

Imagining Otherscape: Integrating Sociocultural and Natural Systems Through Soft-Tectonics

Emerging Micro-Environments

The MFO park in Zurich, Switzerland, by Burckhardt + Partner and Raderschall Landschaftsarchitekten AG, offers a novel landscape design on the former site of the engine company, Maschinenfabrik Oerlikon. This uncommon park challenges convention. The volumetric, spatial design of the park views plants as vital and essential elements of space making, giving definition to the spatial enclosure as well as helping to define its materiality (Figure 1). The seemingly fragile trellis structure is integrated with various plants, thereby creating a formal enclosure space that is more akin to an actual architectural structure than a “traditional” landscape appendage. Columns of greenery, double walls of ivies, as well as the roof garden that envelops the space represent a radical transformation of the classic arbor. Yet the diversity of plants used in this design helps the park move far beyond an “urban picturesque” in its delivery of a rich flora micro-environment.

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The MFO Park alludes to two premises of the built environment. The green enclosure is, in part, a reminder of the origin tale of architecture, the Primitive Hut. Portrayed in *Essai sur l'Architecture* by Marc-Antoine Laugier in 1755, the primitive hut has allegorical allusions to the Vitruvian vision first realized in the world of image. Interlacing vertical green surfaces and the scenery of naturalistic spaces connect the viewer to that tale, as well as to the romantic attributes of European gardens (Figure 2). Of greater significance, the richness and diversity of plants and their bold incorporation into the built environment makes the MFO Park a sophisticated horticultural system that represents a new calling for urban ecological architecture.

From a spatial point of view, the quasi-formal greenery—unwilling to commit to precise forms, specs, and modes of execution—creates a space that is new in configuration yet familiar in essence. The spatial experience is quite novel, and to some extent Imaginal for the public, earning high marks in terms responding to a growing ecological “social” agenda. From an environmental point of view, it is a micro-landscape system that contributes to the overall urban



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ecology of its surrounding context. This view promotes an “environmental” agenda. The space in-between these two readings of MFO Park is, indeed, that of design thinking.

On the one hand, the design thinking represented in this project dwells in “cultural issues,” broadly defined. This includes social systems, design culture, tectonics, etc. On the other hand, the design delves into “natural systems” such as horticulture, climate, etc. The fully realized concept ultimately suggests a hybrid of both sides. At the material level it embodies “hard” building tectonics (although minimal) interwoven with “soft” ecological communities. Lessons from the MFO Park are highly informative for contemporary architecture. While the project suggests the notion of “landscape as building,” it simultaneously codifies “buildings as landscape.”¹

SUBTLE SUBSTANCE

Architecture has historically associated itself with hard materials: stone, brick, concrete, or glass—the latter being the most ethereal but still rigid. Today, it is second nature to think of concrete or brick walls as we draw design lines. In contrast, greenery is associated with wilderness, gardens, loose ivy walls, or at best geometrical forms of green within structures. Nevertheless, the use of horticulture as a system that complements the conception of space in architecture has yet to be fully explored.

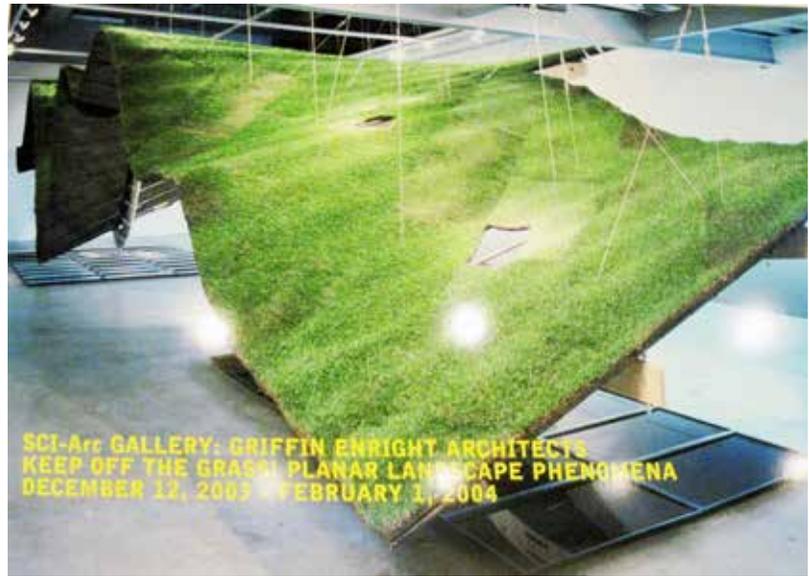
Marco Frascari in his “The Lume Material of Architecture in Venice” argued that light is an architectural material, thereby qualifying it for inclusion in the discourse of material culture. If one accepts his argument that light is an immaterial material or a “subtle” matter, how can we not include the infinitely more material world of plants as an architectural element? Given such a notion, it would be prudent to revisit the discussion of horticulture in architecture beyond its use as a periphery ornamental addition in indoor/outdoor landscape design.

Plants have long been the living companions of architecture, a subject of interest that has appeared in representations and actual built structures. A review of drawings of notable architects reveals that while plants maintain a presence in these representations, they are not major design players. Instead, they are objects that ameliorate the design context or the drawing. Many of these drawings regard plants as mere design appendages or “objects.” This trend of “objectified greenery” was, more or less, carried into built spaces, implying that the

Figure 1: *MFO Park*, Large-scale columns of greenery suggest new representations of plants in defining space (photograph by author).

Figure 2: *MFO Park*, The interior space. The green envelope and datum lines associate the space to the classic notion of arbor yet at a radically different scale (photograph by author).

presence of green is primarily seen through a visual paradigm. The Griffin Enright Architects installation, *KEEP OFF THE GRASS! Planar Landscape Phenomena*, at SCI-Arc, exhibited a formal interest in manipulating elements of landscape,



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thereby giving weight to such a visual interest (Figure 3).

As much as architects have pursued experimenting with emerging technologies and fabrication methods in creating sophisticated forms and (anticipated) functions, they seem to have sidestepped experimenting with horticulture in buildings in their material discourse. While advocates of “sustainability” have pushed the use of greenery into the architectural agenda—and with good reason—there is still much room to explore creative, yet systematic, ways of incorporating horticulture into the architectural design thinking culture. In contrast, landscape architects, by the very nature of their field, have shown greater success in incorporating plants in spatial usage. Landscape architect Lawrence Halprin experimented with the “soft” materials of water and plants, ultimately making them more accessible to the design world as viable materials, as “he knew plants horticulturally and could use them architecturally.”²

I understand that the problematic challenges of growing and maintaining living surfaces indoors limit design choices. But what if we could think of green living plant surfaces in the same way we do for concrete or brick walls? What if we view them not as a decorative afterthought but as interconnected with the building configuration—indeed, as a system component, an essential functional ingredient of the building? The possibilities are tantalizing.

SOFT AS SYSTEM

With new horticultural methods such as hydroponics and aeroponics, emerging materials, and advances in fabrication methods, these design restrictions need not be stumbling blocks. Recent advances suggest creative ways to incorporate “soft systems” into building design, thus placing flora and fauna as “micro-environments” into contemporary building design discourse.³ Can the plant components of a soft system actually fabricate buildings and/or be fabricated architecturally? Can “soft” be included in the design thinking vocabulary as a major conceptual, spatial, and productive element for space making in buildings? A broader vision behind this project is to explore new means for design thinking,

Figure 3: *KEEP OFF THE GRASS*. Griffin Enright Architects installation at SCI-Arc exhibits objectified landscape within a visual paradigm. (photograph from SCI-Arc poster by author).

as well as to explore emerging possibilities for creativity and imaginative design.⁴

Project Soft-Tectonics is research-design work by the author, representing a hybrid of concept and practice. As a concept, it argues for an expansion of design thinking in architecture to the field of horticulture and the art of planting. At the practice level, it refers to the systematic and innovative integration of “soft” (natural systems) and “hard” (tectonic systems). In essence, Soft -Tectonics explores the myriad possibilities of a new material culture leading to new urban ecologies as a viable option for system thinking in architecture.

At an initial stage, Soft-Tectonic concentrates on the realization of a living, vertical surface system in architecture. Such a system represents an innovative, yet practical, response to the considerable amount of “by-products” (vertical surfaces, walls) that architecture creates in achieving programmatic goals. Simply, for a room of 100 sf. we produce approximately 800 sf. of vertical surfaces. This project considers existing “underutilized” walls as vertical real estate and plans accordingly. The project goal is to transform wall surfaces into opportunities for “vertical farming.” I am particularly interested in edible and medicinal herbs and vegetables and the possibility of integrating vertical farming into building systems—in short, promoting the self-sustainability of cities. The first stage of the project resulted in a vertical farming system—the “Garden Curtain.”

GARDEN CURTAIN:⁵ BUILDING A SYSTEM OF SOFT-TECTONICS

With the goal of integrating natural systems and tectonic structures, the design conceived a flexible, curtain-like, vertical growing, Garden Curtain, system that could be easily integrated with architectural spaces at various scales (Figure 4). The following specific design objectives were considered to be essential for the optimized performance of the system in relation to architectural space and user experience:

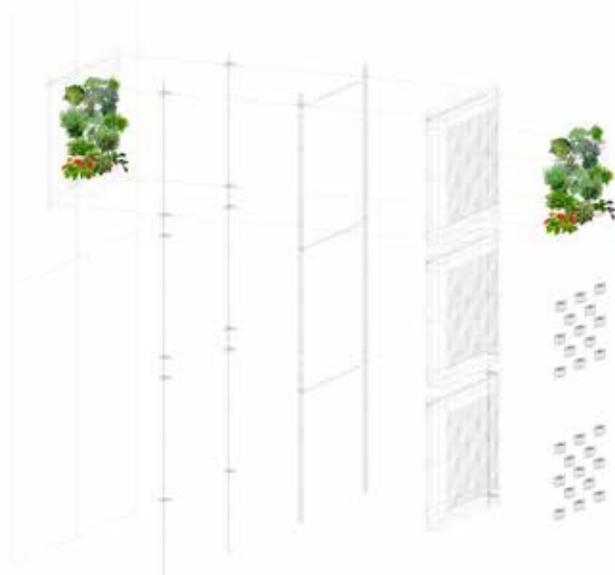
- Modular system (expandable and adjustable in size and form)
- Two-side growth (maximum use of growth surfaces)
- Light structure (to make it useable in almost any structure)
- Enclosed system (to eliminate concerns relative to humidity in building structures)
- Inexpensive construction
- Fast/easy assembly and disassembly
- Low tech enough to be easily utilized by the public

From a spatial design standpoint, the flexibility of the system was a core concern so that the system could easily lend itself to a variety of design materials, forms, and purposes. A positive user experience drove the design process, since the ultimate success of the project remains highly dependent on it being embraced by the public. In terms of mechanics, the design technology utilizes Aeroponics, a growing technology developed by NASA, wherein the soil is eliminated and nutrients are atomized in a contained environment to feed plant roots.⁶ Aeroponics offers several advantageous compared to traditional agricultural systems:

- Reduces water consumption by approximately 95% over traditional methods
- Eliminates nearly all pests due to the removal of soil from the system
- Increases growth rates by 5-7 times over traditional systems
- Is light in structure
- Significantly reduces volatile organic compounds (VOCs) that are produced by many man-made building materials

The design is comprised of modular units of enclosed container units similar to

pillowcases or bags. The container units then form a paneling system to create surfaces of different sizes and scales. These containers hold small growth units (bearing individual plants), which are filled with atomized nutrients (a very fine mist of water and nutrients of a particle size smaller than 50 microns) that are distributed through a tubing system. The tubing system both feeds and drains the container units and connects them to an external nutrient reservoir. This paneling system is easily attached to any surface. And because these portable growing surfaces are



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lightweight, they are easy to access for maintenance and harvesting needs.

DESIGN VISION, AFTERTHOUGHTS

Garden Curtain, while technically a vertical micro-farming system, also represents a sophisticated and impactful design choice when utilized at a mass scale. The following outcomes are envisioned:

Public Health and Social Impact: With socially responsible design always at the forefront, Garden Curtain is a very inexpensive structure, which makes it accessible to a wider public. The design system could be utilized as a shared farming option in urban locations devoid of traditional growing spaces, as new forms of roof curtain gardens, or simply in private residence as growing walls.

Urban Micro-Farming: One of the anticipated outcomes of this project is to promote urban farming in micro-scales, where land or “horizontal” real estate is rare, but vertical real estate is abundant. A principal goal behind this design is to develop easily-accessible micro-solutions to escalating food costs and possible shortages.

Entrepreneurial Spirit: The idea behind the design is to fabricate a system product for designers, developers, urban agriculturalists—and most importantly, for the public. In short, with a minimal investment any consumer could utilize the system in their built-environments. As noted above, an important goal of Garden Curtain is to empower more people to actively participate in food production, which will eventually have significant impacts on the micro-economies of urban dwellers.

Design Thinking Culture: Returning to the notion of “material imagination” discussed by Gaseton Bachelard, one could profit from the duality offered by Soft-Tectonics exemplified in Garden Curtain. At its core, this design concept argues for “building

Figure 4: GARDEN CURTAIN 5, urban vertical micro-farming system.

plant systems architecturally” while “planting building systems horticulturally.” Garden Curtain will also introduce new challenges and avenues of inquiry that are worthy of exploration. By disassociating horticulture from “garden” as its only authentic context—and instead associating it with a soft tectonic system—a new mindset for design thinking could emerge. This new perspective not only considers exploring green systems as a viable material culture discourse, but also views it an essential intellectual process for reconceiving the making of buildings.

The various advantages envisioned for Garden Curtain highlight four critical realms: Sociocultural, Natural, Economical, and Design. While all are consequential, the fourth category, Design, represents a creative and integrative enterprise that intersects all the systems and conceives unseen forms of built-environments that are ecologically and socio-culturally interdependent.

OTHERSCAPE IMAGINED

Soft-Tectonics, in referring to the systematic integration of the two fields at all levels, seeks to produce a tangible impact on human and natural systems.⁷ I would like to distinguish this discussion from the contemporary discourse on the so-called “green movement.” My intent here, in the broadest terms, is a push toward intersecting horticulture and architecture—with the goal of providing the design world a new apparatus that could trigger an architect’s imagination toward discovering new spatial consequences with new performances.

The premise of this project, at its heart, is to advance “thinking in systems” in order to expand the field of architectural in meaningful and innovative ways. Including a productive green system allows designers to explore novel ways of conceiving space in increasingly ubiquitous ways. In short, the notion of architectural space can be transformed into a multilayered entity—one in which natural systems, human systems, food systems, and economies of scale can coexist in a single, striking architectural space. This view of architectural space is different from the conventional notion of architecture as a hard tectonic system at best informed by other systems.

Apart from its utility in a tangible structure, Soft-Tectonics is first and foremost a platform for intersecting social and natural systems through imaginative design thinking. It seeks to create utopian worlds that do not yet exist. The coexistence of a multiplicity of systems in architectural space calls for the discovery of the “other” in our field. Hence, the search for *otherscape* is one that requires the collective imagination of design thinkers from various fields.

ENDNOTES

1. Berrizbeitia and Pollak, co-authors of *Inside Outside: Between Architecture and Landscape*, argued for a unified understanding of building and landscapes, as well as the possibility of seeing buildings as sites for intervention.
2. Laurie Olin, Foreword to, *A Life Spent Changing Places* by Lawrence Halprin, Penn Studies in Landscape Architecture (Philadelphia: PA, University of Pennsylvania Press, 2011). Olin refers to soil and plants as building materials as he continues: “Many of his greatest works were executed with humble, ordinary building materials: concrete, asphalt, stucco, wood, soil, and plants. . .”
3. The ACSA 101, *New Constellations New Ecologies*, already started this discussion by formally putting this topic into discussion.
4. The project was initiated from the domain of representation and imagination with the goal of envisioning spaces conceived of hard and soft materials that create a unified whole.
5. The design of Garden Curtain is currently patent pending (Application # 67/788,297).
6. NASA first developed this technology in order to grow vegetables in space with minimal use of water and nutrients.
7. *Soft-Tectonics or Hortitecture* is an interdisciplinary design-research project aiming at the integration of architecture and landscape architectural design by the author. As phase first of this project, design concepts of living green systems that could be incorporated into architectural design were developed and prototyped. While the first phase concentrated on technological, mechanical, and the sciences associated with the design, it seeks response to broader inquiries; that how soft systems can be incorporated into architectural design in ways that expand design as a systematic thinking as well as an imaginative journey.