Transplacing the Limit

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''The sky above the post was the color of a television, tuned to a dead channel.''
— William Gibson, Neuromancer[1]

Beyond innovations in construction and structure, the traditional notions of physicality and enclosure of tectonic space — as a limit — have been removed for the first time. The notion of the unfeasible has been replaced by a simulated reality. The opening of the barrier is both physical and notional. The gap between the speculative (drawing) and possible (reality) may be bridged, and an avant-garde architecture may become possible, if only as a virtual experience.

In this paper, I will discuss the way that digital technology not only transgresses the limit of architecture, but also trans-places it.

1. THE ART OF TECHNOLOGY

For the most part, the 21st century started in the same way as the 20th had begun: with the optimistic vision of the Futurists, with their utopian and cathartic attempts that opened the way for successive generations of 20th century avant-garde designers. Socioeconomic trends triggered the Futurist movement, and most of the subsequent European 20th century art movements. While often art reflects cultural symptoms, avant-garde art consciously moves against tradition, and is eager to respond to technological innovation. Beyond discourse and criticism concerning its nature, architecture was slow to reflect external influences. The notion of permanence is an intrinsic part of its tradition. Nostalgic by nature, many architects are drawn to the past. Yet, a conscious movement past the attachment to history might instigate a quest for new stimuli, much in the same way that Le Corbusier's collages and paintings explored the beauty and implications of the mechanical object, as something that can generate form.

In the previous century, the primary concerns in the design of tectonic space, which was influenced by art, were composition and formalism. Modernist spaces were clear-cut, object-like, wholesome and sterile; they were organized according to isotropic principles. Only with the advent of digital technology in late 20th century, did architecture begin to release itself from the influence of art. Ultimately, it will not be the shifting perspectives of art that will transform architecture, but the on-going explosion of digital technology. In the 21st century, the art of technology — not art — will most likely be the force that shapes architectural design. The digital revolution has changed the prescribed characteristics of architecture; moreover, it has become an integral part of its morphogenetic process.

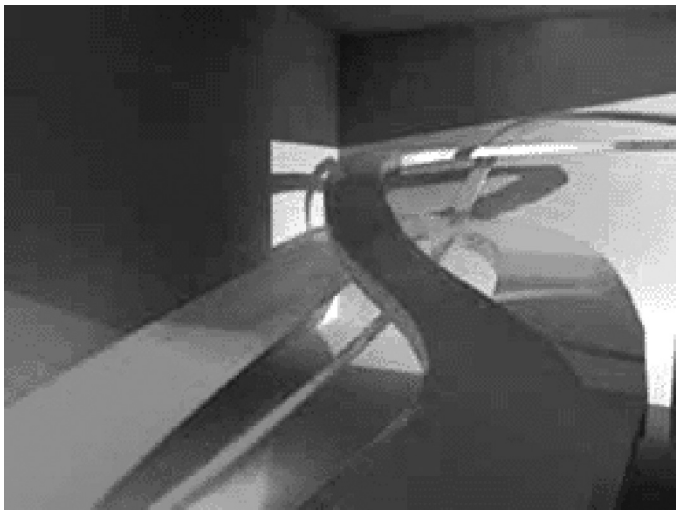

Fig. 1. Interior landscape, by the author.

Modernism had always provided an open field of ideas. It stood for clarity of space, materials and light. Now, for the first time in history, a hybridization has been

created by the convergence of science, technology and globalization. The early characteristics of what I will call a ''new digital modernism'' are already evident. They form a rather ambiguous hybrid, which is fabricated — oddly enough — through precise techniques of simulation.

In another paradox, the more architecture expands or negates its nature, the more it contracts and embraces other things. Architecture does not exist in a vacuum. According to Foucault, ''we are in the age of the simultaneous, of juxtaposition, the near and far, the side by side and the scattered.''[2]

According to Derrida, architecture needs to be ''contaminated''[3] and, in a sense, it has been. Architecture has undergone cross-pollination by other disciplines. It is now necessary to acknowledge its heterogeneous nature. Having been drawn into the realm of technology, which had been traditionally perceived as being ''outside'' its domain, architecture might become — paradoxically — rigorous in its nature. It might also be reinstated in the realm of the avant-garde.

2. TRANSGRESSING THE LIMIT

In the past, architecture rarely transgressed its limit. Any such attempts were restricted to theoretical discourse. Transgression does not deny the principle of limit. In fact, the existence of a limit is a prerequisite for any transgression. Moreover, a limit is not a limit until it is transgressed. According to Foucault, ''transgression is an action which involves the limit, that narrow zone of a line where it displays the flash of its passage, but perhaps also its entire trajectory, even its origin.''[4] As a result, transgressions may encourage the expansion and reconsideration of the position of the limit itself.

What is in question here is the invention of ''new relations, in which the components of architecture are broken down and reconstructed along other axes.''[5] These axes are now integral to the state of architecture, whose primary concern will no longer be the organization of space for functionality. In pushing architecture towards its limits, image becomes more important, because — in the age of digitalization and reproduction — the city of congestion turns into a city of abstraction, representation and simulation.

As Victor Burgin[6] argues, from a world in which images were once limited in number, circumscribed in meaning and contemplated at length, we have arrived at a society inundated with images consumed ''on the ?y'' through magazines, television, film, computer simulations, etc. Flipping and ''zapping'' through avalanches of books and journals, television channels and CD-ROMs, we are bombarded by pictures. In an image-saturated environment, which increasingly resembles inner spaces or fantasies turned inside out, the very subject-object distinction begins to break down. The subject comes apart in the space of its own making.

''Space may be the projection or extension of the physical apparatus,'' Freud noted. In an essay published in *In/Different Spaces*, Victor Burgin emphasized the psychological character of modernist space. A space might be the result of introjection or projection, a product of the thinking and sensing subject, as opposed to the universal and stable entity envisaged since the Enlightenment. Burgin addressed the existence of a spatial unconscious, which is receptive to analysis and interpretation.

A new reality is emerging and architectural thought is changing: the concept that space is not objective/universal but subjective, that digital space is not mimetic or literal but referential. In essence, the new digital spacialities have uncovered the unconscious of urban space.

Fig. 2. Virus House, by the author.

Dramatic changes have been taking place in the technology of simulation, visualization and perception of space — fields, which have advanced faster than the technology of building construction. We are entering a space that is completely artificial, a parallel universe that is entirely alienated from nature and human history. Yet, the final analysis might paradoxically prove this new terrain to be more akin to human nature.

Advancements in digital simulation enable designers to produce results instantly, ''projecting'' (Leon Battista Alberti)[7] and ''mirroring'' (Jacques Lacan)[8] the future as desire and fear. The world had once been represented

Fig. 3. Virus House, by the author.

through the Albertian ''frame of perspective'' or Lacan's ''mirror stage'' theory, which positions the child within a physical and familial space. The more recent dynamic interpretations of the explosive space of the Futurists, the plastic compositions of the Constructivists, and Modernist model of the open plan, are now replaced by the methods and means of designing through simulation and virtuality.

This creates an introverted kind of space, which is deformed rather than expandable, reflective rather than solid, transparent and fluid rather than edited. Though it is interactive, it represents physical isolation and tends toward what Paul Virilio would call ''telesocialization.''[9]

3. THE LANGUAGE OF THE NEW ARCHITECTURE

To appropriately describe this new condition, a new architectural dictionary has emerged. Who would have predicted, ten years ago, that the following terms would be used in everyday conversations about architecture?

Anamorphic:

A distorted image that can be undistorted and restored to its original format.

Anti-Aliasing:

Smoothing lines and curves by blending several colors.

Metaball (meta-clay, blob):

Density-based, isopotential surface; a field of matter that comprises a solid core with a visible surface and a semi-solid area of influence that decreases by the distance. When areas of influence of two or more metaballs overlap their densities, fuse and form a new and more complex surface. Metaballs are ideally suited to modeling smooth organic forms such as the human body.

Raytracing:

A type of rendering that incorporates shadow, reflection and refraction.

Patch (surface):

A surface described mathematically by an equation. It is usually generated from two or more curves. It can be generated either by bezier or b-spline curves, and mainly used to depict smooth, curved surfaces. During rendering, however, patch models are internally converted to polygons. Patch objects are not solid; they are hollow inside.

The most obvious departure is from volumes defined by Cartesian coordinates, since the new digital environment generates an amorphous architecture: deformed, animated, warped and morphing curves. Isomorphic polysurfaces (or blobs), skeletons (or inverse kinematics networks), warps, forces, and particles are topological surfaces, now defined by U and V vector coordinates. These organic, continuous skins force architects to design using calculus rather than algebra. Made of curved primitives with complex mathematical descriptions such as parametric polynomials (splines), nonuniform rational b-splines (nurbs), beziers, parametric bicubic surfaces and n-patches, these higher-order surfaces are reshaping our built forms and generating new design processes.

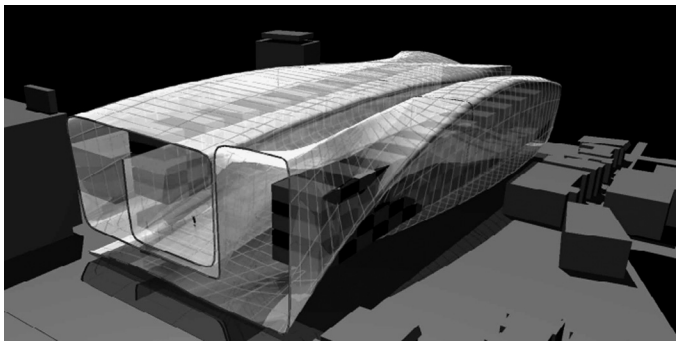

Fig. 4. Japan Housing Competition, exterior, by the author.

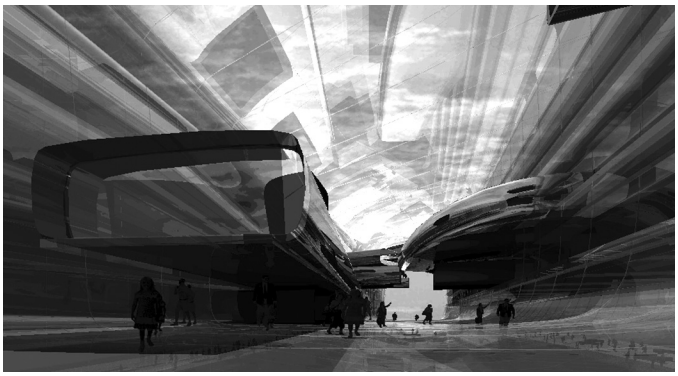

Fig. 5. Japan Housing Competition, interior, by the author.

4. THE ABSTRACT MODELING MACHINE

Experiments in morphogenesis are based on an abstract formal system that is autonomous and deterministic once the rules have been defined. The emphasis of the exploration is on morphological complexity whereby the construction and selection of rules that produce specific effects is motivated by aesthetic and plastic sensibilities. For the first time, architecture is genuinely searching for complexity of this formal type, in order to keep up with a city of networks and systems, with the intricacies of culture and the vagueness of globalization. Therefore, the abstract machine calls traditional methods of architectural design into question. It proposes a design process in which the architect becomes an inventor or constructor of formal systems, as well as a navigator of the system's behavior over time.

Technology is inextricably linked to the contemporary condition. Nowadays, technology is less about the domination of nature, and more about the development of information and the construction of a world of ''images.'' Architects should understand new technologies; they should use them. In the words of the French writer, philosopher, and architect Paul Virilio, ''we are not dealing anymore with the technology of construction, but with the construction of technology.''[10]

According to Benjamin, the aesthetic experience once consisted of defamiliarization, as opposed to familiarization and security.[11] Benjamin's analysis corresponds to the historical and philosophical dilemma of architecture. Is the experience of architecture something that is meant to defamiliarize, e.g. a form of ''art''? Or is it, on the contrary, something that is meant to be comforting and homely? Here, one recognizes the ongoing disagreement between those who see architecture and our cities as places of experience and experiment, as exciting reflections of contemporary society — those who like ''things that go bump in the night,'' that ''deconstruct and self-destruct'' — and those who see architecture as familiarization and contextualization.

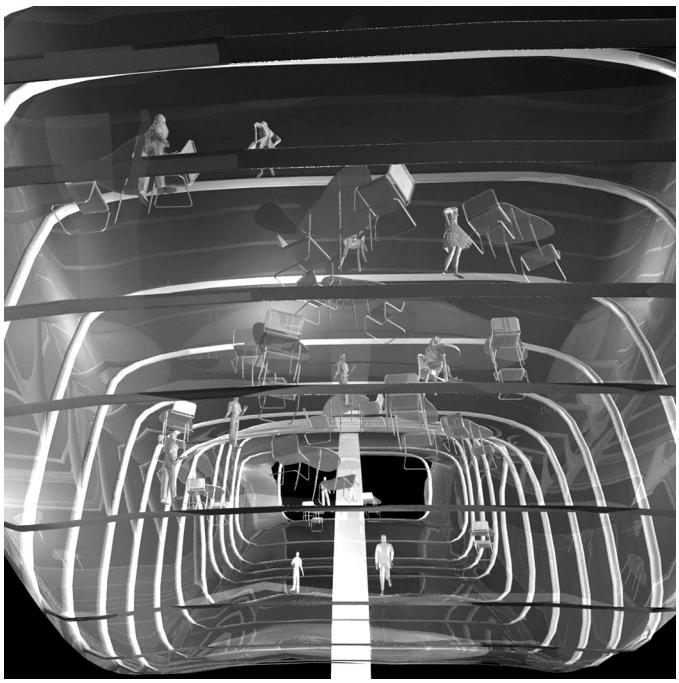

Fig. 6. Glass Restaurant, by the author.

Through the new ''abstract machine,'' the diagram may easily be turned into a system of prediction and control. Hence, a dynamic architectural system, which can adapt to unpredictable circumstances, is required — the equivalent of a 'trans-formal' space, in other words, a space that has 'overcome' form. We are investigating a heterogeneous, fluid and smooth space, whose development and representation are enabled by the generative precision and virtual representation of the computer. In other words, a wall in the traditional sense might be rendered into a permeable 'smart' zone where continuous topological surfaces connect exterior and interior spaces, functional programs and infrastructures.

The abstract machine is indispensable to the design intricacies of complex typologies such as airports, megamalls, corporate office spaces, department stores and theme hotels.

5. FORM FOLLOWS SIMULATION

There is little point in designing architecture, if architecture serves only as an expression of the prevailing economies. Since the digital evolution and revolution has already begun on a cultural and personal level, transforming everyday life, a new field of operation is

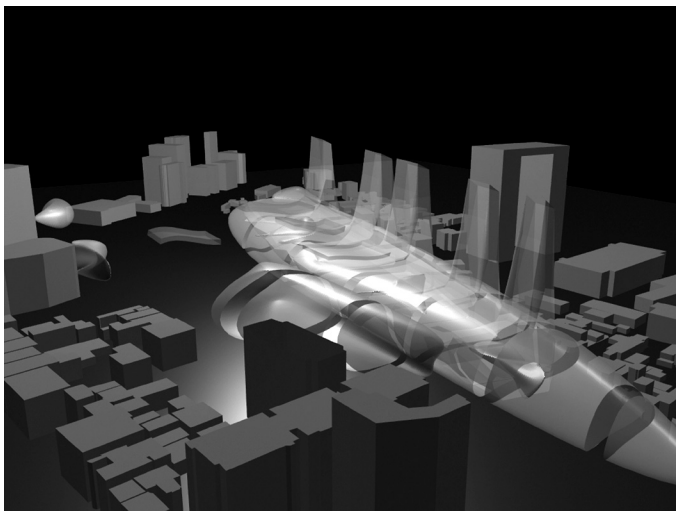

Fig. 7. Urban proposal, Japan, by the author.

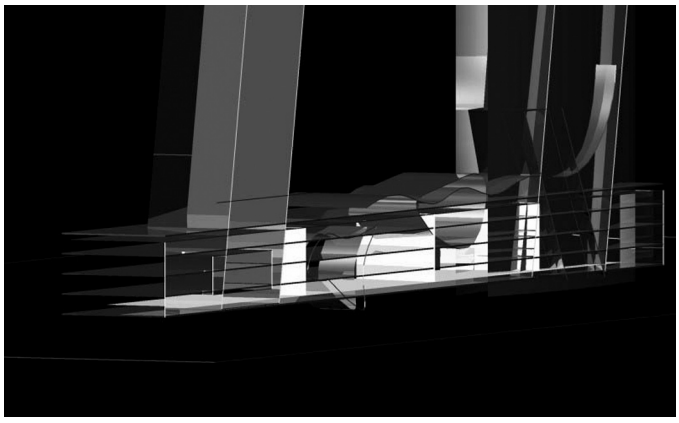

Fig. 8. Urban proposal, Dubai Mall Hotel, by the author.

open to architecture. As Lefebvre put it: ''Urbanism will emerge from the revolution, not the revolution from urbanism.''[12] This has been a 20th century affair. Will this century repeat the pattern, or will this social revolution be replaced by an invisible anarchy, either phenomenological or digital?

Regardless of what this century has in store, designers in the 21st century should present personal architectural positions, preferably in polemical terms. They should be part of this techno-social agitation. Yet, assuming polemical attitudes is difficult, since such positions lie dangerously close to science fiction. A fine line separates exploration, discourse and revolution.

The success of the polemical position can only be achieved by the contemplation of the technopolitical conditions of our culture, those collective peculiarities (the stereo-syncrasy) in combination with the distinctiveness of the individual or the auteur (the idio-syncrasy). Would it be going too far, if we adapted Marx and spoke of ''the idiocy of suburban life,'' bearing in mind that the original meaning of the word ''idiots'' referred to those who did not vote, that is took no interest in affairs of the *polis?*

If *Form* were to follow *Simulation* — whereby meaning, concept and event produce layers of notations, compositions and architectural spaces — resulting constructed or possible landscapes would become ideological battlegrounds or playgrounds. At times, they would coexist with the world around them. At other times, they would be autonomous. They would dominate like a network, creating a fabricated fantasy for all. Through the revised theorem ''form follows simulation,'' a landscape entity is fabricated in the experience of the beholder. It is both visible and invisible, neurotic and solitary, here and there, recto or verso. At its best, the digital vanguard becomes the avant-garde of architecture.

Notes:

[1] William Gibson, *Neuromancer* (Florida: Braille International, Inc., 1993)

[2] Michel Foucault, *Madness and Civilization: A History of Insanity in the Age of Reason* (Washington: Vintage Books, 1988)

[3] Jacques Derrida, *Limited Inc.* (Illinois: Northwestern University Press, (1988)

[4] See note 2.

[5] Bernard Tschumi, *Architecture & Disjunction* (London: The MIT Press, 1999)

[6] Victor Burgin, *Shadowed* (London: Architectural Association Publications, 1997)

[7] John White, *The Birth and Rebirth of Pictorial Space (London:* Faber & Faber, *1957)*

[8] Elisabeth Roudinesco (Translated by Barbara Bray), *Jacques Lacan* (New York: Columbia University, 1999)

[9] Paul Virilio, *Open Sky* (Translated by Julie Rose), (Verso, 1997)

[10] See note 9.

[11] Walter Benjamin, *The Arcade Project* (Translated by Howard Eiland), (Belknap Pr, 2002)

[12] Henri Lefebvre,*The Urban Revolution* marked (Translated by Robert Bononno), (University of Minnesota Press, 2003)