# THIS WILL/WILL NOT KILL THAT

## Ghosts in the Machine:
### Architecture, Representation, and Cybernetics

**Paul J. Armstrong**
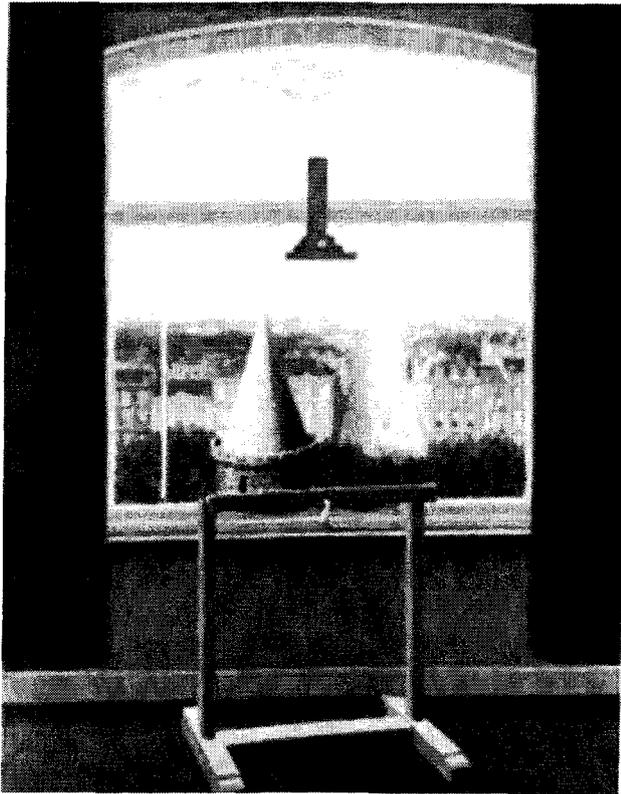**University of Illinois at Urbana-Champaign**

*Fig. 1: Rene Magritte, The Promenades of Euclid*



*Fig. 2: Plate from Durand's Precis de Lecons d'Architecture*

## ABSTRACT

Ann Bergen states that "representation presents itself whenever we think of architecture as embodying an idea." In the most literal sense of the word a building is structure. The imaginative constructs of interpretation remain within the realm of pictorial or linguistic representation. Alan Balfour criticizes the seductive power of digital media where representational software and the machines on which they run have their own formal and, in some ways, sensual characteristics that diminish the desire to build.
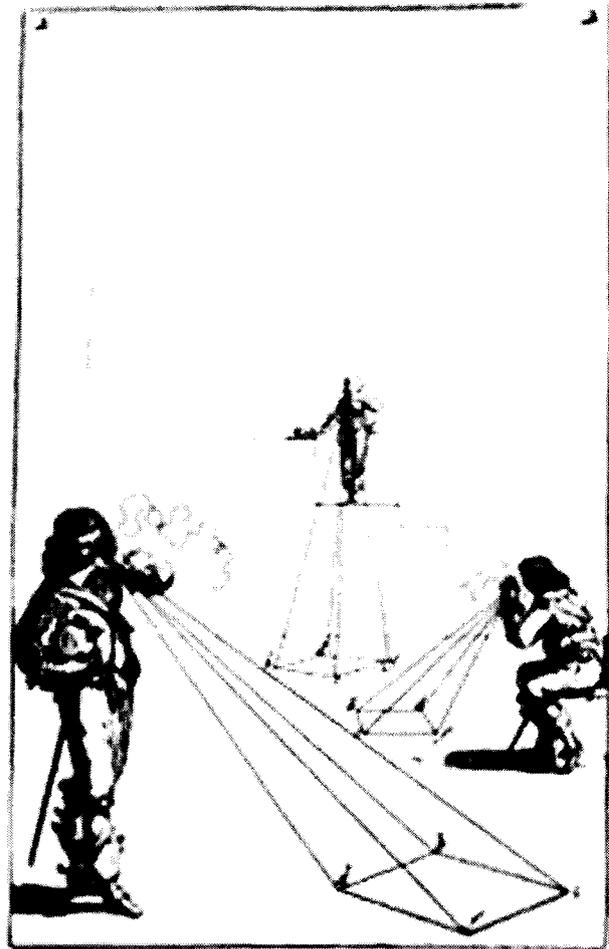
This paper juxtaposes Pérez-Gómez and Pelletier's historical overview of representation from perspective projection methods through the codification of descriptive geometry against the development of digital media and hypersurface theory. Each representational tool and method carries with it a set of internal limitations, which when understood, can be applied consistently and efficiently. However, these tools are not simply neutral instruments. As Daniel Willis contends, we must not disassociate architectural representation altogether from building and materials.

Architectural theory and practice, while independent and separable functions, do in fact inform one another. Pérez-Gómez and Pelletier look to "theoretical projects that question the possibility of a truly poetic architecture" and await the development of new form-giving tools. Meanwhile, other architects and critics search for ways to successfully move beyond the limitations of the tools themselves in order to imbue architectural representations with uncertainty and turn the representational tools to their advantage.

## REPRESENTATION AND DRAWING

Alberto Pérez-Gómez and Louis Pelletier trace the history of architectural representation from its symbolic beginnings as a poetic evocation of ideas through its tectonic modalities derived from perspective and descriptive geometry. The functional motivations of a technological world, they assert, have helped to transform perspectival tools into pragmatic projections that are unable to translate into the realm of representation the symbolic order of the world.

*"Today, the process of creation in architecture often consists of a formalistic approach that assumes that design or representation of a building demands a set of projections. These projections are meant to act as the repository of a complete idea of a building, a city, or a technological object. The reductive architectural drawings employed by the architectural profession for documentation, depiction, or construction rely on syntactic connections between images, with each piece only a part of a dissected whole."[1]*

Ann Bergen states that "representation presents itself whenever we think of architecture as embodying an idea."[2] She illustrates how in Plato's *Timaeus* the Demiurge creates the world by building sensible material copies or representations of the eternally existing forms. Drawings, prints, models, photographs, and computer graphics are perceived as necessary surrogates to built work. Representations in professional practice, therefore, are often easily reduced to the status of efficient neutral instruments devoid of inherent value.

Donald Preziosi notes that a building does not in and of itself represent or speak about anything. "Meanings must be, and inevitably are, brought into the actual construction by interpretation and use."[3] In the most literal sense of the word a building is structure. The imaginative constructs of interpretation remain within the realm of pictorial or linguistic representation. This interpretation begs the difference between building and architecture or, as Wigley contends, "since architecture is a visual medium it is a more potent critique of accepted norms and cognitive control."[4] The realm of imaginative constructs, therefore, has little need of the elaborate constructs of building.

Pérez-Gómez and Pelletier trace the application of a scientific

methodology to architectural drawing derived from the techniques prescribed by Jacques Nicolas Loius Durand's *Précis de Leçons d'Architecture* (1802 and 1813). Durand's legacy is the objectification of style and technique, and the establishment of apparently irreconcilable alternatives between functional (technological) and formal (aesthetic) poles; "the false dichotomy of *necessary* structure and *contingent* ornament." For Pérez-Gómez and Pelletier, "the objectifying vision of technology denies the possibility of realizing in one drawing or artifact a symbolic intention that might eventually be present in the built work." They reason that the process of making the building endows it with a dimension that cannot be reproduced through the picture or image of the built work. "Reciprocally, they write, "architectural representations must be regarded as having the potential to embody fully an intended order, like any other work of art."[5]

Their views are consistent, in a certain respect, with those of Manuel de Solà-Morales who sees the problem of drawing "as bound to the problem of the knowledge of the physical structure of what is being recorded. An approach to [a] proposal based on simplistic casual explanations as working guidelines must give way to the need to recapture the descriptive moment." For Solà-Morales, the strength of description constitutes a "literary knowledge" that "replaces casual simplifications, explanatory models, and diagrammatic representations." However, unlike Pérez-Gómez and Pelletier who view technocratic representation as an impediment to poetic interpretation, Solà-Morales makes little distinction between the drawing and the architectural proposal. In cartography, for example, the description of territory should be obsessive, in order to emphasize the synthetic content of conceptual proposals. "These proposals, like the architectural project, should make suggestions about and remodel the forms of the historical, not so much in an attempt to recuperate as in an attempt to support them." Thus, descriptive drawing can be way means of representing an object or territory in a way that is more than just literal; rather, it seeks to represent that which is depicted in a way that is literary. The strength of descriptive drawing as an "alternative method of analysis," in Solà-Morales view, "provides a way to avoid the project's arbitrary and eclectic nature" where analysis and projection become simultaneous operations.[6]

## THE DIGITAL AVANT-GARDE

Aaron Betsky views architecture as an affirmation of shared belief systems in contrast with the oppositional role of architecture often associated with critical theory or avant-garde art. "The role of the oppositional art object," he writes, "has been to stand apart from the society in which it is created, in order to represent or express certain values of the society. The traditional role of that criticism has
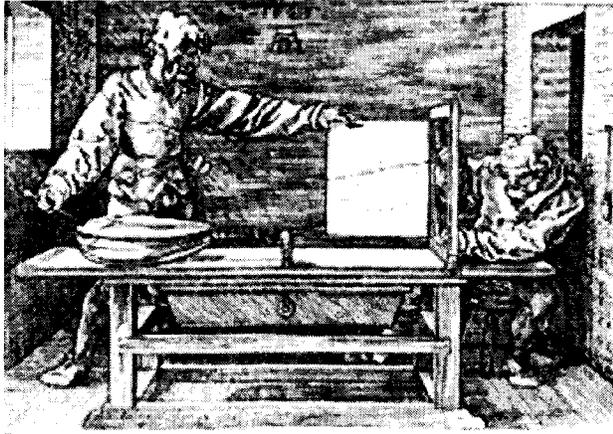
*Fig. 3: Perspective Machine, Albrecht Durer*

then been to interpret the object and thus make it an operative part of the culture once again."[7] This neat nineteenth-century circle of representation and interpretation has always, however, found its hardest test in the architectural object. From Ruskin to Hegel, philosophers have claimed architecture to be either the final *Gesammtkunstwerk* that sums up the expressive abilities of art or the nadir of creation, that place where art loses all its transcendent abilities and disappears into the fabric of the world.

For some critics, the American avant-garde has lost its momentum as a result of its own fascination with formal operations, whether they are contained within the domains of simulacra (e.g., drawings and models) or in the medium itself (as in the case of computer graphics). As Michael Sparks observes, "for while the Dutch have moved beyond the constraints of the avant-garde, the Americans remain fascinated by its possibilities. Rather than focusing on the connection between what is 'just there' to what is 'out there', ...in the most advanced registers of contemporary American architecture there exists a kind of structural condition that makes impossible any connection between the latter."[8] Sparks sees the problem as form itself, which is a constant that defines the parameters of the American avant-garde regardless of the medium employed.

Even Pérez-Gómez and Pelletier fall into the trap of searching for a form-making mechanism that is capable of liberating architects from the technological and scientific forces that have failed to resolve entrenched socio-economic disparities and dislocations.[9]

Many philosophers and cultural historians agree that there is a crisis of modern science and have emphasized the necessity of transcending reductionist thinking in all disciplines and the "ultimate need for a mythopoetic dimension of discourse." Whereas Pérez-Gómez and Pelletier see this discourse emerging from new form-making tools, Solà-Morales sees delineation itself as a "mythic act" that is only

superficially testimonial. "Through the power of definition," he writes, "history is created."[11]

Architecture cannot be an object apart from society. As Mario Gandalsonas has pointed out, architecture is a double representation. "It both presents itself as a physical structure and presents us with a set of planological relationships, or a face or façade, a picture of what is not there. These double representations cancel each other out except when there are discrepancies, a deliberate state that is, in reality, difficult to achieve."[12] The dilemma for the avant-garde architect, according to Betsky, is that the architectural creation is in the best position to act as a critical instrument exactly because of its inescapable power, reality, and integration, but because of this integration it cannot separate itself from already existing power structures. This situation, he contends, has been further complicated by the rapid disappearance of physical reality as a controlling factor in the production and consumption cycle, "an evanescence caused by the increasing efficiency of technology."[13]

In "Architecture and Electronic Media" Alan Balfour reflects on the seductive power of digital media and the impact it has had on architectural education:

"[A]ll representational softwares and the machines on which they run have their own formal and, in some ways, sensual characteristics that, when mastered, not only produce convincing artifacts but also persuade the user that they are personal creations. They give the user remarkable confidence and a sense of fulfillment, so much so that the desire to build is potentially diminished."[14]

To some avant-garde architects, the computer is no longer seen as merely a palliative tool enabling efficient production. More profoundly, it is also used as an auto-generative device having the capacity to completely transform architectural discourse from the realm of physical objects, as traditionally embodied in building and construction processes, into an autonomous mechanism of formal manipulations created solely within the nonphysical ether of cyberspace.[15] In this context, Balfour's concern offers prescient warnings of the transformational power the medium as an end, not a means.

The root of the problem can be traced directly to the methodology of objectification as circumscribed by descriptive geometry and subsequent advances in the physical sciences and their impact on perspective as a conceptual tool. As Pérez-Gómez and Pelletier point out, only after the nineteenth century and a systematization of drawing methods could the process of translation between drawing and building could become transparent.[16] Descriptive geometry allowed for the first time a systematic reduction of three-dimensional objects into two dimensions, making the control and precision demanded by the Industrial Revolution possible. Today computer graphics, with its

Fig. 4: Plate from the Carceri Series, Piranesi



Fig. 5: RUR, Water Garden

seductive manipulations of viewpoints and delusions of three-dimensionality, is simply a more sophisticated mechanism.[17] The growing obsession with productivity and rationalization has transformed the process of maturation form the idea to the built work into a systematic representation that leaves no place for the "invisible" to emerge from the process of translation.

While descriptive geometry attempted a precise coincidence between the representation and the object, they contend modern art remained fascinated by the enigmatic distance between the reality of the world and its projection. In Duchampian terms, the "delay" between reality and the appearance of the world augments the failure of modern scientific mentality to acknowledge the "unnamable dimension of representation." Pérez-Gómez and Pelletier sum up the "both/and" ideology of the avant-garde: "Defying reductionist assumptions without rejecting the modern power of abstraction, certain twentieth-century architects have used projections not as technical manipulations, but to discover something original and recognizable."[18]
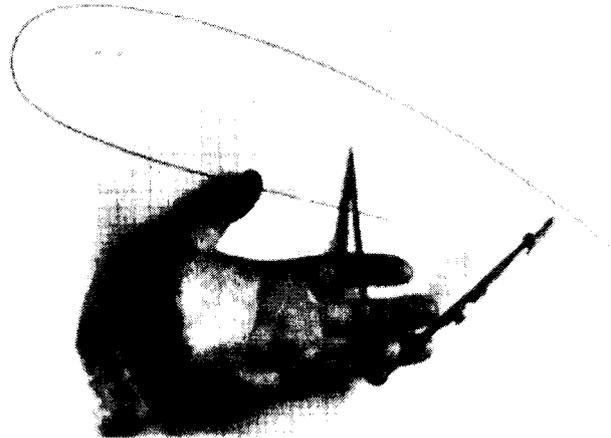
They also see architectural discourse moving discreetly from the built work to "theoretical projects that question the possibility of a truly poetic architecture" and are "not a surrogate for anything else."[19] Given the difficulties of building a symbolic order in a world preoccupied with production and pragmatic shelter, architectural ideas have been particularly embodied in theoretical projects of many kinds. They cite Piranesi's Carceri as just one example that embodies the "first use of montage in architecture to deconstruct the linear perspective of space and time."[20]

According to Pérez-Gómez and Pelletier, recent theoretical projects have sought the "deconstruction of the logocentric metaphysical heritage of modernity as it appears in architecture, while trying to avoid, through the implementation of poeisis, a mere acceptance of the nihilistic status quo of post-structuralist criticism." This is especially the case for Peter Eisenman's formalist notions of "dislocation" and "decomposition" and the emergence of a new autocentric digital morphological theory called "hypersurface."[21]

## CYBERNETICS AND HYPERSURFACE THEORY

Hypersurface theory consists of formal manipulations that ostensibly are created by "interweaving and subsequent unlocking of culturally-instituted dualities." Since hypersurface is a process, the computer has become the quintessential tool, which, by the transformable and permutable nature of the medium itself, is singularly capable of deconstructing architecture into a new, digital algorithm. Stephen Perrella insists that hypersurface theory is not a subjective invention, but is produced through "self-generating and auto-emergent forces deeply insinuated within cultural historicity that are being unleashed by the machinations of contemporary practice."[21] If there is an Orwellian connotation, it is primarily in the sense that the tool/product and the designer have become totally enmeshed in the

unconscious forces affecting the "unnamable dimension" between reality and representation. As such, intention, design, production, and form become mutually interdependent and synthetic entities self-driven by their own internal "auto-poetic" logic systems.

According to its proponents, hypersurface theory offers an alternative from practice-driven representational models that are beholding to the disparities produced by the unfettered greed of "accelerating capitalism."

"Hypersurface is a reconsideration of often dichotomous relationships existing in the environment....The mechanisms that drive the real through the unreal and vice versa, impairing both, stem from the accelerating force of ubiquitous, everyday consumer-culture."[22]

Reinhold Martin points out that the biological notion of integration was itself initially articulated through an economic and political model. Thus integration was given priority over simple mechanical assembly which eventually gave way in cybernetic thinking to "the organism as its own model."[23]

Perella and Pérez-Gómez and Pelletier would probably agree that representational methods and architecture do not necessarily serve the same ends and have often been abused to foster specific political and economic agendas.[24] Their arguments focus on the media and methods used in representation that reinforce the efficiency of practice at the expense of theory and symbolism. And they might also concur that theoretical architecture must stand apart from building and practice.

Betsky also acknowledges the problem of the hegemony induced when that which is represented is a "set of vaguely defined values."[25] However, whereas Pérez-Gómez and Pelletier defend theoretical models as the only way to free architecture from the constraints of Frederic Jameson's "consumer society,"[26] Betsky and Sparks recognize problems inherent to the oppositional role of architecture and the current form-driven state American avant-garde architecture.

Daniel Willis shifts our focus from the limitations of architectural forms and delineation tools to the material requirements of building. "The evidence suggests that the orthogonal proclivities of the pencil and parallel rule have not been weighing down the imaginations of architects since the Renaissance, because these limitations are generally analogous to the ways we build and stand, and to the vertical axes of our dreams."[27] In his view architecture is still about gravity and the appropriateness of building materials and forms for a particular region, climate, and culture.

Greg Lynn is interested in the computer's from-generating capabilities and employs "supple systems" as "flexible economies [that] index the incorporation of generalized external information through the specific unfolding of polymorphic, dynamic, flexible, and adaptive systems."[28] This contrasts with methods of formal manipulations that are based on typology and deep structure (e.g.: Eisenman) that are, Lynn contends, "suspect, reductive, and empty." Sparks, like Betsky, finds fundamental problems in disassociating architecture altogether from the exigencies of building and context. His critique focuses on Lynn's inability to address the complexity of urban life except through form.[29]

Sparks also points out that Eisenman, unlike Lynn, is not interested in new forms which might deal better with the conditions of the late 20th century, but in "dislocative forms" which call into question what he calls the "metaphysic of architecture."[30] According to Sparks, Eisenman's architectural project is consistent with Derrida's philosophical project; both are simultaneously transgressive and conservative in their respective discourses; and both dialogic within those discourses in the very terms given them by the discourse.[31] Modern architecture, with its new technologically derived forms and emphasis on functional efficiency, placed itself in the service of an exterior discourse (e.g., economics). Eisenman has insisted that architecture will continue to evolve only by focusing on its "interiority;" that is, on form.

However, as Willis cautions, the more powerful the technique, the more powerfully it reinforces technical logic as a whole, and therefore the more pronounced its effect on practices that exist for other than primarily technical reasons."[32] The differences separating Lynn from Eisenman can be measured by degrees. In the final analysis, both Eisenman and Lynn present theoretical frameworks that are based on form – whether they function as dislocations of existing typologies or formal digital manipulations of hypersurfaces, such as "symmetry breaking."[33] Like Willis, Balfour is equally circumspect and is wary of "personalized synthetic fantasies that will be used as a palliative to make up for the impoverishment of the material world." This process of internalization "opens our deepest imaginings to control and manipulation" because it fools us into feeling empowered when in fact we are seduced.[34]
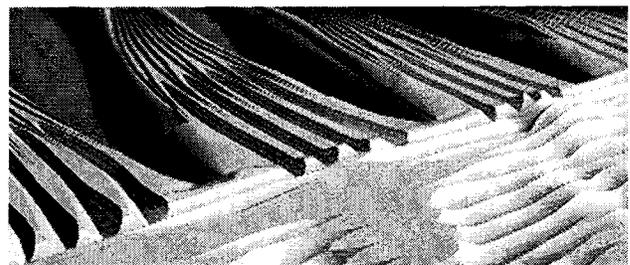


Fig. 6: The Constructor (1924), El Lizitsky

## GHOSTS IN THE MACHINE

Although Willis wishes to maintain the poetic role of architecture, he also recognizes that "an architectural practice should be an on-going engagement with the world, involving a highly learned ignorance, a creative impotence that accepts the limitations, inconsistencies, and surprises living always brings."[35] The construction of a virtual building on a computer, he asserts, is only rarely in any way analogous to the construction of a real building. The building shapes one manipulates on a computer are by definition disembodied abstractions "unlike the 'dreaming' ink of a poet or the contemplative graphite of [Louis] Kahn."[36] As Balfour notes:

> "All databases are in a state of continual expansion. When architecture becomes essentially the production of spaces designed for certain specific effects ranging from efficiency to mood enhancement, and such production is supported by a continually maturing, multiple data set informing decisions, individual imaginations are diminished in a process that becomes one of intelligent management."[35]

The level of abstraction introduced by the computer seems at first innocuous until one realizes that the software used for applying the look of building materials to the geometric polygons the computer generates treats wood or brick as weightless, depthless, surface patterns. As we move further from representing architecture as built form we run the risk of sublimating architecture to strictly a theoretical discourse. In the case of digital software, as Willis points out, there is typically no attempt by the software developer to coordinate the module of bricks and the proportions of openings in the virtual brick wall, thereby transforming the modular logic of construction.

> "The thinking behind this type of computer use is single-minded. It simultaneously rejects or ignores the burdens of building in the world while remaining oblivious to its own limitations, secure in the illusion that the domination of nature is possible, and that a computer is a neutral tool....The homogenizing effect in the output of products designed and drafted on the computer is a tendency seemingly shared whenever practices are replaced by techniques."[37]

Circumspection regarding the adverse effects of new technology has been around for a long time. Most often these criticisms are not reactionary, but rather thoughtful reflections on the potential negative impacts of unbridled technological progress. In *Mechanization Takes Command*, Siegfried Giedion conducted a series of case histories of mechanical objects and systems by then common in all aspects of everyday life, while expressing grave doubts as to whether mechanization, having "taken command," could be effectively controlled.[38] Giedion emphasized the necessity of controlling mechani-

zation by subordinating technological production to what he called "human needs": the need to maintain bodily equilibrium by satisfying biological requirements such as food and shelter as well as the need to adapt to the constant change brought on by scientific and technological progress.

Giedion's desire for maintaining "equilibrium" may also be applied to the independent endeavors of architectural Theory and Practice. Jennifer Bloomer has noted that architectural theory and architectural practice are, to a significant degree, separable and, therefore, each must maintain its own autonomy. She stipulates that "consensus demands a certain avoidance of difficulty....In the long run, and quite pragmatically, the academy supports the profession best by being different from it...."[39] However, even Bloomer concedes that there is a need for applied theory, which tends to converge with practice.

While architecture is a practice that has always utilized techniques freely, it has never become part of a technical logic. Willis concedes that the most successful computer-generated drawings make positive use of the computer's ability to readily deform shapes, producing drawings that incorporate transparency, anamorphosis, collage, and multiple layers implying a temporal depth.[40] If we are to successfully move beyond the limitations of the tools themselves, as Willis contends, we must continue searching for ways to imbue our representations with uncertainty and turn our representational tools to our advantage. We cannot afford to reject outright the logic of technique when applied to architecture or other significant practices as a reaction to technocratic efficiency.

Balfour insists that we are responsible for appropriating the technology to better ends than the creation of a hypothetical virtual world supposedly richer than the real one that we inhabit.[41] He would probably agree with Willis that "the sublime inflexibility of the computer is far more fascinating than its so-called 'virtual reality.'"[42]

## NOTES

[1] Alberto Pérez-Gómez and Louis Pelletier, "Architectural Representation Beyond Perspectivism," *Perspecta 27* (New York: Rizzoli International Publications, 1992), p. 21.

[2] Ann Bergen, "On Representation," *Critical Architecture and Contemporary Culture*, William J. Lillyman, Marilyn F. Moriarty, and David J. Nueman, Eds. (New York: Oxford University Press, 1994), p. 45.

[3] Donald Preziosi, *The Semiotics of the Built Environment: An Introduction to Architectonic Analysis* (Bloomington: Indiana University Press, 1979).

[4] Mark Wigley, "Postmortem Architecture: The Taste of Derrida," *Perspecta 23* (1987), pp. 156-79.

[5] Alberto Pérez-Gómez and Louis Pelletier, p. 21.

[6]Manuel de Solà-Morales, "The Culture of Description," *Pespecta 25* (New York: Rizolli International Publications, 1989), pp. 18–19.

[7]Betsky asserts that "representation in architecture assumes the need to represent something in such a way that a building is uniquely suited to that act and cannot be replaced by two-dimensional means, solely with iconography or with mute form." This is the case, he argues, "when that which is represented is a set of vaguely defined values that cannot be articulated in text, that cannot be overstated, and that must be validated and realized through the act of construction. In this respect architecture is the representation of power." As such, it is the "built affirmation of the social, economic, and physical status quo, and in the activity of affirmation finds a representational role that is unique to its constitution." [Aaron Betsky, "James Gamble Rogers and the Pragmatics of Architectural Representation," *Critical Architecture and Contemporary Culture*, William J. Lillyman, Marilyn F. Moriarty, and David J. Nueman, Eds. (New York: Oxford University Press, 1994), p. 65.]

[8]Michael Sparks, "It's Out There...The Formal Limits of the American Avant-Garde," *Architecture and Design*, Vol. 68, Nos. 5/6 (May/June, 1998), p. 26.

[9]Pérez-Gómez and Pelletier, p. 22. "It is imperative that we not take for granted certain assumptions about architectural ideation, and that we redefine our tools in order to generate meaningful form. Our professional responsibility demands our concern for the making of a world that is not merely a comfortable or pragmatic shelter, but offers the inhabitant a physical, formal order that reflects the depth of the human condition – the conception of building as a poetic translation rather than as a prosaic transcription of its representation."

[10]Solà-Morales, p. 16. "There is an entire social history written in the layout of routes, in the points of crossing and interchange, in the plowing of farmland, in the construction of canals or the irrigation of cultivated land, and in the shape of property ownership. It is written in the placement of industries, in the growth of cities, and the occupation of their surroundings, and in the often violent and contradictory impacts of great infrastructures. Each territory is a unique mix of all these components and only through a description of these components can one begin to synthesize an alternative."

[11]From Betsky, p. 65.

[12]*Ibid.*, p. 65.

[13]Alan Balfour, "Architecture and Electronic Media," *JAE: Journal of Architectural Education*, Vol. 54, No. 4, May 2001, p. 268.

[14]Reinhold Martin traces cybernetics to biological underpinnings in which "the organism was integrated into a bounded whole in which, as the pan-optic machines through which [Michel] Foucault articulated the disciplinary epoch, everything was in its place." The effort to think about the organism as a totality thus contributed to what François Jacob refers to as its spatialization "in depth." The result has been the elaboration of an invisible "secret architecture" (Jacob) or "hidden architecture (Foucault) – what Jacob calls a "second-order structure." [Reinhold Martin, "The Organizational Complex: Cybernetics, Space, Discourse," *Assemblage 37* (Cambridge, Massachusetts: The MIT Press, 1998), pp. 105–106.]

[15]Gómez and Pelletier, p. 34.

[16]*Ibid.*, p. 26. Pérez-Gómez and Pelletier point out that even though the drawings by Dürer and Phibert de l'Orne may be seen as the origin of the reductivism of computer graphics it would be wrong to imagine that perspective always existed, either as a pictorial representation or as the assumed *truth* of real space. Renaissance drawings are not simply the same as modern drawings in their relationship to built place. Plans and elevations were not yet systematically coordinated within the framework of descriptive geometry. These drawings were not instrumental and remained autonomous from building.

[17]*Ibid.*, p. 34.

[18]Gómez and Pelletier, p. 39.

[19]Stephen Perrella, "Hyperspace Theory: Architecture >< Culture," *Architecture and Design*, Vol. 68, Nos. 5/6 (May/June, 1998), p 7. "Hypersurface, is an emerging architectural/cultural condition that is effected through an intertwining of often opposing realms of language and matter into irresolvable complexities that create middle-out conditions....As a verb, hypersurface considers ways in which the realm of representation (read images) and the realm of instrumentality (read forms) are respectively becoming deconstructed and deterritorialized into new image-forms of intensity.[21]

[20]*Ibid.*, p. 8.

[21]*Ibid*, p. 8.

[22]Betsky, p. 65 "These circumstances can be found when the effective elite of any society, which coheres because of a shared belief system and retains its control by that same method, needs to affirm that power. Architecture is, in its essence, the representation of power. It houses the central institutions of any society, commands enormous physical resources, and imposes itself on the daily life of the user or the observer as a physical fact. Therefore, architecture is always the built affirmation of the social, economic, and physical status quo...."

[23]Reinhold Martin, p. 106.

[24]Pérez-Gómez and Pelletier trace the correlation of the tools employed with derived forms through the mechanics and methodology of perspective drawing: "To create a perspective the artists of the Renaissance abstracted themselves from the experienced world; the geometric depth in painting was a sign of an increasing rationalization in perception in general. Albrecht Dürer's perspectival apparatus, composed of an eyepiece and a glass panel, established a rigid method by which to copy nature. The image as a bi-dimensional section of the cone of vision was thus made literal.

It was only in the seventeenth century that perspective drawing became a true Vitruvian *idea*. The inception of the Cartesian modern world and the revolution of modern science introduced during the Baroque period a conflict between symbolic and mechanistic views of the world. This dualistic conception of reality, they point out, made it possible for perspective to become a model of human knowledge, a legitimate and scientific representation of the infinite world. Baroque perspective in art and architecture, however, was a symbolic configuration, one that allowed reality to keep the qualities that it had always possessed in an Aristotelian world. During the seventeenth century the space occupied by man was not homogenized, and the primacy of perception as the

foundation of truth was hardly affected by the implications of this new science and philosophy. Thus perspective, as an architectural idea, became a privileged form of symbolization."[10]

[25]Frederic Jameson, "Postmodernism and Consumer Society," (New York: Whitney Museum of Art, 1982), p. 113. "Today, increasingly, we have a kind of writing simply called "theory" which is all or none of those at once [the erosion of the distinction between high culture and popular culture]. This new kind of discourse, generally associated with France and so-called French theory, is becoming widespread and marks the end of philosophy as such....["Theoretical discourse"] is a periodizing concept whose function is to correlate the emergence of new formal features in culture with the emergence of a new type of social life and a new economic order – what is often euphemistically called modernization, postindustrial or consumer society, the society of the media or spectacle, or multinational capitalism."

[26]Daniel Willis, "The Impact of the Computer on Architectural Practice," The Emerald City and Other Essays on the Architectural Imagination (New York: Princeton Architectural Press, 1999), pp. 283–284.

[27]According to Lynn, a supple system is "an internal system of directed indeterminate growth that is differentiated by general and unpredictable external influences, producing emergent, unforeseen, unpredictable dynamic, and novel organizations." [Greg Lynn, "The Renewed Novelty of Symmetry," Assemblage 26, p. 14.]

[28]Sparks, p. 27.

[29]Peter Eisenman, "Misreading," Houses of Cards (New York: Museum of Modern Art, 1987). "The history of architecture can be seen as the continual rereading, and misreading, of the metaphysic of architecture through successive dislocations, and the subsequent institutionalization of each dislocation, which thereby reconstitutes the dislocation."

[30]Sparks, p. 30.

[31]Willis, "Impact of the Computer," p. 277.

[32]Lynn's description of symmetry breaking is a variation of "Bateson's Rule" (codified by William Bateson in 1894) which demonstrates a relationship between order and variation and homogeneity and heterogeneity. Bateson's insight is that a loss in order and variation is accompanied by an increase in symmetry. Likewise, according to Lynn, symmetry breaking is not a loss but an increase in organization within an open, flexible, and adaptive system. In contrast to deep structure and typology, symmetry breaking is an "internal system of directed indeterminate growth that is differentiated by general and unpredictable external influences, producing emergent, unforeseen, unpredictable dynamic, and novel organizations." [Lynn, p. 14]

[33]Balfour, p. 271.

[34]Daniel Willis, "Introduction: Heavy, Not Dead," The Emerald City and Other Essays on the Architectural Imagination (New York: Princeton Architectural Press, 1999), pp. xv–xvi.

[35]Willis, "Impact of Computer," p. 280.

[36]Balfour, p. 269.

[37]Willis, "Impact of Computer," pp. 280 and 284.

[38]Siegfried Giedion, Mechanization Takes Command: A Contribution to Anonymous History (New York: W. W. Norton, 1949), p. 117.

[39]Jennifer Bloomer, "Pale Houses, Silenced Shadows," Assemblage 37 (Cambridge, Massachusetts: The MIT Press, 1998), p. 64. "The move toward a harmonious blending [of Theory and Practice]...is a superficially beautiful but impossible goal that, like most forced marriages, might not be...appropriate to all the many practices that make up the discipline of architecture." [Bloomer, p. 60]

[40]Willis, "Impact of the Computer," p. 286.

[41]Balfour, p. 271.

[42]Willis, "Impact of the Computer," p. 286.