoin-nikki” and ”Motohiro-ki,” which indicate that the Empress’s first visit occurred in 1688 and that they continued for nine years until her death [4]. The appearance of the imperial palace is written in the diary in 1688. “The taste of this garden is wonderful. Some pavilions built in the garden are beautiful, and very interesting. We saw all over the palace spending all day, and various meals were served. The Sanjou-Oohashi Bridge seen from the river beach on the east side is a wonderful view”. Moreover, in the description in 1694, it is written, ”The pavilions in the imperial palace is very cool and comfortable. It is interesting to see the scenery of fields and mountains from the pavilion. We had meal and played until evening”. The other “We strolled in the garden of the imperial palace together, and enjoyed the scenery of each pavilion. There were many maids to serve meals. There was pavilion imitating “shioya” (hut in the beach where the salt is made) at the island in the pond and smoke is rising up from the boiler. The shells were scattered on the waterside, the fishing net was spread, seaweeds were scattered, and it appears interesting. It is like looking at a real beach. It reminds me of old story of Minister *Toru* (*Minamoto*). We played all day. On the other hand, other pavilion is imitating shop, there are a wonderful toys, and flowers are decorated” (1688). Other specific leisure activities were "The maids in the palace dressed as farmer, about ten people wore the uniform and the hat, singing song, and planted rice" (1673), or “Warriors disguised as fisherman to catch the fish in the river in the east. Various nets were used” (1670) etc. At the imperial palace, they enjoyed looking at actual people besides play to imitate the farmer or the fishermen. “We saw line of people going to Hyakumanben Temple walking along the river. It is interesting view” (1671), or “We enjoyed looking at people who pass the front of the window of the imperial palace all day. We saw perfomance of a street performer who happened to pass by” (1673) etc. During that nine-year

Table 1. Visits to Kawara Imperial Villa by Retired Emperor Meishō

| date | playings | archives |
|---|---|---|
| 1688.03.26 | ga, ba | MN |
| 1688.10.14 | ga, ba, im | MN, MH |
| 1689.02.03 | ga, ba | MN |
| 1689.03.18 | ga, ba | MN |
| 1690.03.28 | ga, ba, im | MN |
| 1690.04.25 | ga, ba | MN |
| 1690.09.13 | ga, ba | MN |
| 1690.11.11 | ga, ba | MN |
| 1691.04.13 | ga, ba, ws | MN |
| 1691.06.11 | ga, ba, im, ws | MN |
| 1693.02.07 | ga, ba | MN |
| 1693.05.23 | ga, ba, im | MN |
| 1693.08.06 | ga, ba | MN |
| 1693.10.21 | ga, ba | MN |
| 1693.11.16 | ga, ba, ws | MN |
| 1693.11.29 | ga, ba, ws | MN |
| 1694.04.21 | ga | MN |
| 1694.U5.16 | ga, ba | MN |
| 1694.09.23 | ga, ba | MN |
| 1695.02.21 | ga, ba | MN |
| 1695.03.12 | Uncertainty | MN |
| 1695.05.12 | Uncertainty | MN |
| 1695.07.19 | Uncertainty | MN |
| 1695.09.23 | Uncertainty | MN |
| 1695.10.16 | ba | MN |
| 1696.04.14 | Uncertainty | MN, MH |

legend1: ga=garden, ba=banquet, im=imitating ordinary’s life, ws=watching street

legend2: MN=*mujouhouin-nikki*, MH=*motohiro-ki*

period, she made 25 visits, an average of three visits a year. The most frequently visited months (based on the lunar calendar) were four times in April and twice each in February, March, May, September, October, and November. One visit was made in June, July, and August. Visits were made in summer because it was cool by the river and close to the Imperial Palace. The activities at the villa included garden viewing, watching citizens, imitating fishermen and farmers, and role plays involving such activities as bazaars.4.2. The Shugakuin Imperial Villa. The Shugakuin Imperial Villa, which still exists, is located on a mountainside about 5 km northeast of the Imperial Palace in Kyoto. The use of the Shugakuin Imperial Villa can be divided into the following three periods: in the first (1655-1679) by Retired Emperor Gomizuno-o, in the second (1721-1731) by Retired Emperor Reigen (1654-1732), and in the third (1824-1836) by Retired Emperor Koukaku (1771-1840).

*4.2.1. First Period: Retired Emperor Gomizuno-o*

The archives about the first period of the Shugakuin Imperial Villa are mainly from two diaries, "Kakumei-ki" and "Mujohouindono-onikki." During the 25-year period when it was used by Retired Emperor Gomizuno-o, 77 visits are recorded in the archives [5]. Retired Emperor Gomizuno-o visited more than three times a year on average. The months with the most visits (based on the lunar calendar) were March and September, with 15 visits each. Next is April, 11 times, October, 10 times, and February, 9 times. In general, he chose the more comfortable seasons of spring and fall for his visits. In Shugakuin Imperial Villa of this time, there was a pavilion called "Shishisai". The pavilion was reconstructed to the Imperial Palace afterwards, and had been burned down. From a description in the diary, pavilion "Jugetsukan" and "Rinuntei" were used many times (20 times and 5 times each) and "Shishisai" also was used 10 times. "Shishisai" existed in the north end of the pond, "Yokuryuchi", and it is considered that the boating took place from there. Moreover at this time, "Zourokuan" was built adjacent to the "Jugetsukan" and the two-story pavilion named "Wankyokukaku" existed in the detached palace in Lower Villa also. The leisure activities at the villa in this period included banquets, poetry readings, garden and moon viewing, pottery making, tea ceremonies, boating, and hiking. Participants included several aristocratic companions of Retired Emperor Gomizuno-o as well as guards and servants. It is considered that the visiting group were not so large by several guests including the Retired Emperor Gomizuno though an accurate number of people are uncertain.

Table 2. Visits to Shugakuin by Retired Emperor Gomizuno-o

| date | playings | archives |
|---|---|---|
| 1655.03.13 | hi | KK、other |
| 1656.12.25 | Uncertainty | other |
| 1659.04.14 | ga, hi, mo | KK |
| 1660.05.12 | Uncertainty | KK |
| 1661.08.15 | bo, ga | KK |
| 1662.03.28 | ga, po, hi, bo, ba | KK |
| 1662.04.12 | hi, bo, ba, hi, bo | KK |
| 1662.04.26 | Uncertainty | KK |
| 1662.10.18 | ga, ba, bo, ba | KK |
| 1663.03.23 | Uncertainty | KK |
| 1663.09.15 | ba, po | KK |
| 1664.03.16 | Uncertainty | KK、other |
| 1664.09.11 | Uncertainty | KK |
| 1664.12.04 | Uncertainty | KK |
| 1666.04.14 | Uncertainty | KK |
| 1667.03.12 | Uncertainty | other |
| 1667.09.06 | Uncertainty | other |
| 1668.03.21 | Uncertainty | KK |
| 1669.03.27 | Uncertainty | other |
| 1669.10.05 | Uncertainty | MN |
| 1670.10.13 | Uncertainty | MN |
| 1671.02.11 | Uncertainty | MN |
| 1671.03.02 | ga, hi, bo, ba | MN |
| 1671.03.09 | Uncertainty | MN、other |
| 1671.05.06 | ga, hi, bo, ba | MN、other |
| 1671.08.28 | ga, bo, ga, ba | MN |
| 1671.09.13 | hi | MN |
| 1671.09.28 | hi, ga, ba | MN |
| 1671.10.04 | Uncertainty | MN |
| 1671.10.18 | Uncertainty | MN |
| 1672.03.10 | hi, bo, ga, ba | MN |
| 1672.04.04 | Uncertainty | MN、other |
| 1672.08.06 | Uncertainty | MN |
| 1672.08.19 | hi | MN |
| 1672.08.24 | hi, bo, ga, ba | MN |
| 1672.09.06 | hi | MN |
| 1672.09.13 | Uncertainty | other |
| 1673.02.10 | Uncertainty | MN |
| 1673.02.16 | hi, ga, ba | MN |
| 1673.03.13 | Uncertainty | MN、other |
| 1673.04.18 | bo | MN |
| 1673.08.19 | bo | MN |
| 1673.10.02 | Uncertainty | MN、other |
| 1674.02.22 | bo | MN |
| 1674.02.28 | Uncertainty | MN、other |
| 1674.05.14 | bo | MN、other |
| 1674.09.07 | Uncertainty | other |
| 1674.10.22 | ga, bo, ba | MN |
| 1675.01.12 | Uncertainty | other |
| 1675.03.01 | bo | MN、other |
| 1675.03.12 | Uncertainty | other |
| 1675.04.06 | Uncertainty | other |
| 1675.04.11 | Uncertainty | MN、other |
| 1675.04.18 | Uncertainty | MN、other |
| 1675.05.28 | Uncertainty | other |
| 1675.08.23 | Uncertainty | other |
| 1675.09.06 | Uncertainty | other |
| 1675.10.08 | Uncertainty | other |
| 1675.11.19 | Uncertainty | other |
| 1676.02.06 | ga, ba, mo | MN、other |
| 1676.02.12 | Uncertainty | MN、other |
| 1676.08.17 | hi, bo | MN |
| 1676.09.21 | hi, ga, ba | MN、other |
| 1676.09.29 | Uncertainty | other |
| 1676.10.09 | Uncertainty | MN |
| 1677.02.17 | ga, hi, bo, ba | MN、other |
| 1677.05.06 | bo | MN、other |
| 1677.09.25 | Uncertainty | MN、other |
| 1678.02.13 | bo | other |
| 1678.03.20 | Uncertainty | MN |
| 1678.09.01 | Uncertainty | MN |
| 1678.09.07 | ga, hi, bo, ba | MN |
| 1678.09.28 | hi, bo | MN、other |
| 1678.10.17 | Uncertainty | MN |
| 1679.03.23 | bo, ga, ba | MN、other |
| 1679.04.09 | Uncertainty | other |
| 1679.04.23 | Uncertainty | other |

legend1: hi=hiking, bo=boating, ga=garden, ba=banquet, mo=moon, poetry=po,
legend2: KK=*kakumei-ki*, MN=*mujouhouin-nikki*

*4.2.2. Second Period: Retired Emperor Reigen*

The archives for the second period include "Reigen-in-houou-gokou-shinki" and "Sentō-nyoubou-nikki." In this 11-year period, 23 visits were made [7]. Retired Emperor Reigen averaged more than two visits a year: (based on the lunar calendar) five in April, September, and October and two in February, March, August, and November. The visits were again mainly in spring and autumn. The feature of this time is building of "Shishisai" and "Wankyokukaku" did not exist first, and it was ruined at first because it was not used for years. Retired Emperor Reigen repaired the Villa on the occasion of visiting. Moreover, the "Rinuntei" was constructed because it was burned down at this time, but it differed from the former building. Retired Emperor Reigen recollected the father, Retired Emperor Gomizuno whenever visiting Shugakuin Imperial Villa. The activities of this period include having banquets, visiting shrines, hiking, garden and moon viewing, and poetry readings. Visiting at this time was not easy for Retired Emperor Reigen. The procedure to the shogunate was complex and obtaining the permission of visiting was difficult. The size of the groups was somewhat larger than in the first period.

Table 3. Visits to Shugakuin by Retired Emperor Reigen

| date | playings | archives |
|---|---|---|
| 1721.09.27 | hi, sh, ba | RG, SN |
| 1722.03.13 | ga, hi sh | RG, SN |
| 1722.09.09 | ga, hi, sh, ga, ba, mo | RG, SN |
| 1723.04.06 | ga, hi, ba | RG, SN |
| 1723.09.07 | ga, hi, ga, ba | RG, SN |
| 1724.08.27 | hi, ga, ba, sh | RG, SN |
| 1724.10.07 | ga, sh, ba, hi, po | RG, SN |
| 1725.04.26 | ga, hi, ba | RG, SN |
| 1725.09.16 | ga, ba, hi | RG |
| 1725.10.18 | hi, sh, ga, po | RG, SN |
| 1726.04.26 | ga, ba, po, hi | RG, SN |
| 1726.11.02 | ga, hi, sh, po, ba | RG, SN |
| 1727.09.09 | ga, hi, mo, po | RG, SN |
| 1727.10.02 | ga, hi | RG, SN |
| 1728.02.11 | ga, hi, po | RG, SN |
| 1728.04.11 | hi | RG, SN |
| 1728.08.25 | Uncertainty | RG, SN |
| 1729.02.03 | ga, ba, hi | RG, SN |
| 1729.03.28 | Uncertainty | RG |
| 1729.10.11 | Uncertainty | RG |
| 1730.04.12 | Uncertainty | RG, SN |
| 1730.11.16 | Uncertainty | RG, SN |
| 1731.10.18 | ga, hi, ba, bo, po | RG, SN |

legend1: hi=hiking, bo=boating, ga=garden, ba=banquet, mo=moon, po=poetry, sh=shrine
legend2: RG=*reigen-in-houou-gokou-shinki,* SN=*sentou-nyoubou-nikki*

Fig 3. Yokuryu-chi pond, the Shugakuin Imperial Villa

*4.2.3. Third Period: Retired Emperor Koukaku*

The primary archives for the third period are "Shugakuin-gokou-roku" and "Hinami-an." In this 13-year period, Retired Emperor Koukaku visited 14 times, averaging slightly more than one visit per year. The most visits were made (based on the lunar calendar) in March (six times), September and October (three times each), and April (two times). The feature of the villa at this time was that the building was ruined after about 90 years after the second period. It was the same situation as the second period. Retired Emperor Koukaku ordered the repair, and "Rinuntei" and "Jugetsukan" were newly built. Those were considered as the same one built in second period. However, the "Kyusuitei" was reconstructed. It is considered that the "Kyusuitei" is the only original building from that time.

During this period, the main activities were poetry readings, banquets, playing music, garden viewing, and hiking. The number of people visiting the villa at this time exceeds 100. The participant borrows a peripheral private house and is using it in Shugakuin Imperial Villa because it did not install. The size of the groups was the largest of the three periods.

Table 4. Visits to Shugakuin by Retired Emperor Koukaku

| date | playings | archives |
|---|---|---|
| 1824.09.21 | ga, hi, sh, po, ba, mu | SG, HA |
| 1825.10.23 | ga, po, hi, mu | SG, HA |
| 1826.03.23 | ga, sh, hi, po, mu | SG, HA |
| 1826.10.18 | ga, po, sh, mu | SG, HA |
| 1827.09.21 | ga, po, sh, hi, mu | SG, HA |
| 1828.03.23 | ga, po, sh, hi, mu | HA |
| 1829.03.26 | ga, po, sh, hi, mu | SG, HA |
| 1829.09.14 | ga, po, sh, hi, mu | SG, HA |
| 1830.U3.16 | ga, po, sh, hi, ba, mu | SG, HA |
| 1831.10.17 | ga, po, sh, ba, mu | SG, HA |
| 1832.03.23 | ga, po, hi, mu | SG, HA |
| 1833.03.10 | ga, po, sh, ba, mu, hi | HA |
| 1835.04.07 | ga, po, ba, mu | SG, HA |
| 1836.04.07 | ga, po, sh, ba, mu | HA |

legend1: hi=hiking, ga=garden, ba=banquet, po=poetry, sh=shrine, mu=music
legend2: SG=*shugakuin-gokou-roku*, HA=*hinami-an*

## 5. Discussion

5.1. The Kawara Imperial Villa

The leisure activities at the Kawara Imperial Villa involved role plays in which the garden pavilions were decorated as stores, and

servants and companions dressed as farmers planting rice, or fishermen fishing in a river. Since Empress Meishō enjoyed watching actual local citizens from a window along the street, a common theme of the activities at this villa involved watching ordinary people or imitating them.

5.2. The Shugakuin Imperial Villa

All visits to the Shugakuin Imperial Villa during the three periods were held in the most comfortable seasons of spring and fall. Japanese people have traditionally enjoyed looking at flowers in spring and the changing fall colors in autumn. The sizes of the groups varied, but the members were generally aristocratic acquaintances of the emperors. The activities shared by all three periods were poetry readings and banquets. But boating and tea ceremony activities in the first period, visiting shrines in the second, and playing music in the third reflect each emperor's preferences. Since the villa was located on a mountainside, another very popular activity was to leave the villa to go hiking in the mountains.

Fig 4. pond and the mountains, the Shugakuin Imperial Villa

**6. Conclusion**

A variety of leisure activities were carried out at the Kawara and Shugakuin Imperial Villas. These activities differed based on who was residing in them. Mountain hiking reflected the location and was an opportunity for emperors to explore nature. Because Retired Empress Meishō's Kawara Imperial Villa was located in the center of Kyoto, she and her acquaintances did not go outside the villa for their activities. Instead they watched the street from the villa or role-played ordinary citizen's lives to escape from their own lives. The lives of the emperors were controlled by the Edo Shogunate, and life at the Imperial Palace was as isolated as the Imperial Court. "Imperial Villas" were a place to escape from their daily lives.

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# Traditional Architecture of Bodrum: The Factors Generating and Affecting the Architectural Culture and Identity

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**Keywords:** Bodrum, architectural culture, architectural identity, traditional architecture, urban transformation, preservation, tourism.

**Abstract**: Anatolia, home of many civilizations throughout centuries, is loaded with substantial cultural and traditional accumulation. Unquestionably, settlements are the most significant indicators of this accumulation. Several regions of Anatolia house various examples of settlements thus far as antiquity. The architectural culture and identity of Bodrum in Western Anatolia, with its impressive nature is considered different from the Ottoman Architecture unique to Central Anatolia and Rumelia. The unique architecture in the Peninsula originates from the ever-continuing interactions with the opposite coasts rather than inland, therefore is considered as a transitional area, and classified within the Island Architecture.

The unique natural and built environment of Bodrum has undergone a tremendous change after 1960's. This modest fishermen town, with plain, white cubic houses, once depending on agriculture, fishing and livestock breeding, had turned into the most famous touristic resort of Turkey in 40 years. Especially after 1980's, immigration and urban sprawl became serious threads for the distinguished identity of the town. Instead of the today's existing approach in preservation which is rather fetishistic towards the traditional houses, preservation of traditional life-style that has already been replaced by tourism, seems more meaningful for the future of the peninsula which once has been so attractive for many. Therefore, here aimed is to expose and remind the life-style that generated the unique architectural culture and identity of Bodrum before 1960's by a detailed literature survey and point out the factors that had a significant role in the generation of traditional architecture.

## 1. Introduction

The known history of Bodrum goes back to the 7th century B.C. and reaches to the Anatolian local people of the peninsula, thus far as Carians, Lelegs and then Dorians. The epic story of the Aegean local people making a living from sea trade, agriculture, seamanship, fishing, and sponge fishing, starts from Zephria, the first settlement on the peninsula; continues as Halicarnassus, the magnificent capital of Caria; as one of the significant ports of Rome, Byzance, Seljuk Empire and Mentese Beylic in the Middle Ages; as the gradually impoverished town of Ottoman Empire from 15th to 19th centuries; and finally as the most popular resort of today's Bodrum of Turkish Republic with a great historical heritage (Mansur, 1972).

Today's popularity of Bodrum, once a small fishing town with invaluable historical heritage and amazing nature, is owed to a group of artists and intellectuals who has recognized and introduced the town to public and pioneered by famous writer Cevat Şakir Kabaağaçlı, also known as the "*Fisherman of Halicarnassus*" who has been exiled to Bodrum as a political prisoner in the early 20th century (Türe, 2006).

Above and beyond the priceless historical heritage and amazing nature, Bodrum Peninsula is remarkable with its unique architectural culture and identity. Traditional residential architecture of the peninsula gained recognition as a significant type within Anatolian residential architecture which is classified in two groups by many scholars as the coastal and hinterland architecture when analyzed on the basis of local-regional differences or characteristics (Ergül and Kaya, 2008). The hinterland residential architecture shows certain similarities and some unifying characteristics regarding the traditions in spatial organization and construction technologies which enable researchers to classify. However coastal residential architecture, due to ever continuing interactions with the opposite coasts and islands does not have a unity within itself, and therefore can be categorized as transitional. According to Sözen (2006), especially the coastal architecture in Bodrum, Foça and Assos are influenced extremely by the architectural culture in the Dodecanese Islands. Consequently, Bodrum Peninsula and Aegean coasts in general, by means of certain characteristics that differentiate them from the Ottoman Architecture unique to Central Anatolia and Rumelia, can be considered within Island architecture (Ergül and Kaya, 2008). Especially the plan scheme that does not include *'sofa'* (hall) and the use of stone as the major construction material are the significant characteristic of coastal architecture of Western Anatolia which distinguishes it from hinterland architecture (Sözen, 2006).

Sözen (2006) mentions Bodrum as one of the settlements in Western Anatolia that reflects the characteristics of the environment surrounding in the most successful way. Geography,

climate, natural environment; and the historical, social and economical background of the peninsula, where different cultures and societies interact, are the basis for evaluating the architectural culture and identity of Bodrum (Ergül and Kaya, 2008). Therefore, the subject matter has been analyzed by a detailed literature survey and presented in this study in three sections namely, the introduction, including geography, climate and the natural environment; built environment, including the traditional houses of Bodrum and traditional construction techniques and materials, and finally the evaluation of the factors that affected the architectural culture and identity of the peninsula throughout history.

The rapid transformation that the natural and built-environment in Bodrum have been subject to since mid 20th century with the emergence of tourism and immigration which affected the identity, architectural culture and life-style in the peninsula is another lively and hot debate about Bodrum Peninsula, but also out of the focus of this study. Today, after 40 years of intense change, Bodrum is the most well-known and visited resort in Turkey.

## 1.1. GEOGRAPHY, CLIMATE AND THE NATURAL ENVIRONMENT

Bodrum Peninsula, located on the southwest edge of Anatolia, approaches massively to the Aegean Sea on the west with its many large and small bays and it is surrounded by Güllük Bay on the north, Gökova Bay on the South (Türe, 2006) Mountains Belen and Tirman, as Mansur (1972) mentions, are encircling the city of Bodrum towards the sea. The tops and sides of these mountains are bare of trees, causing erosions, as a result of demand for timber and land prepared for farming. After the first rain fall, these mountains are covered with flowers, green grass, anemones, wild orchids and narcissus which completely dry out in summer months. The thyme, sage and some other fragrant plants can be found everywhere. With its warm, dry and sometimes mild climatic condition of the Aegean coast, Bodrum reflects a local life that is bound to the fertility of olive, fig and tangerine trees on one side, and sea on the other (Türe, 2006).

Bodrum has a Mediterranean climate. A winter average high of 15 °C (59 °F) and in the summer 34 °C (93 °F), with very sunny spells. Summers are hot and humid and winters are mild and mostly sunny (Fig.1). The peninsula extends across an exceptionally dry belt even when compared with its immediate neighbors. In the lack of rivers and streams, rainwater is collected in ditches and channeled into the cisterns to be stored for the future uses in fields and to water the animals. Low rainfall results in a constant shortage of potable water, an issue that became more critical lately, with an increasing population and more tourists (Mansur, 1972; Türe, 2006).

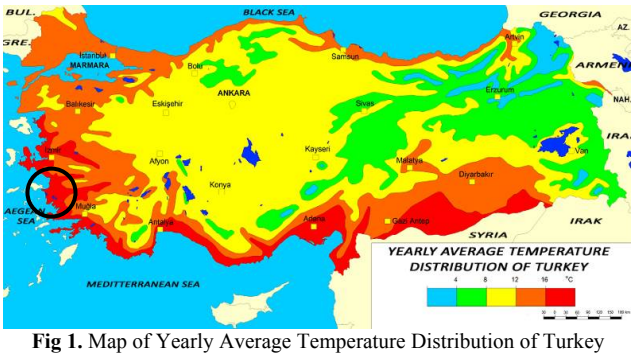


**Fig 1.** Map of Yearly Average Temperature Distribution of Turkey (http://www.4shared.com/photo/LgpProcH/Trkiyenin_Yllk_Ortalama_Saklk.html, retrieved at 23.04.2011)

The city of Bodrum includes the municipalities of Bodrum (the center), Turgutreis, Ortakent, Türkbükü, Yalıkavak, Gümüşlük, Bitez, Konacık, Yalı and Mumcular; and recent tourist-oriented developments were built or are being built across the district area.

## 1.2. ECONOMY AND THE SOCIAL STRUCTURE OF BODRUM: THE PAST AND PRESENT

Both physically and economically, Bodrum have presented the characteristics of a large village with urban features until the end of 20th century. Town and its surrounding have always been poor when compared to other old settlements located in the Aegean Coast, due to the lack of natural resources to support any industry (Mansur, 1972; Çapa, 2008). Agriculture, as Mansur (1972) mentions, was the basic occupation for the people in villages and sea trade for the people in town. Eventually, all have relied mostly on the revenue from the fields in the villages (Fig.2). Throughout centuries, islands and mainland have been complementary in sea trade. Especially in the 18th, 19th and early 20th century, agricultural products such as wheat, dried beans, barley, acorns, and carob beans olive oil, were taken to Izmir and Dodecanese Islands for trading. Islands fulfilled their need of poultry and cattle; mainland, coffee, tea, sugar, rice and fuel for the lamps, from sea trade.

The Cretans who arrived after the massacre of 1897, initiated a new era in the economic life in Bodrum by organizing the growing and trading of tobacco. The crop was sent to Izmir, Istanbul and even to Europe. Besides tobacco, fig and olive was planted and traded (Arıkan, 2008).

Especially after 18th century a striking division of labor occurred in town between the Greek and Turkish population. Carpentry and constructions works were done and most of the shops and taverns were owned by the Greeks. Commerce in town has catered the needs of the locals only. Turks were tailors, cooks, pastry-cooks and seamen working abroad in the sailing ships. The villagers, mostly the Turks, have woven and sell wool and silk to the townspeople, besides farming. Boat-building since 18th century, was almost the only occupation both Greeks and Turks have done and have done it together (Mansur, 1972; Güçlü, 2008).

In the period just before World War II, trade in the South Aegean Coasts have decreased, even completely stopped for a while, which complicated life in Bodrum as well. Economical crisis have led to hunger in many places, especially in small towns and villages, although Turkey did not take art in the war (Güneş and Güneş, 2008).

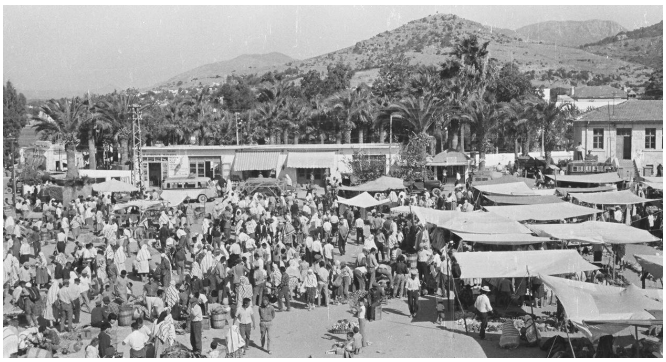

**Fig 2.** A view from Bodrum Bazaar in 1967 (photograph by H. Tanrıöver, Bodrum 1967)

The Cretans who came after the Exchange of Population Agreement and the others were in sponge and fishing businesses and in buying tangerine groves. Subsequently, children of the

wealthy families, mostly young Cretans, were sent to colleges in Istanbul and returned back as educated tradesmen, or acted as bankers giving loans to the farmers in advance of the crop. Especially after 1960's and 1970's, all groups, mostly the Cretans, have invested in the new economic opportunity, tourism. With the development of tourism, Bodrum has begun to acquire the features of other resorts; with pensions, hotels, and a fleet of boats taking tourists to boat trips and diving and fishing tours. In 1970's only a few families used to earn their living from tourism. The land and the sea were still the two basic occupations, and crafts and trades are the natural complements. However, in 40 years tourism became the first source of income for Bodrum and its hinterlands, wiping off the other occupations and traditions rapidly (Mansur, 1972).

### *1.2.1. Land*

During 1960's, 30% of the land could be cultivated since rest was covered with pine trees and marquis. The soil in the fields was clayish or sandy and full of stones which were used in the construction of the houses with wood provided from close-by pine forests for rooftops, cooking and warmth in houses. Water needed for cultivation could only be provided from rainfall, and stored in cisterns and wells since there were no rivers or running water in the region.

The cultivated land included olives, tangerine, figs, tobacco, wheat, barley, and vegetables. Growing, picking, packing, transporting and selling of the crops in Bodrum region, meant income for different groups of people. Packed crop was transported to the town by camels and donkeys by the farmers and delivered to the traders in Bodrum. Later in 1970's, transportation of the crop got easy by means trucks.

Olives, needing less water and care, have always been the most valuable crop of the peninsula. Olive crops were traded in two ways; as fruits and oil. A small portion of it was being used at home by each family for eating.

A type of tangerine, different from the others in the country, was brought to Bodrum from Rhodes in the early 20$^{th}$ century. Nevertheless there has always been citrus fruit grown in the peninsula, but not tangerine. Tangerine Cooperative was founded in 1950's by the growers since it provided income for a large group of people. However, after some time, members have lost interest in the running of the Cooperative.

For the owners of the land not suitable to grow olives or tangerines, figs were the regular source of income. Figs picked up in August, was being sold as fresh fruit, but mostly as dried figs. The other crops such as almonds and vegetables did not represent a significant contribution to the town's economy; provided only a small income for their owners (Mansur, 1972).

### *1.2.2. Sea*

Sea has always been an irrevocable part of the daily life in Bodrum. The expected and unexpected things it brought to the shores of the peninsula have enriched life for centuries. Meals enriched by varied seafood, sea trade, transport and rich and dangerous loot from smuggling and piracy were the advantages and gifts of the sea for the people living in Bodrum. Until 1940's Bodrum's connection to the outside world could only be provided by sea transport and trade. An ancient tradition smuggling, have appeared as smuggling of the *antiquities*, and have become and international trade in the Aegean Sea by the mid 20$^{th}$ century (Çapa, 2008).

Ever-continuing trade between the Aegean Cost of Anatolia and the Dodecanese Islands emerged since the islands and mainland were economically complementary. In the 19$^{th}$ and early 20$^{th}$ century islands were poor in foodstuffs but rich in manufactured products, quite the opposite of the mainland (Ottoman Empire) (Mansur 1972; Türe, 2006).

During the 19$^{th}$ and early 20$^{th}$ centuy fish has become the largest lucrative of Bodrum with the loans of the Ziraat Bank (Agricultural Bank) for fishing boats and equipment and construction of a cold storage in 1953. Fish caught in the morning was transported to İzmir at nights by trucks, packed in blocks of ice. Besides, fishermen of Bodrum sold some of the fish they caught that day to the Greek fishermen who came close to the mainland in search for fish.

Sponge fishing was another source bringing foreign currency. It emerged in 1930's when a Cretan "entrepreneur" brought a diver from Kalymnos to teach the young men of Bodrum to dive for sponge. Mostly, people with low-income were engaged in sponge fishing since it brings in more money than any other occupation but it was also the most dangerous occupation in town. (Mansur, 1972).

### *1.2.3. Tourism*

The recent and most exciting occupation for the inhabitants of the peninsula is tourism. Especially by 1960's, hosting and feeding a group of tourists, which increased to thirty thousand at the end of the first 10 years, have become the new source of income in the region. The low prices for accommodation in that period and road construction facilities completed by the government made Bodrum relatively accessible both for the domestic and foreign tourists. Especially from 1970's on, Turkish people have started travelling through the country for holidays.

At first, the idea of making money by hosting guests seemed embarrassing and inconvenient to locals who have hosted earliest tourists for free. Then, a system has been developed by the Tourism Association founded in 1959, in which the money has been transferred from the tourists to the host by the association. However, locals got used to the new occupation very quickly that they started grabbing people from the bus station to take to their pensions or hotels.

Tourism Association, besides acting as an interface between the hosts and the tourists, has given loans to locals to improve their homes by arranging bathrooms inside and organize courtyards. The members of the association who were aware of the town's potential for tourism have turned to visiting artists, intellectuals, writers, journalists, photographers and archeologists for publicity and for advice to improve the town. However, besides improving, many of the old houses in the Cretan quarter have been taken down and small hotels of a nondescript style constructed instead (Mansur, 1972).

Especially after 1980's because of embracing many natural, economical and bioclimatic characteristics and opportunities for recreational activities, Bodrum have become the center of attraction. People willing to escape from urbanization and live closer to nature, sea and sun; and the government's support for touristic investments on the coasts have increased the number of touristic and recreational facilities in the Aegean and Mediterranean Coasts. Second homes and the other touristic facilities constructed in this period have changed the topography, plantation and forestation forever.

## 2. Built Environment in the Bodrum Peninsula

Anatolian residential architecture was classified in two groups by many scholars as mentioned in Ergül and Kaya (2008)'s work, as the coastal and hinterland architecture, when analyzed on the basis of local-regional differences or

characteristics. The hinterland residential architecture shows certain similarities and some unifying characteristics regarding the traditions in spatial organization and construction technologies which enable researchers to classify. However coastal residential architecture, because of the ever continuing interactions with the opposite coasts and islands does not have unity within itself, and therefore can be categorized as transitional.

Bodrum Peninsula, and Aegean and Mediterranean coasts in general, by means of certain characteristics that differentiate them from the Ottoman Architecture unique to Central Anatolia and Rumelia, can be considered within Island architecture (Ergül and Kaya, 2008).

## 2.1. BUILT ENVIRONMENT BETWEEN 1600'S AND 1960'S

Bodrum was situated on the two coves, enclosing sea and meeting at a point where the Castle (St. Petrum or Petronium) arises. "Kumbahce", the eastern cove has been occupied by the Muslims and non-Muslims from Crete and other islands; and the western cove, by the Turkish people from Anatolia. Between these two groups of settlements "Merkez" (Center) where once a graveyard, today the bazaar and commercial buildings takes place (Uğurlu, 2008; Güneş,Güneş, 2008).

Karaman (2001) mentions that the first settlements out of the Castle (Petronium) were assumed to be built around 1600's in a way that resembles the castle to serve for the self-protection of the locals from piracy and banditry. Settlements in the peninsula have increased in numbers and types after the domination of the Ottoman Empire in 1600's and on. In order that the locals could benefit from the advantages of the sea, settlements have been located mostly on the shores rather than inland.

The coastal belt made up of two coves, as told by Bektaş (2004) has acquired different characteristics regarding order and density. Kumbahce district on the east cove has been occupied by the Cretans since the supremacy of Suleiman the magnificent and was more uniformly occupied and was wider than "Turk Koyu" (Turkish Cove) on the west. Cretans and people from the islands were making a living from fishing and Turks on the west cove mainly occupied by agriculture. This social structure had existed in the last century as well. The houses in this eastern district had small stone courtyards side-by-side forming narrow, shady streets in between while the settlement on west coastal belt was less constant, less dense and newer. The number of houses in the west cove was very few in 19th century (Fig.3), however increased after the opening of the coast road (Fig 4).

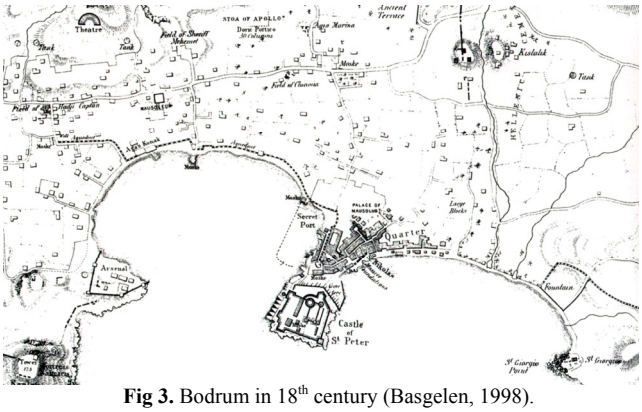


**Fig 3.** Bodrum in 18th century (Basgelen, 1998).


**Fig 4.** Bodrum in 21th century (retrieved on 22.04.2011, http://maps.google.co.uk/).

The garden belt that separates the populated areas on the coast and mountain slopes was flat and suitable for cultivation. It was narrower on the west part of the town since the mountains here are closer to the sea when compared to the east part. Therefore, sea was more accessible on the west cove. The layout of the populated belt along the mountain slopes in two coves was different from each other as well. Houses on west cove have developed around secondary nucleuses, forming neighborhoods Türk Kuyusu, Eski Çeşme and Tepecik, along an invisible line and joined to form a continuous belt while the ones on the east have stood as unrelated single houses. This configuration of the upper belt in the west cove has maintained the development of the services more and easier than the east cove. (Bektaş, 2004)

In the region, sea and land were valued the same and no separation of any kind existed in between the sea and the inhabitants of the town. Sea has always been a part of the houses on the coast, which seemed to extend towards courtyards and interiors with the vegetation along the coast (Bektaş, 2004). The shady, narrow streets, formed by the high courtyards and garden walls, were the common features of both coves.

Until 1960's and 1970's the narrow and densely populated belt following the coastline have existed as it is, with charming white houses forming a harmonious whole with well-proportioned windows, doors and interesting chimney pots resembling Mausoleum (Fig.5). The variety and richness of the folklore reflected on the cubic white architecture of the peninsula emerged as the result of the balanced intermingling of different religions, languages, and different life styles in time. There existed pure unity both with nature and each other. Today, despite all deteriorations houses are still the most striking aspect of Bodrum (Türe, 2006).

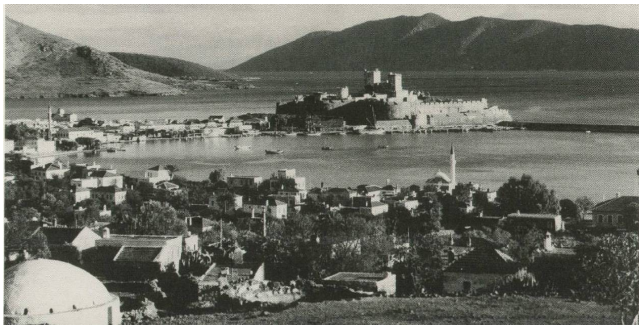

**Fig 5.** A view towards the Castle and Turkish Cove, Bodrum, 1967 (photograph by H. Tanrıöver, Bodrum 1967)

*2.1.1. Traditional Houses of Bodrum*

Bodrum Houses are the products of generations' experience of using small spaces in the most effective way. Although they vary in plan, the significant items that bring in identity to these houses are the sizes, proportional relationships, material and techniques of construction, monumental chimneys, battlements on the edges of the roofs, and definitely the white color, achieved by the use of albarium (Türe, 2006; Bektaş, 2004; Uğurlu, 2008).

Before the tourism boom in Bodrum, the houses were planned and built according to the life of the family and the source of income, farming, fishing, livestock breeding or trade. They were constructed by the local craftsmen and his two apprentices, by using the materials available in the near surrounding. Other significant criterion in designing and positioning the house on the site was the tradition of respecting the neighbors. Arif Kaptan, one of the oldest craftsmen in the peninsula quoted by Bektaş (2004), mentioned the importance of neighborliness and stated the significance of having intent not to look into each other, and not to block the sun, air and view of the neighbors. Houses were somewhat individual as well, because in addition to the family's source of income, the type and size of the house, the locations of windows and doors, were decided by the owner. Therefore, it is possible to observe several variations within the three major types of traditional houses.

Bektaş (2004) classifies Bodrum houses in three categories by referring to their major properties as *Kule Ev* (Tower House), *Musandıralı Ev* (Mezzanine House) and *Sakız Ev* (Khios House). Aysel (2006) makes an addition to the typology with Single Room Houses, having very similar characteristics with Mezannine House. Among all types, Tower House is the oldest and most have been abandoned many years ago. Craftsmen, who are still building traditional houses, quoted by Bektaş (2004) mention that the most common type was Mezzanine House and together with the Khios Houses, they were built until the mid 20$^{th}$ century.

***Kule Ev (Tower House)***

"Kule Ev" is the oldest type of traditional house in the peninsula. First neighborhoods that have been developed out of but close to the castle walls were formed as "Kule Ev" (Fig.6 and 7). Later they have been built also in the other districts of Bodrum. These houses are simply the mezzanine type houses with a square plan (4,5 x 4,5 x 4,5) with stables on the ground level in which the living quarters are elevated to the upper level for easy defense (Fig.8).

They were named as the "Kule Ev" by the local people simply because they have been built higher than the other houses. Another typical characteristic of these houses is the access to the living quarters that is located at a higher level than the ground. Entrances are designed only to be reached by a drawbridge operable manually from inside which leads to a stone staircase constructed away from the doorway. Moreover, entrances in "Kule Ev" are located on the opposite side of the sea (facing north-east) on the contrary to all other types. All these specific features and the embrasures on the edges of the roofs point to the significant need for defense from pirates and banditry, ever since settlements have moved out off the castle. Later, especially the embrasures on the roofs have become one of the most significant architectural features of Bodrum (Türe, 2006). In addition to the specific features mentioned above, Bektaş (2004) mentions the existence of services such as lavatory and WC inside the house on the ground level which enables inhabitants to manage to stay in for several days, in times of conflict.

**Fig 6.** *Kule Ev* (Tower House) in Ortakent Bodrum (photograph by S. Tanrıöver, Bodrum 2011)

**Fig 7.** *Kule Ev* (Tower House) in Ortakent Bodrum (photograph by S. Tanrıöver, Bodrum 2011)

***Musandıralı Ev (Mezzanine House)***

Musandıralı Ev, with a rectangular plan, were mostly inhabited by the farmers. In this type usually having 4,20-4,60 x 6,50-7,50m dimensions (including the thickness of the walls), narrow side of the rectangle depends on the size of the mezzanine and the long side depends on the size of the pole made up of a complete tree which has a four-cornered section. The harmony in plan achieved by these proportions and the locations of the doors (placed on 1/3 of a long side of the rectangle) and windows indicates the presence of golden ratio, succeeded unconsciously (Türe, 2006) (Fig.9, 10, 11).

The house has two levels where the first level is called the "Alt Ev" (Lower House) and the second is the "Üst Ev" (Upper House). The "Lower House" is being used as the entrance and kitchen. Oven is located either on the wall adjacent or on the opposite wall of the entrance. Bathroom which is positioned on one side of the kitchen consists of a can full of water and a drainage only that leads the used water out. In some cases, bathroom is placed outside the house (Fig.12).

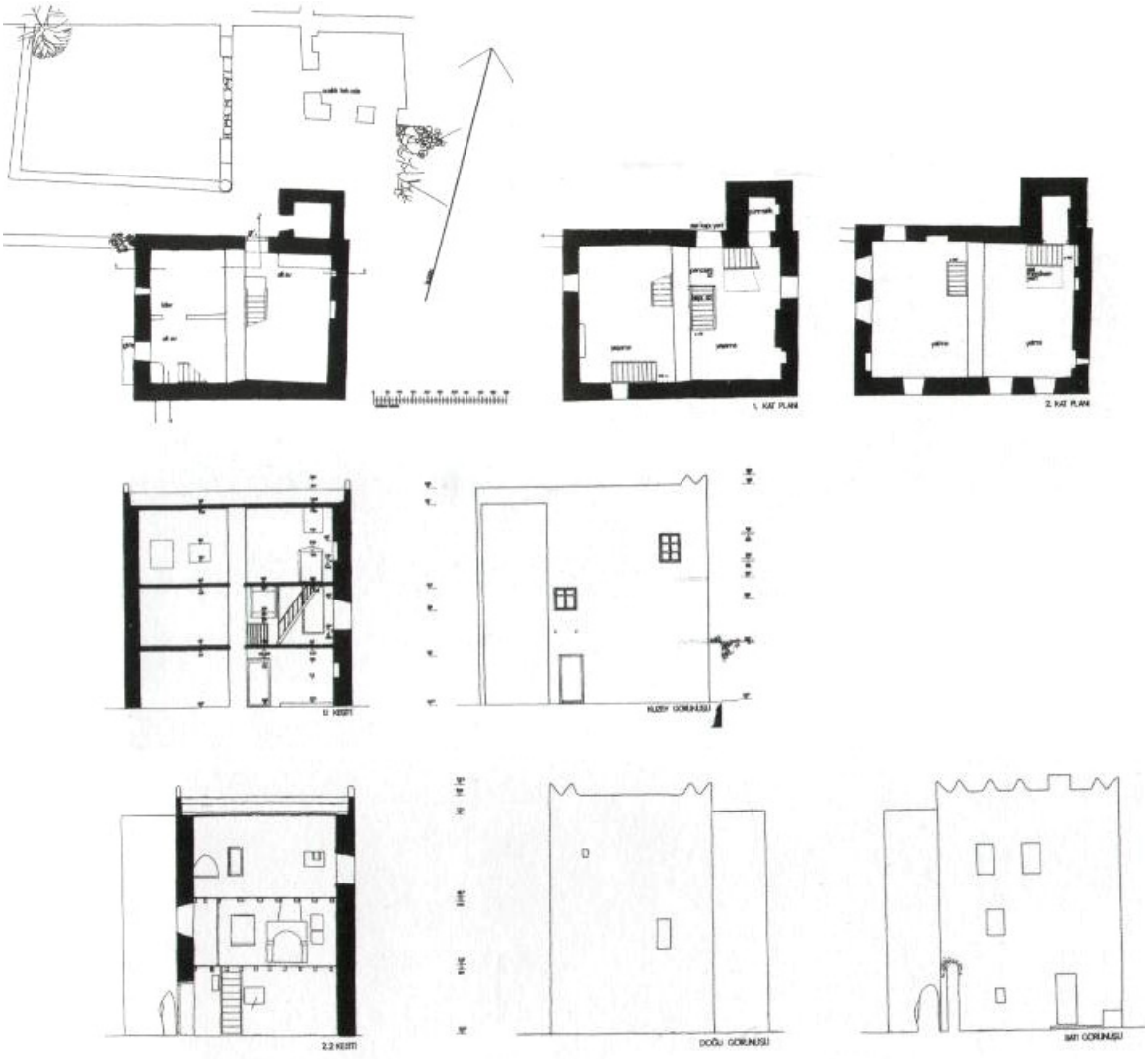

**Fig 8.** Drawings of *Kule Ev* (Tower House) in Ortakent Bodrum (Bektaş, 2004)

(1)

The staircase positioned on the other side of the entrance, connects the "Alt Ev" and "Üst Ev". 1,60-1,80m space in between these two levels is used as storage and is extremely important for the families engaged in agriculture. The living quarter in "Üst Ev" with a ceiling height of approximately 3.00m, houses a second oven placed on the other short side of the rectangle, opposite wall of the staircase. This living quarter in the"Üst Ev" is separated from the kitchen in the "Alt Ev" by a partition that is used as a cabinet from the "Üst Ev". Same application is repeated for the mezzanine level which is the level higher than the "Üst Ev". A second staircase connects the "Üst Ev" to the mezzanine, which is usually 1, 60-1, 80 m higher than "Üst Ev" and is used either as the storage of mattresses and bedding or a bedroom having a connection to the roof.

Musandıralı Ev may also be built with a depressed ground level as a stable or a cowshed for the families engaged with live stock breeding. Then the living quarters can be accessed by means of a staircase built outside, since the ground floor is left for the animals (Bektaş, 2004).

**Fig 9, 10,11.** *Musandıralı Ev* (Mezzannine House) in Karakaya, Bodrum (photograph by S. Tanrıöver, Bodrum 2011)

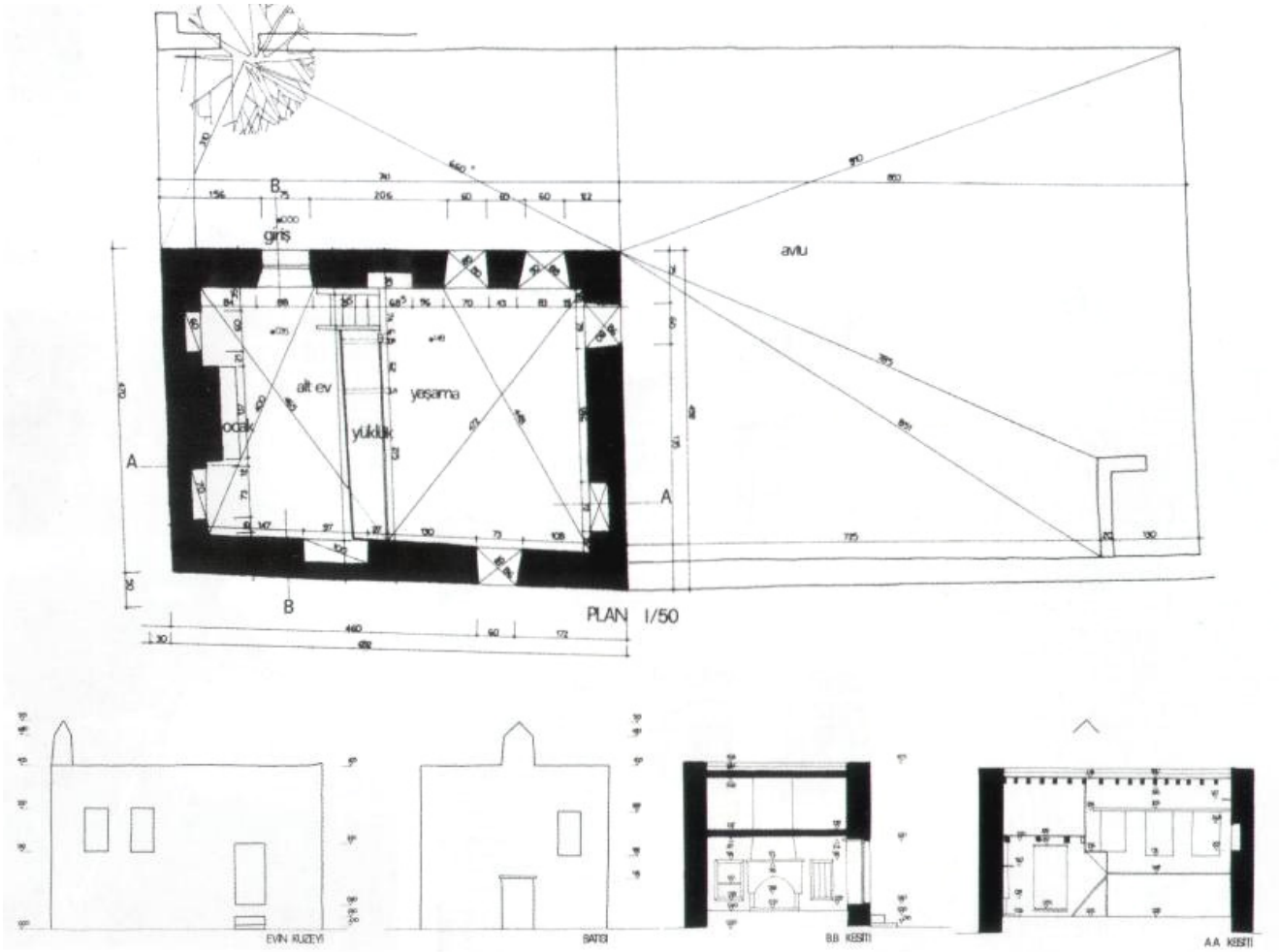


**Fig 12.** *Musandıralı Ev* (Mezzannine House) in Bodrum (Bektaş, 2004)

***Sakız Ev (Khios House)***

Sakız Ev with two identical floors have almost the same dimensions with Musandıralı Ev. Entrance located on one of the long walls of the rectangle, is oriented to east in order to benefit from the morning sun and prevailing wind, coming from the sea.

The narrow sofa accessed from the entrance has two doors on opposite side walls opening to two similar rooms on two sides. The staircase on the opposite wall of the entrance connects two levels. The upper level also has the same configuration with the level below. In some Sakız Ev, a projection covering the entrance, "ayazlık", is added directly above the front door and even in some cases it is constructed as a bay, "cumba", as a part of the interior (Fig. 13 and 14).

"Yer Evi" (Lower Level) has a lower ceiling than the "Üst Ev" (Upper Level). The main living quarter of the family takes place in the lower level and has oven in both rooms. One of these rooms is used as the kitchen in winter months and includes a bathroom corner similar to "Musandıralı Ev". The "Üst Ev" usually is furnished with the best furniture that the family can afford and only used to host the guests. In some variations of this type of houses, entrance hall has been neglected and the entrance door opens into one of the rooms on the ground floor. The access to the other room on this level and to "Üst Ev" is provided from this room. For "Üst Ev" several variations have been adopted such as portioning the room by means of a built in cabinets.

The widespread similarity in the volumes enclosed, building materials and technologies, the proportions of doors and windows create unity between the different districts and neighborhoods of Bodrum. Yet again similar in all houses except the ones in "Kumbahçe" district, lavatory has been placed outside, which in "Kumbahçe" located on a corner of the garden enclosed by a semi-cylindrical volume.

Both in Musandıralı Ev and Sakız Ev, courtyards are the places to spend the summer months. Therefore, they contain all the elements of a life which is lived outside, in the most functional way. Usually all courtyards have stoves and wells; and are organized diligently with pergolas and plants for the provision of shade and enclosed by high walls for protection from the strangers' glances (Bektaş, 2004) (Fig.15).

**Fig 13.** Sakız *Ev* (Khios House) Bodrum (Bektaş, 2004)
**Fig 14.** Sakız *Ev* (Khios House) Gümüşlük, Bodrum (photograph by S. Tanrıöver, Bodrum 2011)

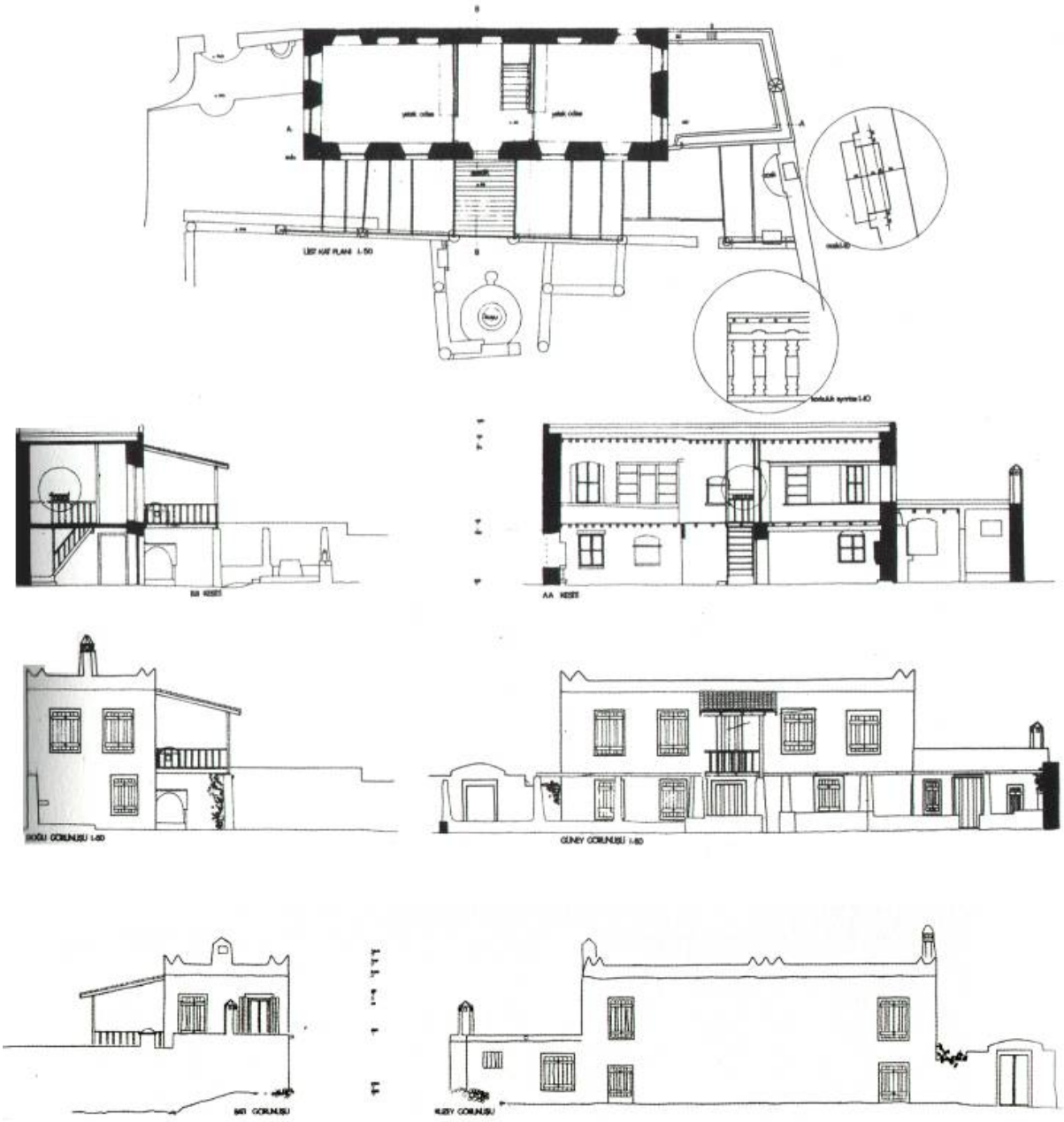

**Fig 15.** Sakız *Ev* (Khios House) Bodrum (Bektaş, 200

*2.1.2. Construction and Materials*

Stone is the typical construction material in the Aegean coast. The foundation, walls, indoor floor, door and window lintels and jambs of the houses are all made up of stone, provided from the near surrounding. Farmers, as told by Sönmez and Bilgin in the interviews, use to prepare soil for cultivation by collecting the stones and use them in the construction of their houses. For the courtyard floors, slate was frequently being used. Kaoline generated by mixing white soil with soil mortar or cement mortar was a tradition in masonry. If application of sand to the cement mortar is the case, sand was provided from a longer distance, from Milas or Kemer. The most accepted and used timber for the beams, floors and other parts of the house was the pitch pine.

**Fig 16.** Soil rooftop of a typical Bodrum House (photograph by H. Tanrıöver, Bodrum 1967)

Perfect insulation for heat and water on the soil rooftops was accomplished by the successful use of local materials (Fig.16). The slitting that is covered by sedge put side by side without space, supported by tree branches and covered with timber. For the upper layer a bush rich in leaf "acı çalısı" and another that grows in marshland "kovalık" was being used. The following 3-4 cm thick layer was made up of seaweed "erişte", and lastly 5-7 cm thick layer of soil was laid to cover the whole surface. In order to avoid the growth of plants on the roof salt was laid on the soil. These layers that avoid heat transfer lastly were covered with a type of clay that was brought from "Üçpınar" district to avoid the water transfer and was pressed by a stone steamroller. Roofs were designed with a slope towards one of the sides in order to deliver rainwater from roof to soil with the rainspouts from fired clay.

Most of the houses were plastered both inside and outside. However in some, the use of plaster is different. The technique called "Çakır" or "Sakar" requires less use of plaster, only to apply on the the speces in between the stones and is 4-5 cm thick. This technique was being used to decrease both the amount of plaster and to create an air current in between the sunny and shady parts of the outside walls to cool the interior. It is for the same cause that both interior and exterior of most houses are painted with lime in pure white color.

## 3. Conclusion

In order to conclude a subject matter that includes many factors as mentioned briefly in the previous sections, interpretation will focus on the interactions among the coasts that is triggered by the environmental conditions in the first place.

As mentioned by many scholars, the ever-continuing interactions between the Western Anatolia and the islands, rather than the Central Anatolia was owed to the rough and impassable topography in the region and lack of transportation technology other than sea transport until late 20th century.

Similar geographical and climatic conditions and natural resources shaped similar living environments on both sides. Construction techniques on one side had been transferred to the other with minor changes since the climatic conditions and materials available have permitted to. Daily life mostly spent outside working either in the fields or on the sea; mild climatic conditions even in winters, have shaped plain and functional interior spaces on both mainland and islands to satisfy the basic needs of the occupants.

The economical and social bonds set up in different scales between the Dodecanese Islands and Western Anatolia, regardless of the dominating power in the region, was another major factor in shaping life and the settings of life, the settlements, on both sides. Different crops on each side created complementary economical and social bonds in between the communities of the mainland and the islands. However, this crucial bond in between has been minimized in the 20th century, after World War I and II.

Fundamental and dynamic interactions in between Western Anatolia and the islands that existed throughout history until 20th century, today continues within a different formation. Many people from all over the world, also from Greece and Turkey are moving from coast to coast mostly for touristic purposes.

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# Enclosed Spaces for Seoul and Kaesong based on Feng-Shui

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**Keywords:** Feng-Shui, enclosed space, city planning, landscape, mountain, river, Seoul, Kaesong

**Abstract:** This paper studies the relationships between the landscapes of Seoul and Kaesong and their interpretations based on Feng-Shui, which is a system of thought that originated in China, that is used for selecting the locations for cities, houses, and graves. Most previous Feng-Shui studies mainly addressed Feng-Shui interpretations using two-dimensional maps. However, in this study we consider the visual relationships between actual landscapes and interpretations based on Feng-Shui using a three-dimensional terrain model. Both Seoul and Kaesong have enclosed spaces and were influenced by Feng-Shui in the Korean Peninsula. Both Seoul and Kaesong have visually enclosed spaces, suggesting an outlook of nature that respects the connections of the mountain ranges.

## 1. Introduction

### 1.1. BACKGROUND

In Feng-Shui, an East Asian system of thought that stresses harmony with nature, a space enclosed by mountains and rivers is considered ideal. Such enclosed spaces are critical spatial elements that help humans can live peacefully. This space has good point that mountains give human beings the meaning where ourself is in the world and human beings lives in the meaning with common recognition. We believe that Feng-Shui has a big suggestion for the problems of modern society. This study identifies one view of nature in Feng-Shui for city planning.

### 1.2. SIGNIFICANCE AND OBJECTIVE

This paper studies the relationships between the landscapes of Seoul and Kaesong and interpretations based on Feng-Shui, which is a system of thought that originated in China for selecting locations for cities, houses, and graves. Both Seoul and Kaesong have enclosed spaces and are typical cities influenced by Feng-Shui for city planning.

Most previous Feng-Shui studies mainly addressed Feng-Shui interpretations using two-dimensional maps. However, in this study we consider the visual relationships between actual landscapes and interpretations based on Feng-Shui using a three-dimensional terrain model.

### 1.3. LITERATURE REVIEW

The most representative study in Feng-Shui studies in Japan is "Feng-Shui in Korea" by Chijyun Murayama[1] (1931). Murayama studied Feng-Shui and systematized it for the first time in the Government-General of Korea. After WWII, Ryokai Makio studied the relationship between Feng-Shui and Buddhism. The Feng-Shui boom of the 1990s fueled Feng-Shui studies in many scientific fields, including cultural anthropology, history, architecture, city planning, and geography.

In the cultural anthropological field, Yoshio Watanabe studies Feng-Shui in China and Okinawa and pointed out that a spatial composition method in Feng-Shui made a model of various kinds of artificial spaces (1990). In addition, he arrived at the view of the world of following two matters from examples of the graveyard Feng-Shui of the Han race. One is "a mechanical view of the world in which people assume that Feng-Shui is an overall environmental material influence through ancestral bones." The other is "a personal view of the world in which people assume that Feng-Shui is emotional influence from ancestors, recognizing ancestral bones as personal symbols." Kunio Miura (1994) studied literature named "Takurishi," which is a Korean geography book in the 18th century, from the viewpoint of a Chinese historiographer and described the relationship Taoism and Feng-Shui. Ka (1994) studied Chinese cities and villages through Feng-Shui and reevaluated the deep scientific wisdom of ancient people in Feng-Shui. Mitsuhiko Nozaki (1994) described the Nittei-danmyaku-theory[2] in detail. In the geographical field, Choi Chang-jo generally systematized Feng-Shui in the Korean Peninsula following Murayama in "Feng-Shui in Korea." Choi (1997) studied the principles of Feng-Shui and its interpretations about actual landscapes and confirmed the adaptive degree to their reality. Shizuaki Shibuya (1994) analyzed the geographical types of old Korean villages and confirmed the generality of spaces called "Haizan-rinsui" or "Zōfu-tokusui" in Feng-Shui. In the architectural field, Yasuhiko Nishigaki (1987) discussed Korean dwellings through Feng-Shui and pointed out the importance of the relationship between "Maru" and "Madang."[3] In the city planning field, Haung[4] (1999) described an ideal Feng-Shui model as a visually enclosed space and assumed that it influenced the ancient capitals of Japan: Fujiwara-kyō (present-day Kashihara in Nara Prefecture), Heijyo- kyō (present-day Nara), and Heian-kyō (present-day Kyoto).

There are many Feng-Shui studies in various fields. Most previous studies discussed about Feng-Shui interpretations of Seoul and Kaesong on two-dimensional maps, but no study has considered the adaptive degree to the real topography of Feng-Shui concerning landscapes in detail.

## 2. Enclosed Space Based on Feng-Shui

### 2.1. BASIC CONCEPT OF FENG-SHUI

"Feng-Shui" literally means "wind-water." In Feng-Shui, all materials and energy are made from Qi. The following passage from Zangshu (Book of Burial) by Guo of the Jin Dynasty (265-420) explains:

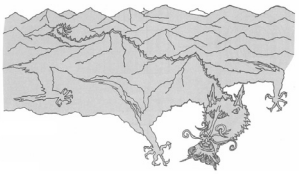
> *Qi rides wind and scatters, but is retained when encountering water.*
>
> *A burial depends on Qi. The Qi of Yin and Yang, when it spits it out, becomes wind. When it rises, it becomes a cloud. When it gets angry, it becomes thunder. When it falls, it becomes rain. When it flows through the underground, it becomes Qi.*

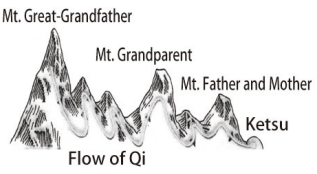
Here, it is grasped as a thing of the same quality variant that produced wind and Qi from Yin and Yang.[5]

The following are the properties of Qi:

(1) It is invisible.
(2) It flows through underground. Based on an area's topography, Qi become denser or thinner.
(3) Human-beings harmonize with nature through Qi (Tenjin-gōitsu).[6]

Ideal sites are surrounded by mountains and rivers to accumulate Qi. Relationships with mountains and rivers are crucial to evaluate its invisibility. In Feng-Shui, mountain ranges are regarded as a Dragon Pulse[7], through which Qi flows (Fig. 1). Fig. 2 shows its flow. In Feng-Shui, a connection of mountain ranges gives meaning to a place as a family tree. Qi flows from Mt. Great-Grandfather to Mt. Grandparent, to Mt. Father and Mother, and condenses in Ketsu, which means the most important place. In China, the father of all mountains is Mt. Kunlun.






left: Fig. 1 Image of Dragon Pulse (Sugimoto, 1992)
right: Fig. 2 Flow of Qi and connection of mountain ranges (Huang, 1999)

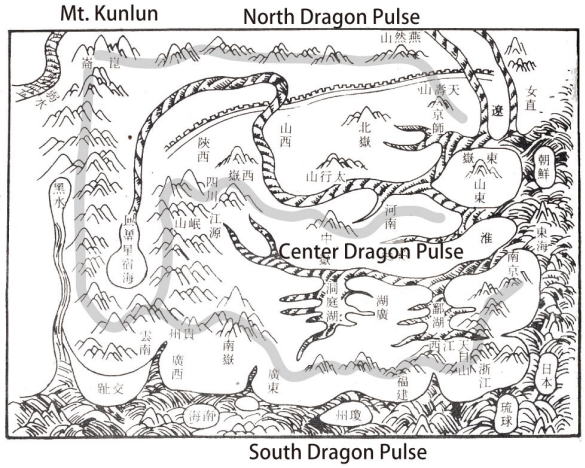



Fig. 3 Great Three Dragon Pulses
("Sanzai Zue" 16th cent. Ming Dynasty)

Fig. 3 shows the Great Three Dragon Pulses from Mt. Kunlun: North Dragon Pulse, Center Dragon Pulse, and South Dragon Pulse. The Great Three Dragon Pulses branch off and lead to the main mountains of each city, village, house, and grave. In the Korean Peninsula, Qi from Mt. Kunlun flows through the North Dragon Pulse and condenses once in Mt. Baekdu, which is considered the father of all mountains (Fig. 4) (Murayama, 1931).

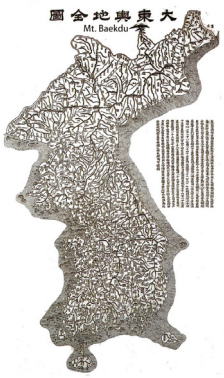



Fig. 4 Map of Korean Peninsula
("Daedong Yeoji Jeondo"
Kim Jeong-ho, 1861)[8]

### 2.2. ENCLOSED SPACE BASED ON FENG-SHUI

Figure 5 shows a typical ideal model of Feng-Shui by Chijyun Murayama, who was the first person to study Feng-Shui in Japan (Murayama, 1931). This ideal model is applied to every standard from cities to villages, houses and graves. Ketsu contains the most condensed Qi due to the enclosed spaces. For a city's center, such structures as palaces located in Ketsu. For graves, the place where ashes are laid in state located in Ketsu. Shu-zan is the main mountain behind Ketsu. Sō-zan is a magnificent mountain that leads to Shu-zan. Qi comes to Shu-zan from Sō-zan.

Myōdō is a plain spread in front of Ketsu. In the case of a city, Myōdō is a city area. Sha are the mountains that enclose Myōdō and are offset from Shu-zan.[9] An-zan is a mountain seen in front of Ketsu. Chō-zan is a mountain in the distance in front of Ketsu. Rivers flow through Myōdō. Suikou is a place crossed by rivers. Constructing cities, houses, and graves in Ketsu brings happiness and prosperity.


Fig. 5 Ideal Feng-Shui topographical model
("Sankyoku no zu" Murayama, 1931)

This model has an axis (Sō-zan - Shu-zan - Ketsu - Myōdō - An-zan - Chō-zan) and a direction called Zakō (In Fig. 5(a), from Shu-zan to An-zan). Zakō is a direction to see the front from Ketsu. In other words, its back is za, and its front is kō. Zakō is different from the concept of the direction. One place can have innumerable directions, but there is only one Zakō that is decided with choice enthusiast characteristics. For example, Zakō, which is the direction from North Shu-zan to South An-zan, is called Shiza-gokō.

The ideal Feng-Shui topographical model is described by some of the following terms. “Zofu-tokusui” means, “to prevent wind and to get water.” “Haizan-mensui” means, “burdened with a mountain and overlooking a waterfront.” “Sanga-kintai” means, “mountains and river enclosed like a collar and a fascia.”

This model is related to Shijinsoō, which means the Four Celestial Animals (Black Tortoise, Green Dragon, White Tiger, and Red Phoenix) are in balance (Fig. 6) (Huang, 1999). In Feng-Shui, to embody the astronomical phenomena in ancient China, the natural terrain for all sides is as follows. The left side is a Green Dragon, the right side is a White Tiger, the front side is a Red Phoenix, and the back is a Black Tortoise. Ideal Feng-Shui topographical structures have a central axis of mountains in a row: Shu-zan - Za-zan - An-zan - Chō-zan. Also, they have a vertical axis of symmetrical mountains: Blue Dragon - White Tiger. Myōdō is enclosed by these mountains.[10]

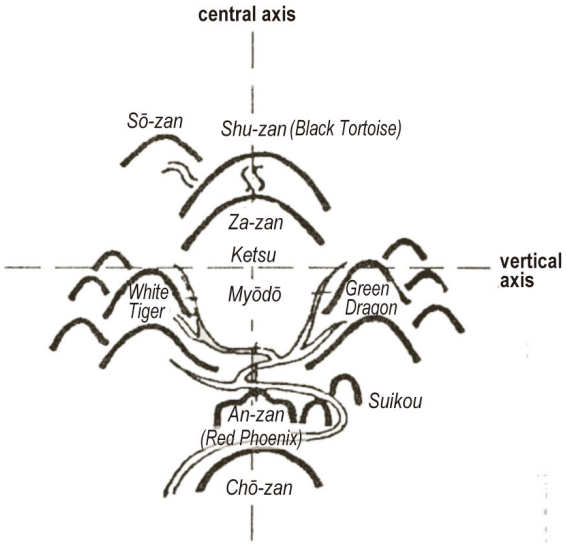



Fig. 6 Ideal Feng-Shui topographical structure (Huang, 1999)

## 3. Methods

### 3.1. OBJECTS

In this paper, we compare Seoul and Kaesong to clarify the relationship between actual landscapes and their interpretations based on Feng-Shui in the Korean Peninsula. Both Seoul and Kaesong have enclosed spaces and are typical cities influenced by Feng-Shui for city planning (Murayama, 1931) (Choi, 1997). When the Joseon Dynasty (1392-1910) came to existence, both areas are compared based on Feng-Shui interpretation in the discussion about relocating the capital.

### 3.2. METHODS

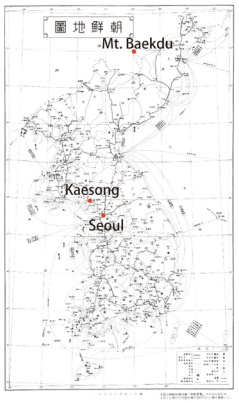
We made a three-dimensional terrain model of the topography to show the enclosed spaces of Seoul and Kaesong. A three-dimensional CG perspective can express visual three-dimensional spaces, which are not expressed in words or by a two-dimensional map. Three-dimensional terrain models were made based on the contour line of the map by the Government-General of Korea.[11] The precision of the three-dimensional terrain models was confirmed by the fieldwork or references. In our discussion, we mainly treated the interpretations based on Feng-Shui in Seoul and Kaesong that were chosen as subjects to relocate the capital by Murayama (1931) and Choi (1997).

## 4. Discussion

### 4.1. SEOUL

#### *4.1.1. Outline of Seoul*

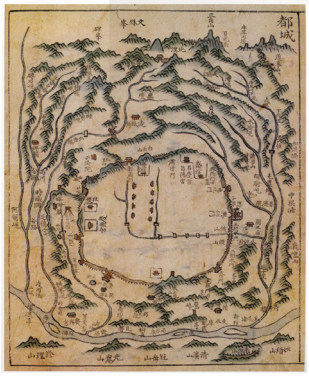
Seoul (Hanyan) was the capital city of the Joseon Dynasty (1392-1910), which was founded by I Seonggye. Seoul is located in the central area of the Korean Peninsula (Fig. 7). According to such literature as the Annals of the Joseon Dynasty[12] (True Record of the Joseon Dynasty), Seoul was clearly selected based on Feng-Shui in 1394 (Murayama, 1931) (Choi, 1997).[13]





(a) Korean Peninsula (b) Map of Seoul and Kaesong

Fig. 7 Positions of Seoul and Kaesong (Government-General of Korea, 1985)



left: Fig. 8 Hanyang Tosong-do: Map of Walled Capital (1720)
right: Fig. 9 Hanyang Tosong-do: Map of Walled Capital (1770)

left: Fig. 10 Kyongjo ohbu-do: Map of Five Districts of Seoul (1861)
right: Fig. 11 Hanyang do: Map of Seoul (1861)

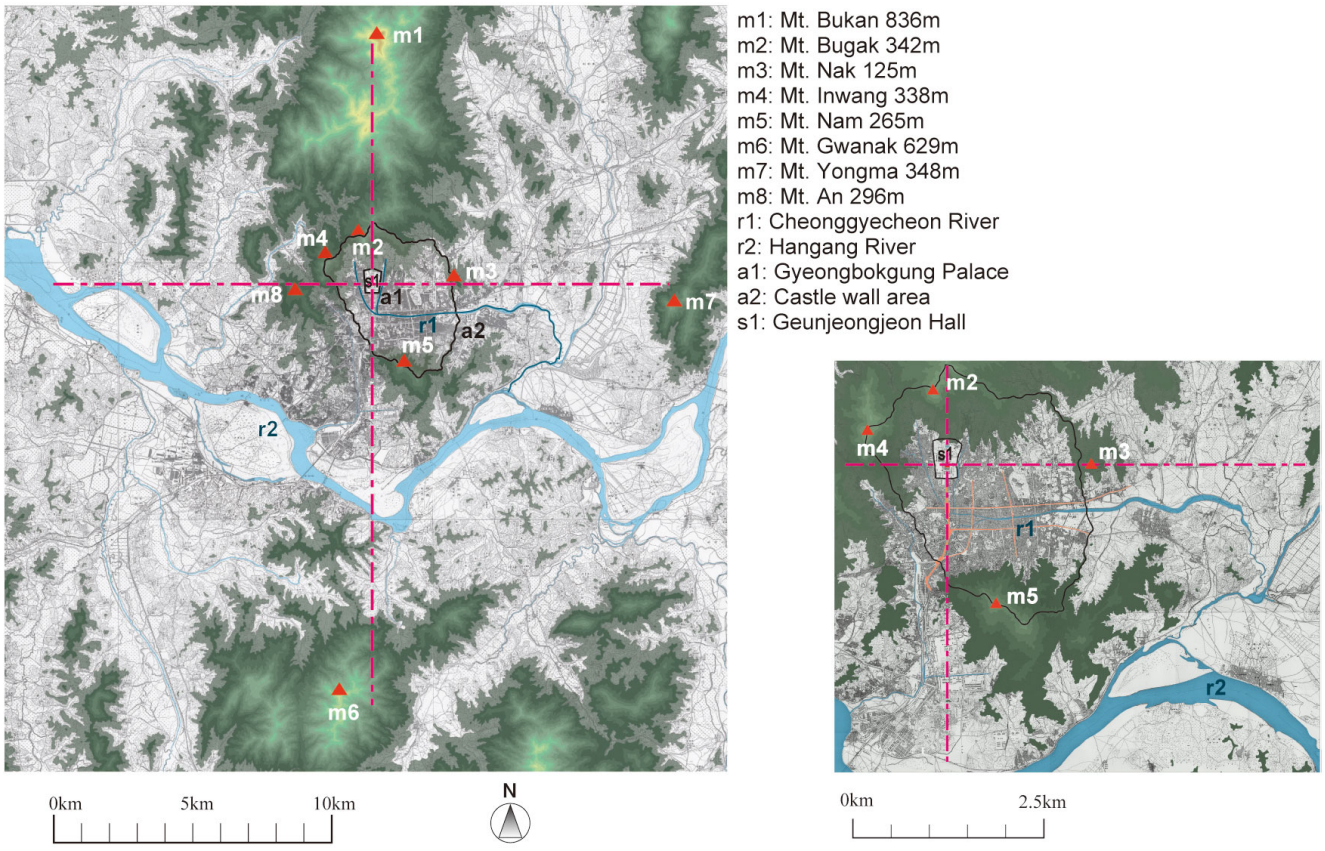
Maps of Seoul from 1720,1770, and 1861 are shown in Figs. 8,9,10, and 11, respectively. In these figures, the mountains and rivers are drawn so that Seoul has an enclosed space.

*4.1.2. Topographical Features and Feng-Shui Interpretations of Seoul*

Figure 12 shows a topographical map of Seoul. The following are its topographical features. The center of Seoul is the Gyeongbokgung Palace, which is a royal palace located in northern Seoul. First constructed in 1394 and rebuilt in 1867, it was the main and largest palace of the Five Grand Palaces built by the Joseon Dynasty. Its name, Gyeongbokgung, means "Palace of Shining Happiness." It is surrounded by the following mountains and rivers: North Mt. Bugak (342 m), Mt. Bukan (836 m), East Mt. Nak (126 m), Mt. Yongma (348 m), West Mt. Inwang (338 m), South Mt. Nam (265 m), Mt. Gwanak (629 m), and the Hangang River.[14, 15]

Seoul faces south. Its central axis does not match the top of Mt. Bugak. When the capital was moved, the castle wall was 18-km long and a 20-km$^2$ area surrounded the city. The castle walls and the roads were not symmetrical, and there were indeterminate forms to the topography.In the topographical map, the east and southwest sides are open, and the impression of being surrounded by the mountains is weak.

The following are the Feng-Shui interpretations of Seoul. The Gyeongbokgung Palace is located in Ketsu. North Mt. Bugak is the Shu-zan, North Mt. Bukan is the Sō-zan, and Qi flows through from Mt. Baekdu to Mt. Bukan. East Mt. Nak is the Green Dragon, West Mt. Inwang is the White Tiger, South Mt. Nam is the An-zan, and South Mt. Gwanak is the Chō-zan. Myōdō is a space enclosed by four mountains: Mts. Bugak, Nak, Inwang, and Nam. The Cheonggyecheon River flows east through Myōdō, and the Hangang River flows from east to west south of Mt. Nam surrounding Myōdō.




(a) Wide area

(b) Castle wall area

Fig. 12 Topographical map of Seoul
(created based on maps by Land Survey Department, Imperial Japanese Army General Staff Office and Government-General of Korea)

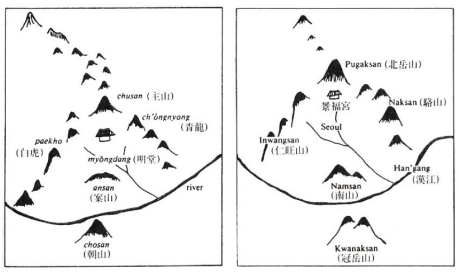



Fig. 13 Feng-Shui model and diagram of Seoul (Choi, 1986)

Fig. 14 Keikyoku of Seoul (Choi, 1997)

Figure 13 shows a Feng-Shui diagram of Seoul. The Four Celestial Animals are all associated with mountains (Choi, 1986). Fig. 14 shows the Keikyoku[16] of Seoul. In this diagram, the Gyeongbokgun Palace is represented by a peony bud that Seoul is about to development as a peony is going to right bloom (Choi, 1997). Fig. 15 shows the Inner Four Mountains and Outer Four Mountains of Seoul (Choi, 1997). The Inner Four Mountains are Mts. Bugak, Nak, Nam and Inwang. The Outer Four Mountains are Mts. Bukan, Yongma, Gwanak and Tokuyo. In this figure, Seoul is enclosed by double mountain ranges.

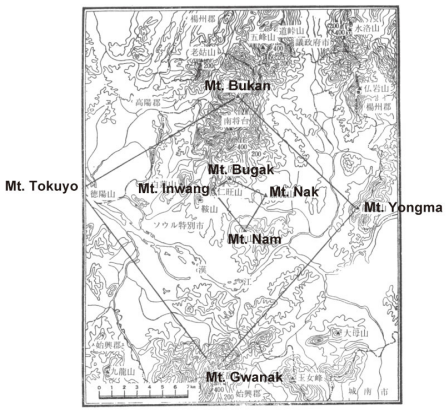



Fig. 15 Inner and Outer Four Mountains of Seoul (Choi, 1997)

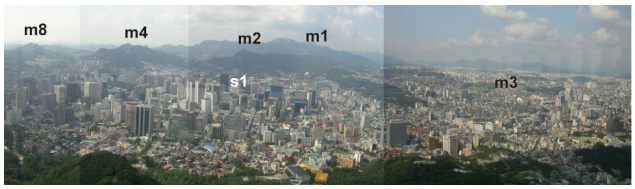



Fig. 16 Panoramic view of Seoul from Seoul Tower in Mt. Nam (created based on photos by author in 2004)

Figure 16 shows a view from Seoul Tower (observation deck 378 m) in Mt. Nam. A mountain range from Mt. Bugak Shu-zan to Mt. Bukan So-zan is prominent, as is Mt. Inwang. On the east side, the widespread green part resembles Mt. Nak at a glance, but it is actually the Changdeokgung Palace. Mt. Nak is east from there, but its precise location is hard to pinpoint. In Fig. 13 Seoul is surrounded in three directions by mountains of the same height. Mt. Nak has been exaggerated to resemble the Green Dragon of Seoul.

The impression of being surrounded like a Feng-Shui ideal topographical model is not common. Instead the presence of the mountain range from Mts. Bugak to Bukan is prominent.

### *4.1.3. Enclosed Space for Seoul*

As Fig. 16 shows, since high-rise buildings are jumbled close together in Seoul, it is difficult to see the neighboring mountain ranges within the city. Therefore, we simulated the view from the Seoul by a three-dimensional terrain model. The three-dimensional modeling area is shown in Fig.11, because this area includes the mountains in Seoul used in the interpretations based on Feng-Shui and drawn in ancient maps, can be seen from the city.

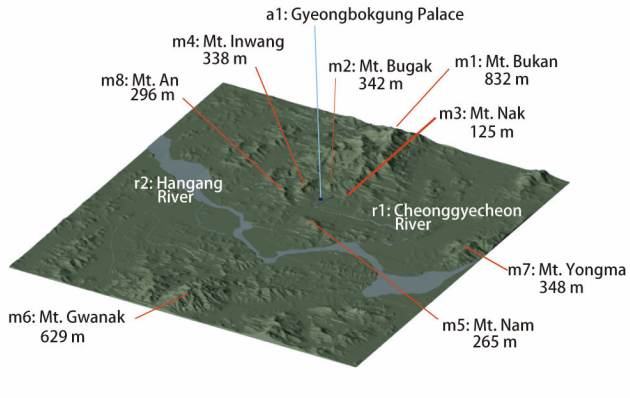
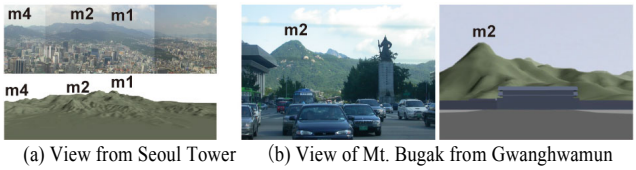



Fig. 17 Three-dimensional Terrain model of Seoul




(a) View from Seoul Tower (b) View of Mt. Bugak from Gwanghwamun Street

Fig. 18 Comparison of photos and three-dimensional terrain model view (photos by author in 2004)

Figure 17 shows a bird's-eye view of a three-dimensional terrain model of Seoul. Fig. 18 shows a precise three-dimensional terrain model. Mt. Bugak can be seen from the south side of the Gyeongbokgung Palace, but it is blocked by high-rise buildings when it deviates from the straight road.

Next we show how the mountain ranges surrounding Seoul, which are Sha in Feng-Shui, can be seen visually. Fig. 19 shows panoramic views of Seoul from Gyeongbokgung Palace. The mountain ranges in all directions are approximately recognizable as follows: North Mt. Bugak (342 m), which is the Shu-zan of Seoul, Northeast Mt. Nak (125 m), which is the Green Dragon, East Mt. Yongma (348 m), from southeast to south Mt. Nam (265 m), which is the An-zan, South Mt. Gwanak (629 m), West Mt. An (296 m), and Mt. Inwang (338 m) from west to northwest. Because Mt. Nak is only 125 m, its presence is weak. Among mountain ranges to see around, it is Mts. Bugak, Nak, Nam, and Inwang border the city, but West Mt. Yongma (about 20 km from the palace) and South Mt. Gwanak (about 25 km from the palace) compensate for the part where the mountains are interrupted. Mountains visually enclose Myōdō. Mt. Bugak is not only the highest mountain that borders the city area, but it is also the mountain with the most distinctive shape. We consider that Gyeongbokgung Palace was built behind Mt. Bugak to emphasize the symbolism.

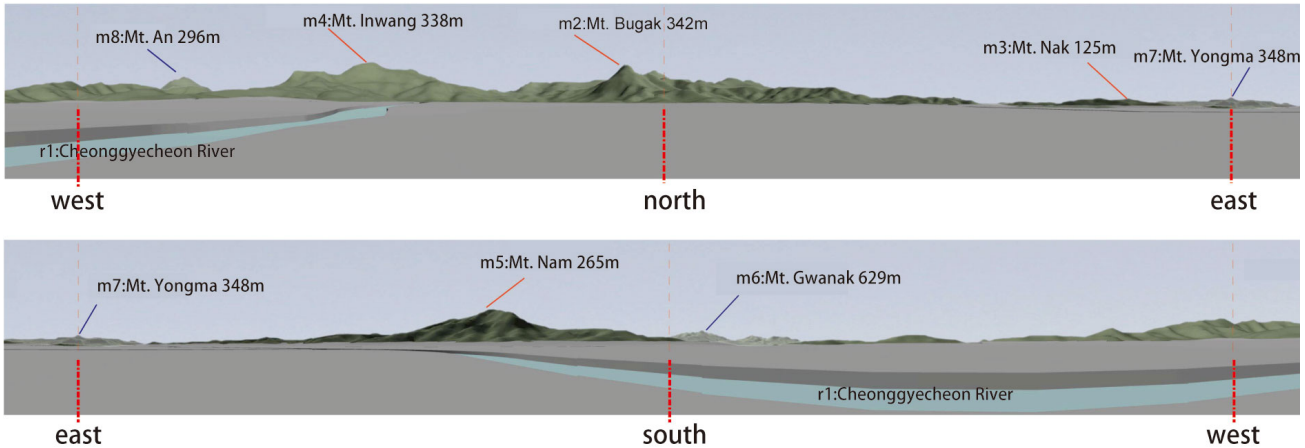



Fig. 19 Panoramic views of Seoul from Gyeongbokgung Palace

## 4.2. KAESONG

### *4.2.1. Outline of Kaesong*

Kaesong (Kegyon), which is in the south part of North Korea, not far from the demarcation line with South Korea, is a modern city with broad avenues. However it also has an old center between the main road and the river with many traditional buildings. Kaesong is an historical city. It was the capital of the Koryo dynasty (918-1392) and still has many sights from that period.

Kaesong is located in the central area of the Korean Peninsula like Seoul. Kaesong is located between the Yesong-gang and Imging-gang Rivers and contacts with the Ganghwa-do northern coast where the Imging-gang River flows into the Hang-gang River to the south. Kaesong is located about 400 km northwest of Seoul (Fig. 7).

Maps of Kaesong are shown in Fig. 20, 21. Fig. 20 shows an 18th century map of Kaesong, and Fig. 21 shows a map of Kaesong "Daedong Jeondo" from 1861. In these figures, mountains and rivers in Kaesong are drawn so that Kaesong has an enclosed space.

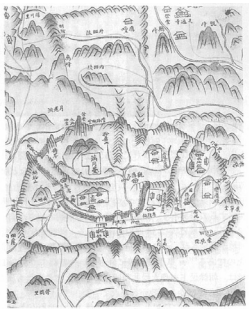


Fig. 20 Map of Kaesong (18th cent.)

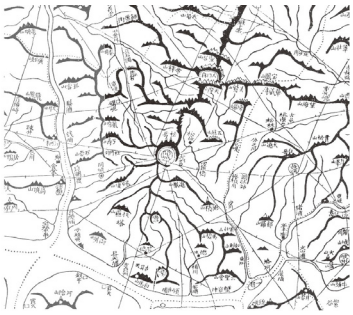


Fig. 21 Map of Kaesong ("Daedong Jeondo" Kim Jeong-ho, 1861)

### *4.2.2. Topographical Features and Feng-Shui Interpretations of Kaesong*

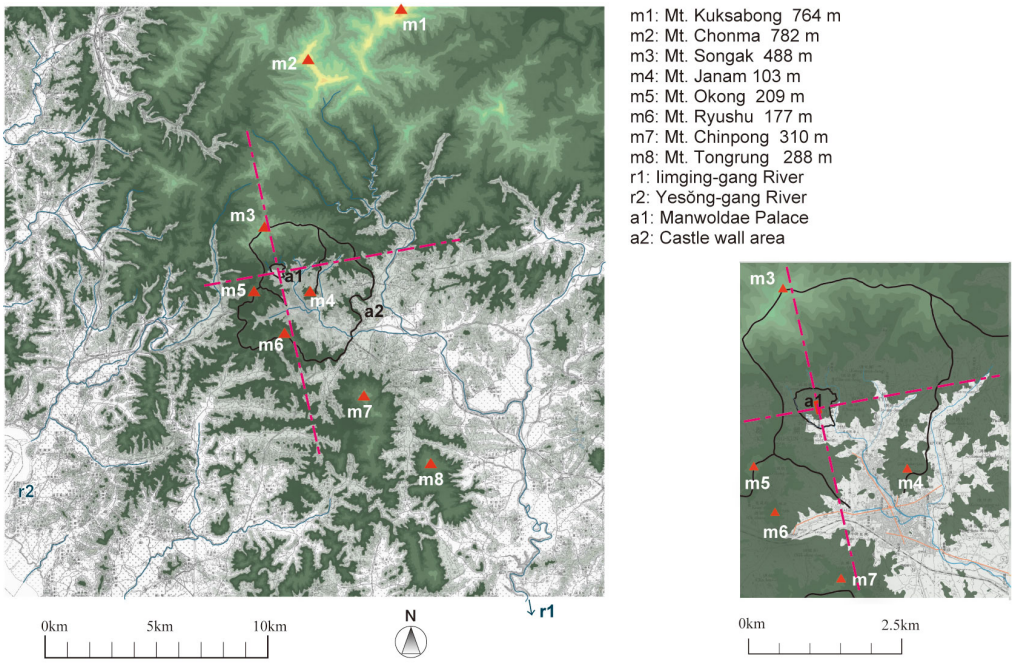
Figure 22 shows a topographical map of Kaesong whose topographical features of are as follows. Its center is the Manwoldae (Full moon tower) Palace, which was the official royal residence during the Goryeo dynasty, whose construction began in 919. It burned to the ground in 1361 during the invasion of the Red Kerchieved Rebel Army; today, only the ruins of its foundation remain.

The Manwoldae Palace is surrounded by mountains and rivers: North Mt. Chonma (762 m), Mt. Songak (488 m), East Mt. Junam (103 m), West Mt. Okong (209 m), the Yesong-gang River, South Mt. Ryushu (177 m), Mt. Chinpong (311 m), Mt. Tongrung (288 m), and the Imging-gang River (Fig.22). [17]

Kaesong faces southeast. Its central axis does not match the top of Mt. Songak. The castle walls and the roads were not symmetrical, and there were indeterminate forms to the topography like Seoul. In the topographical map, there are impressions surrounded by mountains, and the southeast side is open.

The following are the Feng-Shui interpretations of Kaesong. The Manwoldae Palace is located in Ketsu. North Mt. Songak is the Shu-zan, North Mt. Chonma is the Sō-zan, and Qi flows from Mts. Baekdu to Chonma. East Mt. Janam is the Green Dragon, West Mt. Okong is the White Tiger, South Mt. Ryushu is the An-zan, and South Mt. Chinpong is the Chō-zan. Myōdō is a space enclosed by four mountains: Mts. Songak, Janam, Okong, and Ryushu. The White and Karasu Rivers flow east through Myōdō. The Imging-gang River flows from east to west south of Mt. Chinpong, and the Yesong-gang River flows from west to south east of Mt. Okong.

Figure 23 shows a plan of Kaesong (Murayama, 1931). Fig. 24 shows a view from Mt. Janam (103m). The mountain range from Mt. Songak Shu-zan to Mt. Chonma So-zan is prominent. Mountain range from Mt. Okong to Mt. Ryushu is outstanding. The impression of being surrounded like a Feng-Shui ideal topographical model is common. The presence of the mountain range from Mt. Chonma to Mt. Songak is prominent.




(a) Wide area (b) Castle wall area

Fig. 22 Topographical map of Kaesong (created based on maps by Land Survey Department, Imperial Japanese Army General Staff Office and Government-General of Korea)

Fig. 23 Plan of Kaesong (Murayama, 1931)

Fig. 24 Overview of Kaesong from Mt. Janam (Pvince)

*4.2.3.* Enclosed space for Kaesong

Figure 25 shows a bird's-eye view of a three-dimensional terrain model of Kaesong. The three-dimensional modeling area is shown in Fig. 21.

We show how the mountain ranges surrounding Kaesong, which are Sha in Feng-Shui, can be seen visually. Fig. 26 shows panoramic views of Kaesong from Manwoldae Palace. The mountain ranges in all directions are approximately recognizable as follows: North Mt. Songak (488 m), which is the Shu-zan of Kaesong, East Mt. Janam (103 m), which is the Green Dragon, South Mt. Ryushu (117 m), which is the An-zan, South Mt. Chinpong (311 m), and West Mt. Okong (209 m). Mts. Songak, Janam, Ryushu, and Okong border of the city area, but South Mt. Chinpong compensates for the part where the mountains are interrupted. Mountains visually enclose Myōdō. Mt. Songak is the highest of the mountains that border the city. Manwoldae Palace was probably built behind Mt. Songak to emphasize the symbolism.

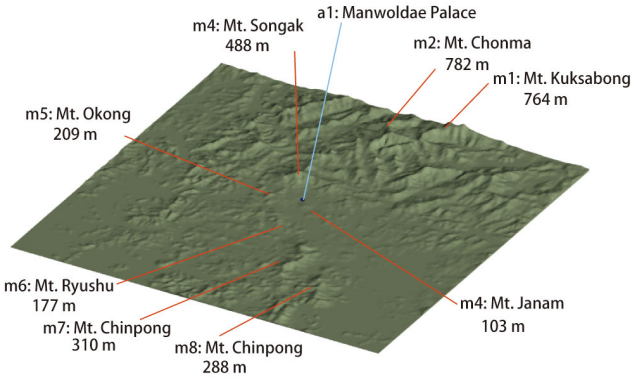


Fig. 25 Three-dimensional Terrain model of Kaesong

4.3. COMPARISON OF SEOUL AND KAESONG

A comparison of Seoul and Kaesong clarifies the following shared points and differences about enclosed spaces based on Feng-Shui.

Shared points:

(1) The mountain ranges, Dragon Pulse, through which Qi flows from Sō-zan to Shu-zan behind Ketsu, characterize the enclosed spaces of Seoul and Kaesong. But the central axes do not match the top of Shu-zan.
(2) The enclosed spaces based on Feng-Shui are appeared as the visible mountains ranges. The visible mountain ranges outside the castle wall compensate for the part where the mountains that border he city are interrupted. Mountains visually enclose Myōdō.
(3) The castle walls and roads were not symmetric, and there were indeterminate forms to the topography.

Differences:

(1) Kaesong, which is more enclosed by mountains than Seoul, better matches an ideal Feng-Shui model. Interpretation based on Feng-Shui in Seoul has been exaggerated.
(2) Since Seoul faces south, its Zako is Shiza-gokō. Kaesong faces southeast to the topography which southeast opens.

## 5. Conclusion

We studied the relationships of the landscapes of Seoul and Kaesong and their interpretations based on Feng-Shui and confirmed shared points and differences. Both Seoul and Kaesong have visually enclosed spaces, suggesting an outlook on nature that respects the connection of mountain ranges. In the future, we plan comparative studies with cities having similar enclosed spaces in China and other Silk Road countries.

## Endnotes

The following quotations are English translation by author.

1. Murayama (1931: 1-2) described it as follows: “In western geography, people think that a ground is a useful material for a human beings. On the other hand, in Feng-Shui, people think that a ground is a life, which controls the good and bad luck of humans. A purpose of Feng-Shui is

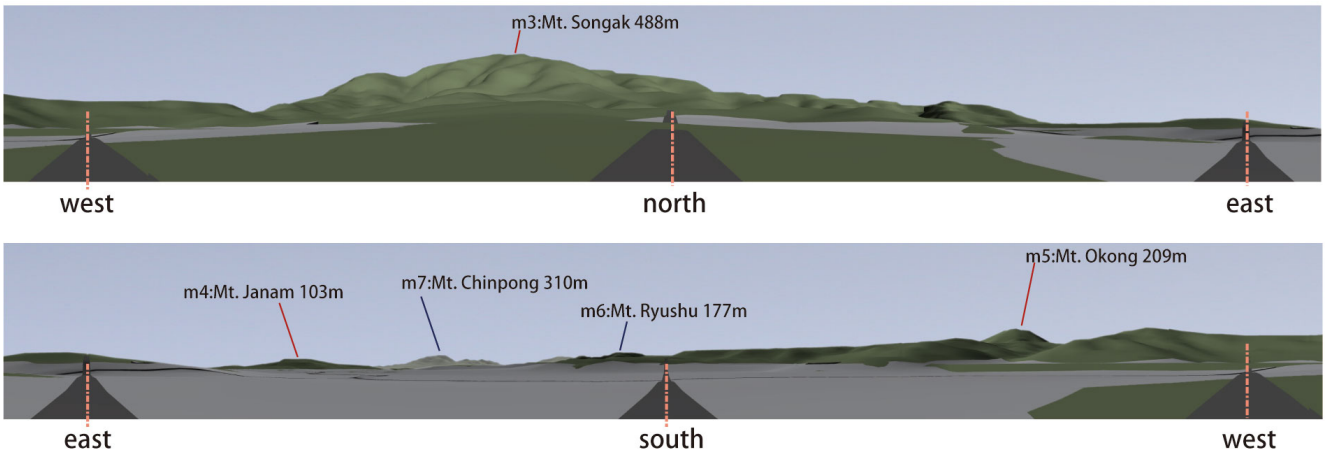


Fig. 26 Panoramic views of Kaesong from Manwoldae Palace

to search how to avoid bad luck and obtain good luck."

2. The Nittei-danmyaku-theory is described it as follows: "The Government-General of Korea drove a big iron column deep into the ground and laid a railroad and a road to cut out the Dragon Pulse of Seoul's Myōdō called the 'Shōgunsyutujin-type' or 'Hiryuushōten-type' in which a leading talented person of a people is born" (Nozaki, 1994: 140).
3. Nishigaki (1987) described it as follows: "In Korea human relationships within a family can be expressed by such Confucian ideals as duty, virtue and belief. As exemplified by the illustrations in tonggukshinsoksamgsnghengshildo these relationships are most clearly manifested through 'Maru' and 'Madang' in a Korean dwelling."
4. Haung (1999: 42) defined 'an enclosed space' in Feng-Shui as follows: "It is not a completely enclosed space, but a visually enclosed space which people feel as a kind of enclosed space by the mass of the mountain range when they look at neighboring mountain ranges from the Dragon lair (Ketsu)."
5. Yin and Yang is another name for Feng-Shui. Yin and Yang is also the basic concept of Feng-Shui. In Feng-Shui, all the phenomena of the pitch and unevenness of the natural topography are interpreted in Yin and Yang. The earth that human beings live on is regarded as one "Taikyoku," which means existence divided into Yin and Yang. Furthermore there is Yang in Yin, and there is Yin in Yang. Whereas Yin specifically means sinks and low, Yang means prominence and high. By a method that selects location in Feng-Shui, the "Yin" and "Yang" of the topography must be in harmony with each other. Yin and Yang, the Five elements, and fortune-telling were closely combined by Dong Zhongshu (B.C. 176-B.C.104) in the Han dynasty.
6. Tenjin-gōitsu is the thought that a human being is part of nature and his/her life must create a harmonious coexistence with nature and be united with nature. In Feng-Shui, the earth is considered a sham human body. "A pulse of Qi" runs in the underground along a dragon pulse in parallel with "a meridian" of the human body. The dragon hole where Qi is concentrated corresponds to an acupuncture point, which is crucial for applying acupuncture and moxibustion in the physical channel. In ancient times, the earth was considered a holy body and to be living.
7. Dragon Pulse is a phenomenon that appeared as a visible substance in which all principles contained by Feng-Shui is a mountain, that is, "a dragon" in Feng-Shui terms. Predicting the good or bad of the flow of the dragon pulses from Sō-zan to Ketsu is called the Dragon Method in Feng-Shui. When people see a dragon, they do not consider all the groups of the mountain ranges from Mt. Kunlun and Mt. Baekdu, but figuratively recognize it as a large dragon. When a diviner sees a dragon, he judges whether the dragon is leading to the back of the main mountain of a suitable range.
8. "Daedong Yeoji Jeondo" is a map of the Korean Peninsula made by Kim Jeong-ho (1861) (pen name Gosanja, 1804-1866?), a Korean geographer and cartographer. He literally walked the entire length of the Korean peninsula through its mountains and valleys to research and compile his magnum opus.
9. Zofu-method (wind control method): It is important how a Myōdō, the neighboring topography, and the geographical features are recognized in understanding Feng-Shui. The Feng-Shui theory about the geographical features around Myodo is called the Zofu-method. Ketsu is decided by this method. The combination and the activity of Yin and Yang are brought to Ketsu by the surrounding mountains.
10. Haung (1999: 44) explained an ideal topographical structure as follows: "The design method of Feng-Shui uses the concept of the cross axis of every direction symmetry. The space structure has landscape that is symmetric all around. This idea is explained as Tenshin-Judō. It expresses the symmetrical topography with the mountains facing each other back and forth that are not inclined to the right or left, and with mountains of the right and left without a difference of height. Such topographical places become ideal Feng-Shui locations."
11. We made a three-dimensional terrain model made with the following procedures:

    (1) two-dimensional contour line data (software, Illustrator 10): traced contour lines of topographical maps (Government-General of Korea, 1994).

    (2) three-dimensional contour line data (software, VectorWorks 9): gave two-dimensional contour line date height and made three-dimensional contour line data.

    (3) three-dimensional terrain model (software, form Z 3.6): used a terrain tool to three-dimensional contour line data and made a three-dimensional terrain model.
12. The Annals of the Joseon Dynasty comprise 1,893 books covering 472 years (1392~1863) of the history of the Joseon Dynasty, from the reign of King Taejo (r.1392-1398), the founder, to the end of the reign of King Cheoljong (r.1849-1863).
13. Most studies agreed that Seoul was clearly selected as a capital of the Joseon Dynasty based on Feng-Shui (Murayama, 1931) (Choi, 1997) (Takeda, 1996) (Sunamoto, 2009) (Yoshida, 2009) (Funo et al., 2010). On the other hand, Son et al. (2006) denied the influence of Feng-Shui, suggesting the reason was that Seoul, which was surrounded by mountains and located in the center of the Korean Peninsula, met the condition appropriate for the capital of a country enough as an important area of the traffic of a land route and a waterway. We want to assume it a future problem how a factor except Feng-Shui influenced the selection of Seoul.
14. Murayama (1931) explained the topographical features of Seoul using "Sanga-kintai" as follows: "Keijo (Seoul) lies at 126.59 degrees east in longitude and 37.34 degrees north in latitude and the following beautiful place of "Sanga-kintai." North Mt. Bugak, South Mt. Nam, West Mt. Inwang, and Northwest Mt. Nak enclose and form a natural castle, and the water from the Hang-gang River surrounds the southeast whole area."
15. Choi (1991) explained the mountain situation of Mt. Bukan, which is Seoul's Chin-zan (Shu-zan) and the neighboring situation as follows: "Seoul is located where Koyo and Yoshu Hills touch the Kyoki Plain. But it is a basin-shaped zone enclosed by high mountains, and the east side slightly opens, and the Cheonggyecheon River flows east. Seoul's topography is ideal for defense, because the Hang-gang River flows through the southeast like a natural moat. In addition, the mountain ranges of Northwest Mt. Inwang, North Mt. Bugak, East Mt. Nak, and South Mt. Nam form a castle wall of nature, and enable the strong construction of a castle. Outside these castle walls, North Mt. Bukan, South Mt. South Han, and Mt. Gwanak tower, creating a natural fortress with a triple defensive wall. In addition, the Cheonggyecheon River flows in the east, and the soil is high, with good drainage, and the Hang-gang River flows to the border that is connected to the Yellow Sea. This is the position where the supplies of each place are concentrated on. The north side is Hanyang (Seoul), which is the border to the Hang-gang River. Mt. Bugak, Mt. Inwang, Mt. Nak, and Mt. Nam form a basin-shaped topography.
16. Keikyoku is to liken the geographical features around a Ketsu to an animal, a material, a plant, a person, a letter, and an astronomical body. Good and bad luck of the place is judged by the analogy of the figure. For example, Kinkeihouran (golden cock sitting on an egg) type gives the prosperity of a descendant by analogy.
17. Choi (1991) explained the topographical features of Kaesong as follows: "Around Manwoldae, the location of the royal palace, there is Mt. Mt. Songak (488 m) which is Kaesong's Chin-zan (Shu-zan) 19.6 km to the north. In addition, Mt. Chonma, Mt. Seikyo, and Mt. Kuksabong (764 m) are to the north, and the Daxing Castle is constructed as a vice-castle in the valley where Mt. Kuksabong meets Mt. Chonma. Kaseong is surrounded by relatively steep mountains, including East Mts. Tsukide and Janam, West Mts. Tsukide and Houmei (411 m), South Mts. Ryushu and Chinpong (310 m) and Kotoku (146 m) and Gunzo (283 m), although it is a coastal area. Because Kaesong is surrounded by mountains, it forms a typical "Zofu-kyoku" that accumulates the energy of the Five Crown mountains. However, the amount of water was insufficient, and the southern district was forced to use well water until the waterworks facility was constructed.

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# Industrial Design in Turkey: A Historical Segmentation in Policy, Industry and Design

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**Keywords:** design, design policy, design history, industrialization, periphery, developmental strategies.

**Abstract:** As being one of the newly developing economies of the world, Turkey lately realized the contribution of industrial design to the government policies for a sustainable development. Two periods of industrialization in Turkish history which were characterized by their own patterns of production were separated by activities of Customs Union with EU in 1980's. Even after Customs Union, being unaware of the design scope; national development has been relied upon compartmentalized fields in industry, innovation, research and development where the integration problem was deteriorated by unstable economic and political situation. This article examines the dynamics that have influenced the emergence and maturation of industrial design in Turkey and the role of design policies which can successfully contribute to social and economic development that finally began to be situated in developmental strategies. In this progress, non-governmental institutions were the active role players for a bottom-to-up conduct and integration of design to government policies.

## 1. Introduction

In its most brief description, industrial design is an approach to design consumer products. The profession is routed in the philosophy and practice of the Crafts movement and Bauhaus in Europe. Its concern with the manufactured products by industrial processes was developed after Industrial Revolution, which is characterized by the mechanization of industry. Industrial Revolution became instrumental for the diversification and mass production of artifacts to satisfy the needs of growing population.

Heskett (1980) declares that industrial design emerged as an essential concern of commercial and industrial activity. Fry (1988) also argues that industrial design is an outcome of modern capitalism that is associated with mass production and sales. In today's competitive global market, industrial design is treated as a strategic tool to build innovative concepts in materialization of artifacts in order to take an advantageous position in the market (Er, 1997). Hence, industrial design is considered as a strategic activity of industrialized market economies of the West and some South Asian countries like Japan and South Korea (Tezel, 2009).

Industrial design has been directly related to mass production and use processes of objects. The role of industrial design is not being a vehicle to satisfy the user by physical functionality, but it has been changed to be a strategic tool for the developing economies to compete in the globalized international market. Hence, industrial design needs to have two of its foot-holds to interact with each other to sustain the stand of the profession. In the developed countries which industrial design has been used as the infrastructure of the sustainable economy, national coordination has been provided between the means of economy, i.e. the politics, industry and education which produces research and development (Tezel, 2009).

Theoretical background of design policies has configured by the demand of International Council of Societies of Industrial Design (ICSID) and United Nations Industrial Development Organization (UNIDO) in 1970's. Discourse of design policy enhanced by the recognition of design management as a unique study area (Er, 2002). Successful execution of design policies provided a competitive position to some South Asian countries in the global market. Having realized the significance of design to gain a competition in the global market, the interest to design policies increased in many developing countries. On the other hand, some of the developing countries, including Turkey, did not place design policies in their developmental strategies for a long time, since their relation to industrial and trade policies were not well established. However, recognition of industrial design in the developed countries was realized by the direct and indirect support of governments (Er, 1997).

According to Heskett (1999), policy is the description of principles, methods and goals in pursuit of certain developmental targets. Er (2002) defines policy as the governmental pressure to be applied to the shareholders until they appropriate them to reach to the economic and social goals. Design policies are executed effectively by creating the national design sources based on innovation and by directing them to industrial production.

As Giard (1996) emphasizes, design cannot be isolated from the other influential contexts. The context of design includes the political system, economic setting and social values. Hence, roots and progress of industrial design can only be examined through political, social and economic factors. In this context, this paper presents the history of main developments of industrial design in government policies and industry of Turkey. As the

methodology of the study, the interrelations of political system, social and economic dynamics of Turkey were investigated for the past sixty years, beginning from the early periods of industrialization of Turkey in 1950's. The paper aims to draw up the integration problems of industrial design to government policy and industry, and evaluates the problems of coordination in between throughout Turkish history.

## 2. Emergence and Development of Profession

The emergence of industrial design in all of the peripheral countries realized in academic field rather than in professional practice (Fathers, 2003; Bonsiepe, 1991). The case was not different for Turkey. Long before industrial design introduced to Turkish industry, industrial design programs have been planned in higher education by the design communities in central countries in order to meet the future demand. Hence, industrial design education was neither a demand from domestic industry nor as an insight of internal dynamics for a future investment. In the early 1970's, as a result of its nature of emergence, industrial design education started in higher education which was largely disconnected from the industry by means of sharing mutual knowledge and experiences. Industrial design education programs appeared first in Istanbul State School of Applied Fine Arts, and second in Middle East Technical University.

A crucial segmentation between training of design and industry in the forthcoming years rooted in various reasons. In the early developmental years of the profession, transfer of practice to the local industries could not be achieved. Before the establishment of Turkish Republic, small scale domestic industries were active, but Turkey was mainly an agrarian country. The first Ottoman factories were established by the Ottoman state. After establishment of Republic, Turkish state implemented a series of liberal policies, and turned to state production in 1930's. However, the real expansion in state enterprises occurred in 1950's. By the late 1950's, the initial state of industrialization was already completed under the protectionist policies. The 1950's witnessed significant growth in the number of industrial establishments. Industrial diversification occurred in consumption goods like food, leather, clothing and footwear industries. The growth of the large scale industries was accompanied by formation of workshops, many of which were integrated into production networks with larger firms. Practical applications of industrial design were difficult to emerge in Turkish industry for this period. Turkish industry was in the very early stage of formation and design was not being considered in the development theories on which Turkish state and outside funding agencies based their policies. These early years of development in Turkish industry were based on production oriented industrial system. Neither Turkish politics nor industry was aware of the fact that industrial design could be a tool of a developmental economic strategy (Er, 1994).

### 2.1. OUTER DYNAMICS AND EARLY DEVELOPMENTAL STRATEGIES

After World War II, based on an optimistic approach, the future and well-being of the humanity were the concern of global conjecture. Sustained development of the world was thought to be provided by economic integration and political stability across the global scale. The objective was to create a system of world economy that permits the underdeveloped countries to be institutionalize in the western style economic, politic and social order.

Emergence of industrial design in 1950's and 1960's in many peripheral countries was not a coincidence. Bonsiepe (1990) points out that the introduction of the design to the periphery was strongly related to the development paradigm of the central to impose 'modernity'. Industrial design was regarded as the symbol of poverty alleviation to be brought by the developed economies to the periphery.

To understand the value of design as a tool of development, the political economy of design should be considered. What makes the design other than an individual practical activity is based on the power of design to create economic value. Design exhibits the ability to produce novel solutions to the existing alternatives, hence contribute to the designed artifacts by creating additive value. In the aggregate, design can be used as a driving force of economic growth and this economic significance situates design as a public policy object that is controlled by the government in pursuit of economic growth and development of society (Amir, 2004).

Including the other groups of developing countries, the first international approach for the introduction of industrial design in Turkey was started by U.S. government. In 1955, a program for some of the third world countries, which was parallel to the Marshall Plan was approved by the U.S. congress. The purpose of the program for periphery was to survey the craft based activities and to increase the competitiveness of these goods in the international market (Er and Langrish, 1993). However this early effort to introduce design and development to the local industries failed.

1960's were the years that industrial production has been disciplined by state politics through five year development plans. State-led Turkish industry was characterized by the execution of import-substitution industrialization. Meanwhile, private capital was enthusiastic to take part in import-subsidized policy of Turkey.

The growing Turkish industry was symbolized by the first Turkish automobile 'Devrim', was an engineering project rather than a design effort which the parts were assembled by craft techniques. In that period, private sector investments were supported by foreign capital under license such as Ford Otosan, Dodge and BMC truck factories (Figure 1).

Fig 1. First Turkish automobile "Devrim"

First representative of mass production of Turkish automotive industry was Anadol produced in 1966 (Figure 2). Following these developments, Tofaş automotive factory was opened to produce Fiat models with Italian license, and Oyak-Renault automotive factory was established in 1969 with French license. In the case of Turkey, these investments were the first initiatives of splitting the manufacturing activities from the design stage in order to use the local resources in an asymmetrical benefit between periphery and central.


Fig 2. First mass-produced Turkish automobile "Anadol"

Although design was assumed to function as a developmental tool for the periphery, developed countries preferred to concentrate on capitalist and profit-motivated nature of design that provided the real benefit for themselves (Margolin, 2008). Hence Turkey was one of the examples of dependency with its foreign investments that was characterized by technological and financial reliance of Turkish economy to the capitalist countries. The formation of small scale industries were detracted from the import of raw materials and semi-finished products.

Whereas, Japan was the first country that realized the fact that if they were to develop their local industries, they would need their own designers. At the end of the 19th century, in Meiji era, Japan began to train its own designers. In 1950's, they produced electronic devices and they defeated American television industry by their original products. Then they produced automobiles and they threaten American automotive sector by quality and pricing. Then South Korea began to produce electronic devices and automobiles and they held a significant international market share (Margolin, 2008).

In Turkey, early years of 1960's witnessed the establishment of State Planning Organization (SPO) which was a state institute to be charged to plan and organize economic developmental strategies. However design was still not seen as an object of discourse in industrialization strategies. Public and legal recognition of industrial design was not available in Turkey in this embryonic phase of Turkish industrialization.

Design was mentioned first in 1972, in the 3rd Five Year Development Plan within the context of higher education planning of state developmental strategies. In that plan; design, technology, development and design practice were related to each other in a hierarchical order. The one who practice the profession, was called 'designer and technology producer' and they were expected to acquire the abilities of research making and creative thinking in graduate programs of higher education (Hasdoğan, 2009).

Throughout its history, industrialization in Turkey progressed in two phases, in which distinctive linkages between local industry and international economy influenced the texture of production. Until 1980's, Turkish industry was far from competition of international market under protective barriers of import substitution. Turkish industry has been developed as a large domestic market to satisfy the needs of Turkish consumer. In this period, some private industrial enterprises were established and they assembled consumer durable goods with imported technological know-how and foreign license (Er et al., 2003). Except some large enterprises, Turkish producer found copying the original foreign designs as an easy practice, since the domestic market was protected by the import substitution policies. Turkish consumer was ready to demand whatever proposed in the domestic market which was free from the foreign competitors. Hence, neither there was a need to introduce design scope in the production stage nor it was demanded by the Turkish consumer in the use stage (Asatekin, 1994).

## 2.2. CUSTOMS UNION AND EXPORT-ORIENTED INDUSTRIALIZATION

Turkey's liberalization efforts which were participated by export-led growth strategy started after 1980's. New government policies helped to develop a private sector of small and medium-sized enterprises. Though export-oriented industrialization and liberalization policies left an open space for design as a strategic tool, Turkish policy was unaware of the critical role of design in price and quality based competitiveness for international market economy.

Before design integrated policies appeared in government developmental strategies, propagation of design started by the establishment of a non-governmental organization, Industrial Designers Society of Turkey in 1988. The purpose of the organization was to promote industrial design to the Turkish public, to provide communication and solidarity among designers and to defend the rights and responsibilities of the profession (Hasdoğan, 2009).

In the 6$^{th}$ Five Year Development Plan of Turkey that covers 1990-1994 (State Planning Organization, 1989), 'product design' in industry called together with research and development activities. For the first time, design was referred as an activity to increase export opportunities and enhance the competitiveness in the global market. Unfortunately, Turkey underwent an economic crisis in 1994 which impeded the economic development and delayed the political commitment to apply the taken decisions (State Planning Organization, 1995). On the other hand, signing the membership to the Custom Union in 1995 compelled Turkish producer to compete with foreign companies with more value added products, especially in electronics, consumer durables, vehicles and transport equipment (Çakmakçı, 2005). This competition and struggle against the economic crisis could not be pursued without innovative power of design.

1990's were the years that small and medium-sized enterprises (SMEs) in Turkish market reached the highest percentage (%99.8) of total enterprises which accounted for %26.5 of the value-added sectors and only %10 of the exports (OECD, 2004). Many studies indicate that Turkish SMEs are below the EU-OECD average in terms of know-how and financing (Gümüşlüoğlu and Elçi, 2009). Even today SMEs are too weak to invest in design and pay-off for that investment seems to occur in long term.

## 2.3. DESIGN RELATED PROGRESSES

Although Turkey experienced sequential economic crises between 1994 and 2001, this period was also the most active period that government has been interested in design oriented policies. Depending on Custom Union Agreement, concordance laws encompass intellectual property rights legislation. Later in 1995, a governmental decision about protection of product designs was accepted and Turkish Patent Institute (TPE) began to register product designs. Design registry system was one of the most important contributions of the government to develop a design policy in that period (Hasdoğan, 2009; Ersayın, 2009).

Although science and technology policy making practices were applied as early as 1960's in Turkey, it was in mid-1990 that innovation subject has started to be discussed. Depending on

EU's "Green Paper on Innovation" declaration (European Commission, 1995), Turkish government initiated the establishment of the National Innovation System which aims to coordinate the operation of institutions to carryout scientific and technological research. The results of this research would be transformed into the economic and social benefit. While The Supreme Council of Science and Technology (TÜBİTAK) was the highest level policy coordination body for innovation, a large number of dynamic private and non-governmental organizations contributed to the innovation system. Turkish Exports Assembly (TİM), The Union Chambers on Commodity Exchanges of Turkey (TOBB), Export Promotion Center of Turkey (İGEME), The Turkish Industrialists' and Businessmen's Associations (TÜSİAD), Turkish Patent Institute (TPE), The Supreme Council of Science and Technology (TÜBİTAK) and Technology Development Foundation of Turkey (TİDEP) are some of the examples of these innovation intermediaries. In recent years, these organizations have been providing immense awareness in innovation. However, they do not have a broad scope and understanding on design (Er and Er, 2004).

2000's witnessed further actions taken by the government to integrate industrial design within industrial development strategies. Governmental institutions began to become shareholders of design promotion programs and they contributed to finance of design events. The 8th Five Year Development Plan that covers 2001-2005 encompasses the strategies based on development of new designs and brand making instead of relying on low wage labor and price competition in global market (State Planning Organization, 2001). According to new government policy, research and development programs have been promoted in certain production sectors alongside patent an industrial design registry system.

Relying on export oriented governmental grant in aid, Undersecretariat of the Prime Minister for Foreign Trade (DTM) notified and series of design promotion activities beginning on 2006. Employment of designers and design consultancy has been supported according to these notifications. Additionally, Turkish Exporters Assembly (TİM) started a promotion activity to support companies, offices and associations of designers to finance their activities in abroad. For all these design initiatives, Industrial Designers Society of Turkey (ETMK) has been the loyal contributor to all design promotion efforts that increased the awareness of industrial design in Turkish society. Due to those support activities, the number of design exhibitions and competitions increased. Since 2008, Design Turkey, a national design award system which aims to encourage qualified design and guide the strategies of Turkish industry has been arranged by ETMK with cooperation of governmental and non-governmental institutions.

A long-lasting economic crisis which started in 2008 has stood as an impediment to implement the developmental policies. However, Turkish Design Council which was the most conspicuous initiative of the government was established by the decision of the Council of Ministers in 2009. The aim of Turkish Design Council was to provide the coordination to enhance competitiveness by value added products, to accommodate collaboration between designers and industry and to develop the image of Turkish design in international market.

The 9th Five Year Development Plan covering 2007-2013 encompasses the clustering strategies for the establishment of collective design, production, research and development centers for industrial regions and SMEs (State Planning Organization, 2006). It appears that Small and Medium Industry Development Organization (KOSGEB) is the agency that runs and supervises government's policies and works as an interface to coordinate many activities to achieve the improvement of SMEs. In the short run, Small and Medium Industry Development Organization (KOSGEB) aims to develop technological skills of SMEs, improves training and access to use of design information, provide financial mechanisms so that SMEs can invest on design (OECD, 2004).

## 3. Evaluation of Current Situation

Increase in quality and quantity of design activities and being shared those activities by governmental stakeholders are promising for the future. In spite of the initiation of political debate on industrial design; weak economic environment, coordination problems in implementation, insufficient governance of design policies has been the major drawbacks to create conducive climate for an integrated development.

South Asian countries who implemented design policy for economic development were found to invest on knowledge production and dissemination. Turkey needs an urgent need to improve its educational and knowledge production capacity. Not only for industrial design but also the other disciplines, quality and quantity of graduates from higher education need to be determined according to potential demand of industrial field.

In order to prevent segmentation in various factors of development, two pillars of knowledge investment, knowledge production and knowledge dissemination should be well implemented. Knowledge production is conducted by research and development (R&D) activities and R&D facilities are mostly located in universities and governmental institutions, but not widely in industrial private enterprises (OECD, 2004). However, commercialization of research results is low in Turkey. Clustering and networking is crucial for knowledge and design dissemination both for organized industrial regions and for SMEs. The challenge is to activate the R&D institutions and universities to collaborate with industry for knowledge exchange. For the integration, policies that create mutual benefits and incentives between the actors can be implemented by the government.

As already began in mid-1990's, government should continue to raise the awareness of design in enterprises and society. Financial supports and being active partners of design activities enhance the awareness of design and promotes the design discourse in various fields.

## 4. Conclusion

The early developmental paradigm was mainly focused on economic advancement which has been guided by the most industrialized countries. However, definition of development has shifted to a larger context based on human well-being in which economic infrastructure is just a part of it (Amir, 2004). Now it is known that economic problems of peripheral countries cannot be solved through designing low-cost products, low-wage laboring, and the like. New developmental paradigm acknowledges the other concerns like health, culture, social equity and education among others. Sustainable development is a challenge for societies that require them to accept ethical consumerism and respect to the others. Multiple factors have to be integrated such as trade, technology transfer, collaboration among disciplines, cultural expansion and knowledge production that affect the conditions for development.

Where does design stand in this large scale picture of developmental paradigm? In the past 50 years of Turkish developmental history, an apparent segmentation has observed in governmental policies concerned about industrial, administrative and knowledge production strategies. Investments on science and technology have been made since 1960's, but innovation and

design related initiatives were started in mid 1990's. While science and technology cannot be accepted only the concern of engineering, industrial development cannot be tied only to manufacturing strategies and financial dispositions. A comprehensive model of development should embrace design policy which is further than materiality of industrial design to increase economic competitiveness.

Developed economies of the world shifted from industrial manufacturing to knowledge production, service creation and innovation. Significance of innovation in today's business world and its contribution to economic success has been discovered in the examples of South Asian countries like South Korea, Japan and Thailand. Economic growth and social well-being of these countries have been relied upon innovation oriented design strategies which were coordinated by governmental policies. Innovation related activities are emerging as a significant part of many disciplinary functions, not only in science and technology, but also in business, manufacturing and services. Some argue that creativity in particular is the leading way of thinking to innovation (Florida, 2003), while some others contemplate that design thinking has more integrated in business processes through innovation oriented nature of the discipline (Dunne and Martin, 2006; Brown, 2008).

Innovation oriented nature of design leads to new forms of value in various disciplines. The contribution of design thinking to business, technology, communication and services can cause macro level effects and enables social, cultural and economic development. Some of the newly developing economies, including Turkey, have disregarded design policy since there wasn't any infrastructure that explains the contribution of design to development and betterment of society. Additionally, design thinking in a society requires maturation similar to development of its economy, administration and services. However, governmental policies are the main coordinator in the progress. Coherent implementation of strategies in different fields of work and involving consultation of key stakeholders at all stages should be in place to integrate into a sustainable development.

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# Learning from Vernacular Turkish House: Designing Mass-Customized Houses in Mardin

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**Keywords:** Turkish house, Mardin, mass-customization, computational design, housing

**Abstract:** Vernacular architecture in housing has different examples within Turkey and "Turkish house" is a widely used and discussed term. Local, climatic and historical conditions including local materials shaped the formation of houses as well as the philosophical and cultural aspects. These houses are mostly built by local users and they have evolved in time. There are many lessons that can be learned from these houses where recent mass houses and apartment blocks are built numerously usually ignoring the environmental and cultural values and needs. Advances in technologies support and encourage mass-customization and mass-production can be freed from unconnected and repetitive housing. For this study Mardin is selected and detailed and new housing design researches and concepts are presented. In short, this paper aims to draw a general frame for Turkish Houses and focuses on Mardin Houses in order to emphasize that new housing can be designed by using new technologies which are inspired and derived from traditional local values and settlements.

## 1. Introduction – Turkish House

Ottoman Empire has ruled Anatolia and Rumeli for nearly five hundred years and there are many architectural monuments and works dated to that period. Even though there are monuments remained form that period, the earliest date for most of the remaining houses are back to 18th century. Ottoman Empire ruled a wide amount of land and houses are formed within the main principles, but they have differences in details; according to the ethnicity, regional properties, political and historical events. These houses are mostly named according to the region or the inhabitants' origins. Macedonian called these houses "Macedonian House", Greek called these houses "Greek House", Bulgarian called these houses "Bulgarian house" (Bektaş, 2007). After Ottoman had been taken over Rumeli, the local culture had integrated with the Ottoman culture and these interactions influenced civilian architecture (figure 1 – Ottoman map). Therefore these houses have also traces of Ottoman Culture and can be called as "Ottoman house" in general. (Eldem, 1984).

However all these definitions are misleading as well as they are inadequate. Throughout history Turks have relocated and have pursued a nomadic life style. After they have been settled, the houses they have built have traces of their former nomadic life (Günay, 1998). Even though there can be different definitions of "Turkish house", the house within the borders of Turkey or in a more general sense, the houses in which Turks have lived throughout time is called "Turkish house". (Küçükerman, 2007). Sedad Hakkı Eldem stated that the common characteristics of an Ottoman house were a witness to the existence of Turkish heritage.

Turkish house has being discussed throughout in time and have been the focal point of many scholars. House types varying from each other with distinct characteristics were usually adapted to their geological and climatic conditions (Eldem, 1984) Materials and construction methods are selected locally and they are used according to these conditions. Other than these, the ethnicity, religion, culture, political and historical events and distance to central government are all affected the formation of the houses. Although there is a great variety of housing types, Eldem stated that a characteristic Turkish house is mostly built in Marmara Region (Istanbul and Edirne) (1984)

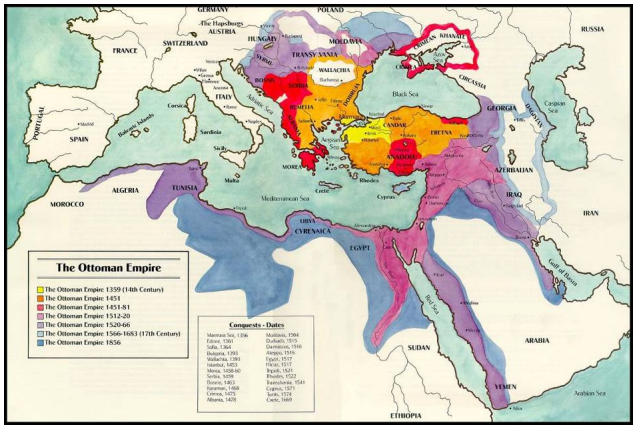


Fig 1. Ottoman Empire map (http://www.ottomansouvenir.com /img/Maps/Ottoman_Empire_Map_1359-1856.jpg)

## 1.1. TYPES OF TURKISH HOUSES

Although the houses are named differently in different regions, these houses have basic properties similar to each other which can be grouped within typologies. The regions in Turkey mainly take place in mild temperate zone even though they may have great differences from coastal to inner regions and from north to south. These differences cannot be seen in the plan types (figure 2).

Mostly each house has a space suitable to use in summer and another in winter. In some cases houses are suitable and used both in winters as well as in summers and second houses are used (for example: summer palaces “kasır” in Mardin or upland houses in Black Sea region.) Coastal and inner regions have different climatic and geographic properties. Also coastal regions have affected by external influences as well as local ones.

Eldem stated that fifteen different types of houses can be counted and it can be increased with a more through classification but the differences between these types are mostly details and specifications (1984). In other words, in a more general point of view the houses can be assembled in seven groups: (figure 2)

- Blacksea shore hinterland region
- Istanbul and Marmara region
- Aegean hinterland region
- Mediterranean region
- Central Anatolia region
- Eastern Anatolia region
- Southeast Anatolia region

Eldem also stated that Istanbul and Marmara region have a special place of importance among these regions and called Istanbul house as a “pure” Turkish house because it has the most characteristic quality seen in Turkish house.

## 1.2. MATERIALS AND CONSTRUCTION METHOD:

The most distinctive factor for the formation of the houses is the material as well as the most characteristic factor for the usage of the material is climate and environment. The climate affects the creation of natural material and houses are designed appropriate for climatic circumstances. It is not a coincidence to build a masonry house in South-east region, in which timber is rare and stone is generous. Also masonry building supports to create inner spaces with natural ventilation and suitable for the regions’ climatic conditions.

The main materials for the houses are mostly wood and stone. The types of wood and stone may vary according to the region and they play a great role in the construction system. (Günay, 1998)

### *1.2.1. Timber-framed houses:*

- They are the most characteristic types of Turkish house.
- They are mostly 2-3 storey’s high
- In the ground floor masonry or wooden pillared structures are mostly used.
- In the upper floors the frames are wooden which can be varied through the region.
- The filling material also differs. Local materials are used as filling material: adobe, clay, brick, stone, earth etc.
- They are mostly built in the areas where central government is strong. They are also built in the regions near the coastline and some inner regions: Marmara, Aegean and Black Sea.

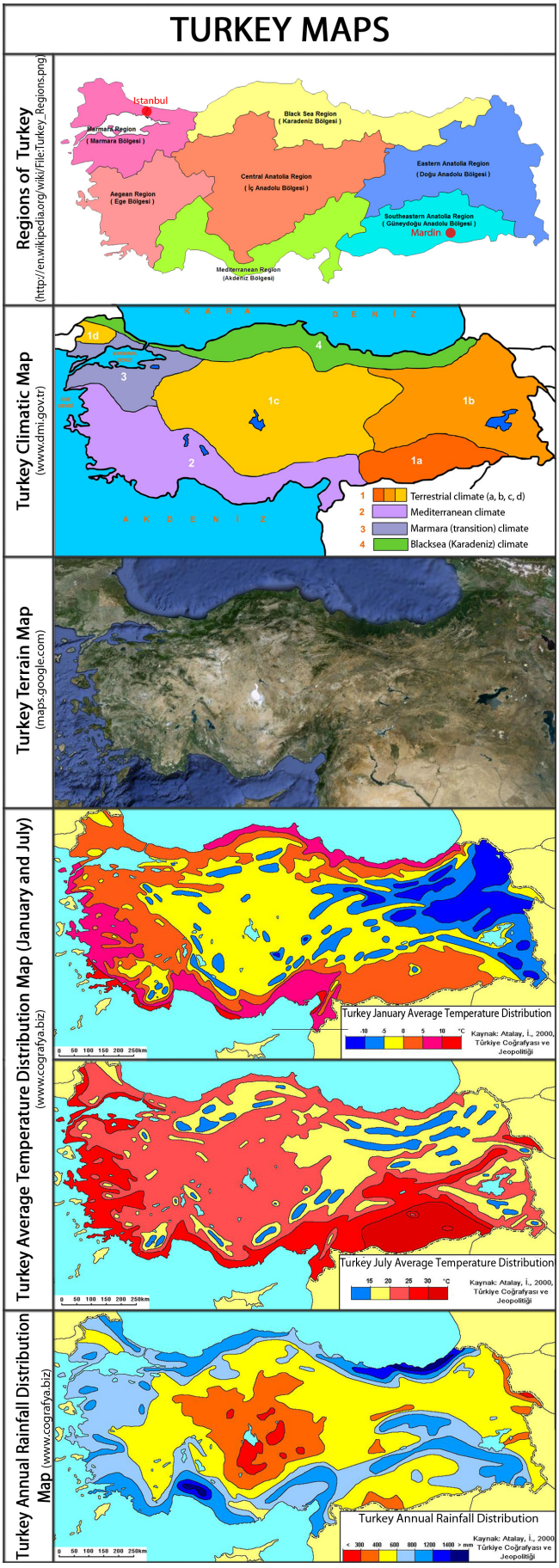

Fig 2. Maps of Turkey

- Although rarely seen, totally wooden constructed houses also exist. They are mostly built in forestry and mountainous areas where it is rainy and wood is an easy material to find. For example: In some middle and east regions of Black Sea.

*1.2.2. Masonry houses*

- They are mostly 2-3 storey's high
- Stone is the main material which can be varied through the region.
- In some of the houses wood is used inside the houses as a decoration material or for roof.
- The houses have courtyards, atriums, cloisters or similar open and semi-open spaces.
    - Inner regions of Anatolia, Cappadocia and Southeast regions:
        - Mostly ashlars wall or cut-stone wall covering is used.
        - The houses have courtyards, atriums, cloisters or similar open and semi-open spaces.
        - They mostly have flat-roofs and terraces.
    - Aegean and Mediterranean regions:
        - Rubble wall with mortar is used.
        - They mostly have flat-roofs or hipped roofs.
        - Some of the houses have wooden oriels.
    - East regions:
        - Rubble wall with mortar and wooden beam is used.
        - They mostly have flat-roofs.
    - Near the Taurus Mountains:
        - Wooden beam and rubble wall with mortar (dry masonry) are used.

Apart from these there are several special and traditional methods such as beehive adobe houses in Harran and cave dwellings in Hasankeyf.

Most of these houses were designed with the local material and suitable construction method. They were designed to be in harmony with climate, topography and environment. They were evolved and developed over time as the cultural, social environment and needs have changed.

## 1.3. FORMATION OF TURKISH HOUSE AND ROOM AS THE MAIN ELEMENT

Turkish house, in respect of the geography it had spreader, have always been in the center of dualities: south-east, analytical-synthesis, concrete-abstract… In this sense Turkish house is a unique synthesis which is formed by our inner world and at the same time has a surprisingly analytical structure. (Yürekli and Yürekli, 2005) Therefore the elements that create Turkish house are both functional and have philosophical and symbolic meanings.

A classical Ottoman city differs from a classical Greek City. The houses are not settled on a grid plan. On the contrary, streets have formed after houses have been built. The sizes of the streets were derived from human size and climatically reasons. Hot and/or rainy regions have shadowy and protected narrow streets. Social structures affect the spaces. The houses were built introvert and on the ground floors mostly garden walls or services were placed. On the upper floors there are spaces extrovert which have windows. The houses were built respectful to each other. They didn't block each others sun, wind or view. The design of the house evolves from inside to outside. (Bektaş, 2007) They are minimalist, sustainable (local material is used compatible with the environment) and rationalist. And also many scholars highlighted Turkish house as to have many principles of modernism. (Eldem, 1984; Bektaş 2007, Yürekli and Yürekli, 2005; Bozdoğan, 2007) All those principles emphasize that Turkish house is not only functional but also reflects the life philosophy, design and technology.

Traditional extended family order influenced Turkish house. New rooms or additions can be done while the family expands or house or rooms can be divided in need. With this flexibility Turkish house became open to expansion and development Mostly ground floors are used as service spaces, while upper floor have rooms, "sofa", "hayat" and "eyvan". Sofa and hayat are multi-purpose halls between rooms. House can be shaped by the type of sofa (Eldem, 1984) or hayat (Kuban, 1995). Eyvans are semi-open spaces between rooms. Expansions of the houses are mainly designed with the help of these spaces.

The main element of a Turkish house is the room (Yürekli and Yürekli, 2005). The size of the room is determined by the material and the size of the house is determined by the room. Önder Küçükerman stated that the origins of a room are based on tents and the properties of the settlements bore from the nomadic life style (2007, Figure 3) Rooms can be described as pure, light and multi-purpose spaces similar to tents. Rooms carry multi-functional purpose: eating, living, working, sleeping are all occur in the same room. Therefore there are storage units for different needs. Turkish House can be varied through details and material but rooms are main elements of the houses.

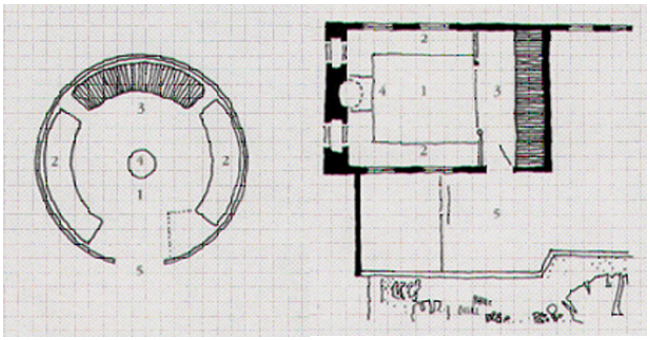

Fig 3.Tent and room (Küçükerman, 2007)

Turkish house mostly used standardized materials and modulation can be found on space-relations, windows, doors and other details (Yürekli and Yürekli, 2005). The constraints of the construction material help the modulation and standardization while on the other hand, a great deal of variety can be found both on the plans and on the details. This case can be seen as another type of contrast or duality: many different types of houses which were built with the defined, limited materials. In short, Turkish house cannot be degraded to a single type ignoring the variety of the houses; both in physical and in philosophical sense.

## 2. Mardin Houses

Mardin is a city in the south eastern region of Turkey. The old city is located on a sloping terrain looking towards the Mesopotamian Plain. The houses in the city are masonry and bear the main principles of a Turkish house (figure 4). The city has terrestrial climate, in which summer days are hot and rainless, while winters are snowy and cold. Stone as a material is a very rational solution as well as semi open spaces - eyvans.

Mardin is one of the well-preserved cities in Turkey with its unique masonry architecture. The terraced urban pattern of the city is an example of usage of traditional stone from Anatolian soil. New housing and improper additions to traditional old buildings are mostly endangering the houses as well as the heritage of the city itself.

Fig 4. Mardin (2005, Belinda Torus)

The houses are formed with rooms and eyvans where eyvans play an important role in the perception of the city. The open spaces like courtyards are enclosed by walls which form the street (figure 5). The scenery of Mesopotamian Plain and the orientation play an important role in the configuration of these units. The places cause different effects according to their inclinations and location. (Torus, 2005) The city as well as houses evolves in time according to the needs. The constraints of the masonry building system affected the size of the room.

Fig 5. A typical street in Mardin (2005, Belinda Torus)

The modular vocabulary of Mardin house consists of three types of spaces: open, semi-open and closed spaces (Alioğlu, 2000). Therefore the house grows primarily by adding a semi-open space (eyvan) and a closed space (room). In the center of a house there is a semi-open space (eyvan) which serves as a living and a circulation area. Eyvans serve as buffer zones both for climatic reasons and to support privacy. Closed spaces are the rooms that have kitchen, living space, workshop and bedroom functions.

There are three types of semi-open spaces which have different names (eyvan, revak, kosk) according to their relations with other spaces. Semi-open spaces are the main vocabulary of Mardin architecture. Mostly they are open on the south site overlooking the valley. (Torus, Çolakoğlu, 2009)

The inclination of the site and orientation toward the valley and south are dominant factors for the configuration of Mardin Architecture. The houses are oriented without blocking each others view, sun and wind. On the ground floor usually common spaces are found related to an eyvan or a courtyard. Kitchen, living room, workshops and service spaces are the main functions. On the upper floors private spaces, bedrooms exist which were also connected with eyvans and terraces.

## 2.1. NEW HOUSES IN TRADITIONAL SETTLEMENTS

Bektaş stated that the new houses and residences built today in Turkey are intended to suit a different style of living. Bektaş also called this new period “influenced”, “integrated” or “modified” and a new synthesis, which have not matured at present, will evolve (2007). The new houses and residences are mostly built similar to each other, ignoring all the climatically, geographical and local influences which traditional Turkish house valued a lot.

New houses mostly lack the environmental and contemporary values, culture and social development. Number of houses built is the main concern so mass and rapid production is emphasized in which these recent settlements mostly ignore the functional and semantic values. As material and construction system, reinforced concrete and tunnel forms are mostly used. Local materials are not used and air conditioning and acclimatization is solved artificially. These types of houses are also built in Mardin and the cultural texture of the city is affected negatively.

Mostly three types of houses and residences built. Mass - produced repetitive single houses are built which lack the individuality and in some of the projects the size of the mass-production may cause overwhelming results for environment. Another type is apartment blocks which are built almost everywhere without considering any environmental condition and cultural aspects. And in most of the cases very close to each other (figure 6). The third type of houses is single houses, which are only imitations of the Turkish house again ignoring all the aspects except some formal similarities (figure 7).

Fig. 6. New apartment blocks in Mardin (2005, Belinda Torus)

Fig. 7. KİPTAŞ Turkish house (www.kiptas.com.tr)

### 3. Mapping and Interpretations of Mardin Houses

There are many scholars who studied and analyzed varied properties of Turkish houses. Some of these works are mainly focused on formal relationships of the spaces while others are focused on details like decorations on façades or window configuration etc.

One of the extensive studies in Turkish houses is the studies of Gülen Çağdaş. In this study, the shape rule schemata is used for characterizing formal compositional aspects of the historic style of Turkish houses (Çağdaş, 1996). Çağdaş presented the parametric shape grammar rules to develop traditional Turkish houses and re-generates them with the shape rules sets. Çağdaş also draws trees of different plan layouts with different types of halls (1996, figure 8). The formal elements and rules are described and different plan layouts of the houses are generated within the limitation of these rules. While Çağdaş stated the general rules of Turkish Houses, Füsun Alioğlu presented the properties of Mardin houses (2000). The works of Çağdaş (1996) and Alioğlu (2000) draw a general frame for the formation of Turkish houses and Mardin houses. The information gained from these studies can be evaluated and interpreted in different ways.

Hakan Özbek evaluated the plans and derives the shape rule schemata of Mardin houses (2004). Özbek analyzed mainly ground floor plans and set the spatial rules (2004, figure 9). These rules are derived and are set in plans and schematized in a very abstract level mainly focusing on the spatial and formal relations. The relations between open, semi-open and closed spaces, relations for third dimension, expanding rules are all stated. Özbek designed new houses for Mardin using these rules and if needed set and used new rules (2004). The generation is made by a hand-made model (figure 10).

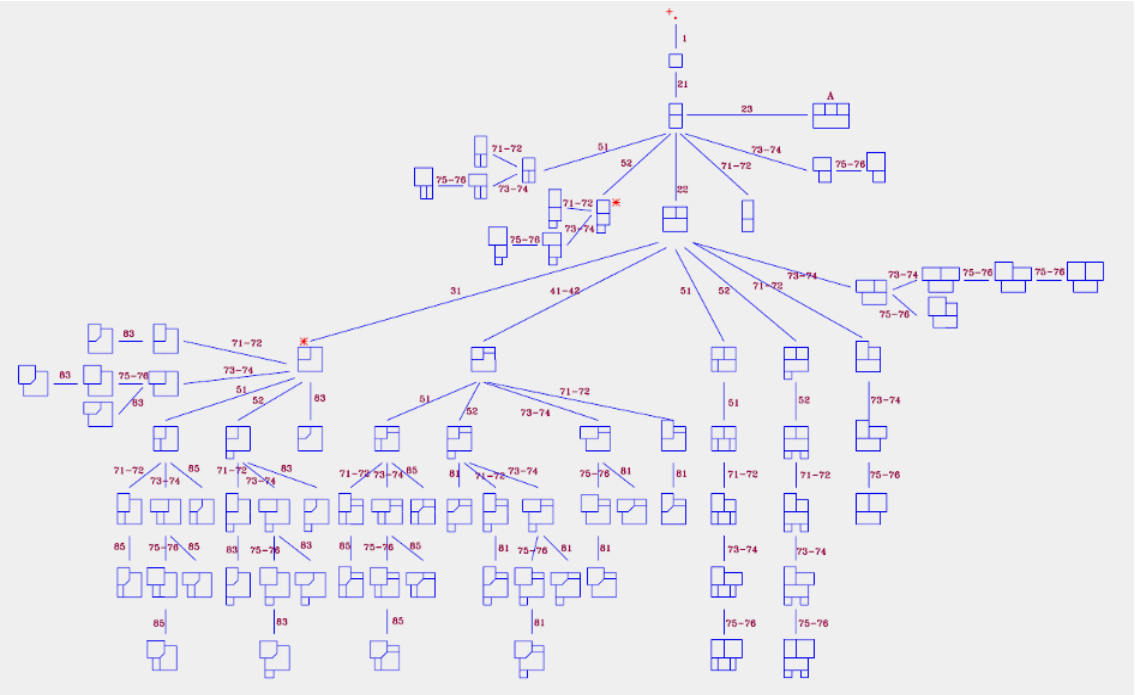

Fig. 8. Part of the tree of plan layouts with an outer hall generated by the shape rules (Çağdaş, 1996)

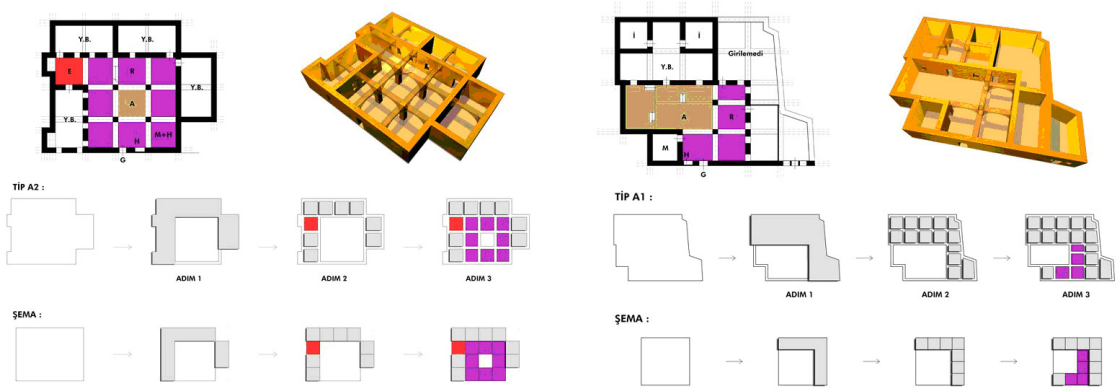


Fig. 9. Analysis of two different plan types (Özbek, 2004)

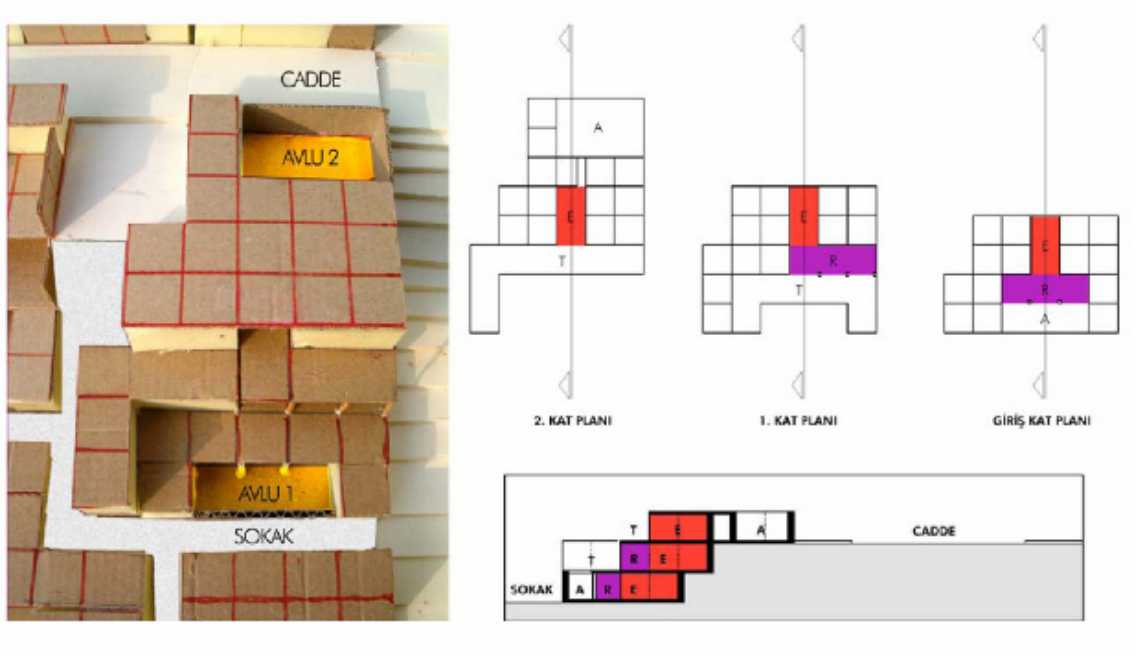


Fig. 10. Generation of new houses for Mardin (Özbek, 2004)

Similarly, Togay Özkaraduman also designed new houses for Mardin basically using the rules derived by Alioğlu and Özbek (2008). Özkaraduman added his own set of rules and designed the houses (2008). First the size of the site for a single house is set and divided into grids. The site is divided to 12 squares and half of the lot is planned to be open spaces (figure 11). Different houses are designed manually and the site is set for the houses to form a neighborhood with the designed houses (figure 12). Özkaraduman also detailed some of the plan layouts and interpreted them for contemporary users (figure 13). While Özbek generated by hand-made models, Özkaraduman used computer aided three dimensional models for the houses. These two studies are different interpretations of the same grammar by different architects.

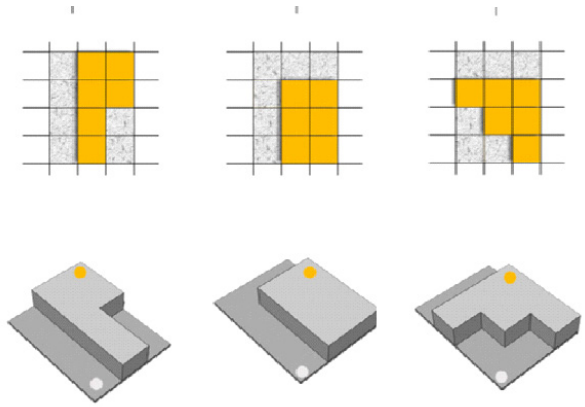

Fig. 11. Examples of the grid for houses with open and closed spaces (Özkaraduman, 2008)

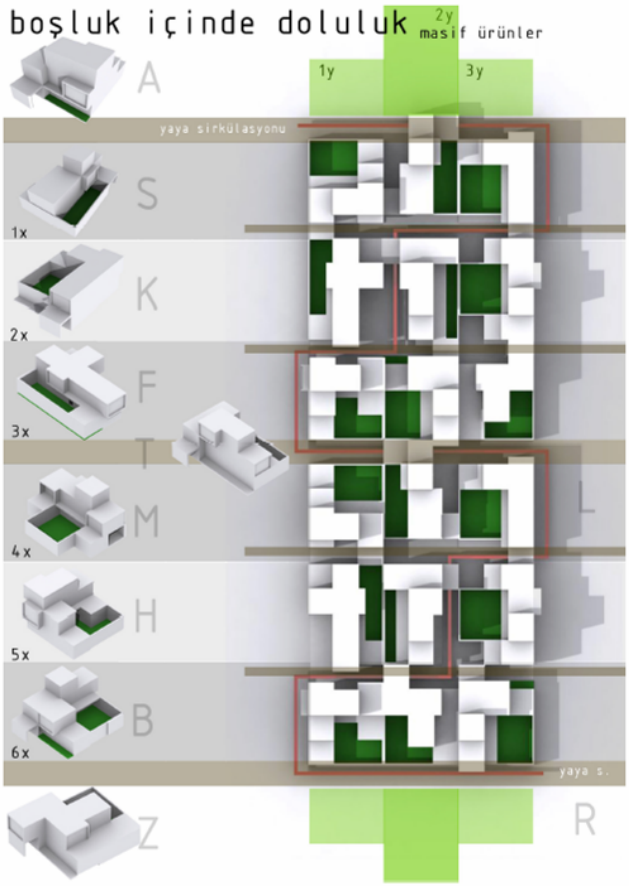


Fig. 12. Site plan for the neighborhood (void in solid) (Özkaraduman, 2008)

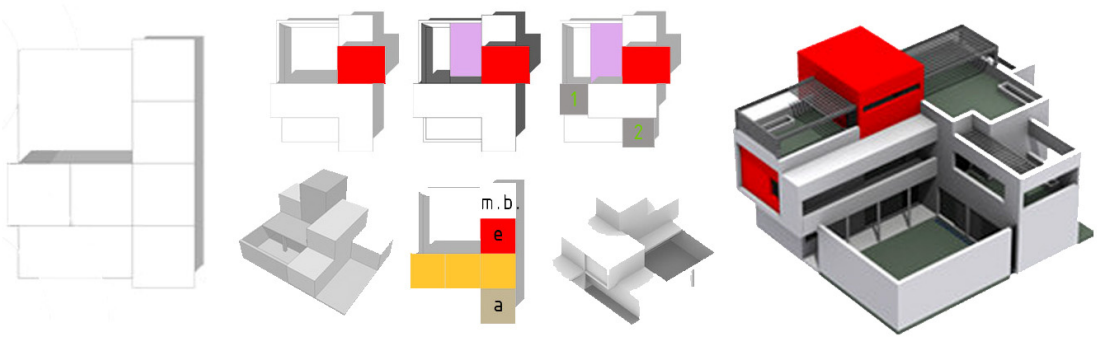


Fig. 13. Design of a house; from plan layout to detailed three dimensional model (Özkaraduman, 2008)

## 4. Parametric Plan Layout Generator for Mardin Houses

The knowledge from the aforementioned studies is also used in another interpretation of the grammar. PLG – Plan Layout Generator is a parametric program which generates different plan layouts for Mardin houses within certain limitations (Torus, 2008).

These works also support technological advances and mass-customization. Mass–customization is a relatively new term for architecture. But the advances in computational technologies encourage these systems which combine mass production with individual customization. With this method, computationally designed flexible projects with low unit costs can be produced.

Ferhan and Hülya Yürekli stated that modulation and standardization can be found in many details as well as space relations in Turkish house (2005). A great deal of variety can be seen in Turkish house, in which rooms are the main elements. In other words, the modulation and spatial relationships of Turkish house also enables flexibility.

In PLG, the flexibility of Mardin houses is analyzed. The orientation, functional and spatial relations are used as basic parameters for the rules. On the ground floor living, kitchen, workshop and less-private spaces are found whereas on upper floors bedrooms and guestrooms can be found.

A very simple interface is designed and only four parameters are asked to the user (figure 14). The dimensions of the site (x, y), the number of floor (z) and the number of rooms (a) can be entered in the interface. There are limitations for these parameters. After the values are set on the program, before the generation some calculations are done in order to control the parameters and evaluate them.

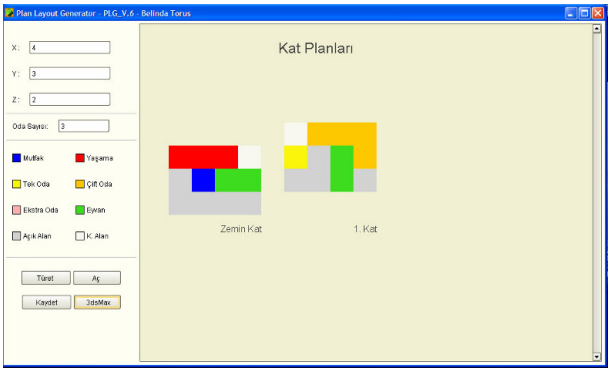


Fig. 14. Interface of the program PLG (Torus, 2008)

The program firstly controls the given data and evaluates them with the rules. If the site is inadequate and the house cannot be generated in the given limits, the program gives an error message indicating the problem. Otherwise it generates rapidly starting from ground floor. The numbers of semi-open spaces are set randomly and the grids are drawn according to the given data. Semi-open space living spaces (3 units), kitchen (1 unit), open spaces and unused spaces are placed respectively. If there is more than one floor, semi-open spaces rooms and open spaces are placed on the upper floor in relation with the lower floors.

Even though the program is working independently, these new house form compositions can be transported into 3dsMax environment for further architectural articulations (figure 15). Different house composition alternatives can be generated very rapidly with specified values (Torus, 2008, figure 16). Generation alternatives for different parameters can also be searched in the program which in fact supports mass-customization completely (figure 17). In brief, PLG is designed to generate plan layout alternatives for houses in Mardin, in which the alternatives for selected or different parameters can be sought rapidly and products can be used as preliminary designs.

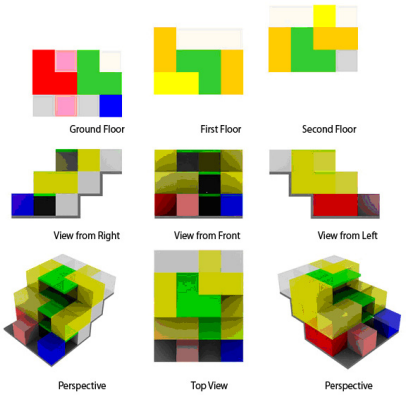


Fig. 15. Different views of a generated solution (Torus, 2008)

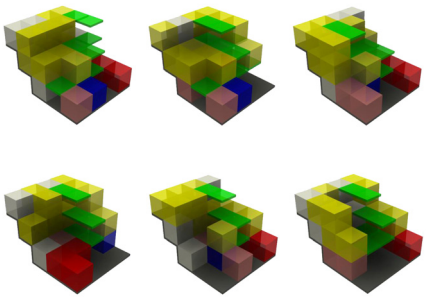

Fig. 16. Alternatives generated with the same parameters in PLG

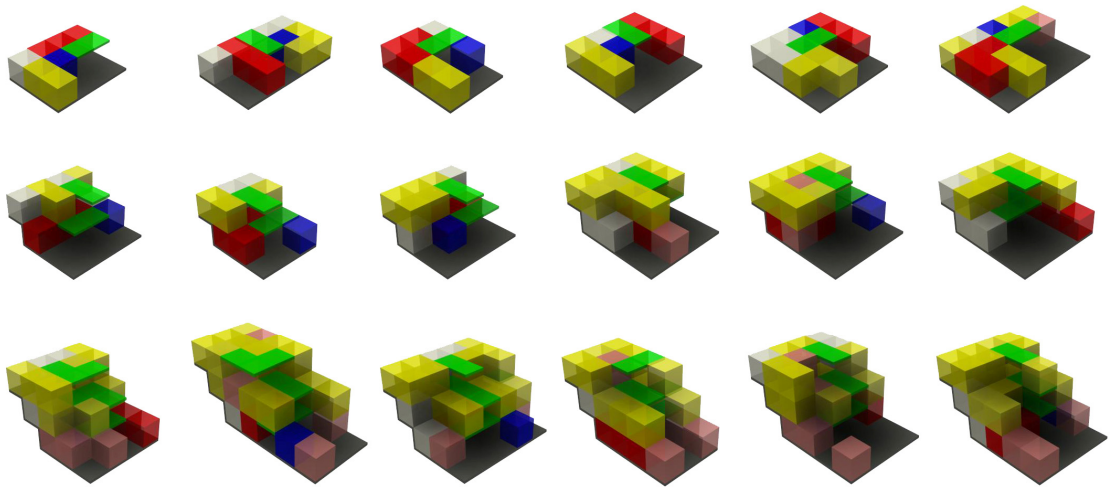

Fig. 17. Generation alternatives with different parameters in PLG

## 4. Conclusion

Turkish house had formed and evolved in time and reflected the life philosophy, design and technology of its era. A great variety can be seen in different regions and different types of Turkish houses can be found. It has mostly been built rationally and respectful to the environment. Construction method also supported the formation of the houses. Mostly local material is used and the limits of the size of the material caused standardized yet flexible spaces and details. Most of these properties are lost or ignored and new houses and recent housing settlements are built ignorant to the abovementioned values.

Mardin house is an example of masonry built traditional Turkish house on the southeast of Turkey while the city has a texture formed by houses and organically formed streets. There are many project proposals for new houses in traditional settlements; three of which are emphasized in the paper. All these projects aimed to generate mass–customization in the settlement which has certain properties of Turkish house as well as some new ideas of the architects. In all the projects, rules of Turkish house and Mardin house have merged with the rules set by the designers. This method succeeded to generate housing alternatives in Mardin with different solutions. While Özbek (2004) derived rules for Mardin and generated the houses by hand-made models, Özkaraduman (2008) designed a neighborhood and detailed a number of houses in 3d computer models.

On the other hand with PLG (Plan Layout Generator), different plan layout alternatives of Mardin houses are generated rapidly within the help of a program developed by the author (Torus, 2008). By using various parameters, a wide range of plan layouts can be obtained and these preliminary designs can be manipulated or detailed on subsequent phases. PLG supports mass-customization computationally which also supports efficiency in time and cost management.

This method can also be used in other traditional areas, on different types of Turkish houses, and new projects can be developed in order to generate these houses. After a throughout analysis of a certain housing type, similar studies can also be pursued. Furthermore with the help of computational technologies, tools and programs can be developed which help mass-customized production of the houses.

Another important point is that these types of generations and programs can be improved in time, adding other details which can either be added to the rules of the generation or to the program. It may encourage different properties, such as the utilization of local material. In this way houses may be more compatible to environmental conditions and variety of projects can be obtained both manually and computationally.

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# Architectural Meaning of a River That Connects the Left and Right Sides of Frame, Drawn by Chronic Schizophrenic Patients Based on Landscape Montage Technique: Similarity to Traditional Japanese Space

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**Keywords:** spatial schema, Landscape Montage Technique, frame, river, landscape, schizophrenia, chronic phase, sanctuary, Pure Land Buddhism

**Abstract:** Out of 56 drawing cases by chronic schizophrenic patients based on the Landscape Montage Technique, we focused on those with a river that connects the left and right sides of the frame (R-LR), which appeared most frequently. We made 17 case descriptions of the R-LR type and ascertained the meaning of such rivers from an architectural viewpoint. We found four types of spatial compositions of the R-LR type, and found that generally there is a tendency of disorganization in the landscape in drawings done by chronic schizophrenic patients. We believed this R-LR type might function as a line of defense for coping with this tendency. We proposed a hypothesis that there was a similarity between the R-LR type drawn by chronic schizophrenic patients and the landscape of Pure Land Buddhism, which is a traditional Japanese space, in terms of a space created to give sanctuary.

## 1. Introduction

### 1.1. BACKGROUND

Universal and fundamental principles can be found in human beings and in works done by children when they compose a living environment. We conducted developmental studies using the Architectural Space Montage Technique (ASMT) [1] and the Landscape Montage Technique (LMT). We previously applied LMT to students ranging from kindergarten to college and clarified the developmental characteristics of the spatial schema in their inner worlds (Yanagisawa, Okazaki, & Takahashi, 2001; Yanagisawa & Okazaki, 2002).

LMT is an art therapy technique devised by Nakai (1970, 1971) based on sandplay therapy. The therapist/researcher draws a frame on a piece of paper and tells the participant to draw a landscape within it. The items to be drawn are said sequentially, and participants draw only one landscape by adding the following items in the following order: river, mountain, rice field, road (large items), house, tree, person (medium-sized items), flower, animal, and stone (small items). After drawing them, anything else can be added. The participants then color the landscape to finish their drawings.

In our study, we focused on *space enclosed by a frame*, which is one LMT feature, and analyzed how a river is drawn with respect to the frame. We also clarified the developmental characteristics of spatial schema based on the types of rivers.

Regarding sandplay therapy, Ueda (1992, pp. 228-241) describes a sandbox as the "*A* space (or the embodying space)". On the other hand, the room in which the sandbox is located is called the "*B* space (or the free space)". In the process of creating one's world in the *A* space, the creator goes back and forth between "embodying the world" in the *A* space and "conceptualizing the world" in the *B* space to gradually concretize the world in the creator's mind in the *A* space.

The above sandbox refers to a frame and the space enclosed by it. According to Ueda, the *A* and *B* spaces, together as "a twofold space", are "transformed and deepened at various levels in many ways and gradually extended, then eventually become the twofold world said here, naturally becoming the invisible twofold called the world and void. Here the world refers to the sandbox, assuming that it is the world in which we live." Ueda argues that "by participating in playing and being in the world in twofold, which is a made up world, patients learn the way of being in the world in twofold that is real, just by playing while naturally learning and going back to one's being at the same time." He also says that sandplay therapy is effective because "it fits perfectly with the underlying structure based on the being of one's self."

In sandplay therapy and LMT, a space that is enclosed by a frame, which is closely related to the above underlying structure, is "a white space structured implicitly, for example, center-periphery, top-bottom, or left-right" (Nakai, 1984, p. 61). LMT begins with a space that is enclosed by a frame, in which a river is arranged. If the river is regarded as the figure, the space enclosed by the frame is regarded as the ground. Since a river tends to be expressed as something that extends into the distance, the structure of the space enclosed by the frame, which is the ground, is decisively influenced by the river that is the figure.

LMT is also a 2-dimensional art therapy technique. Therefore, the space enclosed by the frame will be a "space where a vista is anticipated" (Nakai, 1971, p. 42). In this "space where a vista is anticipated," drawing a river is not so easy since

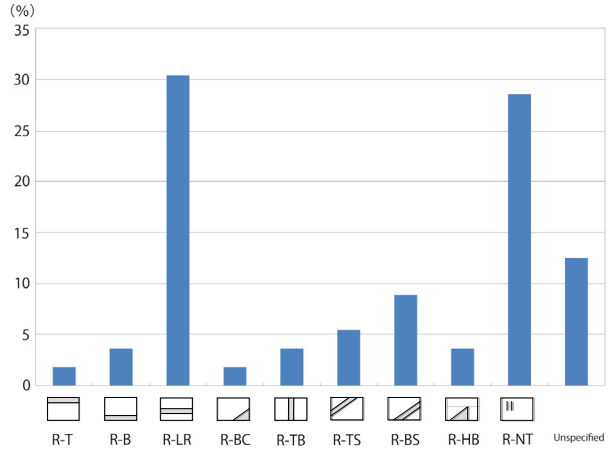
it is always easier to draw a river from a plane view. Due to this, rivers are drawn based on different inner standards depending on who is drawing, and the kinds of rivers drawn are related to various spatial schema.

In other words, the river item in LMT leads to various spatial schema that people may have, and the structure of the space enclosed by the frame, which is the ground, is decisively influenced by the way that the river is drawn. Therefore, analyzing the type of river that is drawn with respect to the frame clarifies the various structures that this space enclosed by the frame can have. Borrowing Ueda's words again, the river type with respect to the frame will become a decisive index for "embodying the world," and eventually the world being embodied will become the "world" in the real world that consists of the "world and void". This means that the river type with respect to the frame possibly becomes a decisive index for composing the world in which we live. Therefore, analyzing how a river is drawn with respect to the frame is significant. We identified this index from an architectural point of view.

### 1.2. SIGNIFICANCE AND OBJECTIVE

This research is an extension of our many previous researches. We focused on spatial schema not only from a developmental perspective but also from a psychopathology perspective and conducted research using the ASMT and LMT techniques on chronic schizophrenic patients. This paper focuses on LMT.

We believe that some principles, which may be at the root of and universal to all human beings, may be found in works done by schizophrenic patients, who are also referred to as those with an "illness related to space" (e.g., Ichihashi, 1984; Miyamoto 1973, p. 165; Takaesu & Oomori, 1984, p.125). In addition, we chose chronic schizophrenic patients among such patients because they were selected by their doctors as having no therapeutic problems. Furthermore, based on Ichihashi (1972), who argued that chronic schizophrenic patients have a unique mental structure, we believe it may be possible to identify a characteristic aspect from the diversity of spatial schema possessed by schizophrenics.




R-T: River that flows along top of frame with limit of upper side not shown
R-B: River that flows along bottom of frame with limit of lower side not shown
R-LR: River that connects left and right sides of frame
R-BC: River at bottom corner
R-TB: River that connects top and bottom sides of frame
R-TS: River that connects top and either left or right side of frame
R-BS: River that connects bottom and either left or right side of frame
R-HB: River that connects horizon and bottom side of frame
R-NT: River that does not touch frame
When the drawings were not done based on LMT or when participants refused to draw, they were classified as "Unspecified".

Fig. 1: Percentage of cases with each type of river (Yanagisawa & Okazaki, 2011, March)

In a previous paper, we analyzed types of rivers with respect to the frames in 56 landscapes drawn by chronic schizophrenic patients based on LMT (Yanagisawa & Okazaki, 2011, March). We found that a river that connects the left and right sides of the frame (R-LR) appeared most frequently, followed by a river that does not touch the frame (R-NT) (Fig. 1, Table 1). Based on this result, in this paper, we focused on the R-LR type and analyzed drawings of the R-LR type. Our goal is to clarify the meaning of such rivers drawn by chronic schizophrenic patients from an architectural viewpoint[2].

## 2. Literature Review

A number of researches on LMT have been done in such fields as psychiatry and clinical psychology that focused on case studies related to the treatment of schizophrenic patients, fundamental studies from the viewpoint of examination and technique, and so forth. The following are the main previous researches related to the characteristics of the composition of schizophrenic patients.

Nakai (1971) applied LMT to mentally ill people and found 17 types of spatial composition, particularly "H" and "P types," which were the drawing types of schizophrenic patients. He conducted semiotic evaluations of the psychological space of schizophrenic patients. Based on Nakai's types, Takaesu and Oomori (1984) classified the drawings of schizophrenic patients into three types: seceded, contiguous, and fixed. Ichihashi (et al. 1971; 1972) identified the characteristics of landscape sketches done by chronic schizophrenic patients as well as other works based on LMT done by chronic schizophrenic patients. The characteristics include "dimensionalizing the drawing composition into 2D," "front orientation of persons and things," "enumerated, stacked up composition, tendency of the abstraction of each thing," "symmetry," and "a peculiar reaction to border and region." They studied the relationship between these characteristics and the structure of the existence of the patients. Eto (1985) looked at world schema as a premise for spatial composition, and through LMT in the process of recovering from the collapse and bewilderment of world schema after acute episodes, he clarified three phases: the failure of world schema, the change of world schema, and the recovery of world schema. He also showed that these phases correspond to the life and behavioral pattern of patients. Kaito (1994) proceeded with a wide variety of LMT researches such as quantitative research and reading studies and set "compositional stage", consisting of nine stages, and "spatial stage", consisting of seven stages, as development indexes and simultaneously considered the stages within the two stages in which patients are mostly seen.

Looking at the previous researches, none were found on the classification of rivers with respect to the frame based on LMT for chronic schizophrenic patients.

## 3. Methods

First, each participant made a model based on the ASMT procedures and drew a landscape drawing based on the LMT procedures privately in a hospital room with the researcher. Since with the ASMT technique, a participant only has to place 3-dimensional objects, it should be easier than the LMT technique. The participants first created models based on the ASMT technique, before drawing based on the LMT technique, to familiarize themselves with creating such works. We believe that it is actually very helpful to the participants by using this sequence. The results of the ASMT will be published in another paper. In LMT, an F6 size piece of drawing paper, a black felt

pen, and colored pencils were used.

Participants were chosen by a doctor who judged them therapeutically competent to participate. At a later date, the researcher interviewed the doctor and nurses to collect the clinical histories and to become familiar with the daily activities and routines of each patient.

## 4. Results and Discussion

We identified 17 cases of the most frequent R-LR type drawn by chronic schizophrenic patients (Fig. 1, Table 1). We made case descriptions and considered the meaning of this type of river from an architectural point of view.

### 4.1. CASE DESCRIPTIONS

Below, information regarding the creator written above each pargraph is shown starting with the participant code, the age in parenthesis, gender, disease name, and the schizophrenia subtype. The part italicised in each case describes the characteristic

Table 1: Participants and river types based on LMT (Yanagisawa & Okazaki, 2011, March)

| Participant Code | Age | Gender | Age of First Psychiatric Visit | Disease Name | Schizophrenia Subtype | Type of River |
|---|---|---|---|---|---|---|
| TM | 38 | M | 28 | Graft Schizophrenia | Undifferentiated Type | R-T |
| SC | 46 | F | 15 | Schizophrenia | Residual Type | R-B |
| RE | 60 | F | 20 | Schizophrenia | Residual Type | R-B |
| FJ* | 60 | F | 19 | Schizophrenia | Residual Type | R-LR |
| OH | 54 | F | 43 | Schizophrenia | Residual Type | R-LR |
| TB | 59 | M | 24 | Schizophrenia | Paranoid Type | R-LR |
| KI | 38 | M | 21 | Schizophrenia | Undifferentiated Type | R-LR |
| HT* | 62 | F | 34 | Schizophrenia | Residual Type | R-LR |
| KU | 63 | F | 25 | Schizophrenia | Residual Type | R-LR |
| KO | 53 | M | 27 | Schizophrenia | Undifferentiated Type | R-LR |
| KR2** | 61 | M | 56 | Graft Schizophrenia | Residual Type | R-LR |
| IH | 61 | F | 18 | Schizophrenia | Undifferentiated Type | R-LR |
| MK | 53 | M | 17 | Schizophrenia | Catatonic Type | R-LR |
| KZ | 51 | F | 18 | Schizophrenia | Residual Type | R-LR |
| TD | 69 | F | 24 | Schizophrenia | Undifferentiated Type | R-LR |
| ST | 80 | F | 39 | Schizophrenia | Undifferentiated Type | R-LR |
| WS | 54 | F | 30 | Schizophrenia | Residual Type | R-LR |
| KM | 66 | M | 38 | Schizophrenia | Undifferentiated Type | R-LR |
| SN | 63 | M | 16 | Schizophrenia | Residual Type | R-LR |
| TA | 76 | M | 35 | Graft Schizophrenia | Residual Type | R-LR |
| EI | 63 | M | 44 | Schizophrenia | Residual Type | R-BC |
| HJ | 46 | M | 18 | Schizophrenia | Undifferentiated Type | R-TB |
| TR | 51 | M | 26 | Schizophrenia | Residual Type | R-TB |
| KY | 63 | M | 22 | Schizophrenia | Residual Type | R-TS |
| KK | 53 | F | 12 | Schizophrenia | Undifferentiated Type | R-TS |
| TS | 59 | M | 38 | Graft Schizophrenia | Residual Type | R-TS |
| OM | 56 | F | 31 | Schizophrenia | Residual Type | R-BS |
| TT | 56 | M | 30 | Schizophrenia | Residual Type | R-BS |
| YD | 64 | M | 33 | Schizophrenia | Paranoid Type | R-BS |
| KR1** | 60 | M | 56 | Graft Schizophrenia | Residual Type | R-BS |
| NB | 60 | M | 17 | Schizophrenia | Undifferentiated Type | R-BS |
| HY | 70 | M | 15 | Schizophrenia | Residual Type | R-HB |
| TU | 69 | F | 22 | Schizophrenia | Undifferentiated Type | R-HB |
| TO | 53 | F | 17 | Schizophrenia | Residual Type | R-NT |
| YM | 26 | F | 20 | Graft Schizophrenia | Residual Type | R-NT |
| EM | 56 | M | 31 | Graft Schizophrenia | Catatonic Type | R-NT |
| KH* | 65 | F | 29 | Schizophrenia | Undifferentiated Type | R-NT |
| MD | 56 | M | 24 | Graft Schizophrenia | Undifferentiated Type | R-NT |
| AO | 52 | M | 47 | Graft Schizophrenia | Undifferentiated Type | R-NT |
| SS | 65 | M | 24 | Schizophrenia | Undifferentiated Type | R-NT |
| YS | 41 | M | 22 | Graft Schizophrenia | Undifferentiated Type | R-NT |
| KA | 57 | M | 37 | Schizophrenia | Undifferentiated Type | R-NT |
| MS | 58 | M | 31 | Schizophrenia | Residual Type | R-NT |
| AN | 57 | F | 42 | Schizophrenia | Undifferentiated Type | R-NT |
| HI | 44 | F | 17 | Graft Schizophrenia | Residual Type | R-NT |
| KE | 50 | F | 20 | Schizophrenia | Residual Type | R-NT |
| MO | 63 | F | 27 | Schizophrenia | Residual Type | R-NT |
| AI | 57 | F | 15 | Schizophrenia | Disorganized Type | R-NT |
| HR | 58 | F | 15 | Schizophrenia | Catatonic Type | R-NT |
| MI | 63 | M | 25 | Schizophrenia | Disorganized Type | Unspecified |
| MY | 73 | F | 20 | Schizophrenia | Undifferentiated Type | Unspecified |
| TK | 61 | M | 30 | Schizophrenia | Disorganized Type | Unspecified |
| YK | 64 | F | 25 | Schizophrenia | Catatonic Type | Unspecified |
| KT | 63 | M | 27 | Schizophrenia | Undifferentiated Type | Unspecified |
| ME | 79 | M | 16 | Schizophrenia | Residual Type | Unspecified |
| EK | 69 | F | 21 | Schizophrenia | Undifferentiated Type | Unspecified |

R-T: River that flows along top of frame with limit of upper side not shown
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R-NT: River that does not touch frame
When the drawings were not done based on LMT or when participants refused to draw, they were classified as “Unspecified”.

We studied 56 cases by 55 schizophrenic patients; one male patient participated twice. 30 works were done by males and 26 by females. Three cases were done by outpatients, and 53 were done by inpatients. Average age of participants was 58.3. 11 cases are included by schizophrenic patients with intellectual disabilities or graft schizophrenic patients. Subtypes of schizophrenia are based on DSM-IV-TR of American Psychiatric Association. Two cases were done by paranoid type patients, three cases by disorganized type, four by catatonic type, 21 cases by undifferentiated type, and 26 cases by residual type.

*FJ, HT, and KH are outpatients. **KR participated twice, and his cases are numbered KR1 and KR2.

that we have found of the spatial composition of each drawing.

FJ (60) F, Schizophrenia, Residual Type (Fig. 2)
This person was cheerful, easy to get along with, and communicated smoothly. She was treated on an outpatient basis at the time, although she was previously hospitalized. She is a leader at a community activity center. She seemed very concentrated and quietly worked on her drawing. Her drawing showed a landscape with *a certain degree of integration*. The river was meandering, and the rice plants in the fields were drawn carefully. She said, "If I draw a road, I must also draw a bridge." At the same time as the road was drawn, she also drew a bridge. Trees were drawn on top of the mountains. "I will also draw them here," as she said that, she also drew trees on the other side toward the front of the river. For the first time, she drew something on this side, referring toward the front of the river, while before it was left blank. On this same side, a dog, rocks, and a bicycle were also drawn. Her coloring was done carefully. After she colored the drawing, she added fish to the river. The doctor stopped by and said to her, "This is really good. It is such a soothing picture. We should have an exhibition." When she heard it, she seemed very happy.

OH (54) F, Schizophrenia, Residual Type (Fig. 3)
This person was cheerful, easy to get along with, and communicated smoothly. She seemed talkative, but also a little embarrassed. Her drawing showed a landscape with *a certain degree of integration*. The river appeared to be almost horizontal, but slanting up at the right end. Kanji characters identified the roads and the rice fields. Her hand did not stop, and she just kept on drawing. "The person appears to be larger than the houses," she said and laughed. She drew a sparrow for the animal. She felt

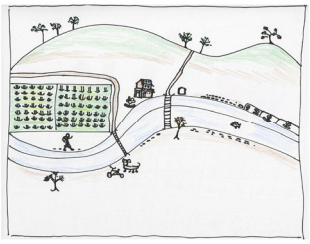
Fig. 2 FJ(60)F R-LR

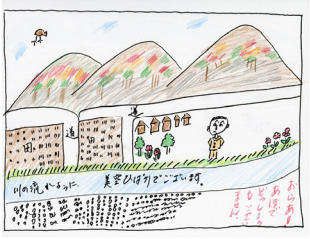
Fig. 3 OH(54)F R-LR

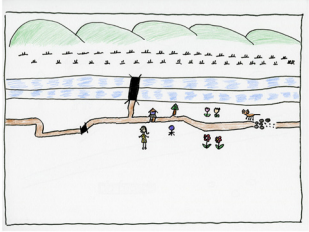
Fig. 12 KZ(51)F R-LR

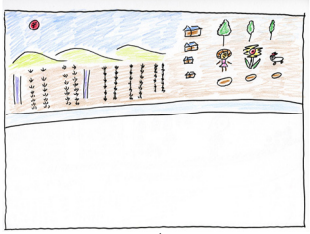
Fig. 13 TD(69)F R-LR

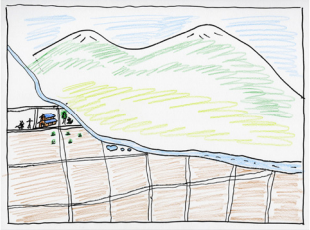
Fig. 4 TB(59)M R-LR

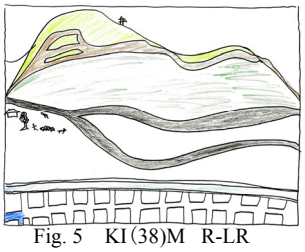
Fig. 5 KI(38)M R-LR

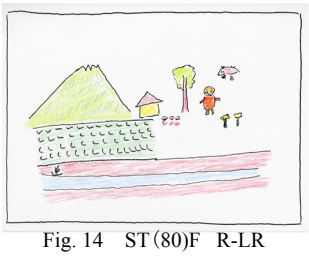
Fig. 14 ST(80)F R-LR

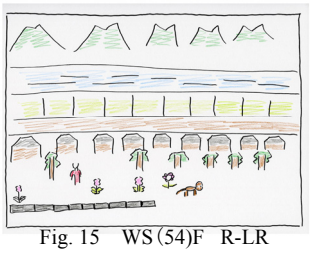
Fig. 15 WS(54)F R-LR

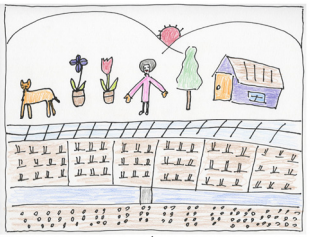
Fig. 6 HT(62)F R-LR

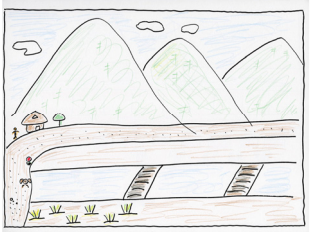
Fig. 7 KU(63)F R-LR

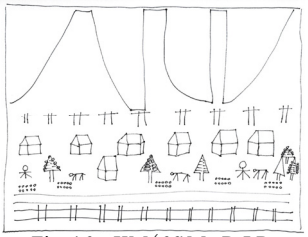
Fig. 16 KM(66)M R-LR

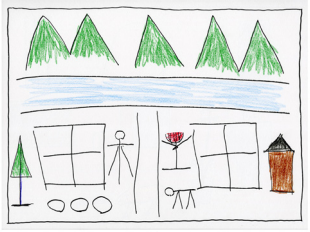
Fig. 17 SN(63)M R-LR

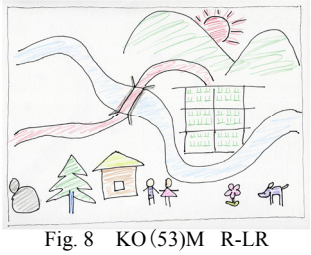
Fig. 8 KO(53)M R-LR

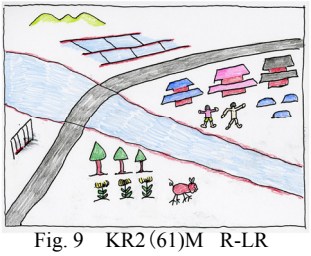
Fig. 9 KR2(61)M R-LR

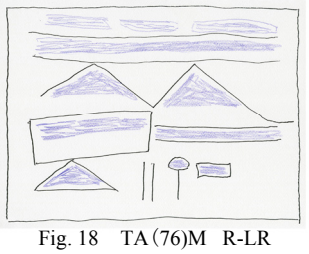
Fig. 18 TA(76)M R-LR

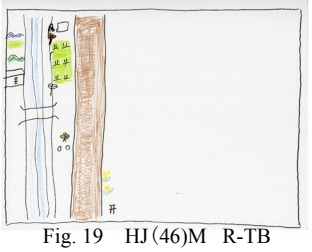
Fig. 19 HJ(46)M R-TB

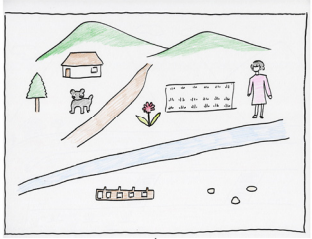
Fig. 10 IH(61)F R-LR

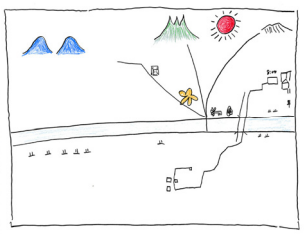
Fig. 11 MK(53)M R-LR

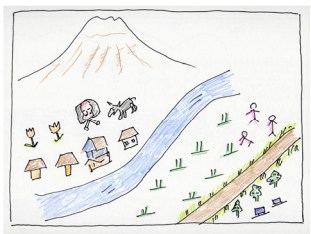
Fig. 20 NB(60)M R-BS

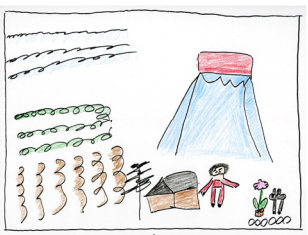
Fig. 21 AI(57)F R-NT

that something was missing in the drawing and added some words on the river that said "like the flow of the river," which were lyrics from an old popular song. The patients were going to have an event where they would sing this song. She said, "It will be fun since we will sing it in a group." She seemed to enjoy coloring her drawing. The mountains were initially colored with brown and black. They appeared a bit lonesome. The researcher said to her, "What season is it? " She said it was autumn. "If it's autumn, there must be maple leaves," as she said that, the mountains became colorful. "I'm finished. I'm done. Here!" she said and wrote on the bottom right-hand corner "I'm an idiot and there's nothing I can do about it" and laughed out loud. She said cheerfully, "that was really fun."

TB (59) M, Schizophrenia, Paranoid Type (Fig. 4)
Communication was smooth. His drawing showed a landscape with *a certain degree of integration*. The river ran diagonally. Along the rice fields, roads were drawn in a grid below the river. A small living space composed of medium and small items was drawn on the left side of the drawing. At the end, where other items could be added to complete the drawing, a symbol representing a rice field was drawn near the living space. He seemed to enjoy coloring his drawing, which was a scene of a Japanese country landscape with lush green mountains and rice fields. According to the doctor, this person often speaks of work related to farms and forestry. Possibly he used to be a forestry worker. The scenes of such a life were expressed in his drawing. He looked at his finished work and was happy. After that, he talked about some of his jobs, which were related to textiles, lacquerware, and woodwork.

KI (38) M, Schizophrenia, Undifferentiated Type (Fig. 5)
Even though this person was very large, he seemed timid. At first he seemed worried, but soon opened himself up. He understood what was being said, and there was no feeling of strangeness in sharing his feelings. However, it was difficult to catch what he was saying. His drawing showed a landscape with *a certain degree of integration*. The river ran horizontally at the bottom of the drawing, and on the side in front of the river was a layer of concrete. The rectangles resembled concrete blocks, but later became rice fields. "Can I draw it like this?" he said and often repeated this question. The medium and small items were drawn very tiny and seemed far away from where the daily life activities were taking place. He added an iron tower and roads on top of the mountain. He talked a lot while coloring his drawing, but it was hard to understand what he was saying. As he talked on and on, he stopped drawing, and it was hard to tell if the work was finished. He seemed very pleased. According to the doctor, he often spends most of the day sleeping.

HT (62) F, Schizophrenia, Residual Type (Fig. 6)
She was quiet and had a soft voice; however, she communicated smoothly. She was treated on an outpatient basis at the time, although she was previously hospitalized. She goes to the community's job assistance center. She had a serious look while she was drawing and smiled whenever she finished drawing an item. Her drawing showed a landscape with *a certain degree of integration*. The river ran horizontally and there was a bridge. Rice fields were drawn above the river. A road was depicted by rocks on the side of the river toward the front of the drawing. A layered structure was formed by horizontal lines on the drawing. The medium and small items were drawn lined up, as told in order from right to left, and they seemed to have no relationship. Concrete rocks were drawn above the rice fields. This was also a structure of layers. At last, she added the sun. She said, "I used to draw a lot when I was little. We used to do sketches in elementary school." She seemed to be in good spirits.

KU (63) F, Schizophrenia, Residual Type (Fig. 7)
Communication was smooth. She had a reserved attitude and appeared overly concerned about everything. She was dressed entirely in pink, which was strange. Although she said, "This is so difficult," "Oh, gee, what should I do," she worked hard at her drawing. Her drawing showed a landscape with *a certain degree of integration*. The river ran horizontally and was crossed by a road . She said, "This house has a thatched roof." Stones were drawn as black dots on the road. She said, "These stones make the road look like a road." At the end, she added bridges and clouds. She colored eagerly. A landscape with a kind of depth was completed.

KO (53) M, Schizophrenia, Undifferentiated Type (Fig. 8)
He was not very talkative, but did answer when addressed by the researcher. He was easy to talk to, but somewhat seemed to avoid sharing his feelings. He was a straightforward person, working quietly and quickly on his drawing. He rarely hesitated and just kept drawing. His drawing showed a landscape with *spaces left unnaturally blank*. There was a meandering river. Lines composing rice fields stuck out horizontally. Their bottom corner ran into the river. A road with a bridge seemed to suddenly emerge from the rice fields. The medium and small items were lined up with each other without much relation. There were unnatural spaces left blank between each of the items. He added the sun to complete his drawing. After finishing the drawing, he appeared quite pleased.

KR2 (61) M, Graft Schizophrenia, Residual Type (Fig. 9)
This was the only person who did the drawings twice. During the second time, he seemed very relaxed. Communication was smooth; however, every once in a while he stuttered, making it hard to understand what he was saying. He answered "yes," every time he was told to draw something and seemed serious. He drew very quietly. His drawing showed a landscape with *spaces left unnaturally blank*. The river ran diagonally. Each item was drawn carefully. The house, the tree, and the flower items were repeated in the foreground. Swings were added on the left side to complete the drawing. After that, he quietly concentrated on coloring, which he did very carefully. The outline of the river was colored, and he called that part of the river the bank. Even color was added to outline the rice fields, and he called that part the footpath. He had a serious look on his face while he was drawing, but gave a big smile when he finished. According to the doctor, he normally does not do anything, but engages in activities with encouragement from others.

IH (61) F, Schizophrenia, Undifferentiated Type (Fig. 10)
She seemed active. This case was conducted easily. She was very talkative. However, often it was hard to understand what she was saying. She changed the subject often and seemed straightforward. Her drawing showed a landscape with *spaces left unnaturally blank*. Compared to other drawings, these unnatural spaces were more noticeable. Each of the items seemed to float. The river ran diagonally. At the end, she added a garden railing with rectangular holes at the bottom of her drawing. Its meaning was unclear. While she was coloring, she said, "My grades in art class were good," "My work was even displayed in an art museum," "I have not drawn anything lately." She also talked about other things, but much was hard to understand. According to a nurse, her willingness to engage in everyday

activities is good; however, recently the things that she is unable to do have increased.

MK (53) M, Schizophrenia, Catatonic Type (Fig. 11)
He talked a lot, but usually he was hard to understand, especially because he kept straying off the track of the conversation. For example, he talked about his room where he was hospitalized, about his family, being in high school, his jobs, mountains, and marriage. There was a lot of complaining. Sometimes he muttered to himself without making any sense. There was not really any feeling of strangeness in the way he shared his feelings. He laughed a lot but sometimes his eyes looked suspiciously at people. His drawing showed a landscape with *spaces left unnaturally blank*. The river ran horizontally. While drawing the road, he spoke in a cheerful voice, telling how to get to the hospital from his house, and showing it on his drawing. "First, here is my house, then you go this way, and then you see a bridge, and there's a slope, and you see the mountains, and here's where I buy my cigarettes. Oh, I'm not supposed to go in this direction on this road. Well, here's where I put my bicycle. I leave home at 8 o'clock, and it takes 20 minutes," he said. In this way, from above, the finished drawing looked almost like a map. At the end, he added the sun and only colored the items, not the space.

KZ (51) F, Schizophrenia, Residual Type (Fig. 12)
Communication was smooth. At first, she claimed that she couldn't draw landscape drawings. She laughed a lot. It took her more than an hour to finish the work. She talked constantly while drawing. She talked about the imperial family, celebrities, acorns, festivals, mountain climbing, the lottery, coloring picture, nurses, catching a cold, her family, sickness, and ramen noodles. She bounced from one topic to another, which was quite exhausting. Her drawing showed a landscape with *spaces left unnaturally blank* at the bottom. The river ran horizontally. Large items were in a structure of layers. When she was drawing the road, she said, "it would be nice if there was a house somewhere," and the researcher answered, "I was just going to say house next. Wow, you guessed the next item to be drawn." We both laughed. For the trees, she said that she wanted to draw a Japanese cedar. "People are easy," she said and drew a symbol representing a person. "This person looks like a sign for the toilet," she said. Again, we both laughed. "I will draw tulips and cosmos for the flower," "I will draw a cat for the animal," she said. For a while, she talked about how she used to have a cat. At the end, she drew a woman in the middle of her drawing. "Thanks to you, I've just drawn a scenery that I didn't think I could," she said laughing. She colored very carefully. The coloring of the river was done partially and repeatedly. She said that she enjoyed drawing very much. According to the nurse, she is usually eager to join activities and gets along well with others.

TD (69) F, Schizophrenia, Undifferentiated Type (Fig. 13)
She smiled the whole time and seemed kind. However, it was hard to understand what she was saying. Her drawing showed a landscape with *spaces left unnaturally blank*. The river ran horizontally and completely divided the world into top and bottom portions. The top was also divided into left and right sides. The large items were drawn on the left, and the medium and small items were drawn on the right. The medium and small items seemed to repeat. The scenery was divided into a number of areas without much unity. At the end, she drew the moon above the mountains. She leant forward to color her drawing while putting her arm on top of the paper that was blank in the front. She only saw the part on the other side of the river on the top portion. She held several colored pencils in her hand while enthusiastically coloring. The side of the river on the top portion was her ideal scenery. With the model making of ASMT done prior to LMT, a Buddhist statue was put in the very front facing the front in the model, which was located behind the landscape drawing. She chanted a Buddhist sutra, put her hands together, and bowed before the statue on the other side of the river. She said that she had no idea about the blank part of her drawing on the side of the river at the bottom portion. After the drawing was done, she took the researcher's hand and said thank you. According to the nurse, she often spends the whole day in bed, but since she can take care of herself, she also actively participates in events held in the hospital ward.

ST (80) F, Schizophrenia, Undifferentiated Type (Fig. 14)
She talked a lot, especially complaining about the hospital. She said that she always had to put up with a lot of things. Although she continued to complain, she also worked diligently on her drawing. Her drawing showed a landscape with *spaces left unnaturally blank*. The river ran horizontally. The large items seemed to be connected; however, with the medium and small items, blank spaces existed between each of them, so they seemed to be floating. The river did not touch the frame, and the entire drawing seemed to shrink from the edges of the paper. She said, "When I was in elementary school, I was not good at drawing, and my grade was 3 out of 10." However, when she was done, she seemed pleased. She put her hands together and bowed before the drawing.

WS (54) F, Schizophrenia, Residual Type (Fig. 15)
Communication was smooth. She had a loud voice. She smiled a lot, with gentle eyes. She worked very fast and rarely hesitated while she was drawing. Her drawing showed a landscape with *a repetition of items in the foreground with spaces left unnaturally blank*. The river ran horizontally. In the upper part of the drawing, a river, mountains, rice fields, and a road were drawn. Mountains and rice fields were repeated. In the lower part, she drew the medium and small items. Houses and trees were repeated. The lines composing a person broke off and ended suddenly, for no apparent reason. The rectangular blocks repeated at the very bottom were stones. At the end, she said there was nothing else to add. The drawing overall was layered, and she seemed to enjoy coloring it. She looked at it at the end, seemed to enjoy it, and shared her joy of finishing the work. According to the nurse, she is outgoing, but only cares about what interests her. Also, she is unable to organize and clean up.

KM (66) M, Schizophrenia, Undifferentiated Type (Fig. 16)
He was polite and seemed very serious, with a stern look on his face. Even if he smiled, it seemed forced with complicated feelings. Communication was smooth. His drawing showed a landscape with *a repetition of items in the foreground with spaces left unnaturally blank*. The river ran horizontally. On the bottom of the drawing, the river was drawn, and bridges were drawn repeatedly. On the top, he drew strangely shaped mountains and repeatedly drew rice fields like symbols in a map right below the mountains. The medium and small items were repeated. He said that there was not anything he wanted to add at the end and also that there was no need to add any colors. The entire drawing was in a structure of layers. He explained that the part between the river and the mountains, or the part composed by the repeatedly drawn medium and small items, was the part that he drew the best. He said, "I am not good at drawing," but when he saw his finished work, he really had a radiant look on his face. According to the doctor, he is usually polite and outgoing, but also often overreacts and gets in trouble.

SN (63) M, Schizophrenia, Residual Type (Fig. 17)
He seemed expressionless and was not talking at all. However, he seemed to be a warm person, and deep down inside he was probably interested in participating in this activity. From time to time he showed such an expression. It was hard to catch what he said, but he seemed to perfectly understand what was being said to him. He worked diligently at his drawing. His drawing showed a landscape with *geometric shapes in the foreground with spaces left unnaturally blank*. The river ran horizontally. Each of the items was arranged so that the left and right sides of the drawing were symmetrical. All of the items were equal, and no hierarchy of large, medium, and small items was seen. He drew the items as if merely filling spaces. He only colored some of the items. His drawing seemed to lack a sense of space. According to the doctor, he usually does not talk to anyone and wonders around the whole day.

TA (76) M, Graft Schizophrenia, Residual Type (Fig.18)
He was quiet and smiled the whole time. He seemed to be a warm person and spoke normally. He did not take the initiative to talk, but answered or spoke when spoken to. His drawing showed a landscape with *geometric shapes in the foreground with spaces left unnaturally blank*. The river ran horizontally at the top and immediately below it, two triangular mountains were drawn. Below the mountains, a quadrangular rice field was drawn, and a road was drawn to the right of it. At the very bottom, from left to right, a triangular house, a tree as two lines, a flower composed of a circle and a line, and a quadrangular stone were drawn. People and animals were not drawn. He said at the end that there was nothing else to add to the drawing. The items, which were arranged so that the entire drawing was symmetrical left and right, were drawn as simple geometric shapes. He only used purple for the coloring. When he was coloring, first he drew three quadrangles above the river. He said, "I don't know what they are." He colored the drawing to avoid touching the outlines, and the coloring appeared to shrink from the outlines of the figures for no apparent reason. According to the doctor, he often sits in the same place all day doing nothing.

### 4.2. MEANING OF A RIVER THAT CONNECTS THE LEFT AND RIGHT SIDES OF FRAME

Hoo-do (Phoenix hall) and garden, Byodoin Temple, Kyoto, 11th century (photo taken by the author, Kazuhiko Yanagisawa)

This is one of the most famous buildings and gardens of Pure Land Buddhism, showing a traditional Japanese space. A seated statue of Amitabha Tathagata is housed in this building, which faces the pond. This building and garden represent Amitabha's Pure Land and there used to be a Kogosho (small imperial palace), in front and on the opposite side of the pond from the Hoo-do, from where the Pure Land was viewed and contemplated with reverence. (e.g., Shimizu, 1988, p. 21) This photo was taken approximately from the place where Kogosho once stood. Similarities are found with this Pure Land garden and the R-LR type of landscape.

Fig. 22 Landscape of Pure Land Buddhism

We looked at each case of the R-LR type, as described above. The types of spatial compositions found with the R-LR type drawings are summarized as follows: 1) landscapes with a certain degree of integration: FJ, OH, TB, KI, HT, and KU, 2) landscapes with spaces left unnaturally blank: KO, KR2, IH, MK, KZ, TD, and ST, 3) landscapes with a repetition of items in the foreground with spaces left unnaturally blank: WS and KM, and 4) landscapes with geometric shapes in the foreground with spaces left unnaturally blank: SN and TA.

The percentages of the types of spatial compositions 1) to 4) are 35.3% (6 cases/17 cases), 41.2% (7 cases/17 cases), 11.8% (2 cases/17 cases), and 11.8% (2 cases/17 cases), respectively. The percentage of 2), 3), and 4), the types having spaces left unnaturally blank, is 64.7% (11 cases/17 cases).

Any of these four types of spatial compositions, on one level or another, can also be seen in the drawings of other types of rivers (e.g., Figs. 19 and 20).

The types of spatial compositions described in 2), 3), and 4) could be interpreted as signs indicating the *tendency of disorganization in the landscape*. Furthermore, a river that does not touch the frame (R-NT) is also common (Fig. 1). This tendency of disorganization in the landscape is even more noticeable (e.g., Fig. 21).

As we clarified, the tendency of disorganization in the landscape underlies the drawings done by chronic schizophrenic patients in general. Since the R-LR type is most frequently seen in landscapes with the tendency of disorganization, this expression might function as a line of defense for coping with the tendency of disorganization. In other words, it might indicate a space that is created to give sanctuary: an expression of the essential spatial schema of humankind.

Note that the landscape of Pure Land Buddhism (Fig. 22), which is an example of a traditional Japanese space, is also an R-LR type of landscape. We hypothesize that the R-LR type drawn by chronic schizophrenic patients and the landscape of Pure Land Buddhism are similar in terms of a space created to give sanctuary.

## 5. Conclusion

In this paper, out of 56 drawing cases by chronic schizophrenic patients based on the Landscape Montage Technique, we focused on those with a river that connects the left and right sides of the frame (R-LR) since this type of river appeared most frequently. We ascertained the meaning of such rivers drawn by chronic schizophrenic patients from an architectural viewpoint. Our conclusions are summarized as follows:

1. We made 17 case descriptions of the R-LR type, including descriptions on the participants, their drawings, the drawing process, participants' conversation with the researcher, and the daily activities and routines of each participant.
2. We found four types of spatial compositions of the R-LR type: 1) landscapes with a certain degree of integration, 2) landscapes with spaces left unnaturally blank, 3) landscapes with a repetition of items in the foreground with spaces left unnaturally blank, and 4) landscapes with geometric shapes in the foreground with spaces left unnaturally blank.
3. The percentage of the drawings with the spatial composition types 2), 3), and 4) described above, all having spaces left unnaturally blank, was 64.7%, or 11 out of 17 cases. These types of spatial compositions, 2), 3), and 4), could especially be interpreted as signs indicating the *tendency of disorganization in the landscape*, underlying the drawings done by chronic schizophrenic patients in general.

4. Since the R-LR type was most frequently seen in landscapes with the tendency of disorganization, this expression might function as a line of defense for coping with the tendency of disorganization. In other words, it might indicate a space that was created to give sanctuary: an expression of the essential spatial schema of humankind.
5. We proposed a hypothesis that there was a similarity between the R-LR type drawn by chronic schizophrenic patients and the landscape of Pure Land Buddhism, which is a traditional Japanese space, in terms of a space created to give sanctuary.

Note that Kawai (1977, p. 33) described the human psyche as a layered structure composed of the conscious, the personal unconscious, and the collective unconscious, based on Jung. He mentioned that the collective unconscious was not acquired individually, but naturally, and universal to mankind in general, and that before reaching a level universal to mankind in general, for example, there could be the familial unconscious only characteristic to a certain family, or the cultural unconscious common only to a certain cultural sphere. We shall study further if the conclusions derived in this paper are only specific to the Japanese culture or to a certain extent universal to mankind in general, which we are more interested in.

**Acknowledgements**

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**Endnotes**

1. The Architectural Space Montage Technique (ASMT) was devised by Okazaki (Okazaki & Ito, 1992) based on the Landscape Montage Technique and sandplay therapy. In ASMT, on a whiteboard participants arrange miniatures including furniture, dolls, and modularized walls of various sizes made to a one-fiftieth scale to create a model of an ideal architectural space. The idea originated from a design for an ideal psychiatric hospital with a living space to welcome patients. Studies were conducted not only on schizophrenic patients but also school children (Okazaki, 1992), mentally handicapped children (Okazaki, Ooi, Yamaguchi, & Urasaki, 1997), and preschoolers (Okazaki, Yanagisawa, & Nanba, 1999).
2. This paper is a revision and enlargement of a previous paper by Yanagisawa and Okazaki (2011, March).

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## ACTIVITY REPORTS OF THE INSTITUTE OF TURKISH CULTURE STUDIES

# Opening Ceremony of the Institute of Turkish Culture Studies (ITCS) at Mukogawa Women's University

The Institute of Turkish Culture Studies (ITCS) at Mukogawa Women's University (MWU) was established inside the Koshien Hall, which is a university building belonging to the Department of Architecture. The opening ceremony was held on Wednesday, July 29th, 2009. The ITCS will conduct researches related to Turkey, which is positioned on the other side opposite of Japan of the Silk Road, and provide opportunities so that Japanese and Turkish students will have more interactions through the institute. The goal of the institute is to also understand and learn about the culture and the way of life of countries located around the Silk Road. Moreover, the Research Center of Japanese Culture Studies at Bahcesehir University (BU) will be established in June, 2010, and various researches will be done through both institutes.

About 250 people, including Ryo Okawara, the chancellor of MWU, Naosuke Itoigawa, the president of MWU, Selahattin Kuru, the vice president of BU, and Burak Karacan, the cultural attache of the Embassy of the Republic of Turkey in Japan, attended the opening ceremony, which was held in the Koshien Hall in the morning of July 29th.

Okawara greeted saying, "The first step of an ambitious plan has started, which is to encourage research and deepen mutual understanding by making this institute into a base, and to contribute to the peace and prosperity of the Silk Road region". Kuru greeted saying, "I think that Kansai and Istanbul have many common characteristics historically and culturally. We will be able to advance research on culture and architecture of both countries, taking advantage of the establishment of this institute."

Then, Ahmet Eyuce, the dean of BU's faculty of architecture and design, made the commemorative speech, "Culture and architecture: An interpretation of built environment and built form from the cultural evolution point of view".

Ribbon-cutting ceremony


Ryo Okawara, the chancellor of MWU, making a speech at the opening ceremony.

*Intercultural Understanding*, 2011, volume 1, pages 122-127

# Inter Cultural Studies of Architecture (ICSA) in Japan 2009, 2010

Students and professors from the faculty of architecture and design of Bahcesehir University (BU) of Istanbul joined us at Koshien Hall and Architecture Studio on the Kami-Koshien Campus of Mukogawa Women's University (MWU) from June 20th to August 2nd, 2009 and from June 21st to August 1st, 2010. BU is located at Besiktas, which is a beautiful place where the Bosporus Strait spreads out and the Asian side of Istanbul can be seen beyond it.

BU's students received special Japanese training before their coming to Japan. They were divided to join either the junior or the senior design classes in the department of architecture of MWU and tackled either the junior or the senior year's design projects. By participating in this program, it is possible for them to gain knowledge, learn techniques, and increase their sensitivity necessary for the design of architecture. They also participated in a basic design studio for freshmen and had the opportunity to study about traditional Japanese culture, such as ikebana, or Japanese flower arrangement, under the guidance of Ryuho Sasaoka, a headmaster designate of Ikebana Misho-ryu Sasaoka in Kyoto, and also woodwork with Masanobu Araki, a master carpenter in Kyoto. They also participated in field trips on Saturdays to explore cities and architectures in Japan, such as Todai-ji and Horyu-ji Temples, Himeji Castle, Jodo-do of Jodo-ji Temple, Omihachiman, Funaya in a town called Ine, Amanohashidate, Itsukushima Shinto Shrine, and so forth. They also took a tea ceremony lesson at Yabunouchi-ke in Kyoto.

BU's students making a courtesy call on Ryo Okawara, the chancellor of MWU, and Naosuke Itoigawa, the president of MWU, on June 24th, 2009

BU's students making a courtesy call on Masahiro Kono, the mayor of Nishinomiya city, on July 9th, 2010

## Basic Design Studio I

Ikebana, or Japanese flower arrangement, under the guidance of Ryuho Sasaoka, a headmaster designate of Ikebana Misho-ryu Sasaoka in Kyoto

Woodwork under the guidance of Masanobu Araki, a master carpenter in Kyoto

## ICSA in Japan 2009

Participants
Professors: Assistant Professor Murat Dundar, Assistant Sinem Kultur
Students: Dilara Sezgin, Didem Veryeri, Cansu Arzik, Ezgi Bayraktar, Duygu Vahapoglu, Gamze Duvan, Ece Ersoy, and Gizem Pepe

Seniors

| | Mon | Tue | Wed | Thr | Fri | Sat |
|---|---|---|---|---|---|---|
| 1 9:00-10:30 | | | | | | Fieldwork |
| 2 10:45-12:15 | | | | Architectural Design Theory IV | | |
| 3 13:05-14:35 | Architectural Design Studio V | Basic Design Studio I | | Architectural Design Studio V | Architectural Design Studio V | |
| 4 14:50-16:20 | | | | | | |
| 5 16:30-18:00 | | | | | | |

| | | |
|---|---|---|
| Architectural Design Studio V | | 6/22(Mon)-7/23(Thr) |
| Review | | 7/30(Thr), 31(Fri) |
| Basic Design Studio I | Ikebana | 6/23(Tue) |
| | Woodwork | 7/7(Tue) |
| Fieldwork | Funaya & Amanohashidate | 6/27(Sat) |
| | Himeji Castle & Joudo-do | 7/4(Sat) |
| | Todaiji & Horyuji Temple | 7/11(Sat) |
| | Yabunouchi-ke | 7/18(Sat) |

Juniors

| | Mon | Tue | Wed | Thr | Fri | Sat |
|---|---|---|---|---|---|---|
| 1 9:00-10:30 | | | | | | Fieldwork |
| 2 10:45-12:15 | | | | Architectural Design Theory IV | | |
| 3 13:05-14:35 | Architectural Design Studio III | Architectural Design Studio III | | Basic Design Studio I | Architectural Design Studio III | |
| 4 14:50-16:20 | | | | | | |
| 5 16:30-18:00 | | | | | | |

| | | |
|---|---|---|
| Architectural Design Studio III | | 6/26(Fri)-7/21(Tue) |
| Review | | 7/27(Mon), 28(Tue) |
| Basic Design Studio I | Ikebana | 6/23(Tue), 25(Thr), 7/2(Thr) |
| | Woodwork | 7/9(Thr) |
| Fieldwork | Membrane architecture | 6/27(Sat) |
| | Himeji Castle & Joudo-do | 7/4(Sat) |
| | Todaiji & Horyuji Temple | 7/11(Sat) |
| | Yabunouchi-ke | 7/18(Sat) |

## ICSA in Japan 2010

Participants
Professors: Assistant Professor Murat Dundar, Assistant Sinem Kultur
Students: Aysegul Sezegen, Beren Guldas, Busra Yeltekin, Gokce Arslan, Elif Gungor, Gozde Yorgancioglu, Irem Soyleyici, and Nazli Efe

Seniors

| | Mon | Tue | Wed | Thr | Fri | Sat |
|---|---|---|---|---|---|---|
| 1 9:00-10:30 | | | | | | Fieldwork |
| 2 10:45-12:15 | | | | Architectural Design Theory IV | | |
| 3 13:05-14:35 | Architectural Design Studio V | Basic Design Studio I | | Architectural Design Studio V | Architectural Design Studio V | |
| 4 14:50-16:20 | | | | | | |
| 5 16:30-18:00 | | | | | | |

| | | |
|---|---|---|
| Architectural Design Studio V | | 6/24(Thr)-7/23(Fri) |
| Review | | 7/29(Thr), 30(Fri) |
| Basic Design Studio I | Ikebana | 6/23(Tue) |
| | Woodwork & Pottery | 7/6(Tue),13(Tue) |
| Fieldwork | Ohmi-Hachiman | 6/26(Sat) |
| | Funaya & Amanohashidate | 7/3(Sat) |
| | Yabunouchi-ke | 7/10(Sat) |
| | Itsukushima Shinto Shrine | 7/17(Sat) |

Juniors

| | Mon | Tue | Wed | Thr | Fri | Sat |
|---|---|---|---|---|---|---|
| 1 9:00-10:30 | | | | | | Fieldwork |
| 2 10:45-12:15 | | | | Architectural Design Theory IV | | |
| 3 13:05-14:35 | Architectural Design Studio III | Architectural Design Studio III | | Basic Design Studio I | Architectural Design Studio III | |
| 4 14:50-16:20 | | | | | | |
| 5 16:30-18:00 | | | | | | |

| | | |
|---|---|---|
| Architectural Design Studio III | | 6/22(Tue)-7/23(Fri) |
| Review | | 7/26(Mon), 27(Tue) |
| Basic Design Studio I | Ikebana | 6/24(Thr), 7/1(Thr) |
| | Woodwork & Pottery | 7/8(Thr),15(Thr) |
| Fieldwork | Membrane architecture | 6/26(Sat) |
| | Funaya & Amanohashidate | 7/3(Sat) |
| | Yabunouchi-ke | 7/10(Sat) |
| | Itsukushima Shinto Shrine | 7/17(Sat) |

## 1. Design Class

The junior year design project was to rebuild the Hanshin Koshien station with a membrane-structured roof. The senior year design project, “Paradise along Waterfront”, was to design a pleasant urban space for Shioashiya District, which is reclaimed ground in Ashiya City.

### Architectural Design Studio III: Rebuilding Hanshin Koshien Station with a Membrane-Structured Roof

Japanese professor explaining about how to create tensional forces on a membrane using a piece of cloth

A Turkish student studying a membrane-structured roof

Students experiencing a space inside a membrane structure using a full-scale mockup

Students conducting a field survey of the Hanshin Koshien Station

Our guest, Mr. Sakurai, the vice president of Nikken Sekkei Ltd., making a comment during the presentation

Our guest, Dr. Kawaguchi, one of the famous leaders in structure design in the world, making a comment during the presentation

## Architectural Design Studio IV: Paradise along Waterfront

Assistant. Prof. Dundar from Bahcesehir University explaining seashore scenes in Turkey

Discussion with a Japanese professor

MWU chancellor Okawara making a comment during the presentation

MWU president Itoigawa making a comment during the presentation

Our guest, Dr. Eyuce, the dean of BU's Faculty of Architecture and Design, making a comment during the presentation

The completed design works being displayed in the hallway

## 2. Field Work

Himeji Castle, Hyogo

Jodo-do of Jodo-ji Temple, Hyogo

Funaya in the town of Ine, Kyoto

Amanohashidate, Kyoto

Tea ceremony lesson at Yabunouchi-ke, Kyoto

Itsukushima Shinto Shrine, Hiroshima

*Intercultural Understanding*, 2011, volume 1, pages 128-133

# Design for the Research Center of Japanese Culture Studies at Bahcesehir University

## 1. Outline of the Research Center of Japanese Culture Studies at Bahcesehir University

On June 14, 2010, "Research Center of Japanese Culture Studies" was inaugurated in Bahcesehir University (BU), Turkey. This institute aims at the introduction of Japanese culture not only to the students of BU but also to general public, and supports and promotes scholarly research and educational activity related to Japanese culture. The institute functions as a base of Inter Cultural Studies of Architecture (ICSA) in Istanbul where Mukogawa Women's University (MWU) students engage in the research or experience recovery protection works of Turkish historical architecture.

In autumn 2009, Dr. Shigeyuki Okazaki and architects in MWU started the design of the Research Center of Japanese Culture Studies at the request of BU. Meanwhile, the Institute of Turkish Culture Studies (ITCS) in the Koshien Hall, which was established prior to the Research Center of Japanese Culture Studies on July 29, 2009, aims to deepen understanding of the two countries in cooperation with the Research Center of Japanese Culture Studies through studies of Turkey and Japan located on opposite ends of Silk Road. Both institutes are expected to be active in research and exchanges cutting across the field of architecture.

The Research Center of Japanese Culture Studies is not meant to be a mere exhibition room for various objects to introduce Japanese culture, but a space of hospitality as a whole. In this sense, we designed this institute also function as a tea-ceremony room.

Opening ceremony of the Research Center of Japanese Culture Studies at Bahcesehir University

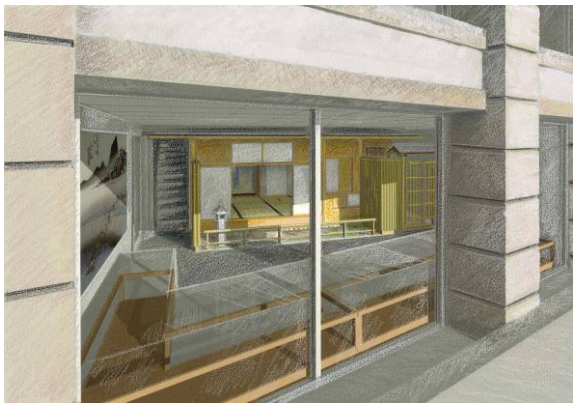
## 2. Primary design (2009.11.3)

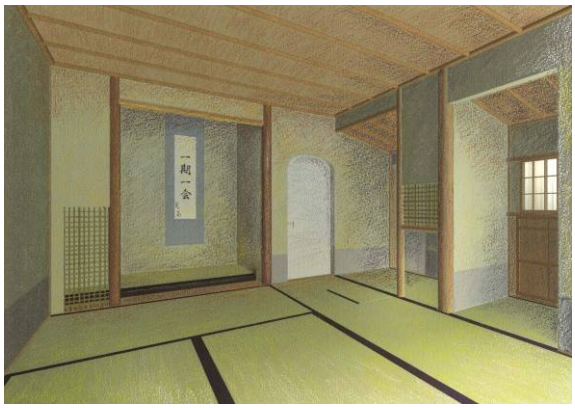
We planned to construct an exhibition room centered on a tea-ceremony room, a space filled with essence of Japanese beauty.

This tea-ceremony room is not of a tea hut style completed by Rikyu Sen. We designed a tea-ceremony room after Enshu Kobori's style called "Kirei Sabi". "Kirei Sabi" is thought to be a compound of "Wabi Sabi" and additional amorousness. In this room, we express quietness, brightness, and amorous and rich elements in overall taste of "Sabi".

In the basic design of the tea-ceremony room, following characteristics of Enshu style were considered to be taken in. Clear distinctions were made between the seats for the main guest and that of the sub. The distinction of seat order was made apparent by installing crawl-in entrance in the central position of the tea room. As a result, upon entering the room one can see the seat for main guest in front of him, and that of the sub on the left. It is a design to help the guests easily distinguish

the order of precedence of the seat. In addition, the seat for main guest is located in front of *tokonoma* (alcove), a position which faces the seat of the host who draws tea. Many windows were planned for the tea-ceremony room not only on the south side of the guest's space but also close to the seat of the host. And installation of a flat ceiling (above the seats for guests) and a modified roof (above the seat of the host) adds variations to the room's upper space.





Perspective drawing of the Research Center of Japanese Culture Studies

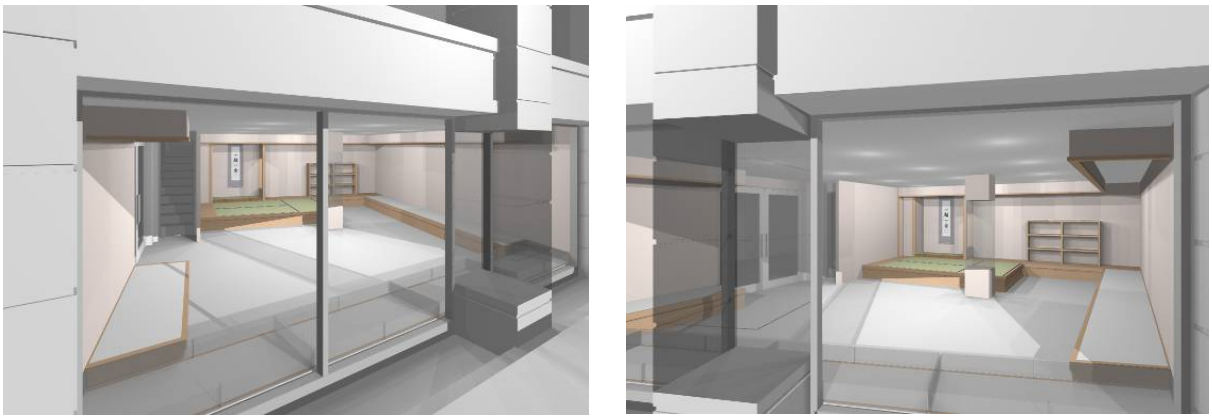
Model of Japanese-style room

**3. The secondary design (2010.01.22)**

The interior of the tea room was modified into a space with a 3-*tatami*-mat space and another with display units adopting *tatami* mat of a specific gauge system.

We set the Standard dimensions of this room as 1 *sun* corresponds to 3.03mm, and designed it as an exhibition space centered on the three-mat room of *Kyo-ma* size (i.e. 6*shaku* 3*zun* long (955x1910cm) mat), which is the basic dimensions of *tatami* in the tea room. This Japanese-style room has *tokonoma*, or alcove, at the front of the room, where different seasonal decorations can be displayed. Incidentally, the Research Center of Japanese Culture Studies faces Ciragan St. with a large opening to it. So, we designed the institute to be a big showcase for passers-by, through which they can enjoy a glimpse of an interior event. The Japanese-style room itself is designed as one of the exhibits. And display units lie along the wall inside the room, so that one can, appreciate every display from outside. The total structural design is based on traditional Japanese style.

We installed a hanging shelf to store exhibits which are expected to increase in the future. In addition, under floor space was devised so that it can be used as the storage by applying step-type doors on the floor below exhibition units.



Perspective drawing of the Research Center of Japanese Culture Studies

## 4. Design for execution/ Designer's supervision

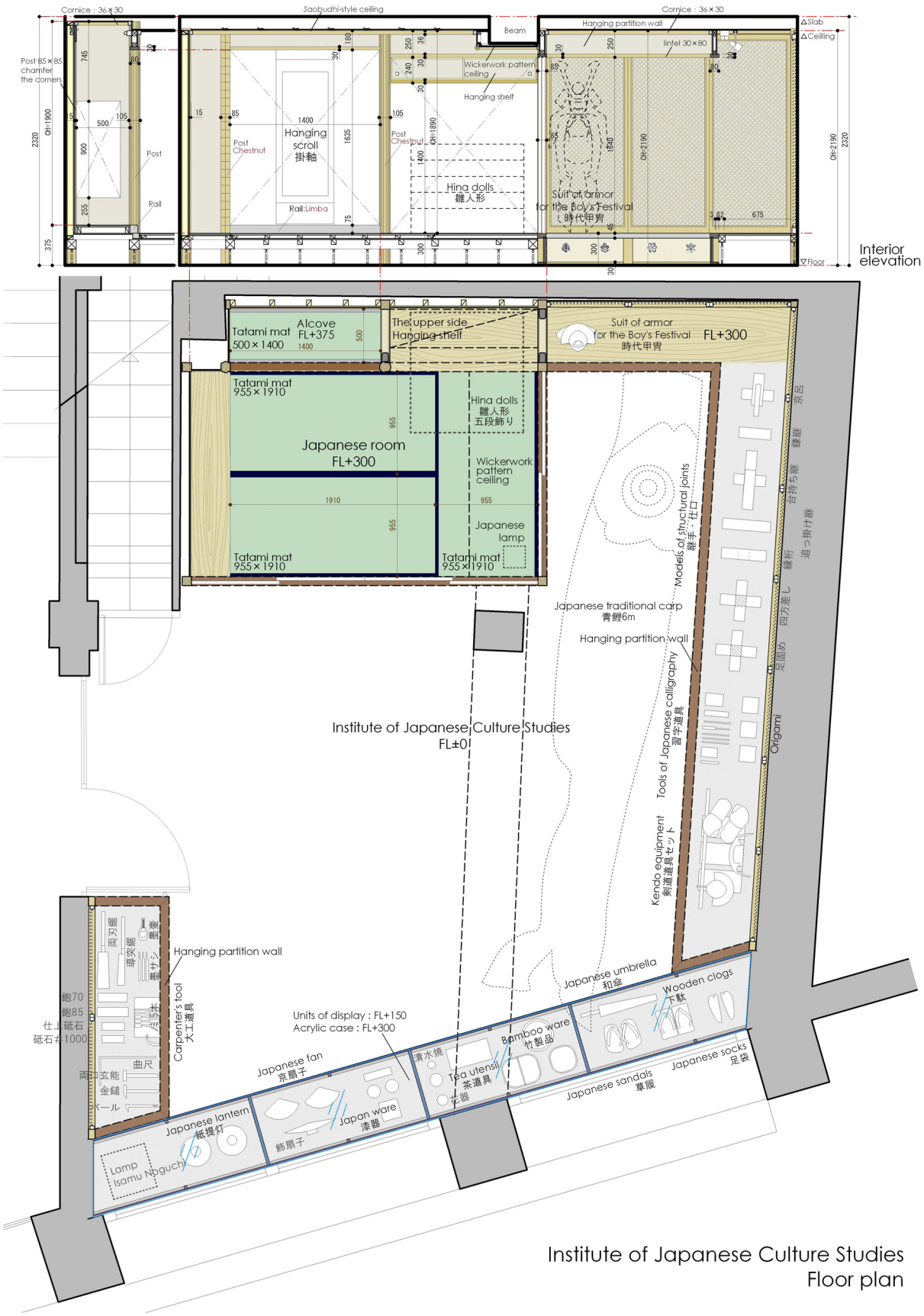
We designed the institute to be constructed entirely with materials from Turkey except *tatami* mat and *shoji* paper.

For the post of the alcove, a chestnut log was selected in the mountain of Turkey and brought back and used unpeeled. For the other post to complement it, an octagonal chestnut log, which was processed by a Turkish carpenter, was used. In addition, materials for downside frame of alcove, a wood sheathing or ceiling board were chosen from the ones locally available and easily processed, e.g. pine wood. As for *tatami* mat, the one donated by MWU as an exhibit was used after being pasted on a plywood of the same size. The ceiling of Japanese-style room is of *saobuchi*-style and that of the exhibit space is of a wickerwork pattern. We intended the introduction of various traditional designs through its variation. As for mud wall, we had a painted color swatch of mud wall sent from Japan and coordinated the color while referring to the standard color samples in cooperation with a Turkish dauber.

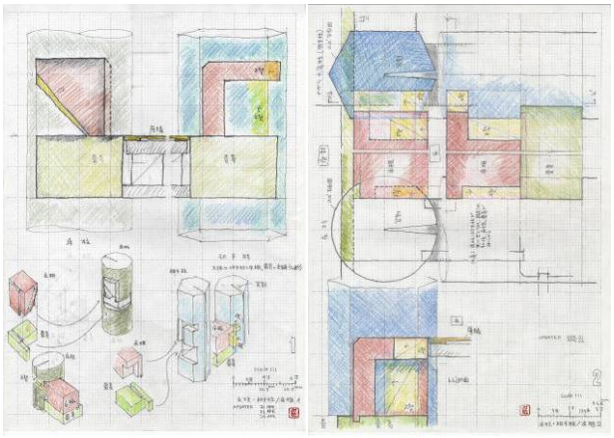
In addition, in an attempt to assimilate the designs of Turkey and Japan, we put the traditional lattice panel of Turkey before the mud wall. In fact, windows of traditional Turkish houses had lattices of various designs, which were used as blind shade or blindfold. We devised a system panel applying the lattice on which exhibits can be flexibly attached or placed. We installed openwork of typical traditional pattern, which is usually seen on Iznik tile, on the door of the storing space under the floor. The openwork serves as a vent under the floor or a pulling handle to open/close step-in type doors.

The *shoji* has crosspieces on both sides to make it look as beautiful on whichever side it may be seen. The lattice of the *shoji* was crafted by a Turkish artisan, and *shoji* screen paper donated by MWU was applied with traditional technique and was completed in collaboration with students of BU.

This exhibition room was constructed by Turkish carpenters. And it seemed easier for them to use steel bundles for the groundwork of the floor. In addition, it was necessary to keep the expected additional load on the existing building as little as possible, because it was virtually difficult to grasp a proof strength of the skeleton or the wall or a state of the ceiling groundwork. Furthermore, we adopted a method of construction which enables a fine adjustment because of the vague horizontal plane and vertical plane of the existing building. In Japan, unlike in Turkey, it is common to connect a pillar and a beam without using building hardware and screw nails. Therefore, we made drawings of each jointing part for cut materials to be used for such items as alcove posts and frames, which needs to be built up without using nails.




Institute of Japanese Culture Studies
Floor plan



The carpenter cooperated with the teacher of BU and built the Japanese room
Left：Full-size detail drawings of alcove

The wickerwork ceiling Right：*Tatami* mat

The students of BU put the Japan paper on the *shoji*

The chestnut tree processing
Visit of the chancellor of MWU

Perspective drawing of the Research Center of Japanese Culture Studies

## 5. Exhibits

About 90 items were donated to the Research Center of Japanese Culture Studies by MWU including Japanese architecture-related pieces such as carpenter's tool, models of structural joints, lamps and Japanese paper as well as tea utensil, traditional items related to people's daily lives such as kimonos, Japan ware and bamboo ware, *hina* dolls, suit of armor for the Boys' Festival etc. Books on Japanese building, art or culture and the thousand origami cranes made by Japanese students are also displayed.

Models of structural joints were made by a Japanese artisan who specializes in tea ceremony room-related work upon our request. They represents sophisticated skills of Japanese wooden building, and at the same time it makes good teaching materials itself which helps one further understand structure and system of joints while he engages in its knock-down or built-up. Incidentally, every traditional carpenter tool exhibited along with the toolbox of traditional style is of practical use. Likewise, tea utensil, tools of Japanese calligraphy, kimono etc., can be used in daily life.

The alcove of a Japanese room

Interior of the Research Center of Japanese Culture Studies

Interior of the Research Center of Japanese Culture Studies

Japanese traditional carp streamers were put up in front of a building of BU

# Inter Cultural Studies of Architecture (ICSA) in Istanbul 2010

Based on the general exchange agreement between Mukogawa Women's University (MWU) and Bahcesehir University (BU) signed on December 8, 2008, eleven first-year master's degree students of architecture major visited BU in Turkey on September 23 and stayed until October 8, 2010. They had in-service training of recovery protection in the project prepared by BU. Here is the report.

**September 23-24**

Leaving Kansai International Airport on the 23rd, we arrived at Istanbul Ataturk International Airport via Dubai. We visited BU in its school bus to pay compliments to President Dr. Esmer and Dean Dr. Eyuce at the university. Then we visited the Research Center of Japanese Culture Studies, which had just been opened in June.

**September 25**

We visited the historical area of Istanbul, a world heritage, to see Hagia Sophia, or the magnum opus of Byzantine architecture, Topkapi Palace built for Ottoman Sultans, Sultan Ahmed Mosque known as the blue mosque, Grand Bazaar, a covered market with about 4400 shops, which the students sketched soaking up the history of Istanbul. Two Turk students who experienced Inter Cultural Studies of Architecture (ICSA) in Japan also participated in, and Japanese students learned various cultural aspects of Turkey through them.

Students meeting with Dr. Esmer, the president of BU, and Dr. Eyuce, the dean of BU's faculty of architecture and design

Research Center of Japanese Culture Studies at BU

Hagia Sophia

Interior view of Topkapi Palace Harem

**September 26**

We visited Edirne, a town close to the borders with Greece and Bulgaria. It is said Roman Emperor Hadrian founded the town, and it was once called Hadrianopolis (Adrianople). Edirne once served as the capital city of the Ottoman Empire. We toured Selimiye Mosque, considered to be the crowning work of architect Sinan, Eski Mosque, the oldest mosque in Edirne, Üç Şerefeli Mosque, where all minarets are of different types, and Bayezid II Külliye Health Museum with a unique space for music therapy. Six Turk students who experienced ICSA in Japan also joined us.

**September 27**

We experienced recovery protection work at the ateliers in the Yıldız Palace. The ateliers managed by the government cover all restoration works at all the palaces in Turkey including Dolmabahçe Palace. There are two different restoration ateliers—the one for room decorations and the other for architecture. Today we visited the various ateliers for room decorations with each atelier restoring such items as closet doors, wooden adornments such as handrails, detailed adornments called sedef, textiles, glass and tiles, and chairs. After the tour, students copied the original decoration pictures of candlesticks and closets. Students appreciated the first-class Turkish culture.

Selimiye Mosque

Students sketching the Selimiye Mosque with enthusiasm

Explanation of the restoration of textiles at an atelier in the Yıldız Palace

Students copying the original decoration pictures of candlesticks and closets at an atelier in the Yıldız Palace

**September 28**

This was the second day of the restoration practice at the ateliers in the Yıldız Palace. Students worked on duplication of the original decoration pictures. Next, we visited the atelier where gold foil was restored and had a valuable experience of pasting gold foil to the picture frame of the mirror in the Dolmabahçe Palace, which is now undergoing restoration. Then, we visited the atelier where carpets were restored before visiting the ateliers that restore architecture, which include restoring wooden fixtures and wooden furniture. The students measured, in two groups, the window of Dolmabahçe Palace and the door of the Hereke atelier (famous with its carpet), the first atelier in Ottoman Empire, both of which are under restoration.

**September 29**

We visited the Dolmabahçe Palace. The Dolmabahçe Palace was built in the mid-19th century where Sultan and his family lived. We observed recovery protection of the hall in the palace and also one of the buildings in the palace, which is for the crown prince. Especially in the restoration work of the ceiling, we were allowed to observe on a scaffold. We also joined public tours with other tourists and appreciated the interior including doors, windows, flooring, and furniture, the same types of which were being restored at the ateliers in the Yildiz Palace. We also visited the ateliers in the Dolmabahçe Palace. All of us had an experience of carving decorative lines on the stone with a hammer and chisel. After dinner in the BU we sketched the sight of Bosporus before us.

Students experiencing the restoration of gold foil at an atelier in the Yıldız Palace

Students measuring, in two groups, the window of Dolmabahçe Palace and the door of the Hereke atelier at an atelier in the Yıldız Palace

Site visit to an ongoing restoration in the Dolmabahçe palace

Students experiencing the processing of stone at an atelier in the Dolmabahçe Palace

**September 30**

We experienced the work at a glassworks, The Glass Furnace, in Sile on the Black Sea, where many of the palace-related glass products have been made. At first, we looked at the making of blown glasses, and then made an easy blown-glass vase with the help of the artisans. Then we made glass sculptures using a technique called fuzyon where bits of colored glasses are laid out on a clear flat glass, which will eventually be processed in the kiln and changed into finished objet d'art or dishes. Students were pleased with making them as if it were a basic design studio work at MWU.

**October 1**

This was the second day at The Glass Furnace in Sile. At first, we looked at making of glassworks called Semazen related with Mavlevilik (a religious community). Then, we used a jet burner with specialists' support and made glass bead accessories called boncugu. One revolves a steal stick and winds melted glass around it. Using this technique, nazar boncugus, Turkish traditional glassworks, has also been made in recent years. We also looked at old-style kiln for nazar boncugus and making of ibriks, a Turkish traditional pitcher.

In the afternoon, we returned to downtown Istanbul. We were specially allowed to see a civic gallery in the Dolmabahçe Palace, which was in preparation before exhibition. We appreciated miniatures, calligraphies, marble pattern paintings called ebru, etc.

Students making glass sculptures using a technique called fuzyon

Finished product: bits of colored glasses were laid out on a clear flat glass.

Students experiencing the production of "Boncugu"

The civic gallery in the Dolmabahçe Palace

**October 2**

We made a trip to Bursa, the first capital of Ottoman Empire. At first, we visited Cumalikizik village with a history of about 700 years. This village has received a lot of attention in the recent decade and many buildings are undergoing restoration work. We strolled down a maze of old streets and had a human-scale experience of it. Then we went to the center of Bursa and visited such caravansaries as Pirinc Han and Koza Han, Kapali Carsi (Covered Market), Ulu Camii (Grand Mosque), a contemporary of Eski Mosque in Edirne, Yesil Turbe (Green Tomb) of Mehmed I, and Yesil Camii (Green Mosque). A Turkish student from Bursa who experienced ICSA in Japan guided us.

**October 3**

We traveled Istanbul again. At first, we visited the Mihrimah Sultan Mosque and the Valens Aqueduct built in the 4th century. Then we went to Eyup situated in the head of Golden Horn Bay and visited the Eyup Sultan Mosque the holiest Islamic site after Mecca and Medina. Then we went on to Pierre Loti, which was named after a French novelist, and to Rahmi M. Koc Museum, which was once a dockyard.

Then we went to Eminomu, and visited the Yeni Camii (New Mosque), the Egyptian Bazaar for the upkeep of the mosque, and the Rustem Pasha Mosque designed by Sinan. Then we walked across the Galata Bridge and watched a panoramic night view of Istanbul from Galata Tower.

Cumalikizik

Interior view of Ulu Camii

View from cafe at Pierre Loti

Interior view of Rustem Pasa Mosque

**October 4**

We went to Iznik by bus, and had a practice in Iznik Foundation. Iznik tiles have adorned Topkapi Palace and many mosques and reached full bloom in the 16th century. However, the history and craft of the tiles discontinued. Iznik Foundation was established in 1993 for a rebirth of Iznik tiles. At first, we learned a process of making Iznik tiles and ceramics which use quartz observing kilns and the atelier. Then, we decorated a 12-cm angle tile. We traced a pattern first in charcoal, then with a brush in black color. Then we decorated the tile in colors including blue, red and green. We completed the tiles with professional advices. We stayed at the guesthouse of Iznik Foundation.

**October 5**

We visited a wooden dwelling in a small town called Soloz, located on the southern coast of Lake Iznik, on the way to Istanbul from Iznik. This building is said to have been build at least over 150 years ago and was constructed in combination of wooden framework and masonry of fieldstones (bottom part) and bricks (upper part). It is a typical composition of Turkish traditional dwelling, and yet such a large building with four stories, is so rare that it attracts the attention of the people interested in architecture. This building was originally used as a cocoonery and as the hospital of Greek army during World War I. So, this building could survive destruction by Greek army. The owner of this building returned to live in after World War I. We could look on the interior. The stair and the floor was warped and seemed to tumble down at any time. But the owner said it did not see any problems when the big earthquake occurred in 1999. We studied the construction of this historic building through sketching and making a survey.

The atelier of the Iznik foundation

Student experiencing Iznik tile painting

Traditional wooden house in Soloz

Exterior wall in combination of wooden framework and rubble masonry

**October 6**

We had some in-service training of the restoration of historic building at the atelier of KUDEB. KUDEB has worked on conservation and restoration of various architectures such as wooden dwellings, mosques, bridges, and castle walls under the policy to retain original design and materials. KUDEB contributes, in many aspects, to the restoration and conservation of historic buildings in Istanbul. We were briefed on KUDEB at first and practiced restoration of the wooden fittings at the atelier. We peeled the paints off the door with a hair dryer, filled in the wormholes on the 200-year-old door, and used the Turkish traditional plane. Then we visited the ongoing restoration site by KUDEB and had an explanation by the architect in charge. This building was built in the 19th century and will be used as a library when restored.

**October 7**

After the practical training at the atelier of KUDEB, we visited the traditional wooden dwellings in Suleymaniye and Zeyrek. We visited mostly the dwellings that have not been restored and are still used. We took a break at a restaurant, which was the resident priests' quarters of Zeyrek Mosque build in the 12th century and repaired in 1998, and sketched thereupon. After lunch, we returned to BU and prepared for the exhibition scheduled for the next day. Then we attended the lecture about the process of the westernization of Ottoman Empire by Dr. Miyuki Aoki Girardelli, a part-time lecturer at BU. She provided us with various subjects, such as the etymology of “architecture” and “art” in Turkish and the intercultural actions between Ottoman Empire and Europe on and after the 18th century.

Students experiencing wood planing

Site visit to an ongoing restoration by KUDEB

Traditional wooden house in Zeyrek

Lecture about the process of the westernization of Ottoman Empire by Dr. Miyuki Aoki Girardelli

**October 8,9**

We prepared for the exhibition of students' sketches scheduled for the afternoon replacing the conventional exhibits at the Research Center of Japanese Culture Studies. Then we had lunch with Dr. E. Ozen Eyuce, an assistant to president. Our representative extended a gratitude to BU in English. The exhibition of sketches, which we made wherever we visited, was held in the afternoon. Many staffs of the university appreciated the sketches. Our representative delivered, in English, our impressions of Turkey and that of the practices we had done. Eight Turkish students who participated in ICSA in Japan joined the exhibition. Everyone enjoyed the time and shared a bittersweet of farewell. Soon after the exhibition, we left for home.

Exhibition of sketches made by Japanese students

With Turkish Students

Participants
Professors: Kazuhiko Yanagisawa, Junko Morimoto
Students: Mayako Ishida, Kie Inoue, Natsuki Ohmichi, Chisato Okuda, Yuka Norikoshi, Ayami Hashimoto, Ayano Fujii, Yuna Hongo, Hazuki Murao, Minami Yamakawa, Aya Yamaguchi

Schedule

| | |
|---|---|
| September 23 | Departure from Kansai International Airport for Istanbul |
| September 24 | Arrival at Ataturk International Airport, Istanbul<br>Visit to Bahcesehir University and Research Center of Japanese Culture Studies |
| September 25 | Istanbul tour |
| September 26 | Edirne tour |
| September 27 | Practical training on conservation and restoration at Ateliers of Yildiz Palace in Istanbul |
| September 28 | Same as above |
| September 29 | Visit of preservation restoration site in Dolmabahce Palace in Istanbul |
| September 30 | Practical training at Glass Furnace in Istanbul |
| October 1 | Same as above |
| October 2 | Bursa tour |
| October 3 | Istanbul tour |
| October 4 | Practical training at Iznik Foundation Tiles in Iznik |
| October 5 | Visit to a traditional wooden house in Soloz |
| October 6 | Practical training on conservation and restoration at Conservation and Implementation Working Group（KUDEB） in Istanbul |
| October 7 | Visit to traditional wooden houses in Zeyrek and Suleymaniye<br>Lecture about the process of the westernization of Ottoman Empire |
| October 8 | The exhibition of sketches made by Japanese students at Bahcesehir University<br>Departure from Ataturk International Airport for Japan |
| October 9 | Arrival at Kansai International Airport |

# Lecture

**Culture and Art of Turkey: Aspects of Eastern and Western Cultural Exchanges in Turkey**

**Date：Saturday, December 4, 2010, 10:30～16:15**
**Place：West Hall, the Koshien Hall**
**Lecturer：Dr. Minako Mizuno Yamanlar (Professor of Ryukoku University)**

We invited Dr. Minako Mizuno Yamanlar, Professor of Ryukoku University, and held a lecture entitled "Culture and Art of Turkey: Aspects of Eastern and Western Cultural Exchanges in Turkey". She discoursed on Turkey's various culture and art from the three main aspects of "Culture and Art in Anatolia Seljuk Age", "Culture and Art of Ottoman Empire", and "Exchanges between Japan and Turkey".

In the first part, "Culture and Art in Anatolia Seljuk Age", various civilizations in Anatolia peninsula were introduced. Formation of Iran Seljuk and Anatolia Seljuk by Turkish people, Konya, a former capital's various art like mosaic tile, brick, letters or pattern, pottery, carpet, wood carving, etc. were also explained.

In the second part, "Culture and Art of Ottoman Empire", history of Ottoman Empire, as well as interior and ambience of Topkapi Palace and class system in the court, was introduced. Portrait or illustraion, flower pattern, ceramics from China, and Ottoman culture and art as represented by hamam, coffee, and foods, were also explained.

In the third part, "Exchanges between Japan and Turkey", Japanese who had visited Turkey, well-known Ertugrul Frigate disaster, and Otani Kozui, who was the first to actively develop a joint enterprise were introduced. History on exhibition of Turkish art and future ways of exchanges between Japan and Turkey were also commented on.

We appreciated the lecture given in a very comprehensive manner by the researcher who is actively at work of history of art and culture of Islam. It was a valuable opportunity for us.

The Lecture at West Hall

Dr. Minako Mizuno Yamanlar, Professor of Ryukoku University

# 1st International Conference on Archi-Cultural Translations through the Silk Road

**Date : March 16-18, 2011**
**Venue : Bahcesehir University, Istanbul**

The 1st international conference on Archi-Cultural Translations through the Silk Road was held at Bahcesehir University (BU) in Istanbul from March 16 to 18, 2011 under the auspices of iaSU and BU. iaSU, which is short for the International Association of SILKROAD UNIVERSITIES, is an association of universities mainly organized by BU and Mukogawa Women's University (MWU), which are located at different ends of the "Silk Road." The organization aims to encourage exchanges among the universities located on and near the "Silk Road".

On March 16th, an official announcement of the establishment of iaSU was made, and the conference's opening ceremony was held. Murat Dundar, a representative of BU's steering committee, Ahmet Eyuce, the dean of BU's faculty of architecture and design, and Enver Yucel, the president of BU's board of trustees, announced the objectives of this conference from their respective points of view. Congratulations were conveyed from Ryo Okawara, the chancellor of MWU, to the participants: "I wish both universities, together with iaSU member universities, success in contributing to global peace in the future through encouraging exchange of an academic research and the cultures of the Silk Road region." Furthermore, Shigeyuki Okazaki, the director of the Institute of Turkish Culture Studies (ITCS) and the department chairman of MWU's architecture department, gave an opening speech entitled, "What can we gain through intercultural exchange?" Then a welcoming reception was held.

On March 17th and 18th, researchers from 12 countries worldwide, including Turkey and Japan, presented papers on such topics as architecture, cities, landscapes, and environmental art. Six researchers from the ITCS of MWU also presented their studies. Furthermore, on the evening of 17th, Okazaki gave an invited lecture, "Symbiosis between Man and Nature in Japanese Architecture and Garden."

This conference was held over the three days and was a great success. The 2nd international conference on Archi-Cultural Translations through the Silk Road will be held at MWU in 2012. We are looking forward to more active participation at the next conference in Japan.

The opening speech given by Dr. Okazaki, the director of ITCS

Presentation given by ITCS's researcher

# Annual Events Dec. 2008- Mar. 2011

| Date | Events |
|---|---|
| December 8, 2008 | Conclusion of the general exchange agreement between Mukogawa Women's University and Bahcesehir University |
| June 20-August 2, 2009 | Inter Cultural Studies of Architecture (ICSA) in Japan 2009 |
| July 29, 2009 | Opening ceremony of the Institute of Turkish Culture Studies at Mukogawa Women's University |
| June 14, 2010 | Opening ceremony of the Research Center of Japanese Culture Studies at Bahcesehir University |
| June 21-August 1, 2010 | Inter Cultural Studies of Architecture (ICSA) in Japan 2010 |
| September 23-October 9, 2010 | Inter Cultural Studies of Architecture (ICSA) in Istanbul 2010 |
| December 4, 2010 | The lecture given by Dr. Minako Mizuno Yamanlar (Ryukoku University, Japan) "Culture and Art of Turkey: Aspects of Eastern and Western Cultural Exchanges in Turkey" |
| March 16-18, 2011 | 1st International Conference on Archi-Cultural Translations through the Silk Road |

# OUTLINE OF THE INSTITUTE OF TURKISH CULTURE STUDIES

## Organization

| Position | Affiliation | Title | Name |
|---|---|---|---|
| Director | Department of Architecture | Professor | Shigeyuki Okazaki |
| Researcher | Department of Architecture | Professor | Takahiko Otani |
| | | Professor | Jun Sakakihara |
| | | Professor | Yusei Tazaki |
| | | Professor | Uzushi Nakamura |
| | | Professor | Sanae Fukumoto |
| | | Associate Professor | Fumie Oi |
| | | Associate Professor | Takashi Manda |
| | | Associate Professor | Kazuhiko Yanagisawa |
| | | Lecturer | Noritoshi Sugiura |
| | | Lecturer | Toshitomo Suzuki |
| | | Lecturer | Akira Tanaka |
| | | Lecturer | Hideaki Tembata |
| | | Assistant Professor | Sayaka Nishino |
| | | Visiting Professor | Kunihiko Honjo |
| Visiting Researcher | Bahçeşehir University (Turkey) Faculty of Architecture and Design | Professor | Ahmet Eyüce |
| | | Assistant Professor | Murat Dündar |
| Assistant | Department of Architecture | Assistant | Eriko Kuroiwa |
| | | Assistant | Maiko Hirano |
| | | Assistant | Junko Morimoto |
| Secretary (*or* office administrator) | Secretariat Division of School of Human Environmental Sciences | Chief Clerk | Masaki Ichie |

Reviewers on *Intercultural Understanding*

| Name | Title and Affiliation |
|---|---|
| Yasushi Asami | Professor, University of Tokyo, Japan |
| Kunio Kato | Professor Emeritus at Kyoto University, Japan |
| Mamoru Kawaguchi | Professor Emeritus at Hosei University, Japan |
| Mitsuo Takada | Professor, Kyoto University, Japan |
| Minako Mizuno Yamanlar | Professor, Ryukoku University, Japan |
| Hironobu Yoshida | Professor Emeritus at Kyoto University, Japan |
| Ahmet Eyüce | Professor, Bahçeşehir University, Turkey |
| Murat Dündar | Assistant Professor, Bahçeşehir University, Turkey |
| Murat Şahin | Assistant Professor, Yeditepe University, Turkey |
| Shigeyuki Okazaki | Professor, Mukogawa Women's University, Japan |
| Kazuhiko Yanagisawa | Associate Professor, Mukogawa Women's University, Japan |

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# Rules and Regulations of the Institute of Turkish Culture Studies (ITCS) at Mukogawa Women's University

**(Establishment)**
**Article 1** Mukogawa Women's University (hereinafter referred to as "the University") locates the Institute of Turkish Culture Studies (hereinafter "the Institute") in the University.
(2) The Institute shall be operated under the administration of the department of architecture (of the University) for the time being.

**(Objective)**
**Article 2** The objective of The Institute is as follows:
(i) to conduct comparative studies on life, technology and culture centered around architecture of Japan and Turkey, as the east and the west starting points of the Silk Road, and to clarify the cultural base common to both countries beyond the differences in history, climate and so forth between the two countries.
(ii) to conduct, developing above-mentioned aims, extensive studies on life, technology and culture centered around architecture of neighboring Silk Road countries and to clarify similarities among them and contribute to new mutual understandings and contribute to the peace and prosperity of the Silk Road region through such understandings.
(iii) to support international exchange of students mainly in the field of human environment and conduct international education activity of architecture and human environment based on the achievements of the studies mentioned in (i) and (ii).
(iv) to discuss internationally the achievements of research and education referred to in the preceding three items and to introduce (*or* transmit) it to the world in various ways at every occasion, and to share common values with the people around the world.

**(Operation)**
**Article 3** The operations of the Institute to achieve the above-mentioned objectives are as follows:
(i) to conduct studies in cooperation with the Research Center of Japanese Culture Studies at Bahcesehir University, Istanbul
(ii) to hold an international workshop "Inter Cultural Studies of Architecture in Japan (ICSA in Japan) " where architecture and human environment students of the world centered around Turkey are invited every year in principle, to support the similar workshop "Inter Cultural Studies of Architecture in Istanbul" which is held at the Research Center of Japanese Culture Studies at Bahcesehir University and to send teachers and students of the University centered around the department of architecture for the research and education activities.
(iii) to hold seminars, introduce the research achievements, exhibit and hold lectures, concerning life, technology and culture centered around architecture, where researchers, business persons and residents who belong to the field of studies conducted by the Institute are invited.
(iv) to hold permanent and special exhibitions on life, technology and culture of neighboring Silk Road countries centered around Turkey.
(v) to conduct public relations activities such as publication of the research and educational achievements of the Institute, symposium and so forth.
(vi) other operations required to accomplish the aims mentioned in the preceding article.

**(Organization)**
**Article 4** The Institute may have research departments with respect to differences in research fields to perform relevant activities.

**(Director)**
**Article 5** The Institute shall install a director.
(2) The chancellor appoints a director from among professors
(3) The director shall be appointed for a period of two years and may be reappointed
(4) The director handles the operations of the Institute under the president's direction

**(Vice Director and Head of Research Department)**
**Article 6** The Institute may install a vice director and heads of research in each department referred to in article 4.
(2) The chancellor appoints a vice director and heads of research department from among the faculty. The latter position may be substituted by adjunct teaching staff.
(3) The vice director assists the director and engages in the administrative operations
(4) The vice director fills in for the director under the director's direction
(5) Each head controls his research department and engages in the research under the director's direction .

**(Senior Researcher)**
**Article 7** The Institute may install senior researchers with the chancellor's approval.
(2) The director appoints senior researchers from among researchers.
(3) The senior researchers assist their heads and engage in the research.

**(Researcher)**
**Article 8** The Institute shall install researchers required.
(2) Teachers at Bahcesehir University may be appointed as researchers
(3) The researchers engage in research under the director's direction.

**(Temporary Researcher)**
**Article 9** The Institute may install temporary researchers as the need arises.
(2) The president appoints temporary researchers upon recommendation of the director
(3) The period of the appointment shall be less than one year and it may be renewed when necessary.
(4) The temporary researchers engage in the specific research or joint research.

**(Assistant)**
**Article 10** The Institute may install assistants.
(2) The assistants assist research under the director's direction.

**(Steering Committee)**
**Article11** The University shall have the steering committee of the Institute (hereinafter "the steering committee") to deliberate the basic policy concerning the operation of the Institute.
(2) The steering committee shall consist of the director and a few members chosen from among the vice director, the heads of research departments, the senior researchers and researchers.
(3) The president appoints the members of the steering committee.
(4) The director shall be the chairperson of the steering committee.
(5) The chairperson shall convene and lead the steering committee.
(6) The member shall be appointed for a period of two years and may be reappointed. When a vacancy arises, the successor's term of office shall be the predecessor's remaining term.
(7) The details on the steering committee shall be otherwise laid down.

**(Secretariat)**
**Article12** The Institute shall install a secretariat.

(2) The secretariat shall consist of a few members and the chief clerk of School of Human Environmental Sciences shall be the chief of the secretariat
(3) The members of the secretariat handle clerical works under the guidance and supervision of the center chief under the director's direction.

**(Supplementary Rules and Directions)**
**Article13** In addition to what is provided in this rules and directions, the necessary matters concerning the administrative operations of the Institute shall be prescribed by the director.

**(Modification or Elimination of the Rules and Regulations)**
**Article14** Modification or elimination of the rules shall be implemented with the chancellor's prior approval.

**Supplementary Provisions**
(1) The rules and regulations shall be enforced starting on July 29, 2009.
(2) In the period from the day the rules and regulations is enforced until March 31, 2011, the term of the appointed directors and members of the steering committee shall begin on the day when they are appointed and end on March 31, 2011 notwithstanding the provisions of Article 5, paragraph(3) and Article 11, paragraph(6).

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