



# Biophilic qualities of historical architecture: In quest of the timeless terminologies of ‘life’ in architectural expression



Nelly Shafik Ramzy\*

Department of Architectural Engineering, Faculty of Engineering Sciences, Sinai University El Masaeed, El Arish City, Egypt

## ARTICLE INFO

### Article history:

Available online 28 November 2014

### Keywords:

Biophilia  
Biophilic architecture  
Traditional architecture

## ABSTRACT

Empirical evidences in the last three decades confirmed that designs that connect humans to natural contents and landscape configurations, help to enhance humans' overall sense of wellbeing, with positive and therapeutic consequences on physiology. Findings in the field of environmental psychology showed also that these features have positive effects on human productivity and can reduce stress. Opportunities for contact with these elements are, however, increasingly reduced in modern urban life. Therefore, more attention has been recently paid by architectural theorists to find ways to reconnect the built environment to these elements. *Biophilia* is one of the most recent and viable reconnection theories in this field. This paper highlights the underpinnings of this design theory and addresses the assumption that one of the reasons behind the great admiration that most of the people have for historical buildings attributes to the biophilic qualities found in these buildings. By drawing inspiration from historical architecture, and by use of a qualitative analytical methodology that typify certain characteristics in them, this paper brings in conclusion specific biophilic strategies and settings that might help ‘bringing life to buildings’, as seen in these buildings.

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## 1. Introduction

Before the Roman era, architecture had been almost exclusively symbolic, enclosing little or no real space. With the evolution of Byzantine, Gothic and Renaissance styles, together with the simultaneous Islamic styles, there came a new sort of architecture, in which mass and interior space were manipulated to produce aesthetically pleasing spaces. At this point, architectural design turned to be not any more the mere design of buildings; but rather the intellectual creation of spatial experiences that comprise a message or an inspiration and convey “both the sheltering power of place and the indefinite promise of space” (Harries, 1997).

Nevertheless, the simultaneous evolution of society, science, and industry started to depart architects away from this view, suggesting that social betterment could be created by buildings that are more economic and efficient, where the separation that architects placed between themselves and the features of Nature was celebrated as a great accomplishment (Madsen, 2006).

*Biophilia* is a term that stems from Greek roots meaning ‘love of life’. It was coined by the social psychologist Erich Fromm and popularized in the 1980s as Edward O. Wilson pioneered a new school of thought focused on this concept, which he defined as “the urge to affiliate with other forms of life”. Wilson’s *Biophilia Hypothesis* asserts that people need to contact with nature and with the complex geometry of natural forms, just as much as they require nutrients and air for metabolism (Kellert, 2005).

Biophilic architecture is an innovative approach that paves the way into Nature-based dialog between architectural spaces and a set of human inborn affiliations, where natural forms and patterns play the role of vocabularies and compositional grammar.

Specific strategies to establish this dialog include, but not limited to, direct access to: daylight, fresh air, plants and green spaces. Geometrical features of biological forms such as fractals, scale-invariance, as well as some sophisticated notions of symmetry, self-similarity, and complex hierarchy are proposed as primary formats to indirectly connect people to patterns and features of natural elements.

In this approach, incorporating Nature into the built environment is not a luxury, but a sound economic investment in health and productivity, based on well researched neurological and physiological evidence. Empirical results revealed how these forms and

\* Tel.: +20 1223 765 567.

E-mail address: [tawszwm@yahoo.com](mailto:tawszwm@yahoo.com)

qualities can endow physical forms with certain identifiable 'living patterns', offering more genuine and healthier alternative to what architects currently embrace.

Significant quantitative data had been gathered to confirm that greater contact with natural elements is linked to increased productivity, improvement in learning rates, reduced stress, faster recovery time, and decreased use of painkillers (Wilson, 2012).

Ancient people probably knew this rule better than people do now, because biophilic strategies, as simple as they are, –as shown in the following– are noticeably absent in most of the contemporary projects. Contemporary hospital, for example, is a product of the triumph of medical science over Nature and is, thus, designed to cure, not to heal. Biophilic design is said to have the potential to re-invent the hospital typology to be more efficient (Ulrich, 1984, 2000). In his study, *The Economics of Biophilia*, Wilson proved that integrating quality Nature-integration schemes into an office space can save over \$2000 per employee/year in office costs, whereas over \$93 million could be saved annually in healthcare costs as a result of providing patients with similar qualities (Wilson, 2012).

The argument in this paper is based on the above mentioned empirical findings. In addition to providing a brief account to drive attention to this approach and awaken further interest in it, the paper addresses the assumption that one of the reasons behind the great admiration that most of the people have for historical buildings is that these buildings already contained the qualities of biophilic design hundreds of years before the emergence of this concept, and that these qualities is what keeps the spatial expression of these buildings always 'alive'. The paper aims at exploring historical architecture to reveal some settings and features in these buildings that responds to the criteria of biophilic design, as suggested by contemporary architectural theorists and shows how they are still beneficial and applicable today. In conclusion, the paper, inspired by historical styles, brings in an inclusive framework that contains criteria, strategies, and settings to extend the logic of Nature and the language of 'life' into the built environment. It also suggests further strategies and settings from historical styles, which had not been previously suggested by the contemporary theorists of Biophilia.

Reaching this, the research pursues a twofold approach: first, it overviews the different concepts and ideas suggested by the different theorists of biophilia and classifies them into concepts, criteria, strategies, and settings; a qualitative methodology, with purposefully selected examples and case studies that typify these characteristics in historical styles, was employed in order to seek observed and illustrative support for the hypothesis of the paper; second, based on the concepts and the criteria delineated in the first step, historical architecture were further explored for further strategies, which had not been suggested before by theorists of biophilia. In a sense, only a few 'grammatical rules' and 'terminologies' are presented here, and it is up to creative minds to work out a formal language with these tools.

The parts of the paper are cross-linked with each other. After the introductory section, section two presents a brief survey for the empirical findings of environmental psychology, which outlines humans' psychological relation with specific natural elements and settings. Criteria for biophilic design, as suggested by the theorists of biophilic-based architecture, are discussed in section three and classified into criteria, strategies, and settings. Some of the brilliant settings of these strategies in historical architecture are then introduced with examples for the potentials of integrating these traditional settings within current technologies/projects. The criteria discussed in section three will then serve as standards to explore historical architecture for further strategies of these criteria in section four. Section five will then summarize the conclusion and findings of the paper.

## 2. Theoretical background: empirical findings on environmental preferences

Over the last decades, several empirical studies recording user preferences have been done to uncover the advantages of natural environments, and environments mimicking their geometrical qualities. The most prominent findings of these studies are summarized in the following in order to clarify the mechanism of the Biophilia-effect and specify the criteria that may trigger it (Salingeros & Masden, 2008).

In their study "*Neuroscience, the Natural Environment, and Building Design*" Salingeros and Masden gave some examples of these empirical studies, which prove that human eye/brain system has evolved to perceive fine detail, contrast, ornament, hierarchies, color, and visual connections. The findings of these studies suggest that people depend on the presence of these qualities in the environment not only for the sense of belonging and well-being, but equally for existence, as a primal source of what they call "*neurological nourishment*" (Salingeros & Masden, 2008). The mechanism for this nourishment was discovered in studies using *Functional Magnetic Resonance Imaging*, from which it had been concluded that humans have an innate craving for certain type of information: the circuits for this have been associated with the brain's pleasure centers, which also control the reduction of pain (Biederman & Vessel, 2006). Ecological/visual complexity as exhibited in Nature is a source of this nourishment. From these studies Salingeros and Masden came to a conclusion that the physiological basis for sensory experience relies strongly on these geometric features; not for any stylistic reason, but because human perception is built to engage with those features. Creating an environment that deliberately eschews these features may, therefore, have negative consequences for physiology, mental health and sense of wellbeing (Joye, 2007a; Kellert, 2005).

Neuroscientists found also that views of complex, dynamic natural scenes trigger many more interactions of the opioid<sup>1</sup> receptors in the large rear portion of the visual cortex. Views with less visual richness, such as a blank wall or a tree-less street, are processed in the small forward portion of the visual cortex and trigger far less pleasurable mental reactions (Biederman & Vessel, 2006). They found that environments devoid of such information mimic signs of human pathology and may reproduce clinical symptoms of macular degeneration, cerebral achromatopsia, and visual agnosia, since they provoke similar sensations as sensory deprivation and neurophysiologic breakdown (Salingeros, 2003).

It had also been taken into account that what architects are introducing in biophilic-architecture is not the actual nature and might not have the same effect. But, recent investigations lead to the fact that people can engage emotionally with certain forms and surfaces the same way as they engage to real natural elements. Extensive research programs helped to uncover possible innate reaction to specific geometry in natural forms, details, hierarchical subdivisions, colors, etc. It had been found that both natural and built environments possess intrinsic qualities that enable such a strong connection, and which in turn can trigger the sense of wellbeing. In an evolutionary-ecological approach, it had been found that the incorporation of trees or tree forms, actual or symbolic, into the built environment should have a strong positive impact on people. Research on emulations of Nature (e.g., photos, posters, videos, paintings, etc.) had been also performed. The results obtained with these stimuli are found to be close to the responses associated with real Nature, suggesting that realness does not play a decisive role.

<sup>1</sup> Psychoactive chemical that resembles morphine or other opiates in its pharmacological effects.

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