

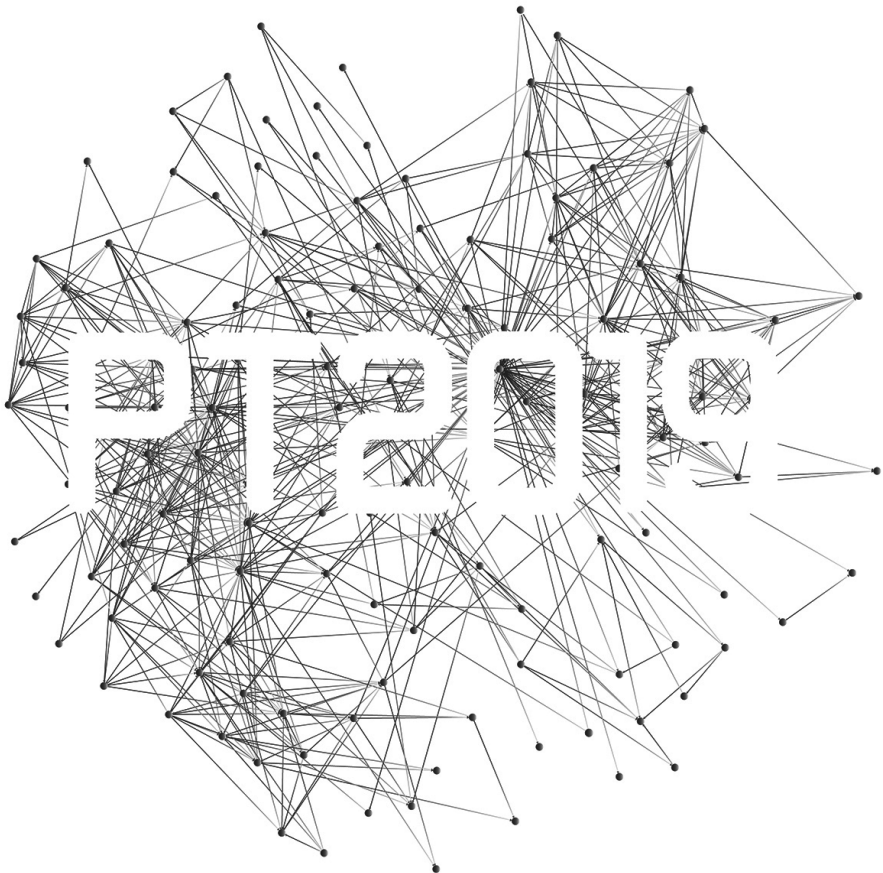
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6th INTERNATIONAL
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PLACES AND TECHNOLOGIES

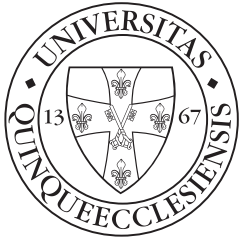
PLACES AND TECHNOLOGIES 2019

THE 6th INTERNATIONAL ACADEMIC CONFERENCE ON
PLACES AND TECHNOLOGIES

EDITORS: Dr Tamás Molnár, Dr Aleksandra Krstić-Furundžić, Dr Eva Vaništa Lazarević, Dr Aleksandra Djukić, Dr Gabriella Medvegy, Dr Bálint Bachmann, Dr Milena Vukmirović
PUBLISHER: © University of Pécs Faculty of Engineering and Information Technology
PUBLISHER RESPONSIBLE: Dr Gabriella Medvegy
PLACE AND YEAR: Pécs 2019
ISBN: ISBN 978-963-429-401-6 (PDF)



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PLACES AND TECHNOLOGIES 2019

**KEEPING UP WITH TECHNOLOGIES TO TURN BUILT HERITAGE INTO
THE PLACES OF FUTURE GENERATIONS**

**CONFERENCE PROCEEDING OF THE 6th INTERNATIONAL ACADEMIC
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ASPECTS OF THE RELATIONSHIP BETWEEN THE ARCHITECTURAL HERITAGE AND NATURE FOR BETTER PLACES IN FUTURE

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ABSTRACT

Through consideration of the built heritage in terms of biophilic characteristics, different approaches and elements of establishing a relationship to nature can be recognized, which in different ways evolved depending on location, climate, social and cultural conditions. The paper discusses some elements of biophilic design as well as their expression in architectural creation, with an emphasis on highlighting elements of biophilic design in architectural heritage. The importance of connecting people with nature and the need for this connection to be realized for people in urban areas is indicated by numerous papers that prove that nature has a positive effect on the quality of work, education, health, recreation, housing and others. Nowadays, man is more and more alienated from nature by using modern technology to make his life and work easier. New technologies are increasingly represented in our lives, so our built environment has changed very dynamically in the 20th century, as well as at the beginning of the 21st century. Since there is an adverse effect on the physical, psychological and health condition of man, the experience and skills arising from the architectural heritage are becoming increasingly important in order to overcome the problems. This paper presents a brief overview of papers that consider the impact of urban environment on human well-being, as well as studies that address the topic of biophilia as an approach dealing with the need of man to be in a natural environment. The aim of the paper is to indicate that the appreciation of the experience and skills arising from the architectural heritage can provide better places in the future and human well-being.

Keywords: human well-being, relationship to nature, biophilic design, architectural heritage, sense of place

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INTRODUCTION

Industrialization and urbanization have led to significant changes in the lifestyle of people. Urbanization and migration of people from rural and underdeveloped areas into cities resulted in massive construction and increase in density of urban areas. Given that construction was directed at creating new buildings and urban structures, the built heritage was often neglected. However, since some time ago, a great importance is dedicated to the renewal and re-use of the built heritage. The built heritage does not just connect us with the past and the tradition, but also possesses characteristics that make it useful and environmentally friendly. The built heritage is characterized by biophilic characteristics, and different approaches and elements of establishing a relationship to nature can be identified. A brief overview of papers that examine the impact of the urban environment on human well-being, as well as studies dealing with the topic of biophilic design as an approach addressing the need of man to be in a natural environment, is given in the paper. Some biophilic design elements are taken into consideration and their expression in architectural creation is discussed. The aim of the paper is to highlight the elements of biophilic design in the architectural heritage, will be achieved by analysing the case studies. The intention is to indicate the importance of respecting the experience and skills arising from the architectural heritage in order to achieve better places in the future and a human well-being.

SOME ASPECTS OF THE RELATIONSHIP BETWEEN ARCHITECTURAL HERITAGE AND THE NATURAL ENVIRONMENT

Migration of people from rural to urban areas, from poorly developed into developed areas or countries, has led to high population density in many urban areas. Throughout Europe after the Second World War numerous spacious settlements were built in certain types of constructive prefabricated systems which resulted in urban structures with the same or similar buildings regardless of the location. The prevailing approach to design of the modern urban built environment has encouraged the massive transformation and degradation of natural systems and increasing human separation from the natural world (Kellert, n.d.). This proved unfavorable for the quality of human life, productivity, health and well-being of people. Biophilic design can reduce stress, improve cognitive function and creativity, improve our well-being and expedite healing; as the world population continues to urbanize, these qualities are ever more important (Browning, et al., 2014). There are various publications that discuss biophilic design, its characteristics, classification and patterns. Some of the features of biophilic design that are relevant to this research will be shown in this section.

Some authors point out the influence of certain types of environment on human health. According to Park et al. (2010), measurements of the Profile of Mood States (POMS) show that forest environments can relieve human psychological tension, depression, anger, fatigue, and confusion, and moreover, that they can enhance human psychological vigor. Furthermore, from the viewpoint of attention restorative theory- ART (Kaplan, R. and Kaplan, S., 1989; Park et al., 2010), these results strongly support that the forest is a good restorative environment for human beings. With the desire to advance design, architects have developed concepts of the so-called sustainable designs which aim to demonstrate their plans for the construction of buildings or urban settlements that would prevent the bad influence of urbanization, while at the same time allowing people to connect with nature. Stephen R. Kellert explains that “the ultimate challenge of sustainable design is to restore in the built environment all our tattered

valuational connections with healthy natural process and diversity. The complexity of this task is exacerbated by the need to foster this occurrence in at least three areas of building environment: level of building systems, the relationship between groups or individuals with buildings and facilities, and environment connection with ecological processes“ (Kellert, 1999). Kellert (n.d.) points to two basic dimensions of biophilic design: the first is an organic or naturalistic dimension, defined as shapes and forms in the built environment that directly, indirectly, or symbolically reflects the inherent human affinity for nature, while the second is a place-based or vernacular dimension, defined as buildings and landscapes that connect to the culture and ecology of a locality or geographic area. According to Kellert, place-based dimension includes what has been called a sense or, better, spirit of place, underscoring how buildings and landscapes of meaning to people become integral to their individual and collective identities, metaphorically transforming inanimate matter into something that feels lifelike and often sustains life.

Browning, Ryan, and Clancy (2014) consider that biophilic design can be organized into three categories – Nature in the Space, Natural Analogues, and Nature of the Space – providing a framework for understanding and enabling thoughtful incorporation of a rich diversity of strategies into the built environment. In terms of the subject of this paper, the Natural Analogues category is interesting because it addresses organic, non-living and indirect evocations of nature. Objects, materials, colors, shapes, sequences and patterns found in nature, can manifest in a built environment in various specific ways. Natural Analogues include three patterns of biophilic design: 1) Biomorphic Forms & Patterns- Symbolic references to contoured, patterned, textured or numerical arrangements that persist in nature; 2) Material Connection with Nature- Materials and elements from nature that, through minimal processing, reflect the local ecology or geology and create a distinct sense of place; 3) Complexity & Order - Rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature (Browning, et al., 2014).

A place, as a human creation in the external environment or in the interior of a building, can make a person feel pleasant or uncomfortable, create a sense of relaxation and pleasure, which reduces the presence of stress, or causes anxiety, insecurity, fear and generate stress. The place is convenient if it inspires, provokes appropriate reminders and relationships, which creates a sense of love for that place, making man happy and well-being. This is largely related to local conditions, socio-cultural norms, traditional patterns, past experiences. From the aspect of the aforementioned, biophilic design is recognized as an appropriate approach. Biophilic design is the designing for people as a biological organism, respecting the mind-body systems as indicators of health and well-being in the context of what is locally appropriate and responsive (Browning, et al., 2014).

In this segment, certain elements of biophilic design that can be recognized in the architectural heritage are considered, as well as their characteristics and the potential of transferring into the design of contemporary urban spaces and structures.

When it comes to the spirit of the place, traditional rural and urban structures, as well as the concepts and construction of buildings, are characterized by respect for the geographical structure of terrain and areas (Figure 1a, 1b), climatic conditions, achievement of natural ventilation, lighting and insolation, reaching the view without any obstacles, and thus the relationship with nature and synergy with it. From this come the dynamics, identity, humanity and legibility of rural and urban structures and buildings.



Figure 1a: Traditional urban structures are characterized by respect for the geographical structure of terrain and areas. (left - Syros Island, Greece; right – Porto, Portugal) Photos: A. Krstić-Furundžić.



Figure 2b: Traditional rural structures are characterized by respect for the geographical structure of terrain and areas. (left - village on the slopes of Kopaonik, Serbia; right - Eleonas, Greece) Photos: Authors.

Feelings of connection to the geography of an area often foster feeling of familiarity and predictability that can be achieved by emphasizing prominent geological features associated with the siting, orientation, and views of buildings and landscapes (Kellert, n.d.). The morphology of the settlements in the hilly terrain and along the aquatic surfaces is characterized by the dramatic nature of the connection with the terrain, since the buildings are rowed one above the other along the slope, which gives equality to the perception of the natural environment. Along the streets there are interruptions in the rows of buildings that provide passers-by different pleasant visual sensations that generally stimulate people positively. An additional challenge is understanding the connectivity of buildings and landscapes with culture and ecology of the site or geographical area. All this makes people happy, creating curiosity for new experiences, stimulating imagination and the desire to explore, and evoking the sense of secrecy of the place. Specific combinations of complexity and orderliness against rugged terrain and water surfaces create an unforgettable and always repeatable fascination. Human love such places and often come back. Such sites, as representatives of the architectural heritage, represent a connection with the past, i.e. history and thus constitute an integral part of the individual and collective identity.

It is therefore important that such an experience of the space, i.e. place, is kept in the process of its development. It is necessary to recognize the basics of planning and construction throughout history, in particular the patterns of biophilic design that are characteristics of the subject area, and incorporate them into the current and future procedures for designing and constructing new ones (Figures 2a, 2b) and reconstructing existing structures.



Figure 2a: The spirit of place (left) is kept in the process of urban development and construction of new buildings (right). (Porto, Portugal) Photos: A. Krstić-Furundžić.



Figure 2b: Traditional construction experiences (left) are present in the design of new buildings (right). (left - village in central Serbia, right - tourist center on the mountain Kopaonik, Serbia) Photos: Authors.

Biophilic patterns are achieved by various elements in the surroundings and the structure of the building. Achieving an optimal life comfort, maximum energy savings and reduced consumption of fossil fuels, and thus environmental pollution, is based on achieving the appropriate energy performance of the building, which is directly related to the design approach in specific conditions. Respecting the experience and principles of traditional architecture and implementing its functional elements in a modern manner, are in line with the commitment to biophilic design. In this respect, it is necessary to achieve relationship between the building and the environment through the implication of heating, cooling, ventilation and daylighting technologies that are based on natural forces (as pressure, temperature and moisture differences) and the use of renewable energy. A further sophisticated step is to implement forms, motifs, ornaments and materials that are characteristic of a particular climate, culture and society. It contributes to the respect of the biophilic design patterns in terms of historical and cultural connection to the place and the preservation of the spirit of place.

Shading devices are one of the elements of traditional architecture whose function is to prevent overheating in the summer period, as well as protection from the outside view (Figure 3). In some cultures, the function of protecting women's rooms from looking from the outside is particularly important. When it comes to mountainous areas, there are shading and insulating devices as elements of traditional architecture that protect against cold, wind and snow, and whose use is also present in modern mountain buildings (Figure 4).

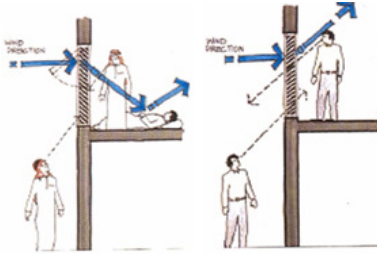


Figure 3: Shading device as a multifunctional building element of the architectural heritage. (middle and right - Manama, Bahrain) Photos: A. Krstić-Furundžić.



Figure 4: Shading and insulating device as an element of traditional (left) and modern architecture (middle and right). (Appenzell, Switzerland) Photos: Authors.

According to the climate, traditional shading devices are mainly made of wood, but also stone and ceramics, which are ecological materials (Figures 3, 4 and 5). They are often applied as stylized motives in modern buildings produced in new materials (Figure 5), such as metal, plastic, glass, and concrete, manufactured as prefabricated panels.

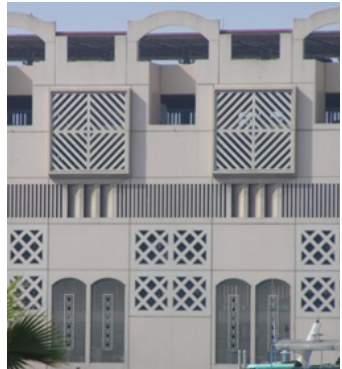


Figure 5: Traditional shading devices (left) applied as stylized motifs in modern buildings (middle and right). (left and middle - Manama, Bahrain; right – Dubai, United Arab Emirates) Photos: A. Krstić-Furundžić.

Natural ventilation is important in all environments, but in some climates, as dry, hot summer continental and Mediterranean hot summer climates (The Köppen climate classification), it is a way to achieve natural space cooling. The concepts of natural ventilation and cooling of buildings are based on the distribution of pressure in the building, which is in function of temperature difference between internal and external air and wind effect (Krstić(-Furundžić), 2006). For this purpose, there are traditional elements of ventilation towers and wind catchers, which today, in a stylized way, appear in contemporary architectural creations (Figure 6).



Figure 6: Ventilation towers and wind catchers as elements of traditional (left) and modern architecture (middle and right) (Dubai, UEA) Photos: A. Krstić-Furundžić.

Most people respond positively to buildings and landscapes that possess information richness, variety, texture, and detail that mimic natural patterns when coherently revealed (Kellert, n.d.). There are architectural creations reminiscent of the trees as a model of the original shelter for man (Figure 7, left), association with air flow or sea waves (like shading devices in Figure 7, right), as well as forms of animals (as fish gills the façade opens for the windows as shown in Figure 8-left) or plants as a 'functional decoration' (Figure 8-middle) or as protection from the sun's rays that resembles leaves of tropical plants (Figure 8-right).



Figure 7: Reminiscence of natural patterns (canopy as trees-left, shadings as reminiscent of air flow or sea waves-right). (left - Oriente station, Lisbon; right - office building, Passeig de Gracia, Barcelona) Photos: A. Krstić-Furundžić.



Figure 8: Reminiscence of natural patterns (as fish gills the façade opens for the windows-left, a 'functional decoration' simulation of ivy vegetation-middle, and a sun protection that resembles leaves of tropical plants-right). (left – office building, Barcelona; middle – Museu Diocesa, Barcelona; right - Ledras street, Nicosia, Cyprus) Photos: A. Krstić-Furundžić.

CONCLUSIONS

For the purpose of human well-being in urban areas, it is important to connect people with nature. Some elements of biophilic design are taken into consideration and their expression in architectural creation is discussed. The presence of elements of biophilic design in the architectural heritage is emphasized, and the possibility of their incorporation in the contemporary design of architectural structures is noticed. Based on the consideration in the paper, it has been shown that biophilic design and the acceptance of traditional experiences and skills of urban and architectural design can enable people living in urban areas to feel the natural environment. Such an approach has a positive effect on human health because it reduces stress, anxiety and depression and indirectly increases the motivation of people to take an active care of their health. Therefore, it can be concluded that the mentioned approach to urban and building planning can have a positive impact on the prevention of disease.

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