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Roof gardens: an opportunity to expand the art of landscape architecture

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Abstract: In the Paris world exhibition of 1867 Carl Rabitz, a German master builder, patterned the roof of his own villa to extend the functional space in the building design. The flattened roofs and the extra space given to the appartment was used for amenity. In the 1970's, people started appreciating the value of alternating the cityscape with the coverage of large parking spaces and the roof terraces were transformed into green roofs. However, it was not until the 1980's that the environmental aspects of such structures started coming into consideration as people sought environmental solutions for the increasingly congested cities.
In contemporary times the bioclimatic and the economic advantages that the green roofs provide to buildings have become an integral part of their design. Roof terraces are not positioned any more on the top of a structure, they are the structure and together with other structural matters function as a living organism allowing the control of the environmental attributes inside and outside the building.
The new trends emphasize the importance of vegetation in the architectural design to regulate the energy consumption and the thermical comfort of the building while, at the same time, rendering that soft texture to the appearance of the structure that only natural elements could provide.
Landscape architecture as the only practice that can combine architectural design with vegetation has a primary role in the transformation of the urban space. New possibilities are emerging where landscape architects can exploit the bond between architecture and landscape elements in order to rearrange the urban texture and create a more livable cityspace.

Key-Words: Roof terraces, Bioclimatic design, Roof landscaping, Green roofs, Urban design, Landscape architecture.

1 Introduction

Natural ground in the cities is designed primary to serve people's functional needs. Little space remains for pedestrian and recreational use. Such administration of the city land has formed dense and fragmented city centres with lack of open space.
Contemporary urban landscape requires radical actions through design in order the city centres to become viable. The vertical segregation of vehicular and pedestrian movement launches the creation of a new level above the city ground and that can be designed without the restrictions of the natural one [1]. The new city floor can be formed by related levels· completed with all the ground level elements such as grass trees water, giving a way to the continuous circulation and recreative pedestrian standards on and above existing level and with building volumes above and below.
However provision of free pedestrian circulation cannot provide a successful urban space. Landscape architecture as the only science that can connect landscape function and environmental advantages through design has found a vast field to experiment and expand its possibilities in the environmental city design.
The concept of the roof landscape has evolved and what it used to be a green terrace or a private balcony used for amenity has alternated in an extra land that can be used as a reference point in the daily life of citizens and, in addition, regulate the circulation and the connection between districts isolated from heavy traffic or high buildings. Further has the ability to frame ecological solutions within aesthetic and cultural expectations.

2 The evolution of the roof terrace concept

The Babylonian hanging gardens (present day Iraq) are highlighted as the first trace in history where roof terracing was used as a systematic art [2].Gigantic, densely planted terraces were built up against the city wall in order to demonstrate abilities, knowledge and power. The terraces were supported with the use of a semi - mechanical irrigation systems, similar to an Archimedes screw, as a process for raising the water to the required height, according to writings on tablets that were found at Nineveh.

Romans were the next to involve in roof terracing, and improved the existing technology but taking it up a step further with such developments as the Augustus Mausoleum in Rome, where round terraces were built on the 44-meter hill above the marble monument with cypresses and fish-ponds on top [2]. The construction of roof terraces still considered to be a manner of prestige and dominance during the Roman period and well into the Renaissance period, where terraces like were revived with the rest of classical culture.

It was the Paris world exhibition of 1867 that changed the approach of designing roof landscape forever. Carl Rabitz, a German master builder, informed the public about the advantages and disadvantages of various types of roof and expressly recommended flat roofs because of the wide variety of possible uses for them. He produced a plaster model of his own villa with roof garden. A purposed designed flat roof intended principally for leisure use during the summer months. Simultaneously, he patented his invention, volcanic cement, as the ideal covering [2].

The main arguments for the design are still very relevant: beautification of the city scape, leisure space apart from the city congested, increased roof insulation and stabilisation of the effects of the temperature changes on roof structure and the internal environment.

Le Corbusier, the main representative of modern architecture, was the first to integrate flat roofs into the living space of the building. The flat roof and the living patio offered a new aspect in the social demand of the new buildings. ‘Is it not against all logic when the upper surface of a whole town remains unused and reserved exclusively for a dialogue between the tiles and the stars?” declares Le Corbusier in his book “Five points of new architecture”in 1923,where he is concluding with the words “The roof garden becomes the favorite place in the house and additionally for the town it means that the built –up space lost is regained.” [3].

Le Corbusier succeeded in eliminating the overemphasized decoration of the nineteenth century and introduced a minimal design. His obsession with geometric simplicity and the deficiency of plant growth rendered a half measure impression on the terrace designs.

In contrast Frank Lloyd Wright managed to integrate landscape design in his buildings by placing in accordance the lines of the building with the terrain and using abundance of foliage in his designs [2].

In 70’s the use of the roof landscaping liberated from the private space of the buildings and became a public urban space standard motif in covering substructures such as underground car parks and subways in order to integrate them with the surrounding environment.

The construction of the terraces as green roofs gradually became more established in the 80s when ecological building methods were discussed more widely. Energy saving and environmentally friendly construction was also examined with regard to roof greening. A special example from the 80s is the green Hundertwasser apartment house in Vienna built in 1983.

In recent years, concepts have advanced a great deal and architecture can work along landscape architecture and together create sustainable buildings that interact with the hostile cities and stand as art pieces in the urban landscape where they can be a reference point for the quality of the citizens lives.

3 Present trends

There are many different types of roof landscaping. Such diversity makes it difficult to identify exactly what is as a roof terrace. This term may include balconies, a large area over a parking garage, as well as roofs that occur at any level, from a few meters below ground to several feet up in the air.

A common parameter in naming a terrace a roof landscape could be the basic constructive profile that is made of different layers in order to provide safety for the building and its user and for the construction of the terrace itself. This way a roof terrace can be defined as any space designed with or without planting, separated from the ground by a man made structure. This definition though releases the roof landscape concept from any restriction that limits it to be on a roof. The range of possibilities is expanded and a roof landscape can have any form and

(Fig.1 Freeway Park
http:/w/ww.seattle.gov/PARKS/park_detail.asp?ID=312)

can be located on any construction. As a result the living walls and the green roofs that have a common constructive profile are consider to be part of the roof landscaping and they demonstrate the new possibilities that are opening for landscape architecture.
Green roofs perform better in matters of durability and utility, but mostly they offer a chance to produce art and design in the form of living architecture. At present times the challenge in designing a terrace is to overcome its technical nature and create a statement for the alternation of the urban context.
Past examples like the Freeway Park in Seattle, verify the notion that vegetation and free pedestrian area can enhance the quality of urban life and create living spaces that last in time. Halprin's radical proposal was to create a more extensive landscape which in a sense "ignored" the freeway by building over it, thus connecting the two

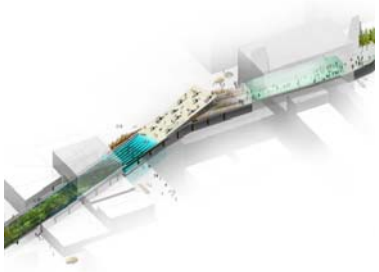
(Fig.2 Freeway Park
http://www.seattle.gov/PARKS/park_detail.asp?ID=312)

districts once again. He describes his approach thus: "..the trick is to perceive the old freeway as part of the cityscape and tame it rather than complain about it…" [4] Halprin has deliberately turned his back on any temptation to create an artificial naturalness. In various spots there are openings with views to the freeway.
The Halprin's design had a vision and this is what differentiates it from other similar projects

Fig.4 Overhead passage in London

Fig.3 Overhead Passage in Japan

(Fig.2,3) that were aiming to reorganise the circulation as well. The impact that green vegetation had in the downtown area along with the vast use of water and the free pedestrian passage in city center, created a memorable project that can be a reference for contemporary examples.
A similar contemporary project is the Highline in NY(Fig 5,6) . The abandoned historic railway in NY that as the years passed by has become a green "corridor" that enters inside the city like a natural torrent and brings with it all the wild vegetation.
In this case the area to be designed had the



(Fig.5,6 Highline NY
http://www.thehighline.org/ design/prelim_design/ highline.htm)

character of a linear field, defined by the strict line of the railway bridge and rendered with the wild vegetation that had grown there. The design manages to balance the formality of the railway ridge and the natural wildness of the vegetation. The railway tracks create a grid of parallel lines that are crossing all the way down the space creating this way a recall to its previous use. An old railway is transformed into a long roof terrace that provides a free pedestrian area. Creative roof landscaping has assured that the memory of the railway survives, while a new space is added in the urban landscape of NY and in the annals of the world landscaping.

When the roof landscaping is interrelated with building structures (Fig.7,8) there the results are unanticipated. The terrain borrows the plasticity of the building and is impose on the structural components with the dynamism that only living elements can add on the cold still urban landscapes.

Fig.7 Namba commercial centre Japan

The project features a lifestyle commercial centre crowned with a rooftop park. In addition to providing a highly visible green component in a city where nature is sparse, the sloping park connects to the street welcoming passengers.

(http://www.metaefficient.com/architecture-and-building/unusual-green-architecture-in-japan-namba-parks.html)

When the roof landscaping is interrelated with building structures there the results are unanticipated. The terrain borrows the plasticity of the building and is impose on the structural components with the dynamism that only living elements can add on the cold still urban landscapes. At the same time the architecture of the building emerges and is improved with the successful coexistence between structural and planting materials. The bioclimatic advantages add a long term low cost function to the building and increase the environmental benefits. Contemporary designs propose even larger areas of roof terracing, like a project in Moscow (Fig.9) where a whole city is created under a vast terrace. Such projects that offer a greener image to the city in previous years would be considered unconstructable because of the increased cost.

Fig.8 School of ART, Design and Media at Nanyang Technological University, Singapore

This remarkable piece of architecture has been described as 'a vegetated form that blends landscape and structure, nature and high-tech and symbolizes the creativity it houses'.The curving green roof distinguishes the building from other structures on campus but the line between landscape and building is blurred. The roofs serve as informal gathering spaces challenging linear ideas and stirring perception. The roofs create open space, insulate the building, cool the surrounding air and harvest rainwater for landscaping irrigation. Planted grasses mix with native greenery to colonize the building and bond it to the setting.

(http://www.psfk.com/wp-content/uploads/2008/10/singapore-green-roof.jpg)

Fig.9 Crystal island Moscow

Foster and Partners have just been granted preliminary permission to start construction on this volcano-shaped

superstructure in Moscow, which will be dubbed "Crystal Island". In terms of efficiency monolithic buildings like this seem unnecessary, but the proposed dimensions are amazing: it will be 1,500 foot tall with 26,909,776 foot squared of floor space, that's enough room to house 30,000 people.
(http://www.metaefficient.com/architecture-and-building/the-largest-building-in-the-world-to-be-green.html)

Over the past decade the technology has improved and green is not considered an extra luxury or a show off but a necessity to regain the lost balance with nature. The energy print of the project while being constructed and also during its function is more important in the long term and will compensate for any higher initial construction costs (Fig.9,10).

Fig.9, 10 Fuokoka Japan
(http://www.metaefficient.com/architecture-and-building/amazing-green-building-the-acros-fukuoka.html)

The new architectural trends incorporate the vegetation as a functional part of the designing process and not only for its decorative qualities. The new notions with respect to landscape create possibilities for landscape architecture to experiment and to expand its horizons and at the same time change the image of the present-day cities. The impact that such interventions have on the urban context can change the old perceptions in the use of the vegetation in the city development and from a solely decorative element be transformed into a functional structural element.

4 Conclusions

In the contemporary examples ground level and terrace are interrelated in a way that the user isn't consciously aware when he is divorced from the ground. The structures use natural elements of the landscape such as ground, planting and water while at the same obtaining an artificial profile (character).
Building and landscape coexist in a way that the building can obtain all the advantages that only a natural product can provide with a limited cost. The same time landscape is using architecture in order to regain all the lost terrain that industrialisation has taken from the modern cities. Creativity is unlimited with good design and landscaping. Landscape is applied to a building and it can take any form and shape in the urban environment. Vast opportunities are emerging in the field of landscape architecture when land can be constructed in a vertical way in the urban context. Roof terracing also can rearrange basic circulation and space problems in an ecological and politically correct way that architecture and landscape architecture working separately cannot. One time such constructions were considered to a luxury and a demonstration of dominance and power or an innovation that was trying to expand the functionality in the city apartments for the profits of urban constructors and the inhabitants. At contemporary times it seems to be a necessity and one of the major solutions to regain the balance between pressing demand for more living space and the natural processes that keep this planet alive and support for human civilisation.

References

[1] 1. T.Southard, "Living off the ground", Architects journal, 18 September 1968, pp.577 -583
[2] 2. John,Mayson Whalley , "The landscape of a roof", Landscape Design , February 1977, pp.7-11
[3] 3. Le Corbusier, "Towards a new architecture", The Architectural Press, 1946
[4] 4. Sutherland Lyall, "Designing the new landscape", Thames & Hudson, 1998