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## The necessity of inspiring from nature in architecture



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### *Abstract*

There was a turning point in each period of time which human has discovered a new sight about the world and nature order in a way, and then has presented this relation by numeral, artful and industrial language.

Nowadays when it is talked about technology, different kinds of cars and big buildings are stroked in human mind. It is clear that if the technology result which is the answer of fundamental human needs is considered, it almost will be clear the reason of some circumstances, that each industrial or structural phenomena has been inspired from which natural alive pattern, so it has to be a relation with logical and scientific principles between mechanical system and alive constant system.

Each modern animate in the earth is the final result of 2 thousand million years evolution. In this long period of time, natural choice has been destroyed cruelly whatever did not follow his special aim pleasantly, so following nature is so much useful because the evolution has caused mechanisms which we can follow them, but the evolution process has to be studied and learned from that.

Therefore, this essay is codified to reach this aim in 5 zones with these topics: human and nature, nature through ages, nature the source of sprite, architecture and nature.

The first zone contains human and nature informant principles and introduces their relation periods. In the second zone it is surveyed nature rule in human life, in third zone the nature is presented as a teacher and a source of human sprite, and the last zone expresses the relation between architecture and nature and the architecture usage way from nature with some real examples and finally the way for reaching a favorite architecture and the advantages of patterning natural forms and the cause of knowing nature order more and more considered at the conclusion.

**Key words:** nature, architecture, Bionic science, Bionic architecture.

### **1- Introduction**

The role of nature and importance of natural resources in human's social-economic (and even his psychological) life is undeniable, and also it is essential to note that God is the Creator and man the explorer.

Human always have to explore the nature in order to create a new order. Nature is a detailed set of rules, so that the future is related to the past. Any progress and development in the new buildings engineering is made possible by applying these rules. There is a kind of inherent

simplicity in the nature and if it is converted to design language, definitely a beautiful and delicate building would be created.

On the other hand, selecting IT, Nano and Bionic as the three top sciences in today's world shows the importance of nature in all sciences, because subjects like Nano and Bionic directly deal with nature.

The purpose of this paper is to become sensitive towards the environment and to achieve a meaning based point of view to phenomenon(s). More accurately, it is meant to find insight and knowledge which will make them tangible and ready to offer so that each of the addressed would be able to apply them by using skill and techniques. In this paper which is based on library studies the universe would be introduced as a model for different sciences, particularly architecture. Therefore an important step for balancing and interaction between man and nature will be taken.

This text assumes that a reasonable relationship between man and nature is essential. According to the conducted researches around the world evolution is being done continuously in nature and biotic technologies have the best situation and cooperation in accordance with each other. So it is also better for modern technologies to be modeled on evolutionary situations of life.

Here comes the question: How can architecture take advantage of nature experience?

Considering the mentioned cases about the importance of the subject, this article reflects about the relationship between nature and architecture.

### 1. Man and Nature

"We are in line with the laws of nature, these laws rule our acts and all our actions are based on them. "

Le Corbusier (1887-1965)

Nature and the universe are a large collection, including countless subsets which act as a cycle. Each branch is related and connected to the main branch from which it is ramified. All components are always in correlation with each other based on a hierarchical order and law. They affect each other in order to reach Macro-system's goal. In other words, a component without the whole and the whole without its components would be meaningless.

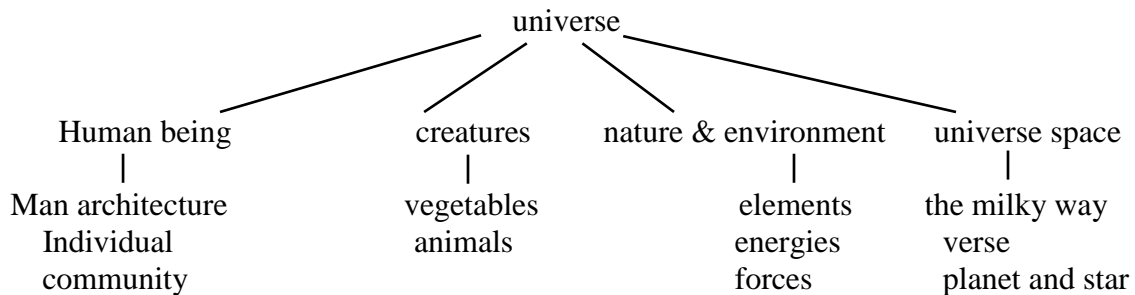


Fig 1: Sprinkler diagram of the world (Golparvarfard, 1388, p.71)

By considering that man himself is a part of the nature; the discipline of man and nature's lives are conjunct and the unbreakable relationship (Man ↔ Nature), still can be seen clearly in all levels.

“Accordingly, the principles on which the man's relations with environment take shape and are involved in its creativity are:

1. Exploitation of nature: Means man uses the factors and elements which are available in nature.
2. Utilization of nature: In this regard man sometimes does some manipulation and even transformations in the elements of nature in order to make them into desired form and shape.
3. Man sometimes uses the factors and elements of the nature in a symbolic way: To mean something special.” (Golparvarfard, 1388, p.185)

Generally man has experienced four contact stages with nature throughout history, including: Organic stages (The discussion of Nature's dominancy over Man), High-organic (Man with Nature), Low-organic (Man's dominancy over Nature) and Semi-organic (Man and Nature). “In fact in Semi-organic period, which its goal is to be aligned with nature, a category namely man and nature is proposed. These two are concatenated and would shape the cycle of man's life. The movement of this cycle is made possible only by the continuous and regular correlation between them.” (Rahmani, Alinejad and Tabasi, 1388, p.2).

In the west “the prevailing attitude had been the belief of man's dominance over nature. On the contrary, man in some of eastern philosophies is considered as a part of nature.” (Lang, 1383, P.256) In table number 1, man and nature are reviewed from the viewpoints of eastern and western thinkers.

| Man and nature from the eastern and Islamic thinkers' viewpoints   | Man and nature from the western thinkers' viewpoints    |
|--|---|
| All nature speaks of God   | Belief in human domination over nature                  |
| Peace of society depends on the peace of nature  | Lack of attention to metaphysics                        |
| Metaphysical cognition must be revived again   | Conquer and domination over nature                      |
| Being happy with nature exactly means accepting its rhythms and norms  | Secularized knowledge of nature                         |
| Inseparable connection between man, nature and religion in Islam   | Nature can not give anything about God to man           |
| Speculating about God, divine realm, revelation and wisdom is not a job just related to mystic, philosopher, scholar and leader. Everything in society must move in a coordinated direction. | The scientific knowledge is used to nature exploitative |

Table1. The comparison between western and eastern thinkers' viewpoints about man and nature (Nazarizadeh, 1385, P.6)

## 2. Nature through the ages

The role of nature and its application in structures and human life has a long antiquity, “as Democritus said the relationship in this way: «A spider taught us weaving and swallows , nesting.» or in five centuries ago, Leonardo da Vinci considered bat wings as a pattern to build flying machine, due to its forms and materials.(magidi,1388,p.495).

Human has been known an unfamiliar creature in the **Renaissance** and nature was believed not as a nature starter but a dead and mechanical mass which has to be under supremacy of a human being .furthermore this modernized thought separated nature rules from moral roles and human behavior from the universe functions.

Gradually through entering the modern age and increasing human building producing , architecture aliened to nature, “Emanuel Kant- who is known as a famous german philosopher and is effective in developing modern thoughts- says: «nature does not present its laws, but human beings discover nature's laws with their own mental concepts.»(daryush,1389,p.109).

Now, human beings information about the limitation of matter and energy sources, Nature's role in architecture is progressed and contemporary times can be called «natural architecture» time, that means contemporary architecture endeavours that is presented as a member of nature family. So that mankind is competed with nature creative and structural power by building actual models inspired from nature.

### **3.Nature is inspiration**

“Nowadays nature inspiring, where the most remnant create by at least effort,yet is attractive. Nature performs everything carefully in an effective and without error form.”(margolius,1389,p.94).

“Dr. Willinsky (1998) says as: nature gives the most multi aspects, practical, harmless and friendly environment solutions and its enough to have care and recognize them; then put them in industry by technical recognition and give practical aspect.”(Tahermoghaddas and Kimiya,1389,p.8).

“As some mystics have said universe helps human to go to a world over the universe” (Nasr,1386,p.130).“Human does not create but discovers, means that because all things are latent in nature forms, artificer just should go inside it and discover ; therefore it is true to say all ways end in nature. Arthur Schopenhauer says: «only real remnant which directly arise from nature and life such as nature and life, always remain young and able; because it does not belong to certain age but humanity.»

In this beyond science that practices technical inspiring from buildings, behaviors and different relations in fauna world is called bionic science, i.e. bionic is systems science that their substitute is alive systems or have alive systems properties or are like alive systems.”(sadeghi.1386,p.3).

Regarding to mentioned definition, “nature inspiring methods are such as:

- Truly imitate natural model (of course nature inventories operation has need changes and institutional accordance in their structure to match human aims).
- Alive systems especial properties operation
- Creating similarity to alive systems human making systems

In comparison, mentioned methods it is important that: «imitation of nature» has one method and nature recognition has another method. Nature copying could serve as a form of manufactory skill but does not help nature recognition . copying shows things as seen. Instead, natural structures study how forms development observing gives a field to better realize of the world that live in it.”(shakeriraad,1388,p170).

#### 4. Architecture and nature

“Architecture arises from need and indicating unique nature that is its existence cause.”(Colin Clark, John Wilson).

“Architecture is the first human manifest that creates its as nature, it gives up nature rules, rules that have authority on our nature and world. Gravity, static physics and dynamic physics rules appear on the base of reduced absurdum sentence means that things should close together to avoid destroying. A grand fate displays nature creatures and gives up a balanced, developed, changed and union thing secret.”(Le Corbusier, 1989, p.44).

Naturalism and interesting to matching with nature has appeared in architecture since many years ago and Egypt pyramids especially and beside them smaller pyramids are as mountain range that say king is huge as mountain for subordinates.(Talaei delshad, 1985, p.3-4).

Nature operation and fauna inspiring in art and architecture remnant have formal effect and sometimes introduce to select materials and building; Charlie Lockston defines bionic architecture in 5 important principals that certainly have some inspiration from nature (naturalism and environment):

“1. building crust or cover, relating building is as: London research institute (inspired from lotus plant).

To select a natural form in architecture, selected form and structure don't make just for beauty or attractiveness of a natural model but forms make on the base of needs, conditions and their cultural limitations. It means that should follow meaning not surface that has seen. We should recognize principals that cause organism development, living in their environment, use these relations and information in forms planning”(Daryush, 1989, p.193). As an example, in Calatrava plans have seen natural forms, of course create regarding to dynamic signs that sees in natural things.

2. Building structure: related buildings are such as:

a) Munich Olympic stadium, Germany: generally this project initial form could compare with spider web in stability and beauty. This project is an example to use the less material for a wide area.



Fig 2. Munich Olympic stadium, Frei Otto, 1972

b)crystal palace: in this building ceiling plan has inspired from water lily.

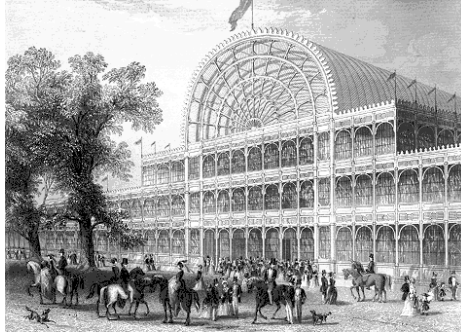


Fig.3. Crystal palace, Paxton, London,1851.

3.energy: Ionica building in Cambridge: this building architecture has practical his learning very well from thermal and ventilation system of insects and termites in buildings. In this plan thermal resources have used for building climate adjust and by this 45% energy losing has avoided.

4.wasting: symbiosis project, Denmark.

“Architecture thought that it's traditional elements are atmosphere and structure is a phenomenon that forms in architecture thought. Generator rules is effective in organization of architectural concepts, so it's development could be rapid and examinational as genetics language rules. In this language explain relations between phenomana by using different forms codes.”(Rahimi and Hosseini,1387,p.136). this process in a short time could create many development Stages and often the result is unexpected forms .

## 5.Conclusions :

Human , nature and architecture are triangle three points that are not opposite, but combine and complete each other ; and by using experiences , nature sciences and techniques and creating a friendly bridge between human and nature by architecture help could create a trace that has nature inside its .

Architecture duty is creating relationship among human, spiritual and body environment.

“Often by hierarchy and disciplinary in nature components and elements recognizing could receive rules to life and do human activities and after nature elements recognizing and knowledge receiving about present phenomena in nature and also hierarchical system and how chain relations among them and each elements role recognizing as cause of another cause , entre second stage means attitude that includes learning analysis in the mind and purposeful

conclusion from it to entire third stage means ability and skill for built creativity and create part of huge meanings and make Legal our life that of course this discipline is sign of nature discipline .”(Golparvarfard, 1388 , p63 , 62 ) .

It is important that there is a common thing between engineering and nature sciences and it is effort to use the less energy . Forms in nature form to maximum efficiency and deliver needed power by using the less material.

Darsi Thompson in his book « About development and form » mentions that alive fauna forms are results of matching with physical powers to food behaviour and habit – as many biologists believed that time . Andreas Fininger also in his book « nature anatomy » refers to structure and form development as vigilant reaction . In fact natural form and structure is continuous consistence with environmental powers. Engineering science researchers also want to do activities with the less consumption and the most return.

“In addition to these natural forms , they are growable and changeable and generally natural forms are dynamic and attractive and create especial attraction in human that belongs to nature .” ( Sayyadi and Maddahi , 1389 , P32 ) because have relation with our sense relationships . “Receiving interested architecture should be human and nature relationship and know health and alive related to nature and its processes recognizing . “A creative architecture should accept all its work differences: discipline and freedom, mind and creativity, nature and technology .”(Pitsi,1388, 12 ) .

The main aim of using important nature achievements is that instead of recreating from alive fauna , study nature principles and their consistency because all things in nature are powers balance , so that world has structure , therefore architectures and experts commissions and trainings to find better solution for symbiosis with nature serves as today world need.

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