

The New Approach to Sustainability in the Design of Urban and Architectural Interiors – Elements of Composition Revised

Patrycja J. Haupt

Abstract—Today we tend to go back to the past to our root relation to nature. Therefore in search of friendly spaces there are elements of natural environment introduced as elements of spatial composition. Though reinvented through the use of the new substance such as greenery, water etc. made possible by state of the art technologies, still, in principal, they remain the same. As a result, sustainable design, based upon the recognized means of composition in addition to the relation of architecture and urbanism vs. nature introduces a new aesthetical values into architectural and urban space.

Keywords—architectural composition, biodiversity, elements of composition, green architecture, sustainable design, urban composition, water management.

I. INTRODUCTION

AMONG the multiple problems generated by the global rapid urbanization process there are those connected with harmful effects on the environment and human health. Architects and urban planners are encouraged to implement sustainable design through legislative and economical system solutions. There are low carbon, alternative energy, advanced water management systems, land reusing, improving social structure investments developed across Europe. Some of them set a new standard for contemporary and future architecture through being both environment and people friendly. According to nowadays studies contact with nature is essential for renewal of men's vital powers and psychosomatics, apart from the cultural heritage region of their origin [1]. Anthropological problems deriving from changes in the such as staying long hours inside the building and highly urbanized environment need to be faced. Limited access to nature causes the search of solutions improving the life quality, population's physical and mental health, concerning architectural and urban design as a tool to develop better quality environment. One of the ways of the improvement is introducing natural elements such as water and greenery as a substance for creating architectural and urban interiors. So there is a need for the elements of composition forming surrounding "architectural reality" [2] to be revised according to the new trends of designing healthy and people friendly environment.

P. J. Maciejowska-Haupt is with the Cracow University of Technology, Chair of Housing Environment, Kraków, ul. Podchorążych 1, Polska (phone: +48 12 628 20 22; fax: +48 12 628 20 22; e-mail: ph@pro.onet.pl).

Among all types of beauty and its classification one of the fundamental categories is the beauty of nature and natural landscape. Sensing it may be described as aesthetical experience and it may be triggered by: images, sounds, thoughts, etc. [3] According to Władysław Tatarkiewicz the beauty lies in the contact with nature itself. Referring to urban space there On the other hand Peter Zumthor [2 - op.cit. 75] states: "*the object and its environment: a consonance of nature and artificially created work that is different from the pure beauty of nature and different from the pure beauty of an object*". Concluding, there is new quality of beauty achieved when architecture is incorporated into landscape, or when nature is introduced inside the built environment.

II. ELEMENTS OF NATURE

The natural elements used in contemporary design of urban and architectural interiors are those, present in architecture ever since – water and greenery. They for both practical and aesthetical reasons. On one hand they may be used as tools for environment enhancement as well as means of composition improving visual qualities of the space. Water and green features improve air quality through controlled evaporation, help manage rainwater through retention and infiltration, may support heating and cooling systems through heat exchange, are a part of sewage filtration systems, also provide alternative energy source as energetic crops, or water flow power plants. On the other hand they both provide flexible substance for interior composition. There are multiple possibilities offered by the use of natural elements: transparency, reflections, colour, motion, sound etc that allow the creation of different ambiance and impression, also generating particular moods and feelings [3]. The unique value of those elements lays in their changeability.

The shape of water and green features in urban and architectural space is unrestricted - from whole surfaces, planes to single points. Perceiving the townscape according to Kevin Lynch natural elements may become important points of interest on the mental map of the city. They may provide nodes, focal points, intersections or loci clearly distinguished by their unique identity [4]. Jan Gehl in his theory introduces perception of the space as a sequence of interiors watched by observer moving at a certain velocity [5]. Each of those interiors consists of basic elements – large ones: floors, walls and ceilings, and small ones that form accents or dominants [6], [7]. Natural features such as greenery or water may become a substance for any element of architectural or urban

composition as shown in the case studies below. Developments described were ordered into three groups: urban interiors (spaces between the buildings, foreground); in between the building and the landscape (entrance zone, intervening garden); architectural interiors (surfaces and accents) [8].

III. PUBLIC SPACES

Chiswick Park – urban, floor, greenery+water, dominant, axes. (see fig. 1) The individual buildings at Chiswick Park, London designed by Richard Rogers Partnership are arranged around a central linear water feature that creates a water floor dominant for the interior. It is bordered by landscaping and timber boardwalks. The lake is formed on two levels with a waterfall connecting them. The buildings face one another and are fronted by pedestrian paths. The elevations are fully glazed to maximize outside awareness for the occupants. The buildings provide large internal areas of fine spatial quality in floor depths of 18m between central core and perimeter glazing. The floor to ceiling height of 3m promotes awareness of the fine external landscape and creates a light and airy feel internally. All vehicular movement is routed behind the buildings. The parkland provides a pleasant place for employees and local people to enjoy and the large trees and water help to regulate the air temperature around the buildings, reducing the urban heat island effect in the neighbourhood. The Chiswick Park landscape is almost 'water neutral' – it draws little water from external sources and most run-off is contained within the site. The lakes and waterfall at the centre of the development are the most visible elements of the sustainable urban drainage system that reduces site run-off to a level low enough to be handled by existing services. The irrigation system is fed from the borehole, it reduces the need for potable water. The result of the project has been an important addition to the green infrastructure of a relatively dense part of London, bringing benefits as a wildlife corridor, public amenity space and in providing robustness in the face of climate change.

Mile End Park Ecology Pavilion – urban, floor, greenery+water, dominant, foreground. (see fig. 2) Situated amongst the water features and reed beds of Mile End Park, London the Ecology Pavilion provides an ideal large contemporary space within natural wild surroundings. The lake in terms of compositions acts as an extension of the building creating the modelling the entrance zone, and creating picturesque foreground for its elevation. The building itself is an earth sheltered structure, designed to be as energy efficient possible by utilizing the technique developed in the Rocky Mountains Research Centre - a passive annual heat storage system (PAHS). Opening on the lake provides support for natural cooling and heating system. Water needs for irrigation and lakes' top up, supplied from two specially drilled 40m deep aquifer boreholes; grey water is recycled and solar gain maximised through careful siting of buildings with 'living roofs' or sheltered construction which also visually integrates structures into the landscape. The ecology pavilion water

feature is home to rare orchids, moths and spiders and its trees, grassland and lakes are proving to be a home for water birds and increasing populations of dragon and damsel flies. The park acts as a tranquil visual interlude in an otherwise heavily built up area. Its architecture and design is contemporary, using much wood and metal in its construction while roofs designed into the modelling of the Pathway are turfed, relating directly to the landscape.



Fig. 1 Chiswick Park, Richard Rogers Partnership, London, 2000-2010



Fig. 2 Ecology Pavilion, Mile End Park, Tibbalds TM2, London, 2000

Franklin Delano Roosevelt Memorial – urban, wall, water, accent+dominant. (see fig. 3,4) A series of water walls were used as the main motive in the composition of Washington DC memorial place completed in 1997. It represents a sequence of three groups of urban interiors, which are part of the recreational areas surrounding the city from the south. The main idea is based on differentiating water walls in each of the combined areas. Some of them are a simple plane, some represent cascades becoming fluently a part of the interior's floor. In several places, they are shaped geometrically, elsewhere irregularly, mimicking the natural landscape form. Cascades of water produce a tranquil, murmuring sound, providing relief from urban noise. The water sprayed into the air cools the area and improves its quality. The memorial introduces the sensory impressions similar to those induced by contact with natural landscape inside the recreational area of a large city.



Fig. 3 Franklin Delano Roosevelt Memorial, Washington, DC, Lawrence Halprin, 1997



Fig. 4 Franklin Delano Roosevelt Memorial, Washington, DC, Lawrence Halprin, 1997

IV. PUBLIC INTERIORS

Onassis Cultural Center – architecture, wall, water, dominant. (see fig. 5,6) The need to experience the natural landscape is also reflected in the composition of the architectural interiors. The water wall inside the atrium space of the exhibition Onassis Cultural Center in New York creates a geometrical cascade compositional closing to the axes of the whole interior. The movement of the water provides sensory experience imitating a natural waterfall. Water particles sprayed into the air creating the mist, a field for optical prism illusions. They also provide effective air quality improvement inside the whole interior. Cascading water produces a sound that is essential for the recreational nature of that space.

David Rubenstein Atrium at Lincoln Center – architecture, wall, greenery+water, accent. Harmony atrium was formerly a privately owned public space of mere visual quality and functional solutions. Lincoln Center reinvented this area with the true intention of creating a place for the public. Wedged into Manhattan's dense fabric, the passageway currently serves as public visitor facility. The main accent of the 6m high interior are two vertical gardens and a fountain in the ceiling drops thin streams of water into a stone basin. Apart from their compositional value, they also perform as components of the air quality system. Multiple oculis pierce the ceiling to bring natural light into the double height space. Transformed by light, color, texture, and thoughtfully chosen materials, the space is now a tranquil and welcoming oasis. This is an exceptional revitalization of an urban interior space that is both uplifting and considerate.



Fig. 5 Onasis Cultural Center, New York



Fig. 6 Onasis Cultural Center, New York

TU Delft Architecture Faculty – architectural, wall, greenery, dominant. BKCity is a magnificent listed monument of more than 30.000m² functioning as the faculty of Architecture of the TU Delft that became a subject of sustainable refurbishment. It is a historic 1920s labyrinthine brick structure where the use of environmental friendly technologies transformed it into fresh, contemporary interior. Furthermore within the next ten years it is planned to be

energy and carbon neutral structure serving as a didactic tool that puts sustainability at the heart of education for the generations of architects. The result of the project, focused on increasing energy efficiency and decreasing operating costs is an outstanding composition of greenery infiltrating historical structure, creating a space that addresses sustainability in an integrated manner: Energy & Materials, Ecosystems & Species, Culture & Economy, and Health & Happiness. In the next phase of realization following issues are planned to be referred: an indoor plant ecosystem, energy and water usage that is operationally sustainable

Dutch Broadcasting Company Headquarters Hilversum - architectural interior greenery accent. The Hilversum building designed by Ector Hoogstad Architecten is home for the AVRO, KRO and NCRV – three large Dutch broadcasting companies. Through its strong and unambiguous building structure: a continuous ribbon of office space it harmonises with the surrounding villas and the greenery of the Media Park despite the huge difference in scale. The structure is folded onto the lot in a zigzag pattern in order to create conservatories that provide space for vertical communication. All of those interiors contain bamboo gardens designed by WEST 8. Their geometrical form accents the main ground floor areas which are open to the public. They also contrast with brick walls – tribute to Hilversum Town Hall designer, Willem Marinus Dudok. The internal gardens apart from their compositional meaning are parts of the air quality and distribution systems.

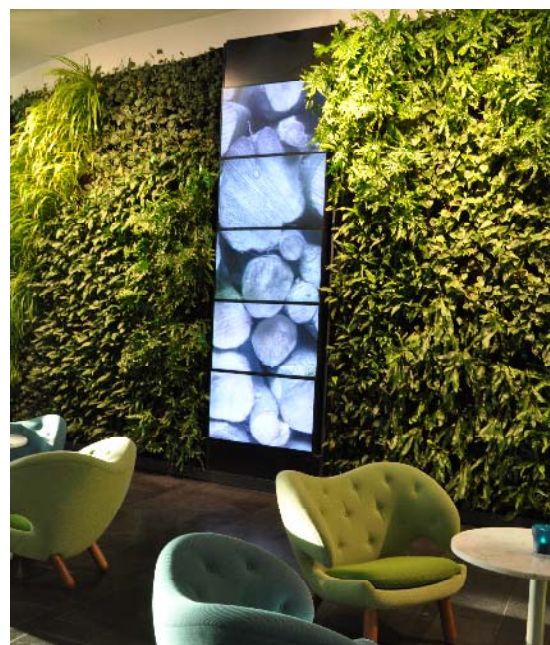


Fig. 7 Bella Sky Hotel Lobby, Copenhagen, 3XN, 2011

Bella Sky Hotel Lobby – architectural, wall, greenery, dominant. (see fig. 7) Bella Sky Hotel is the largest building work initiated in Denmark in 2008 and will be one of the largest hotels in Scandinavia.

It has become a unique landmark of Copenhagen's new urban area, Ørestad. The dynamic shape and an unobstructed view from all rooms is what makes the design of the building so exceptional. Nevertheless, the interiors of this structure match the intriguing, twisted form of the structure. The hotel lobby is merged into the existing entrance lobby of the Bella Center, conference venue, on the other side it becomes a continuation of the landscape design. The composition of the main lobby is based on placing the icons of Danish design in an interior defined by a large vertical garden. The green lobby wall, apart from its compositional role as a contrasting background for the light furnishings is designed for improving the air quality inside the entrance area.

V. CONCLUSIONS

Today we tend to go back to the past to our root connection to the nature in its very primitive form. Therefore in search of friendly spaces there are small "fragments of natural environment" introduced as elements of spatial composition. [7] Though reinvented through the use of the new sustainable substance, still, in principal, they remain the same. Describing contemporary urban and architectural interiors composition we may continuously refer to the components of a cityscape identified by K. Lynch and K. Wejchert and to the elements and rules of architectural composition classified by R. Krier and J. Żurawski. It may also offer attractive places for dwelling, work and recreation, providing interaction, face to face contact areas; both people and environmental friendly.

ACKNOWLEDGMENT

The presentation of the paper and conference attendance was made possible by funds from the project „Politechnika XXI wieku - Program rozwojowy Politechniki Krakowskiej – najwyższej jakości dydaktyka dla przyszłych polskich inżynierów” within the Operational Programme Human Capital, one of the programmes devised to implement the National Strategic Reference Framework (NSRF) 2007-2013 covering the entire intervention of the European Social Fund (ESF) in Poland.

REFERENCES

- [1] G. Schneider-Skalska, *Kształtowanie zdrowego środowiska mieszkaniowego*, Kraków, Wyd. Politechniki Krakowskiej 2004.
- [2] P. Zumthor, *Thinking Architecture*, Berlin, Birkhauser 1999, p.37.
- [3] W. Tatarkiewicz, *Dzieje sześciu pojęć: sztuka, piękno, forma, twórczość, odtwórczość, przeżycie estetyczne*, Państwowe Wydawnictwo Naukowe, Warszawa 1982 r.
- [4] K. Lynch, *The Image of the City*, The MIT Press 1960.
- [5] J. Gehl, *Life between Buildings. Using Public Space*, Island Press 2011.
- [6] K. Wejchert, *Elementy kompozycji urbanistycznej*, Wydawnictwo Arkady, Warszawa 1984 r.
- [7] G. Schenider-Skalska, *Architektura a natura*, Środowisko Mieszkaniowe - Housing Environment 6/2004.
- [8] Krier R., *Elements of Architecture*, Academy Editions, London 1992.
- [9] Żórawski J., *O budowie formy architektonicznej*, Arkady 1962.