How do waterscape projects combine landscape design and natural processes to create dialogues that engage both culture and nature? The case of the Boston park system and the solar city

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Abstract

The transformation of nature through urban development has resulted in a disturbed ecosystem. Urban infrastructure built to contain and overpower natural processes has finally been particularly harmful. In recent years, some ecologically and culturally conscious design practitioners have tried to develop a way to combine the processes of nature and the aesthetic qualities of water in order to create urban spaces that bring people together in embracing the nature and culture of a place. These types of projects are called "waterscapes." Waterscapes are constructed water features in urban public squares and parks: they celebrate the role of water in our urban landscapes and allow people to experience the qualities of water through touch, sight and sound. The rationale behind this way of treatment of water resources is to produce sustainable and beautiful urban spaces where people can engage with the pleasures of water.

Keywords

Waterscape, urban ecology, water infrastructure systems

INTRODUCTION

Water has supported the landscapes of our civilizations. Earth's evolution and transformation is due to water. Nowadays we are facing complex urban development processes leading to completely new challenges concerning the management and design of urban infrastructure systems and landscapes. Water can improve spatial quality by creating an attractive and spacious place.

Landscape architects, planners and designers know better the fundamentals of water and its power in transforming our landscapes. This means that it is water that allows us to reaffirm our commitments to landscape. The potentials of nowadays water infrastructure systems for shaping urban form and meeting human, ecological and aesthetic objectives have almost been lost. The processes of extreme and unpredictable urban growth and decline are leading to huge challenges concerning the affordability and functioning of present water conceptions and demand new innovative solutions. The appearance of water infrastructure systems, further accentuating natural physical landscape structure became a visual and spatial component of structuring and organizing cultural landscapes. The relationships between natural and human processes are based on a deep understanding of complex processes. Water infrastructure was able of creating synergies with other important urban functions, serving as an open space network for social needs. However the

increasing pressure, intensity and speed of urbanization led to the disappearance of any visible forms of water infrastructure in most cities.

The transformation of nature through urban development has resulted in a disturbed ecosystem. Among the many consequences of a disturbed hydrologic cycle are polluted waterways because of sewer overflows and urban runoff, subsiding land due to a diminished water table, and city dwellers that are deprived of experiencing the fundamental life force of water. Urban infrastructure built to contain and overpower natural processes has finally been particularly harmful. After these observations, we need to realise that urban structures will have to be reexamined in order to achieve an urban landscape where water's existence is going to be evident.

Contemporary landscape and urban design is usually looking at urban landscapes with mainly aesthetic considerations constrained by an attachment to the picturesque. In order to change their current situation and become more attractive, most cities are developing programs to open up their inner-city waterfront locations on canals and rivers. Landscape architects and designers have not being questioning themselves about the technical nature of infrastructure. Rather than leaving this field to engineers, the profession of landscape architecture should take a leading part in the reconstruction and development of urban infrastructure systems. The strength of landscape architecture lies in its ability to extend our understandings of infrastructure, linking the performance of natural processes with engineering and urban design strategies. In order to manage to create an infrastructural landscape, it is basic to develop a more profound and practical knowledge about ecological systems and a more developed cooperation between different disciplines and practitioners combining the work of architects, engineers and urban designers.

Combining the built and the natural will possibly allow to new logics towards the cultivation of infrastructural landscapes as a base of sustainable urban and regional form.

MATERIAL & METHODS

Liquid perception is the promise or implication of another state of perception. According to his cinema theories, Gilles Deleuze considers that liquid perception is "more than human perception, a perception which no longer has the solid as object, condition or milieu. It is a more delicate and vaster perception, a molecular perception" (Deleuze, 1986).
In this paper the aim is to show the importance of moving towards a systemic approach to urban ecosystem by introducing a water-urbanism. The examples that are going to be presented explicitly demonstrate how water shapes the urban landscape, how projects allow people to see, hear, touch and experience water moving through segments of the city.

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Waterscapes as fountains and open waterways are examples known from ancient times, proving how closely urban design has been linked with water. This relationship can be traced from antiquity through the Middle Ages arriving finally to modern times. Water was not only combined with the city's prosperity but as well was used to express a living relationship between a city and its

surroundings. For example, the small-scale garden or park is the most comprehensive form of man-made landscape. It shows us the pertinence of paradigms and of ways to understand how landscape works: being able to imagine water spaces with more complex requirements and more complex structures according to topography demands and ecology conditions.
But still, water remains one of the key questions that has to be answered in order to move towards a sustainable relation assuring the stability of urban ecosystems. We need to move towards a sustainable water culture. Natural water has to be combined with aesthetic creations in order to achieve urban ecological waterscapes: the combination of the scientific with the aesthetic can assure design strategies concerning water's transformation.
Protecting and managing of a landscape require noticing, conserving and leading each landscape component. Water resources are the most important natural values that complement the landscape and provide ecological cycle. In this context:

i. Recognition of the diversity of water resources to include aesthetics and its inclusion in water resource design and planning will contribute sustainability.
ii. Water resources should be considered as a whole and all cultural studies related should be planned and managed by focusing on these natural values.
iii. The water should be able to be used as a visual resource value for planning at macro level and design studies at micro level.

EXEMPLES

In this paper we will present two cases, located in different periods, illustrating the principles of sustainable urbanism, where water principles are among the priorities of each proposition.

The Boston Park system Back Bay Fens

The first example is the Boston park system designed by Frederick Law Olmsted. Frederick Law Olmsted was an American journalist, landscape designer and father of American landscape architecture. He was famous for designing many well-known urban parks, including Central Park and Prospect Park in New York City. He developed a style of landscape design that still exerts a strong influence on his profession. Olmsted believed that the rural, picturesque landscape contrasted with and counteracted the confining and unhealthful conditions of the crowded urban environment and served to strengthen society by providing a place where all classes could mingle in contemplation and enjoyment of the pastoral experience. He sought to screen his "pleasure grounds" completely from the intrusions of daily life by screening them with thick plantings along their borders, separating and excluding commercial traffic, and discouraging all usage of the grounds which were not in harmony with this goal. He also strove to bring the landscape as close to as much of the urban population as possible, so that all could benefit from it. He designed parks and public recreation grounds trying to create spaces that had an important psychological effect to their users, planning every detail in a specific way. He also conceived of entire systems of parks and interconnecting parkways to connect certain cities to green spaces.
The success of these larges-scale urban parks was the implementation of a new vision of urban form that led finally to the application of an ideology of moral and civic improvement in other areas of urban design. Modern technology and science made city a safe place to live. Improvements in water supply, water treatment and sewerage benefitted the health of the cities increasing their comfort and safety.

In the late 19th and early 20th centuries, Frederick Law Olmsted devised strategies that both solved complicated drainage problems and provided cherished public open space as in the Back Bay Fens [figure 1]. His conceptions for metro-wide park systems, linked by scenic parkways, took its most

comprehensive form in the 1890's proposal for Boston regional park system. It is considered today as a park that marked the culmination of the evolution of the naturalistic urban landscape. The plan proposed by Olmsted evoked the scenery of nearby salt marshes. To manage this he had to provide ingenious solutions to a series of problems involving sanitary engineering, traffic engineering, recreational facilities and institutions for scientific educations.

Figure 1: Sylvester Baxter, *Boston Park Guide*

The project's site (Back Bay Fens) was a noxious, sewage-soiled mudflat. For Olmsted the project had a strong sanitary engineering aspect that should be resolved. In order to keep water permanently in the area, he created a basin with a tidal gate. The problem was that the two major steams that fed into the Fens would cause devastation to the basin in case they flooded. The solution he proposed was for the streams to bypass the Fens through conduits that could carry the ordinary rate of flow and to plan the Fens to handle the overflow during freshets. In order to create a soft vegetated edge around the basin, he had to solve two problems. First of all he had to provide adequate space to hold the floodwaters and have at the same time room left for natural growth. Secondly, he had to protect the natural shoreline from erosion by surf during storms. The proposal he suggested was to make gradually shelving banks and to construct wide islands slightly above the usual water level which would be planted. In flood conditions a full fifty acres would be covered by water, but the plantings would slow the serf's development. The water in the basin would be extremely high tide on the river after which a gate would allow the water level to fall as the ebb tide drained the river.

This project, that gave Olmsted the opportunity to preserve stream ways in the midst of built-up areas, was linked to the Muddy River valley between Back Bay and Jamaica Pond [figure 2]. He proposed to narrow the river valley in some places in order to make the river follow a more graceful course and create a chain of picturesque fresh-water ponds. On the Boston side of valley he planned a public way that continued the walk, drive and ride system of Back's Bay design. On the other side he allowed more space for planting along the walks and drives. Between Jamaica Pond and Franklin Park the walk was extended by means of the Arborway consisting finally a multilaned parkway.

Figure 2: Olmsted archives, *Boston Park System*

Olmsted's plan for Boston's park system, known as the «Emerald Necklace» consists of several small parks that are linked by tree-lined roads called parkways. This concept of separate but connected parks provided a way to link newly-added areas to the traditional city center while providing several forms of recreation for area inhabitants such as pleasure driving, picnicking, and hiking [figure 3].

Figure 3: A view of the park

The solar city in Linz

The second example is the Solar City, in Linz (Austria). The Linz Solar City Project is an integrated solar village for 1300 households on the outskirts of Linz. The city of Linz assigned the task of designing the first 630 homes to architects of the calibre of Norman Foster, Richard Rogers and Thomas Herzog, who has been a pioneer of sustainable construction since the '70s.
The project is among the larger settlements built on the basis of the tenets of sustainable architecture [figure 4]. The basic principle underlying the project is the desire to promote low cost building methods internationally. The sustainability parameters include achievement of maximum possible density, maximum flexibility of types, and careful study of traffic routes to promote and facilitate pedestrian and cycle traffic. Individual homes are built to make the most of the lie of the land, with greenhouses, winter gardens, balconies and orientations that benefit from the climate and nature surrounding them. One of the parameters taken into consideration is energy supplies: the development was not supplied by the city's electricity grid but co-generate its own energy with "solar" installations which will, in the future, make the neighbourhood completely independent and even allow it to return part of its energy surplus to the city's energy grid.

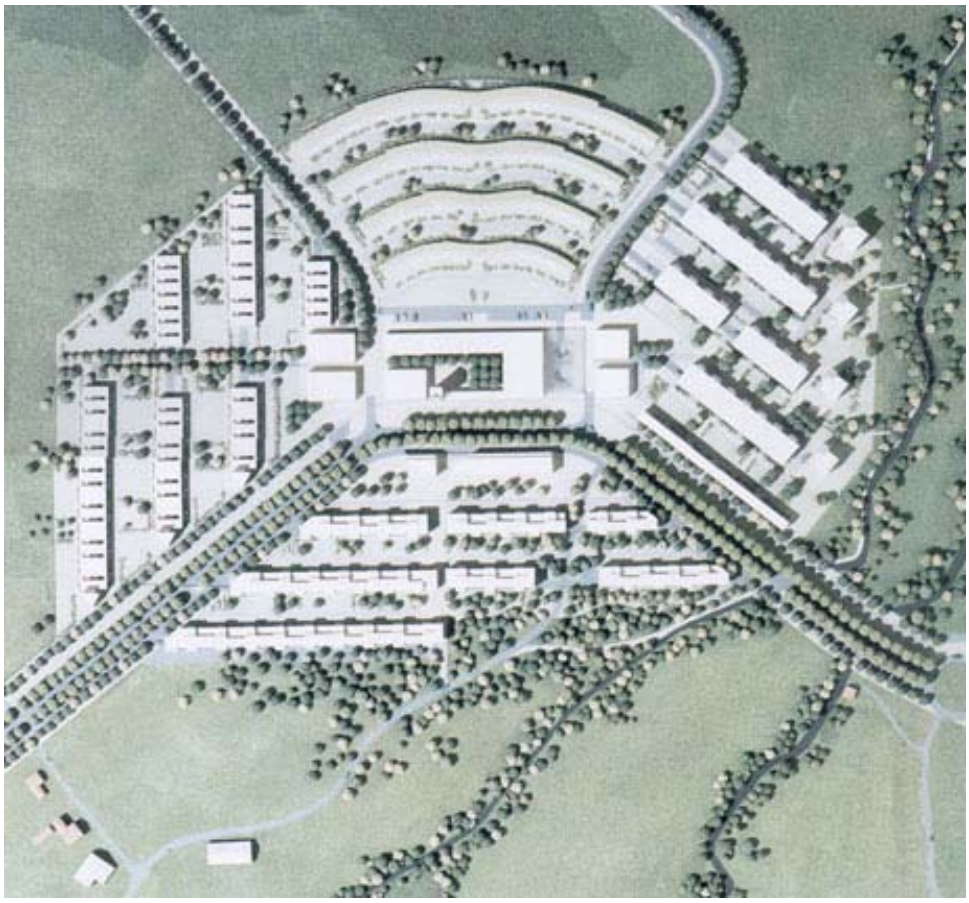

Figure 4: Solar City: masterplan

More particularly, the site is located close to the two rivers that pass by Linz: Danube and Traun. The place was characterized by a typical landscape of water meadows. The aim was to transform the water meadows to a nature conservation area. This meant that the designers had to fend off threats to the nature conservation area without banning access but by controlling it. Rainwater was the first thing that had to be controlled: a system of channels, basins, ponds and streams, extending from the area near the buildings to the wooded meadows was thought. Rainwater is brought where possible to seep away and larger quantities of rain have their own channels or are fed to the raceway in north of the Solar City.

Among the priorities were groundwater upgrading, the creation of permanent and temporary wet areas and finally support to the water regime in the river meadows. To protect the landscape, a range variety of different recreation areas, such as playgrounds, gardens and meeting places, was established between the Solar City and the nature conservation area. Furthermore, a park corridor or a "parkway" and facilities like a bathing lake, allotments and a sports center were thought to enrich the project [figure 5 and 6].

Figure 5 and 6: Solar City: permanent and temporary wet areas

CONCLUSIONS

As pieces of urban infrastructure, waterscapes respect and celebrate the hydrologic cycle of nature while simultaneously expressing the cultural importance of water for humankind. Waterscapes construct and repair all types of water features, from small to large features. They concentrate on introducing water features and water courses into the landscaping of an area. On one hand they can be natural elements that penetrate the city (rivers, lacks or the sea) which are taken into consideration in order to form the urban shape. On the other hand, waterscapes can be constructed: artificial creations are usually though during or after urban plantation. The addition of ponds, waterfalls and water features are for example inherent to the completion of any office, landscaped garden, entertainment area or focal point. These two categories can as well be combined. In both cases, making use of dynamic natural processes, the designed urban landscapes will work as artificial ecologies.

The most valuable contribution of design practitioners can be made at the first stage of a project to generate ideas with technical understanding and creative flair for the design, organization, and use of spaces. First of all, they have to conceive the overall concept and prepare the master plan, from which detailed design drawings and technical specifications are prepared. They can also review proposals to authorize and supervise contracts for the construction work. Other skills include preparing design impact assessments, conducting environmental assessments and audits, and serving as an expert witness at inquiries on land use issues.

Water is after all, a natural element and requires careful management. With careful harvesting, cleaning, use and re-use it can be (re-)considered as a liveability element to urban ensembles.

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