International Journal of Modern Achievement in Science, Engineering and Technology (IJSET)
ISSN 3023-459X
DOI : 10.63053/ijset.24

Explanation of Naturalism and Its Role in the Mindset of Contemporary Architecture

Mahdi Aliyari[1]

1. Department of Architecture, Islamic Azad University, Shabestar Branch, Shabestar, Iran.

ARTICLE INFO

Keywords:
Naturalism,
Contemporary Architecture,
Iran

ABSTRACT

Naturalism is a philosophical and artistic movement that places greater emphasis on the relationship between humans and nature. This movement believes that humans should live in harmony with nature and use natural resources in a sustainable and responsible manner. Nature has always been one of the most important sources of inspiration for humans throughout history; from the earliest artistic works left by humans on cave walls to the present day, it has always been present. Aristotle, an ancient philosopher, was one of the first to speak about nature as a great source of inspiration. Undoubtedly, some of the best works of art, such as paintings and classical music pieces, have been created through this approach. Therefore, the aim of this research is to identify the concept of naturalism in architecture and how the tendency towards nature has influenced contemporary architecture in Iran. Accordingly, we raise the question of how naturalism has impacted contemporary architectural works in Iran. To address this question, specific examples of contemporary architectural works from different time periods where the theme of naturalism has been discussed in critiques and descriptions were selected. The study investigates how inspiration from nature and the mutual influence between architecture and nature have been analyzed descriptively and analytically. The results of this research indicate that the use of natural materials and emulation of natural forms have had the greatest impact on the inclination towards nature in contemporary architecture.

Introduction

Humans are undoubtedly connected to nature and have long sought to use nature to their advantage. It is clear that the root and foundation of all human activities lie in nature. This is why it can be said that human innovations in sciences and life skills have been the discovery of aspects of nature, and humans, rather than influencing nature, are influenced by it. In other words, nature is the source of emotions and beauty, and since humans are nature-oriented, human-made creations should always be in harmony with nature.

In fact, architecture is a phenomenon that ends with the regular relationship between nature, as a suitable platform for architecture, and humans, as its creators (Fatemi and Turkman, 2015). Nowadays, some architects believe that emulating nature will be much more beneficial than merely beautifying the appearance of buildings. Therefore, they make great efforts to mimic the structural rules present in nature, emphasizing that the use of nature-based designs and patterns is not just a slogan but a vital and cost-effective matter economically and financially.

Nevertheless, until recently, the use of models existing in nature in buildings, both aesthetically and functionally numerous, was unfortunately limited to simple and passive systems. For example, on the southern facade of the Arab World Institute building in Paris, a row of mechanical sensors resembling eyes have been installed that open and close based on the amount of incoming light to control the internal temperature of the building. Emulating nature has many advantages (Hagan, 2001). The use of natural patterns in contemporary architecture is one of the modern methods of architectural design that has attracted the attention of architects. Today's world feels detached from nature, to a certain extent returning to nature as one of its characteristics, and striving to reconcile with nature.

Throughout history, humans have always considered natural elements as a fundamental principle in their structures from the moment they built shelters, dwellings, living spaces, workplaces, or any kind of space for use. In this historical era, human architecture consciously highlighted two main aspects: form and function. The use of natural forms in architecture is a sign of human inclination towards the creations of nature and its influences. On the other hand, natural forms in the past have played an influential role, both in terms of functionality and aesthetics, instilling respect and reverence in various cultures and nations.

For example, animals and birds in different countries and in various ceremonies and communities had their own unique reverence based on their cultural past. The use of nature in all arts, including architecture, has always been important for artists. As Swiss painter and writer Paul Klee stated: "Connection with nature is the most essential condition for an artist. The artist is human: he is nature himself, a part of nature, amidst natural space" (Khakzand and Ahmadi, 2007).

Therefore, identifying the concept of naturalism in architecture and understanding the tendency towards nature in examples of contemporary architectural works is the primary goal of this research. To achieve this goal, analyzing how inspiration from nature and the mutual influence of architecture and nature can be described, the topics that can explain the methods of drawing inspiration from nature and naturalism in architecture, especially contemporary architecture, should be elucidated. Hence, we raise the question of how naturalism has influenced contemporary architectural works. In pursuit of this question, specific examples of contemporary architectural works from different time periods where the theme of naturalism has been discussed in critiques and descriptions were selected for examination.

1. Research Background

In 2015, Daneshjoo et. al. presented an introduction to naturalism in samples of contemporary architecture in Iran. The aim of this study was to analyze a number of contemporary architectural works in Iran from a naturalism perspective to extract patterns and evaluate the approach to nature in some contemporary Iranian architectural works quantitatively and qualitatively. Descriptive-analytical techniques were employed in the research process, and the necessary data for forming a theoretical framework were collected through library research and field studies for each work's analysis mentioned.

The research process and conclusions were based on the analysis of specific examples selected from prominent works of contemporary architecture in Iran. The research findings indicated that the use of natural materials, incorporating water into designs, and utilizing natural forms had the most significant impact on the direction towards naturalism in contemporary architecture in Iran.

Forouzanfar and colleagues (2017) examined the foundations of teaching nature-oriented architecture in architecture and urban planning based on research-oriented teaching models. In this article, they discussed the concept of education, its related concepts, and its continuity with the history of education in general and architectural education in particular. They then analytically addressed the patterns and models of research-

oriented teaching in urban planning and architecture. Finally, they proposed some educational strategies in the form of policies and practical programs in this field. Based on studies and examination of architectural teaching models with their extension into the field of architectural education, some proposed educational approaches include: "Environmental design and creativity education in architecture"; "Design process and creativity education in architecture"; "Mental process and creativity education in architecture"; "Individual characteristics and creativity in architecture". Additionally, based on studies and examination of architectural teaching models extended to the field of nature-oriented architectural education, some proposed methods include: "Dynamic-based education"; "Creativity-based education"; "Requirement-based education"; "Experience-based education"; "Self-discovery-based education"; "Self-confidence-based education"; "Opportunity-based education"; and "Clinical experience-based education".

Shareghi (2020) examined the role of nature and nature-oriented architecture in the design of commercial complexes. The results showed that the artistic effect is a combination of form and content. This effect consists of elements such as words, sounds, colors, or objects, and behaviors it represents a theme it tries to express. In fact, the role of spoken words can be assigned to space. The use of water elements, in addition to their properties in preventing unwanted noise, was very effective, and the presence of fountains brought a pleasant sound to the space and considered as the "music of space". On the other hand, fountains represent power and also evoke concepts such as reflection, dance, and tranquility. Creating a space for sitting beside the water on the northern side of the site and creating a curved form, which is a symbol of peace, reminiscent of Khajoo Bridge, a suitable place for gathering and conversation of people. Water symbolizes life and death; like a bridge connecting the soul and body of a person. Wherever water is present, there is a discernible sense of space. Drawing the water axes inside the complex is another reason to respect nature and maximize the use of water potentials such as reflection, transparency, and purity, and creating vertical and horizontal axes that not only eliminate unwanted noise but also create a desirable space.

Coburn and colleagues (2019) investigated the psychological responses to natural patterns in architecture. The results indicate that nature-inspired visual patterns may play an important role in the aesthetic evaluation of architectural scenes. It was also found that natural visual patterns, such as scaling and contrast, predict aesthetic priorities.

Hyde (2023) examined a study entitled "Architecture Inspired by a Specific Habitat - A Case Study of Fallingwater House by Frank Lloyd Wright". The results showed that Frank Lloyd Wright's work is presented as an initial example of nature-inspired architecture and explores how buildings may be more broadly integrated into their sites and environments. The integration of architecture, biomimicry, and eco-mimesis as a framework for examining Frank Lloyd Wright's work provides a new understanding of his architecture and orientations for future research in the ecological design of buildings and cities.

2.1. Research Methodology

In the present study, a descriptive-analytical method was used to collect documents and analyze the relationships between variables; therefore, initially, theoretical foundations regarding the importance of nature in architecture were examined using library methods, and then nature-inspired design patterns were extracted. This was followed by an analysis of the characteristics of the selected case study. Subsequently, the results of the research process are presented in Table 1.

3. Theoretical Foundations

3.1 Nature-Inspired Design

Edwards articulates in his article that nature can be a guide in five ways:

1) Assessment of construction criteria: Evaluating a building can result from its destructive impact on nature.
2) Representation of nature: Nature is depicted within and outside the building, meaning plants bring non-living structures to life.
3) Learning from nature: Learning the principles of cycles and recycling.
4) Living beings are designers: Every living being faces design issues, much like indigenous architectures.
5) Utilizing natural models: Paying attention to natural patterns and their functioning; for example, focusing on spider webs, their structural functioning, their resistance, and comparing them to steel, which performs much stronger (Sharqi, 2020).

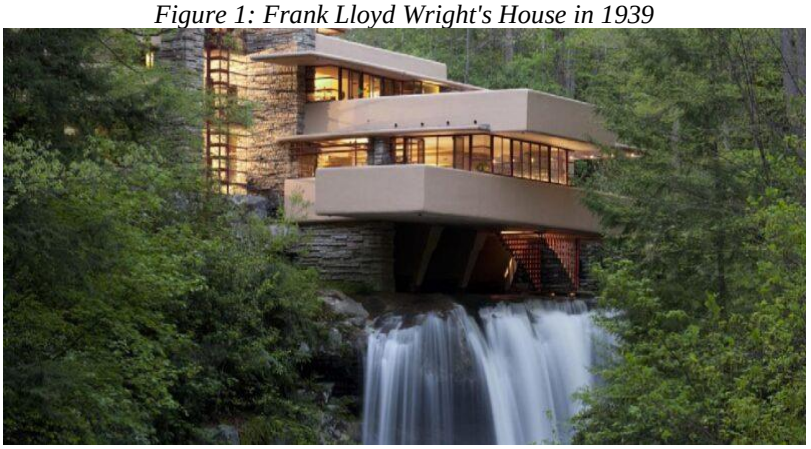
3.2. Relationship between Nature and Architecture in Contemporary Architecture

As the 20th century drew to a close and on the cusp of a new century, a serious return to nature and its proper

and healthy utilization places humanity on the brink of new achievements in a fresh perspective on nature. Prior to modernism, fields, streets, alleys, markets, and gardens were places for people to meet. Buildings around these streets and markets gave a sense of place identity, and the urban communication networks had various and unique landscapes, utilizing their spaces in various ways. These spaces had different elements of nature alongside them.

Frank Lloyd Wright blended his houses with nature from the beginning. The combination of architecture and nature in his work is so contemplative that one often cannot distinguish where the buildings begin and where nature ends. In his famous and precise personal home, he said: "I never build a house on a hill, but always on top of a hill's rise; this shows that he has tried to make the house stand out by placing it in a specific position where the continuous curve and beauty of the hill are visible. In 1939, Frank Lloyd Wright created an intriguing fusion between nature and human habitat with the design of the Fallingwater House (Figure 1) (Shareghi, 2020).

Figure 1: Frank Lloyd Wright's House in 1939



With only expansive and intersecting balconies above and natural cavities below, accompanied by the flow of the river and a unique amalgamation of waterfalls, he emphasized his interest and attention to the human habitat alongside nature. Over time, two different answers have been found to the issue of the relationship between buildings and nature, both of which have always been in some way correct and honest. Greek temples are nestled in nature, yet constructed with a variable aspect of it, and medieval cities are so intertwined with nature that they seem to be part of it. In the era of contemporary architecture, Le Corbusier has presented a fresh perspective on nature. He introduced Villa Savoye with a broad terrace in Poissy, France, by placing empty frames in its façade, creating an intermediary between the interior architecture and the outer nature. In fact, by creating this open strip in the wall, he framed a scenic terrace and brought a painting-like view into sight (Figure 2) (Shareghi, 2020).

Figure 2: Villa Savoye in Poissy, France

In comparing the perspectives of two great contemporary architects, it can be said that Le Corbusier, with his thoughts in design and creation of architecture, aimed to pull nature into and around the architecture; whereas Wright did not reach out to nature in this regard. He said that in the design of the Sydney Opera House shells and the glass surfaces in front of it, he was inspired by the natural and dynamic movement of a bird's wings in flight. However, among the buildings of recent decades that have been used in a monumental and semi-realistic display of natural forms in the shape of a bird (eagle), the design of the J. F. Kennedy Airport is the work of Eero Saarinen. This building depicts a large bird either landing or taking off. The eagle shape symbolizes the country and flight as a sign of airline flights. Here, the form represents a symbol of performance, and in fact, it is a blend of technological movement and expression of flight.

3.3. Exploration of Bioclimatic Architectural Concepts

3.3.1. Nature-Inspired Forms

In this method, only the imitation of form is considered, and the foundations and structural principles are not paid attention to; for example, earth layers conforming to the forces entering it shape themselves, while architects, by disregarding these forces, merely extract the existing situation. Transforming a seemingly natural structure into reality is a costly and essentially unnatural act because nature operates on the principle of minimum energy use, whereas constructing and maintaining a quasi-natural building with irregular shapes requires a significant amount of energy (Sharqi & Ghanbarian, 2012).

3.3.2. Semantic Inspiration from Nature

Metaphor and its meaning can save us from superficiality. Architectural works that have looked at nature from a comprehensive metaphorical perspective and based their buildings on it represent the best model of this creative strategy. The TWA Airport in the United States, designed by Saarinen, is an example of metaphorical expression; this airport resembles a bird from above (Figure 3). The white metal ceiling of this building showcases the expressiveness of the materials used, considered as the skin and bones of this motorless flying bird. However, what is new in this design is the organic curve at the top of the ceiling. These curves start from triangular nodes and bend (Sharqi & Ghanbarian, 2012).

Figure 3: TWA Airport in America

3.3.3. Inspiration from the Rules of Nature

The best inspiration from nature involves utilizing its rules and laws. Since these rules are universal in nature, one shouldn't seek inspiration from a specific example. Architectural structures that incorporate these natural rules become closer to nature. Preserving the existing structure against loads and forces acting upon it in natural phenomena is the most important existential philosophy of their structure. Natural structures employ various methods to counter external threatening forces. Four such methods are mentioned as follows (Sharqi & Ghanbarian, 2012):

1) Nature always strives to utilize tensile and compressive stresses in its structures as much as possible and avoids using bending stresses except in cases where the structure has a layered nature. Essentially, all natural structures have a layered texture; meaning their surfaces and volumes are formed by layers

overlapping each other. The layered nature ensures that only tensile or compressive reactions occur in natural forms. Because bending implies wastefulness in material consumption, and in nature nothing is created in vain (Golabchi, 2003).

2) Resistance to forces through flexibility and deformation: This method is abundantly observed in natural structures and possesses high flexibility. For instance, many birds prefer to build their nests on soft and slender branches of trees because the more flexible the branches are, the less likely they are to break. Such behavior results in structures being not only more resistant with less material consumption but also more resilient in a better way.

3) Escaping from forces and providing void space against them: This method is another way nature counteracts forces, essentially reducing the amount and intensity of the incoming forces. For example, trees bend during strong winds, allowing some of the forces to pass over them, thus reducing the amount of force exerted on their trunks.

4) Utilizing interfering forces against each other or themselves: Trees bend in the wind, storing some of the wind force as potential energy within themselves and releasing a portion of this force against the wind during their back-and-forth movements. The arrangement of tree branches is such that the weight on one side of the tree supports the other side and vice versa. Similar behavior can be seen in the structure of the mast and main deck of the Alamillo Bridge in Spain, designed by Calatrava. In the design and construction of this bridge, an asymmetric balance between the mast and the deck is achieved by combining aesthetic principles in a way that the mast and main deck each act as a support for the other (Figure 4) (Sharqi & Ghanbarian, 2012).

Figure 4: Alamillo Bridge in Spain, designed by Calatrava

3.4. The Mutual Influence of Nature and Architecture

The relationship between humans and nature has existed since the moment humans stepped on the earth, and humans have always both influenced and been influenced by nature. Nature has always provided suitable patterns to answer many human questions and has taught its laws to them. The mutual influence of architecture and nature can be seen as a moment when humans chose caves for their residence or constructed shelters using branches and leaves of trees, among other things (Protogazzi, 2006). Therefore, among the nature-based architectural approaches, inspiration from nature is essential. The perspective of an artist architect when faced with nature differs from others. Moreover, inspiration from nature varies among different architects (Daneshjoo, 2015).

3.4.1. Imitating Nature in Architecture

Viewing architecture as a living entity has been an important concept for a long time. However, this concept gained more attention from the early 19th century when the term "biology" became prevalent. The method of "biological analogies," which, like many ideas influencing modern architectural doctrine, dates back to the 1750s. In those years, two groundbreaking scientific and historical books were printed: one was "Botanical Systematics" by Linnaeus in 1753, which categorized green plants based on botanical science principles related to pollen displacement and reproductive organ structures, and the other was "Natural History" by Buffon in 1794, attempting to summarize all living phenomena based on general laws of nature.

These two were the foundation for expanding the concept of biological analogies. The discussion of "biological analogies" in modern architecture can be traced back to Sullivan and Wright, who later laid the groundwork for a new field of study in architecture called "bionics," where mimicking nature is defined as part of the architectural design process concerning "form, function, materials, and technology." Bionics, meaning "biologically inspired" or the use of "artificial and physiological features of nature," was first applied by the American scientist Jack E. Steele in 1959. He viewed "bionics" as the science of systems that form the foundation for all living systems. Two important points are worth noting: one is his acceptance of the idea of "gradual evolution" as essentially a degrading process rather than an improving one, as his religious beliefs prevented him from accepting gradual evolution for all creatures except lower animals. And, on the other hand, he was the first scientist to correctly identify the parts of "growing organisms," especially "animal" animals, as he recognized that an animal cannot move from one point to another like a plant organism can.

Some architects strive for naturalism by incorporating water into their buildings. "Human interest in water is to the extent that sometimes designers, inspired by natural beauties such as waterfalls and streams in parks, gardens, homes, and even halls, create corners of nature as much as possible and make it accessible to people" (Adibi et al., 2005). To identify other sources of architects' inspiration from nature, "one can refer to humans' constant need for connection with nature and open spaces, which is manifested in house architecture in open spaces (courtyards) and semi-open spaces (iwans)" (Mahmoudi, 2005). The courtyards of traditional and old houses are echoes of Iranian gardens. In Iranian architecture, the house courtyard is an extremely architectural space that also has the characteristics of a garden. In fact, it is a small garden with additional functions for a continuous life (Ahmadi, 2005). Since the Iranian garden is considered a prominent aspect of nature, another method of drawing inspiration from nature can be the use of courtyards, especially central courtyards. "The central courtyard, like a natural oasis, brings together light, water, wind, and plants, thereby providing comfort for residents in unfavorable environmental conditions" (Ahmadi, B. 2005).

Another method of drawing inspiration from nature is using natural forms. The result of incorporating natural forms in architectural design is achieving an excellent design where structural efficiency, functional requirements, and aesthetics are combined; lessons learned from nature are appropriately applied, not just mere imitation of it (Taqizadeh, 2006).

In recent decades, various architectural perspectives regarding nature have emerged, with one of the most important being structural approaches that have led to the creation of innovative architectural works and even new architectural systems in some cases (Nohi & Zibafar, 2005). Therefore, another method of drawing inspiration from nature can be considered natural structures. Emulating natural structures in architecture can be done in three ways: formal, metaphoric, and following the laws of nature, with the best outcome being adherence to the laws of nature (Shahroudi et al., 2007). With the advancement of science and the achievement of molecular aesthetics in the chemical composition of materials, the search for nature at the microscopic level has been explored. For example, the design of geodesic domes by Buckminster Fuller, which represents stable and strong structures in the shape of carbon molecules, delves into the complexities of nature at a microscopic level as another source of inspiration (Taqizadeh, 2006).

Zamani (1999) states about the relationship between architecture and nature:

1) Architecture is replaced by and bonded with nature at a certain point in the natural setting. The architect faces a world of natural data that influence his spatial system. The architecture that draws from its surrounding nature somehow extends nature and includes a partly detachable human presence from the natural framework to accept a return to nature.

2) The expansion of nature in architecture can also be experienced by incorporating natural elements as part of the architectural structure. Throughout history, a variety of natural materials have been commonly used in architecture.

3) Iranian architecture considers nature as a glimpse of paradise on earth, drawing inspiration from nature to create building configurations where the form of plant patterns in tile works is an example of this frozen nature (Zamani, 1999).

Considering the points mentioned, one can incorporate the setting, materials, and decorations using methods inspired by nature. Besides the setting, the placement of a structure in a natural landscape or the view from a building to a natural landscape can also serve as a way to draw inspiration from nature. For example, in his works, Hossein Sheikhzadeh showcases nature restricted to topography and surrounding views. Nature outside the building provides him with beautiful vistas, and in harmony with nature, he elevates his creations on high slopes (Hosseini et al., 2008). In this approach, architecture places nature within the realm of vision, both inside and outside the building, thereby purifying the air and creating a sense of

tranquility (Mahdinejad et al., 2012).

Symbolization of nature is another method of engaging with nature in architecture, evident in the works of several contemporary Iranian architects (Mahdinejad et al., 2012). The spiritual message of nature is not only found in the overall beauty of its forms, movements, and entities, but also in symbols that directly reflect various divine attributes (Nasr, 2000). Some architects consider the harmonization of a building with the natural environment as the source of their inspiration from nature. In the natural history, a general law states: only those species capable of adapting and harmonizing with their environment are able to thrive and sustain life. It is a well-known fact that various natural forces seek a harmonious blend of materials and forms for coordination and excellence. Thus, aligning the environment with climatic conditions is considered the primary step in utilizing natural energies and aligning structures with climate conditions is deemed essential for benefiting from natural conditions (Ayvazian, 1998).

3.4.2. The Influence of Nature's Teachings on Architectural Design

3.4.2.1. Geometry and Golden Ratios

In many contemporary architectural designs, geometry is not just shaped through randomness or playing with forms. The reasons for the formation of geometry in nature provide significant assistance in shaping geometry in architecture. The foundation of nature is based on specific proportions and sizes, so stable that we unconsciously find anything that aligns with these proportions beautiful, and anything else displeasing (Ayatollahi, 1997). One of the most important geometric patterns in the structure of all four categories of living beings is the combination of two types of geometry: freeform and regular. In fungi, the geometry of the veins or the patterns of rock formations have unpredictable shapes governed by strict principles and predictable patterns. In atoms, even though the exact path of electron movement is unknown, an overall regular structural pattern governs them. In plants, the structure of root growth and the distribution of veins, and in animals, some organs such as the circulatory system and the nervous system are examples of freeform and unpredictable geometry in nature. However, in all three domains, there also exists regular and predictable geometry. In animals and humans, despite the presence of entirely regular and symmetrical geometry in many organs, such as the ear or details like fingerprints, there is also freeform geometry present. All these differences stem from the behavioral and functional differences of that organ and specific characteristics attributed to it. Therefore, there are two geometric layers in any natural entity:

1) Fixed principles: They are not mutable, and as they exist as an innate tendency and internal potential in the essence of objects, this geometry is intrinsic and innate.

2) Different shapes: In any living being, internal forces have a tendency towards specific geometry and form, but external forces exist that lead to the adaptation of organisms to their surrounding environment. In this realm, the predictability of identity is reduced to the point where it reaches unpredictability and diversity. In architecture, each subject gives rise to its intrinsic geometry that corresponds to the subject. However, no two examples of instances are identical because each architectural unit has complied with various internal and external forces, ranging from the client's requirements to the characteristics of the texture, climate, history, and so on (Sharqi and Ghanbarian, 2012).

3.4.2.2. Adaptation to Climate

Most desert plants have deep roots that go into the ground to obtain the necessary water due to the lack of sufficient water in the upper soil layers. Some desert shrubs have thick skin, few or no leaves, and equipped with thorns to prevent internal water evaporation. Some others have fleshy leaves that can store a large amount of water and use it during dry periods. Cacti, during dormancy, shrink and wrinkle, reducing their surface contact with sunlight. A species of this plant can weigh up to 4 tons, 80% of which is made up of water (Sufi, 1959). In cold, hot, and arid climates, plants are thick and bushy. The outer surface covering the bushy and plant bulb is limited. In this state, the plant bulb remains more protected from extreme cold or heat and has a more balanced response to external temperature fluctuations compared to the plant's behavior. Contrary to plants in moderate regions, plants in different environments have freedom in adapting to different seasons. Plants in warm and humid areas also vary in shape and size. Animals also exhibit various behavioral and structural adaptations in nature. For example, Bactrian camels, with a thick coat, can resist mountain cold, while dromedary camels are resistant to excessive heat due to their specific physiological structure. However, in temperatures lower than -15 degrees Celsius, they require shelter. The upper part of their body is thin, so during the hottest hours of the day when the sun is directly overhead, a small surface area of their body comes in contact with the direct sunlight rays. The camel's hump serves two different functions: as insulation against

the scorching sun rays and as a reserve of energy and water. When fat burns, free hydrogen is released, combining with oxygen in the air to produce water, giving about 21 liters of water from burning 20 kilograms of fat. Animals in the temperate regions have smaller accessory organs compared to animals in tropical regions. A larger body size and smaller accessory organs have less surface area for heat radiation, which is advantageous for cold regions where retaining necessary heat is essential for survival. Animals in snowy plains cope with the cold with the help of fat under their skin. Many animals in these areas dig beneath the snow for shelter (Wallace and W.Todd, 1975).

3.4.2.3. Structures in Nature in the Assessment of Load and Repair Cycle

In regions where strong winds are constant, tree roots are stronger to withstand the anchor resulting from the lateral force of the wind. Typically, in these conditions, the roots grow in the opposite direction of the wind to provide the necessary anchoring resistance. In these areas, the central core of the tree trunk bends against the wind, and annual rings in the section where the force enters create compressive stress, more compressed than the tensile part of the section (Figure 5) (Farshad 1974).

The repair cycle in architecture, after the construction of a building, is less present due to the non-living nature of the structure; however, over time, designers strive to create more dynamism in their architectural designs. The organic single style is a result of utilizing this natural law. According to Calatrava, the designer of the Milwaukee Art Museum in America (Figure 6), buildings can also be considered as part of nature in constant change. Calatrava placed a shading device above the museum building that controls the temperature and light inside the museum by opening and closing. This shading device is a metaphor for the flight and wings of a bird.

Figure 5: The central core of the tree trunk bends against the wind and yearly rings.

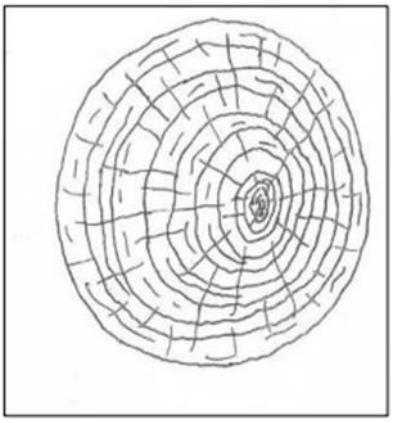


Figure 6: Milwaukee Art Museum in the United States

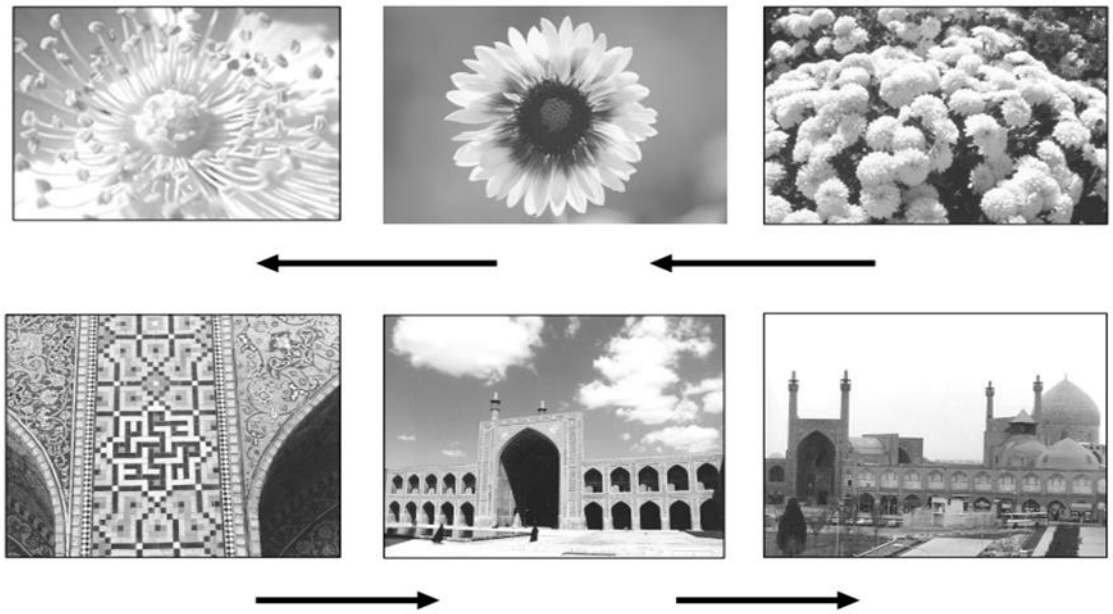
3.4.2.4. Preservation of Identity in Nature

In nature, species are aware of their own kind and reproduce only within that limited range. In plants, the possibility of grafting between different plants exists but is not common. Each plant can only be grafted with plants from the same family. For example, oranges can only be grafted with oranges, lemons, and so on, and they do not accept grafting with apples or walnuts. Animals also recognize their own species and have no inclination towards crossbreeding with other animals. If animal interactions were to occur regardless of the species, an infinite number of strange creatures would emerge, and distinct species would be unrecognizable. In art and architecture, intrinsic characteristics of architectural species must also be preserved. In modern architecture, many times various identities have blended together, creating peculiar creatures (Sharghi & Gonbriyan, 1391).

3.4.2.5. Existence of details at different scales

In nature, depending on the existing scale, there are details at the same level (in the first row of Figure 7, the closer we get to a flower branch in a garden, the more and more precise details we perceive). In architecture, structures that are perceptible from various distances must have proportionate scale and details across different levels (in the second row of Figure 7, as we get closer to a facade or materials of an architectural element, we perceive more and different details). Architecture lacking details quickly becomes tiresome and leads to boredom; the best solution to this issue lies in studying the nature-inspired approach to this matter. Figure 7 illustrates three types of nature-inspired inspirations in architecture (Sharghi & Ganjbaryan, 2012).

Figure 7: Three types of nature-inspired inspirations in architecture



2. Conclusion

In contemporary architecture, naturalism plays a significant role as architects aim to create buildings that are harmonious with the natural environment and utilize natural resources efficiently. Naturalism has a great impact on the mindset of contemporary architects. They seek to use natural resources in designing buildings and urban spaces, striving to incorporate renewable energies as much as possible. Furthermore, naturalism focuses on designing green spaces, outdoor areas, and utilizing light and air as natural elements in architecture, highlighting the crucial role of materials in the relationship between architectural works and nature. Following this concept, one can refer to the natural element and the utilization of natural forms which meaningfully establish a relationship between architectural forms and nature. It appears that the concept of utilizing natural elements or their patterns plays a significant role in establishing the connection between nature and contemporary architecture. Overall, naturalism in the mindset of contemporary architects reflects

their efforts to create sustainable, eco-friendly, and nature-aligned buildings and urban spaces.
Naturalism in contemporary architecture has emerged as an important approach. This approach not only focuses on creating sustainable and eco-friendly buildings but also emphasizes establishing a closer relationship between buildings and nature. In other words, nature-oriented architects in designing buildings and urban spaces strive to intelligently utilize natural elements such as light, air, water, and plants. Naturalism in contemporary architecture indicates a shift in the construction culture towards sustainable buildings, resource-efficient structures, and closer connections with nature. This trend marks a significant turning point in global architectural developments, demonstrating increased attention to environmental preservation and intelligent use of natural resources.

References

1. Adibi, Asghar; Monaam, Alireza; & Ghazizadeh, Sayyed Neda. (2005). The Role of Water and Fountains in Urban Parks. Honarhaye Ziba, (22): 73-82.
2. Ahmadi, Bahram. (2005 A). Courtyards and Gardens in Traditional Houses of Yazd. Farhang Yazd, 25: 69-63.
3. Ahmadi, Farhad. (2005 B). The City - Central Courtyard House (Sustainable City House, Ritual House). Saheh, 41: 113-90.
4. Ayatollahi, Habibollah. (1997). The Theoretical Foundations of Art. Raja Publications.
5. Ayvazian, Simon. (1998). Utilizing Traditional Architectural Methods in Energy Conservation. Honarhaye Ziba, 3: 89-84.
6. Coburn, A., Kardan, O., Kotabe, H., Steinberg, J., Hout, M. C., Robbins, A., ... & Berman, M. G. (2019). Psychological responses to natural patterns in architecture. Journal of Environmental Psychology, 62, 133-145.
7. Collins M, Brebbia CA. Design and Nature (II), 2004.
8. Daneshjoo, Khosrow; Mirhosseini, Seyyed Mojtaba; & Mahdavi Nejad, Mohammad Javad. (2015). An Introduction to the Nature Orientation in Examples of Contemporary Iranian Architecture. Identity of the City, 9(23): 83-90.
9. Farshad, Mehdi. (1974). Architectural Forms, 2nd Edition. Pahlavi Shiraz University Publications.
10. Fatemi, Sayed Abdul Mohammad & Ahmad Turkman. (2015). Environmental Tourism Planning, Based on the Nature-oriented and Sustainable Architecture Approach, International Congress on Sustainability in Contemporary Middle Eastern Architecture and Urban Planning, Dubai, Islamic Azad University Dubai Branch, Consortium of the Role and Design of Urban Fabric.
11. Forouzanfar, Farid; Javidnejad, Mehrdad; & Purzargar, Mohammadreza. (2017). Clarification of the Foundations of Education in Nature-oriented Architecture in Architecture and Urban Planning Based on Research-based Teaching Models. Urban Management, 16(49): 189-216.
12. Golabchi, Mahmoud. (2003). Art and Structural Engineering. Abadi, 41 and 42.
13. Hagan, S. (2001), Taking Shape: A New Contract between Architecture and Nature, Architectural Press, St.Louis, USA.
14. Hosseini, Seyyed Baqer; Yazdanfar, Seyyed Abbas; & Abolghasem Hosseini, Samieh Sadat. (2008). Symbolism in the Thoughts of Islamic Thinkers and its Reflection in the Works of Contemporary Iranian Architects. Abadi, 58: 75-68.
15. Hyde, R. (2023). Site-Specific Bioinspired Architecture—A Case Study of the Allen– Lambe House by Frank Lloyd Wright: The Pragmatic versus the Naturalistic, Intent versus Realization. Biomimetics, 8(2), 178.
16. Karimi, Sarvoh; Etesam, Iraj; & Shahcheraghi, Azadeh. (2020). Analysis and Investigation of Effective Components on Perceiving Urban Facades from the Perspective of Phenomenology, Islamic Art, 344-360.

17. Khakzand, Mehdi, & Ahmadi, Amir Ahmad. (2007). An Overview of the Nature-Architecture Approach. Bagh Nazar, 4(8), 35-47.
18. Mahdavi, Abdollah. (2005). Reviewing the Significance of the Veranda in Traditional Houses. Honarhaye Ziba, 22: 53-62.
19. Mahdinejad, Jamaloddin; Cyrus Sabri, Reza; Damavandi, Majid Ibrahim; & Abaspour Asadollah, Javaneh. (2012). Designing Architecture Based on the Interaction of Beauty and Performance in Nature. Identity of the City, 10: 59-66.
20. Matlak, J.L. (2000) Designing of Environment and Landscape, Translated by Assistance of Education and Investigation of Organization of Parks and Green Space of Tehran Town, Publications of Organization of Parks and Greenspace of Tehran Town, P 67.
21. Nasr, Seyyed Hossein. (2005). Religion and the Order of Nature. (Translator, Mohammad Hossein Fagfori). Tehran: Hekmat Publications.
22. Protogazzi, Paulo. (2006). The Influence of Nature in Space, (Translator, Zhaleh Esra). Memari va Farhang, 27: 35-33.
23. Schultz, Christian Norberg. (2012). Architecture: Presence, Language, and Place, translated by Alireza Seyedalvian, Niloufar Publications, Tehran.
24. Schultz, Christian Norberg. Architecture: Meaning and Place, translated by Vida Norouz Barazjani, Jahan Jahan Publications, Tehran, 2003.
25. Seamon, D. (1979). A geography of the lifeworld. New York: St. Martin’ s.
26. Sepp, H. R., & Embree, L. (Eds.). (2010). Handbook of phenomenological aesthetics (Vol. 59). Springer Science & Business Media.
27. Shareghi, Atousa. (2020). Examining the Role of Nature and Nature-Oriented Architecture in the Design of Commercial Complexes, Eighth National Conference on Urban Planning, Architecture, Civil Engineering, and the Environment, Shirvan.
28. Sharghi, Ali; & Ganjbarian, Abdolhamid. (2012). Lessons from Nature in Architectural Design. Environmental Sciences and Technology, 14(3): 118-107.
29. Sheikh al-Islami, Alireza; & Mirdrikvand, Rezvan. (2016). Cognitive Grounds Analysis of Nature-Oriented Architecture (Case Study: Aliabad District, Khorramabad City). National Conference on Cultural Tourism and Urban Identity.
30. Shirazi, Mohammad Reza. (2014). Postmodern Theories in Architecture, Tehran, Ney Publication.
31. Sieveking Hall, Johan Palasma, Alberto Perez-Gomez. (2016). Questions of Perception: Phenomenology of Architecture. Translators: Morteza Nikfetrat, Sedigheh Mirgozar-Langroudi, Ehsan Bitaraf. Ketabe Fekr-e Now Publisher.
32. Sufi, Jahangir. (1959). Fundamentals of Physical Geography. Ferdowsi Press.
33. Spiegelberg, H. (1981). Husserl and Pfänder on the Phenomenological Reduction. In The Context of the Phenomenological Movement (pp. 62-82). Dordrecht: Springer Netherlands.
34. Taban, Mohsen; Pourjafar, Mohammadreza; & Poormand, Hassan Ali. (2012). Identity and Place; A Phenomenological Approach, Identity of the City, 6(10), 79-90.
35. Taqizadeh, Ketayoun. (2006). Lessons from Natural Structures, Lessons for Architects. Honarhaye Ziba, (28): 75-84.
36. Wallace, McHarg Mac, and Roberts W. Todd. (1975). Comprehensive Plan for the Park Paradises of Tehran. Mandala Consulting Engineers, Environmental Protection Organization.
37. Zamani, Pegah. (1999). Introduction to the Presence of Nature in Architecture. Collection of Architecture Articles. Second Congress of the History of Architecture and Urban Planning in Iran (19-25 March 1999, pp. 457-465). Tehran: Cultural Heritage Organization of Iran.

38. Zomeiran, Mohammad. (1998). Phenomenological Essays on Art and Beauty, Kanoun Publication, First Edition, 452 pages.