



Biophilic Features of Anatolian Darussifas

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Keywords

*Biophilia,
Healing Spaces,
Modern Buildings,
Seljuk Darüşşifas.*

Abstract

The concept of biophilia is defined as the innate emotional intimacy that one feels towards nature and living things in nature. This hypothesis claims that people are instinctively connected to all other life systems. In the field of architecture, it is expressed as a design that enables the continuation of human-nature interaction and beneficial effects of nature (relaxing, healing, performance enhancing, etc.) in built environments. Researchers working in this field are united in the fact that architectural decisions are the biggest responsibility in supporting the connection of man with nature and they have defined a number of biophilic design elements that can be applied in buildings to construct nature-related "healing spaces". Although these biophilic design parameters are considered for modern buildings, it is known that there are applications made with similar concerns in historical buildings. The content of the study to be presented in this context is to trace the healing features of architecture in historical buildings and to question the existence of biophilic elements revealed by the modern world. For this purpose, one of the most important values of Turkish architectural heritage, "darüşşifas" will be focused. Three of the surviving Anatolian Seljuk Darüşşifas (Kayseri Gevher Nesibe Darüşşifas, Sivas I. İzzeddin Keykavus Darüşşifas) were selected for the field study and were evaluated according to the biophilic parameters.

1. Introduction

Since the last century the negativities observed in human health and quality of life have led scientists to the root of this problem. As a result of the researches, the instinctive link between man and nature was discovered, and the concept of biophilia, which means the love for life and all vital processes [1,2,3] started to be discussed.

Biophilia is based on the link between man and other living things. Being aware of the innate connection with nature, human beings have built their living spaces with a nature-based design approach, in an effort to include nature in every aspect of their lives. As a result of the researches, it has been seen that being in contact with nature has effects that improve the quality of life such as good nutrition and exercise.

Many researchers from different disciplines working in this field are united in the fact that architectural decisions are the biggest responsibility in supporting the connection of man with nature, and they have identified a number of biophilic design elements that can be applied in buildings to build healing spaces connected to nature. Biophilic elements used in working environments, living spaces and public spaces have recently become one of the current topics of architecture, with the idea that they will increase human efficiency and provide mental concentration.

Although it has been known that nature is indispensable for human existence and well-being since ancient times, experimental and theoretical studies on the human-nature relationship, which

intensified in the 20th century, showed that contact with nature promotes psychological and physiological health, reduces daily life stress, and improves human physique has proven [4]. Wilson (1993), one of the pioneers of the concept of biophilia, states that contact with nature is a basic need for human health, productivity and well-being, rather than an emotional preference [5]. Contact with nature supports individuals' access to physical and spiritual maturity and cognitive productivity. The minimum level of contact with nature, especially in childhood, causes limitation of emotional, cognitive and physiological abilities, and decreases productivity and efficiency [6]. Since the times of urbanization, shelters were built with guidance of nature, and in all societies, applications such as gardens, courtyards, atriums and inner gardens were made and contact with nature was achieved.

Humanbeing, whose relationship with nature is based on his/her existence, has attributed holiness to these gardens with the development of mythological and religious events in connection with nature. About 2000 years ago, Chinese Taoists noticed the positive effects of gardens and greenhouses on human spirituality and placed their temples in areas intertwined with nature [7]. The Ancient Egyptian gardens near the Nile River valley and the walled gardens of the Persian civilization in Mesopotamia, the Hanging Gardens of Babylon, and Cennet'ül Arif gardens in the Alhambra Palace, where water plays with various plants and trees are masterfully constructed. These are important examples that prove that great efforts are made to benefit from the healing, purifying and spiritualizing effects of nature in communities. In Islamic civilization, courtyard design, which provides the connection with nature as well as privacy in civil

and public buildings, has been the most important element determining the development of Islamic architecture and cities.

In this context, the aim of this study is to trace the healing features of architecture in historical buildings. For this purpose, the existing classifications developed on biophilic design approaches and biophilic design studies prepared by researchers from different disciplines were examined, and in this way, the combined models, processes and features of biophilic design, which were the evaluation criteria of the study, were determined.

Afterwards, the focus was on "darüşşifas", one of the most important values of the Turkish architectural heritage, built with the understanding of "healing space" using the healing elements of nature. Three of the surviving Anatolian Seljuk Hospitals (Kayseri Gevher Nesibe Hospital, Sivas I. İzzeddin Keykavus Hospital, Divriği Turan Melek Hospital) were selected as the case study of paper and these buildings were examined and evaluated through the determined biophilic parameters. As a result of the examinations, it was seen that many biophilic design elements including direct and indirect use of nature were applied in these buildings and these applications played an important role in the "healing space" feature of the hospitals. It is clear that innovative perspectives on existing biophilic design approaches/classifications can be developed interdisciplinary and extended researches in the future.

2. Conceptual Framework and Background

The word biophilia, which is a combination of the words "bio" meaning life and "philia" meaning sincere love, means the instinctive liking of all people for life and things related to life [1]. Animal figures carved on stones in Göbeklitepe, the first known settlement of humanity, columns inspired by palm and lotus trees in Egyptian gardens, and plant and animal decorations of Greek temples can be shown as the oldest examples [8, 9,10,11]. The continuity of nature-inspired themes in architecture, from historical buildings to modern ones, is an indication that biophilia is not a new perspective, even if it is a new concept.

Wilson defined the concept of biophilia as an innate tendency to focus on life and vital processes and emphasized it as a biological need expression that includes the desire to connect with life [5].

He argued that this need for nature is necessary for physical and mental growth in the developmental process. Further, Wilson argues that the biophilia hypothesis reveals human dependence on nature, whose ties extend far beyond simple matters of material and physical lateness, as well as the craving for aesthetic, intellectual, cognitive, and even spiritual meaning and fulfillment [3,5,6,12,]

Judith Heerwagen, who calls biophilia a basic human need rather than a psycho-cultural choice, and whose research focuses on the relationship between the built environment and human psychology, says that biophilia has evolved as an adaptive mechanism to protect people from danger and help them access basic life resources such as food, water and shelter [13].

- In addition to indirect contact with symbolic depictions with nature, it is seen that direct contact accelerates and contributes to healing.
- Regardless of rural and urban residence, education and income level, individuals living close to natural environments report less health and social problems. Even individuals living near open spaces and in contact with open spaces limited to grass and a few trees experience fewer health and social problems.
- Office environments with natural lighting, natural ventilation and other environmental features provide performance enhancing, lower stress environment and more motivation.

Table 2. Combined models, processes and features of biophilic design presented by Kellert and Calabrese [19]

- Contact with nature is directly related to cognitive functions in tasks that require attention and memory.
- Healthy childhood and development are associated with contact with natural environments.
- The human brain functionally responds to sensory stimuli emanating from the natural environment.
- Communities with higher quality environments produce a more positive assessment of nature, superior quality of life, greater neighborhood and a stronger sense of place than communities with lower environmental quality, regardless of income level.

The first experimental study examining the impact of contact with nature on human health was conducted in 1984 by Roger Ulrich on two groups of patients undergoing the same type of surgery in a hospital. While one of the windows in the patient rooms opened to the wooded area shown in Figure 1, the windows of the other group opened to the brick wall shown. In the groups whose age, gender and general health status matched on average, as seen in Table 1, the group that was in visual contact with nature after surgery needed less painkillers and the recovery period was shorter than the other group. In their next experiment, Ulrich et al. exposed stressed subjects to natural scenes and urban scenes devoid of nature. As a result, it was concluded that the subjects watching natural scenes reduced physiological stress and quickly improved their mood. Ulrich proved the healing effects of nature on people with these experiments [14, 15, 16, 17, 4,18] Later, other researchers proved the positive effects of biophilia on humans, whose number and quality of these experiments were increased, by scientific studies.

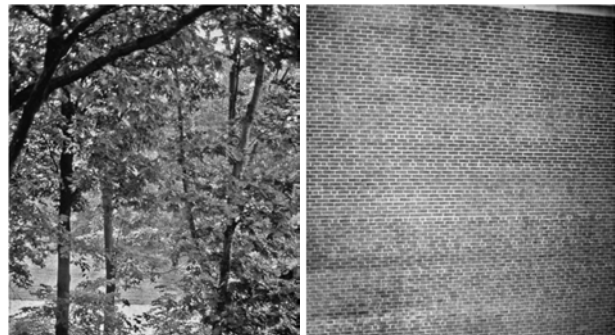


Figure 1. In Ulrich's experiment (a) The nature view seen by the first group window, (b) The brick wall seen by the second group window [18]

Table 1. As a result of Ulrich's experiment, the pain medication doses used by two groups of patients during the recovery period [18]

Analgesic power	Number of painkiller doses (2-5 days after surgery)	
	First group	Second group
Strong	0.96	2.48
Mild	1.74	3.65
Ligth	5.39	2.57

As can be seen from the table, biophilic properties of the space have directly affected the healing process of the patients.

3. Method

Although there are no records other than the written documents of some of the hospitals built during the Anatolian Seljuk period, there are hospitals that have survived in their entirety and only some parts of the building. In the study, 3 buildings, most of which are still standing, were discussed. The biophilic elements of the hospitals were searched through archive scans and on-site visits, and the classification of Kellert and Calabrese [19] was used as a checklist. (Table 2)

DIRECT EXPERIENCE OF NATURE	INDIRECT EXPERIENCE OF NATURE	EXPERIENCE OF SPACE AND PLACE
<ul style="list-style-type: none"> • Light • Air • Water • Plants • Animals • Weather • Natural landscapes and ecosystems • Fire 	<ul style="list-style-type: none"> • Images of nature • Natural materials • Natural colors • Simulating natural light and air • Naturalistic shapes and forms • Evoking nature • Information richness • Age, change, and the patina of time • Natural geometries • Biomimicry 	<ul style="list-style-type: none"> • Prospect and refuge • Organized complexity • Integration of parts to wholes • Transitional spaces • Mobility and wayfinding • Cultural and ecological attachment to place

4. Findings And Evaluations

The Gevher Nesibe Darüşşifa, Kayseri built in 1206, consists of two sections, the hospital section (Şifaiyye) where patients are treated and the madrasah (Gıyasiyye) where medical education is given. Gevher Nesibe Hospital, which was built according to the double madrasah plan scheme, has a single storey, 4 iwans (*eyvan*) on the north-south and east-west axis and was built in the plan type with an open courtyard surrounded by porticoes (*revak*).

Environmental factors such as fresh air and daylight, which affect the quality of life of the users, were transmitted directly from the courtyard of the Gevher Nesibe Hospital, the oldest surviving Anatolian hospital, to all spaces. It shows that the pool in the courtyard of the hospital and the madrasa, and the bath in the Bimarhane, were used in addition to the sound and appearance of water, with its purifying, cleansing and relieving effects of physical illnesses. It is known that plants are used as medicine in the hospital, but the landscaping that will allow the use of plants in the hospital has not been seen today. Due to its functional necessity, a view from nature is offered in the open courtyard, which has no windows on its facades, except for a few spaces.

The part where geometric ornaments and natural associations are used intensively in the building, which was designed with a simple façade understanding, is the crown gate. Geometric motifs, which are indispensable elements of Seljuk architecture, have added an inviting appearance to the exterior of the building by increasing the wealth of information. Snake figures and lion reliefs, which are the symbols of medical science, on the door of the hospital added a sense of protection and security. The natural appearance of the hospital, which is entirely made of local stone, is supported by building elements consisting of natural shapes and forms. The patinas formed over time, such as color change and wear on the stones of the building, create the perception of living space.

The darüşşifa was designed according to the geography and climate in which it was built and placed according to physical environmental. The tomb, which is thought to belong to the builder of the building, Gevher Nesibe, the building epitaph and the lion relief on the hospital gate reflect the historical and cultural context of the building. The spaces of different functions and sizes in the darüşşifa are brought together in a balanced and orderly manner. The transitions in open, semi-open and closed spaces and spaces of different sizes arouse a sense of curiosity towards the building and increase its attractiveness. The hospital, which gives the feeling of a safe shelter isolated from external dangers, supports the instinct of shelter with the view of nature in the open courtyard. The spaces lined up around the courtyard are designed in accordance with the symmetrical and central focal point of nature, and the instinct of shelter is encouraged.



Figure 2. Kayseri Gevher Nesibe Darüşşifa [20]

The Izzettin Keykavus Darüşşifa, Sivas which is one of the oldest ones of Anatolia, was built entirely of cut stone and dominated by a crown gate that exceeds the façade wall by 1/3. The crown door is surrounded by a profiled stone border in three directions. There are interlocking medallions and geometric star motifs on the crown door surface, which is surrounded by a wide stone border from the outside. The second row of pointed arch-shaped borders has a muqarnas cascade. There are relief figures of leopards on the right and left of the pointed arch.

Fresh air and daylight, which are basic needs for human health and well-being, are provided by the windows in the courtyards and spaces in the center. The large-sized pool in the middle of the courtyard draws attention to the importance of water in the hospital. In the hospital where plants are used as medicine in treatments, plants are not used as a landscape element. The wide open courtyard of the hospital, located in a densely populated area, provides users with safe natural views and gives information about the current ecosystem and climate.

The geometric ornaments on the crown gate of the building, which was built in the traditional Seljuk style, and the leopard figures on the right and left of the muqarnas, give a feeling of curiosity and trust towards the building with the presentation of wealth of information at the entrance of the hospital. In the hospital, which was generally built of white stone, the tomb was emphasized by using blend bricks at the entrance of the tomb, which is thought to belong to Izzettin Keykavus and his family, and on the dome drum.



Figure 3. Double Minaret Madrasa and Izzeddin Keykavus Darüşşifa [21]

The male and female figures used as moon and sun symbols in Turkish architecture on the right and left of the main iwan pointed arch in the courtyard increased the information richness of the building and gave the building a sense of sheltered space. Some of the portico vaults are built of brick and geometric shapes are used in the vault core. Thus, on the one hand, functional differences were emphasized, on the other hand, a sense of curiosity was gained by creating diversity. Building elements and combinations shaped with inspiration from natural models, together with ornamental elements consisting of natural images, encourage the instinct of shelter in the hospital. In addition, the patinas formed in natural materials over time support the natural appearance of the building.

Although functionality is dominant in the shaping of the Darüşşifa spaces, the composition of these spaces and the transition spaces are organized in a functional way. The integration of many parts into the whole and the opening of closed spaces to central open spaces, which is a natural attitude, created a safe shelter model that supports the shelter instinct. The fact that it was built on the area known as madrasah street because of the historical madrasahs around it showed that the environmental context of the hospital was well constructed and its cultural context. The tomb and inscription belonging to Izzettin Keykavus I, one of the great rulers of the Anatolian Seljuk State, reflects the historical context by giving information about the history of the building. In addition, the traditional human and leopard figures used in the building also refer to local beliefs.

The Divriği Turan Melek Darüşşifa, Sivas, which is considered one of the most iconic structures of Anatolian Turkish architecture, is located in the medrese complex consisting of a rectangular structure, mosque, hospital and tomb, located on the north-south axis of a sloping land. Although it was built according to the closed courtyard typology, the light emanating from the bright lantern and windows in the courtyard cover created a spacious environment and added attraction to the building with light plays such as diffused light and shading. Numerous windows and lighting lanterns on the upper cover allow daylight and fresh air circulation inside the building, creating a healthy space. A mystical atmosphere has been created by increasing the effect of the water in the space by the pool hitting the luminous lantern in the middle of the courtyard, the visual and auditory water plays created by the garbage stone and gargoyle-like stones around it, and the lights reflected on the water from the luminous lantern.



Figure 4. The Divriği Grand Mosque and Darüşşifa [22]

Table 3. Unified models, processes and features of biophilic design

Biophilic Design Parameters		Gevher Nesibe Darüşşifa	İzzeddin Keykâvus Darüşşifa	Turan Melek Darüşşifa
Direct experience of nature	Light	✓	✓	✓
	Air	✓	✓	✓
	Water	✓	✓	✓
	Plants	*	*	-
	Animals	✓	✓	-
	Weather	✓	✓	✓
	Landscapes and Ecosystems	✓	✓	✓
	Fire	*	*	*
Indirect experience of nature	Images of nature	✓	✓	✓
	Natural materials	✓	✓	✓
	Natural Colors	✓	✓	✓
	Simulating Natural Light and Air	-	-	-
	Naturalistic Shapes and Form	✓	✓	✓
	Evoking Nature	✓	✓	✓
	Information Richness	✓	✓	✓
	Age, Change, and Patina of Time	✓	✓	✓
	Natural Geometries	✓	✓	✓
Biomimicry	✓	✓	✓	
Experience of space and place	Prospect and Refuge	✓	✓	✓
	Organized Complexity	✓	✓	✓
	Integration of Parts to Wholes	✓	✓	✓
	Transitional Spaces	✓	✓	✓
	Mobility and Wayfinding	✓	✓	✓
	Cultural and Ecological Attachment to Place	✓	✓	✓

The door covers and courtyard columns of the building, which is known as the structure with the highest plastic value among Anatolian darüşşifas, are decorated with compositions consisting of geometric and plant motifs. The door frame adorned with palmettes and leaf

friezes, the star-embossed pediment, and the male and female figure capitals symbolizing the moon and the sun, added iconographic value to the hospital door by representing the healing power, might, health and power of nature to the patients. A peaceful and safe space was emphasized at the entrance to the building with the star motifs in the door arch and the sky analogy. After the iconographic crown gate, the most ornate parts of the building are the interior covers. The infinity spiral in the pool was also used in the center of the vault covers, different geometric motifs were embroidered around the spirals, and the dome transitions were adorned with palm trees. The columns in the courtyard of the hospital are another element that increases the variety of decoration of the building. The dimensions and surfaces of the columns carrying the mezzanine and the decorations on their capitals differ from other columns.

In the complex, which was built with the understanding of functional space, the spaces open to the porticoes surrounding the common courtyard. The space setup of the darüşşifa, which was designed with a simple understanding, was made in a way that facilitates navigation and enables mobility. The peaceful atmosphere of the darüşşifa courtyard, together with the spatial setup, arouses curiosity and supports the instinct of shelter. Located at a point that dominates the settlement where it is located, the windows opening to the outside environment offer a view to its users and enable users to connect with the natural environment. The tomb, inscription, mystical and natural analogues, where the tombs of the builder and his family are located, reflect the historical and religious context of the building.

5. Conclusion

When the historical process is examined, human, who started his life as an inseparable part of nature, developed with a utilitarian perspective and reached the level of destructiveness with industrialization. Man, who sees nature as a tool that he has to consume for his own existence, has faced the consequences of this point of view since the 18th century. Negative conditions that reduce the quality of life, such as lack of resistance to physical diseases, mental fatigue, low level of vital well-being and cognitive efficiency, and depression have shown that people drift away from their instincts and drift towards a destructive life.

Studies have shown that people are disconnected from nature and other vital processes that nature is instinctively connected to, and that this way of life adversely affects human health and well-being. In this direction, the concept of biophilia, which is called the innate connection with nature, has emerged. Researchers, who said that the human race was formed and developed in a bio-centered environment, argued that there is an instinctive bond between nature and man, and that this bond will be strengthened by "experience". Researchers who said that biophilia are not very clear instincts such as eating and sleeping, stated that if this instinct is supported by the built environment and culture, it will remain alive, thus increasing the quality of individual and social life.

The first basic criterion seen in hospitals was the direct experience of nature and the inclusion of environmental factors directly into the building, especially with the courtyard system. The second criterion, the indirect experience of nature, has been realized by shaping the decorations and structural elements, which are indispensable elements of historical buildings. The last criterion, the place and the experience of the place, has been seen in the design and placement of the hospitals in accordance with the historical, cultural and ecological context to which they belong. Thus, it has been revealed that biophilic design features are successfully applied in Anatolian Hospitals in order to create healing spaces.

Declaration of Conflict of Interests

The authors declare that there is no conflict of interest. He has no known competing financial interests or personal relationship that could have appeared to influence this paper.

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