



Recreating the earth

moving mountains and imagined topographies in contemporary architecture

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ABSTRACT

The present investigation intends to broaden the discussions about contemporary architecture, mainly in what concerns its integration issues with land use and ecology, and in this process, to contribute to enrich the current debates on the imaginary by proposing a dialogue towards a paradigm shift, encompassing alternative ways of doing architecture and inhabiting collectively the earth.

Departing from the multifold interpretation of architecture as a subtraction to earth (encompassing simultaneously the reference to tangible excavated architypes and the notion of environmental deficit), the paper observes the emergence and formulation, within contemporary architecture and urban projects, of an alternative response, in progressive consolidation, centred on the theme of recreated topographies. Focusing on a set of built and unbuilt cases proj-

ects, which demonstrate a variety of simulated landscape forms in its design integration with local ecosystem services, this analysis aims to characterize and define these works, unveiling the subjacent motives and contextual influences behind them. Questioning what consequences their premises would be able to introduce in current urban fabrics and problematics, it is then discussed the possible potentialities and shortcomings of this approach, including the extents of its dissemination possibilities, and its role in overcoming contemporary social and environmental issues, within and without urban areas.

1. architecture as subtraction

The notion of architecture as a subtraction to earth contains in itself interpretations that are multifold, and includes diverse concepts and practices, which cannot be considered as exclusive to contemporaneity. Subterranean structures and cities, including excavated dwellings, permeate architectural history and vernacular imageries, traversing a vast cultural and geographical range that extends from the Anatolian plateau, to the Chinese steppes, to North American rocky cliffs. Seemingly, leaving almost intact the earthen surface, these architectural forms, subtracted from the ground, soil and rock materials, derive from diverse local environmental rationales, including the economy of materials (and its recyclability, biodegradability and reduced environmental impacts) as well as passive design approaches (resorting to the soil stable temperatures in extreme climate conditions). Conceptually, these subtracted forms form in themselves a specific imaginary, of ancient experienced spatial archetypes and primordial refuges.

In addition, it is possible to interpret architecture's subtraction to earth not only as physically and immediately tangible but also in broader conceptual and environmental terms, and thus inherently shared by all architecture forms. The notion of construction as debit to the soil topographic and multifunctional surface, has been consistently expressed with increasing frequency since the 20th century, particularly as a toll towards nature, in its direct and indirect subtraction of living land and available resources. The need for further architectural surface with minimum soil usage has led to the concept of high-rise verticalisation, with imaginary landscape multiplication as early as 1909 illustrations, as outlined by Koolhaas (1978), and it is expressed in the possibilities of the *toit-terrace/toit-jardin* proposed in *The 5 points for a new architecture*, by Le Corbusier (1926), including the replacement in the coverture of a portion of land with access to sunlight (stolen from the ground), and the freeing of the understory soil, as walkable surface, by supporting pillars.

Furthermore, the increasing awareness of all the environmental impacts derived from the construction industry, including the subtraction of natural resources and biodiversity and the disturbance repercussions in ecological cycles, has therefore prompted the establishment of post-modern ecological thinking into sustainable built environments. If "*dwelling is the manner in which mortals are on the earth.*" (Heidegger, 1971, p. 3), then our human collective dwell now in permanent deficit, where developed countries models imply ecological footprints superior to the existing biocapacity, and a consequent decline of world ecosystems functions and services (MEA, 2003). With a worldwide increase of urban population, paralleled by an escalation of scarcity issues and of urban vulnerability trends, it has consequently deemed logic, as stated by Rogers (2001), that if natural resources consumption is inherently due to feed these hegemonic urban systems, it is also in the city that lays the possibility of inverting its depletion.

In parallel with the conservation and mitigation of remote environmental impacts, the need for the restoration and provision of ecological services within urban limits has also been formed. On-site landscaping and open green naturalized spaces, along with bioregional planning, have thus emerged as necessary to regenerate local urban ecological systems, although in the majority of existing consolidated urban fabrics, the opportunities for greening may be frequently scarce and restricted to the existing building envelopes (hence, associated with the dissemination of green roofs and walls, even though with much older origins). This, as referred by Grant "*leads to a blurring between the public and private realms, especially at street level, and an increasing reliance on the buildings as the platform for urban greening.*" (2012, p. 122), demanding novel solutions in architectural and planning projects.

2. recreating the earth

Deriving from this framework, it is possible to observe the emergence within architectural and urban projects, of recreated landscapes, as the progressive consolidation of an alternate response to its problematics. Differing from isolated flat green roofs on top of a high-rise or the addition of living walls in an otherwise conventional orthogonal building, these imagined and reconstructed topographical structures provide multiple continuities, mimicking inexistent or erased topographies, and connecting otherwise detached margins, altitude levels and recognizable places, through physically or metaphorically walkable surfaces, and frequently the concealment of the more conspicuous architecture traces.

These topographical manipulation approaches include several sustainability certified and ecological design iconic projects, such as the Fukuoka International Hall and the Singapore School of Art, Design and Media of the Nanyang Technological University, as well as other contemporary signature projects, with vegetated, mixed and non-vegetated surfaces, such as the Kiro-San Observatory, Lisbon's Museum of Art, Architecture and Technology, and the Oslo Opera House, as represented in Figure 1.



Figure 1: Recreated topographies: Oslo Opera House, Norway (left); ACROS International Hall, Fukuoka, Japan (center); Museum of Art, Architecture and Technology, Lisbon, Portugal (right).

In particular, in the research *Interpretation Patterns on the Design Integration of Local Ecosystem Services in Architectural Projects* (Vitorino, 2015), which develops a multi-criteria methodological tool and a comprehensive database with insight into contemporary case projects, focusing on the relationships between architectural design performance and local ecological functions, it has been identified a significant group of works expressing a blend with topography, directly related with this approach. This set of built and unbuilt cases projects - some of those fabricated on the fertile terrain of ideas competitions, and thus open to the realm of the imaginary-, demonstrate a variety of forms of simulated topographies, which illustrate and suggest alternative approaches to building and inhabiting the earth.

Project Name	Year	Author	Typology	Location	Features
Moos Water filtration plant	1914	Zurich Wasserwerk	Infrastructure (built)	Zurich, Switzerland	green roof: soil formation and fertility biodiversity and habitats durability of materials
Mill Creek Canyon Earthworks	1982	Herbert Bayer	Infrastructure/ Landscape Art (built)	Kent, United States of America	earth forms: water runoff and erosion control leisure and recreation
ACROS International Hall	1995	Emilio Ambasz + Nihon Sekkei	Mixed Use Building (built)	Fukuoka, Japan	interconnected accessible green roofs: biodiversity and habitats leisure and recreation climate & noise mitigation
Tree Mountain	1996	Agnes Denes	Landscape Art (built)	Ylöjärvi, Finland	earth forms: land remediation and reforestation erosion control community participation
Thermal Village Blumau	1997	Hundertwasser + Peter Pelikan	Hotel Ensemble (built)	Blumau, Austria	continuous accessible green roof: leisure and recreation landscape aesthetic fruition
Kitakami Canal Museum	1999	Kengo Kuma & Associates	Cultural Building (built)	Ishinomaki Japan	buried structure with green roof: landscape fruition adequacy to function, occupancy and circulation
Experimental House	2005	Loco Architects	Residential Building (built)	Tsukuba, Japan	earth forms: raw material resources materials cycle minimal wastage
Marine and Freshwater Resources Institute	2005	Lyons Architects	Educational-Industrial Building (built)	Victoria, Australia	continuous accessible green roof: rainwater collection and treatment landscape aesthetic fruition
California Academy of Sciences	2008	Renzo Piano	Cultural Building (built)	San Francisco, United States of America	undulating green roof: biodiversity and habitats energy cycle thermal insulating layer water conservation
Kagoshima Museum of Environment	2008	Nikken Sekkei	Cultural Building (built)	Kagoshima, Japan	continuous accessible green roof: climatic regulation structure design
Solaris	2010	Ken Yeang	Office Building (built)	Fusionopolis, Singapore	spiralled green terraces: biodiversity and habitats energy cycle climatic regulation
Interactive Museum of History	2011	Nieto Sobejano Arquitectos	Cultural Building (built)	Lugo, Spain	buried structure with green roof: leisure and recreation adequacy to function, occupancy and circulation
Neepsend	2011	Radu Costin Sava & Xiao Guo	Mixed Use Ensemble (unbuilt)	Sheffield, United Kingdom	continuous accessible green roofs: climatic regulation food provisioning
Mountain Band-Aid	2012	Yiting Shen, Nanjue Wang, Ji Xia, Zihan Wang	Residential Ensemble (unbuilt)	Yunnan, China	continuous green landscape: erosion and hazard control water cycle and sustainable life-style support systems

Table 1: Examples of projects addressing the integration of local ecological services with recreated topographies (adapted from Vitorino, 2015).

Spanning from approximately one century, the selected projects depicted on Table 1, without intending to be an exhaustive list, illustrate several of the formal typologies and relations with local ecology, established through the employment of recreated topographies.

Resembling rolling hills, the alternative designation of the Thermal Village Blumau, these projects partake the reinterpretation and recreation of the earthen surface into a series of slopes, offering the possibility and evoking the subtle motion of riding up-and-down over them.

In the project sequence depicted on Table 1, it is also possible to observe the chronological progression of this series. From infrastructure, landscape and land art projects, these recreated topographies tend to develop into the building scale, with increasingly frequency since the 1990's, in a series of projects, at times associated with environmental sustainability certification and ecological design dissemination. More recently, the development of this trend, manifested into digital media representations of unbuilt utopias, has also significantly reached larger urban scale ensembles and master planning projects.

3. moving mountains and the work of the imaginary

Attempting to unveil the subjacent motives and contextual influences behind this collective of projects, it has been firstly verified the contamination of 20th century ecological thinking and the extents of the notion of building footprint as a subtraction of biodiversity, permeable soil, aquifer recharge, and other interconnected ecological functions – which these projects attempt to replace both physically and/or metaphorically. The buried and excavated archetypal structures enclosed in the notion of architecture as subtraction to earth also contribute to its definition, acting as its spatial references at a primordial level.

However it is also worth to explore the existence of further material, aesthetic, philosophic and theoretical conditions contributing to support these recreated topographies. The influence of specific technological developments has been certainly determinant to its possibility, in both structural and representational terms, with the advancements in building structure design and green roof materials and specific systems, as well as in graphic representation and research, including computer generated three-dimensional visualization, parametric design, and photo rendering techniques. Whereas, on the theoretical field, they retain the echoes of diverse design research works, such as the *oblique function* investigated by Parent and Virilio (1966), and the *anti-object* and *organic architecture* strategies expressed by Kuma (2006, 2009).

While in itself, the recreated topography approach cannot be considered an absolute solution to sustainability, - even if it would be possible to restore or accumulate all the subtracted ecological services by the building footprint, other natural resource deficits would be necessary to address – it creates spaces that can trigger contemplation, primordial form of daydreaming, as mentioned by Valadares (2018), and holds up to the aesthetical function of green building, assigned by Hosey (2012). Reaffirming central concepts of *The Poetics of Space*, by Bachelard

(1964), it has also been argued (Vitorino, 2018) that the environmental awareness communication in contemporary architecture has been attempted through the recurrence of spatial archetypes, and other phenomenological experiences, including nature proximity and contemplation, such as the reproduction of a walk in a forest, or a climb to a hill.

Furthermore, this group of exceptional projects reveals in itself a whole imaginary of socioecological plenitude, and address metaphorically in fact the restoration of a terrestrial landscape continuity - presently broken in most built environments, in its multiple different terms: access, visual, ecological, social, etc.

As such, it is possible to question whether these practices signal the walk to a paradigm change in present day vertical megalopolis and what consequences their premises would be able to introduce in urban fabrics and problematics. A further discussion on the possible potentialities and shortcomings of this approach, including the extents of its geographical possibility of dissemination, and its utility to overcome contemporary social and environmental issues, within and without urban areas is still necessary.

Though cost, maintenance, and available space may be considered as immediate obstacles in a range of existing metropolis, it is also possible that we cannot directly address and spread directly these strategies into urbanized areas without significant whole society reformulations, as it would entail economical, technical and social challenges to address first. While it entails the possibility to overcome contemporary urban issues, such as inequality and vulnerability, by providing an accessible provision of ecological services such as food, potable water, clean air, and climate regulation, for instance, it steps on the shortcomings derived by actual property, economy and security issues.

However, here maybe lays the greatest interest of the persistence of these recreated topographic images and spatial formulations, that is exactly to act in the global imaginary to envision for instance, a collective future where: continuity would be the norm and discontinuity the exception in architecture and urban planning; environmentally, construction would be regenerative rather than subtractive; and the creation of new cities and urban areas could be planned with these principles in practice.

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