

Public Buildings' Forms and Structures as Models for Re-establishment of Building's Connection with the Environment

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ABSTRACT

One of the most complex and problematic issues of our time, in order to reduce pollution and consumption of conventional energy resources, inclines the construction of human habitat in harmony with nature. Solution of the problem is to design buildings according to the principles and methods of bioclimatic architecture, which indicates the concept of designing buildings as an integral part of the environment.

This is certainly not a new approach, since old civilizations built their habitats by these methods. Nevertheless, previous century architects, influenced by industrial revolution, were loyal to new technologies and rarely took into account the impact of their design on the environment or psychological impact on the residents of the city as a result of nature's suspension. By insisting on design standards that have faced away from nature, architecture has created environmental problems and lost communication with people. Furthermore, components that are produced in order to use natural energy sources, such as photovoltaic panels, solar collectors, thermal glass, and etc., that can be used for the final appearance of the building, are generally treated by the architects, as included rather than expressive elements.

In developed countries, where overpopulation is one of the biggest problems, the concept of "return to nature" is a renewal of the green area, destroyed for building of facilities, by creating gardens as an integral part architecture or by creating the architecture as a part of a garden.

Applied to the topic of this report, the identification of a new aesthetics of public buildings, designed in the spirit of bioclimatic architecture, aim is to explore their structure and form as a value occurred when the architect manages to harmonize the life of nature and architecture in the mutual appreciation.

INTRODUCTION

In the era of environmental, energy and economic crisis architecture has become one of the primary objectives of environmental reform. It is estimated that building uses 1 / 6 of world water supplies, 1 / 4 of forest area, 2 / 5 of fossil fuels, see [1].

Technological achievements in previous century allowed architects to design buildings regardless to climate conditions, topography, or human habits in specific region. As a result not only buildings were almost completely relied on fossil fuel consumptions, but also architecture has lost its rich source of ideas, creating environmental problems and losing communication with people.

In the last few decades a lot of effort is invested in finding and applying new technological achievements in building's ecological design. These components produced in order to use natural energy sources, such as photovoltaic panels, solar collectors, thermal glass and etc., are rarely incorporate in buildings aesthetic design. Rather they are treated as included elements. On the other hand the foundations for these modern elements can be almost always found in vernacular architecture which indicates the concept of design building as an integral part of its environment. This concept is also the basic idea of bioclimatic or green architecture design of today.

Applied to the topic of this report, the identification of a new aesthetics of public buildings, designed in the spirit of bioclimatic architecture, the biggest problem for the architect is how to fit the noble ideas of ecological architecture with aesthetic expression. The solution to this problem could be the establishment of new building's designing rules, regardless of the industrial productions' mechanisms, which creates conditions for balanced relationship of man with nature, as a value developed from equilibrium of building and its environment.

METHODS AND AIMS OF THE PAPERWORK

By analysing public buildings, designed by the principles of bioclimatic architecture, their incorporation with the environment and aesthetic values, it is to be identified the new look of facilities which connects building with its environment and nature.

The aim of this report is to explore the aesthetic of public buildings designed in the spirit of bioclimatic architecture as a value developed from the symbiosis of architecture and nature.

HISTORIC GREEN ARCHITECTURE

The durability of the building is a goal of sustainable development today that is to be achieved by using materials, construction systems and methods that still do not have a proven history of durability. Models for green or sustainable architecture are to be found in buildings or structures few centuries old, which are even today in excellent condition and still in use. The green architecture of old cities understood the technology of designing objects in respect to conditions of climate, topography, and human habits, by using materials available in the region. One of the most important components of preserving these buildings is their aesthetic value created by a symbiosis of nature and architecture.

Therefore it can be concluded that green architecture of old cities consider sustainability that should be achieved through:

- Cooperation with nature ;
- Building in accordance with ecological principles.

These are also the principles of modern green architecture theory which indicates the concept of design by which the building becomes an integral part of the environment. It includes design and construction or reconstruction of houses, while taking into account climate conditions, location, traditional materials, context, resources, facilities and natural or created conditions in the area[2].

The examples of historic green architecture can be founded in ancient civilization of Japan and China who considered the earth as the ultimate benefactor. Applied to architecture this philosophy understood fusion of architecture and landscape as a method to achieve the most valued aesthetic of architectural works. A traditional Japanese house is designed as a constant permeation of interior and exterior, where the walls are designed as a membrane that at same time separate and inform the two areas.

There are plenty examples of vernacular architecture which show that both pleasant conditions and aesthetic worth preserving can be achieved. Some of these prototypes are to be

found in Iraq, Iran, Saudi Arabia, North Africa or Greece. In Morava's region on Balkan peninsula buildings were often built from mud. The main construction system called "bondruk", placed on stone foundations, was made of timber columns and beams, stiffened by sprits and was . Wall infill was made of mud or a mixture of mud and straw or animal fur.



Figure 1 Great Mosque, Mali, Africa

Greek civilization laid the foundations of today's Western civilization. The theory of mind's superiority over the matter is reflected in all aspects of Greek culture: the construction of massive temples where their form, size and proportions are the basics of aesthetics, and the landscape is experienced as a functional area. Their architecture is often copied and it is always a symbol of power. With great discoveries in the period from 16th to 18th century the balanced relationship between man and nature was changed because people start to believe in the illusion that nature can be tamed through science.

GREEN ARCHITECTURE IN THE 21TH CENTURY

The architects, influenced by industrial revolution in the previous century, were loyal to new technologies and rarely took into account the impact of their buildings on the environment or psychological impact on the residents of the city as a result of suspension of nature. By insisting on design standards that have moved away from nature, architecture has lost its rich source of ideas, created the environmental problems and lost communication with the people.

The ecological design's supporters, and even advanced among them, are still looking for a way to integrate environmental technologies, the nature conservation and aesthetic component in their work, because only the presence of all three factors led to really long-term architecture.

In the most developed countries, where overpopulation is one of the biggest problems, especially in countries that do not have a large territory, life in the untouched nature is impossible. Almost every square meter of land is used for human needs, and what looks like a naturally created forest or meadow is actually a green area created by human intervention at some point of time. In this sense, the concept of "return to nature" [1], is a renewal of the green area, destroyed for building of facilities, by creating gardens as an integral part architecture. For this purpose green facades and roofs are often used. They usually connect buildings with the existing vegetation on the site or create necessary new garden areas in overpopulated cities. The purpose of these man made green areas is not only to protect

buildings from the climate but also to stop destruction of nature and to re-established a connection between people in the dense urban tissues and nature.

Emilio Ambasz, Nikken Sekkei or Renzo Piano are some of the leading architects in promoting the idea of integration terrain and vegetation into architectural object. The idea of landscape as an inseparable part of the building is the basic characteristic of their work.

Facade as a terraced garden gradually ascending to the ground, roof completely covered with low vegetation and trees gradually ascending to the ground or wavy form of green roof that indicates topography of terrain and the application of glass facades that reflected the environment are some of the applied technics by these architects in order to connect urban life with nature in modern cities. By designing a green roofs and facades architects have managed to link the objects with their environment, to expand the facilities outside their internal dimensions and to provide the green areas for the inhabitants of the surrounding blocks to enjoy in.



Figure 2. Osaka Central Gymnasium, 1996.

For the same purpose, connecting building with its environment, a façade performed as a glazed wall can be used. Glass wall can be stand as an independent membrane in relation to the external wall of the building. Between the outer wall of the building and the glass membrane, a garden, which is an integral part of garden around the building, with vegetation that existed before the construction of the building, can be placed. In this way architect ménage to achieve the object to become a part of the garden and the garden to be a part of object's architecture.

Using the glass wall as layer facades allows architects to design façade unlimited by arrangement of internal chambers, and, on the other hand, to connect, through the glass reflections, object to its surroundings. Facade reflected the sky, the surrounding buildings, greenery and life of the streets around the building. Another advantage of this solution is that the greenery is used as a natural insulator that protects the building from climate conditions.

Interaction of nature and the building can also be achieved by a division of the basis in parts, which are held between the existing greenery. If this basically division is followed by the division of the façade architects could achieve the building to be an integral part of the ground vegetation, which separates it into pieces, but also makes the connection between the parts.



Figure 3. Fondation Cartier, France, 1991-1994.



Figure 4. Forest Building in Virginia, USA

CONCLUSION

Technological achievements in previous century allowed architects to design buildings regardless to climate conditions, topography, or human habits in specific region. As a result not only buildings were almost completely relied on fossil fuel consumptions, but also architecture has lost its rich source of ideas, creating environmental problems and losing communication with people. Solution of the problem is to design buildings according to the principles and methods of bioclimatic architecture, which indicates the concept of designing buildings as an integral part of the environment.

This is certainly not a new approach, since old civilizations built their habitats by these methods. The examples of historic green architecture can be founded in ancient civilization of Japan and China, or Iraq, Iran, Saudi Arabia, North Africa or Greece, who considered the earth as the ultimate benefactor.

In the last few decades a lot of effort is invested in finding and applying new technological achievements in building's ecological design. These components produced in order to use natural energy sources are rarely incorporate in buildings aesthetic design. Rather they are treated as included elements failing to aesthetically connect building with its

environment and therefore failing to express noble ideas of environment protecting architecture.

The ecological design's supporters, and even advanced among them, are still looking for a way to integrate environmental technologies, the nature conservation and aesthetic component in their work, because only the presence of all three factors led to really long-term architecture.

The leading architects in the field of green design play an important role in promoting the idea of landscape as an integral component of architecture, the architecture as part of a garden.

Applied to the topic of this report, the identification of a new aesthetics of public buildings, designed in the spirit of bioclimatic architecture, it can be concluded that a value occurs when the architect manages to harmonize the life of nature and architecture in the mutual appreciation, when architecture is grown in natural cracks, when a building is not just an object in the garden but a part of a garden. By incorporating the configuration of the terrain, climatic conditions, materials and vegetation found in the region and modern ecological technology architect can managed to bring the object in harmony with nature.

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ILUSTRATION SOURCES:

Fig 1. See [1]

Fig 2.

<http://www.nikken.co.jp/en/projects/index.php?JOBNO=O910127&SEL=LOC&LOC=24000&NEXT=1> (d.p. 15.01.09)

Fig 3. See [1]

Fig 4. See [1]