Architectural Representation Beyond Perspectivism

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1. We use "meaning" in a sense derived from the phenomenology of Edmund Husserl and Maurice Merleau-Ponty. In this sense, meaning is a given in the prereflective engagement of man (with his body) in the world. There is no question here of meaning as the effect of association. Human meaning remains, primordially, a mystery whereby we recognize an order in the specificity of the perception. It is the objectified, enframed perception of objects that makes it so difficult for us to understand that this perception with meaning is indeed the very ground of our thoughts and actions.

2. From a phenomenological perspective a "symbol" is not a contrivance or invention. Symbols are of course historically determined but possess a transhistorical dimension, as we today have access to the meanings of the past. The symbol is also not necessarily a representation of absolute truths or transcendent theological values. It affords us a glimpse of our transhistorical embodied reality (never fixed or reducible to a formulation such as the transparent Being of Western metaphysics) and thus makes it possible for us to endure in the world despite our personal mortality. It is our position that such understanding of symbolization as a reality immanent in the world of man survives both the critique of philosophical nihilism and relativism, and as a goal of architectural design overcomes the esthetic formalism that is usually the result of this view in the self-referential products of postmodern architecture.

Computer-aided design and technical drawing have become part of the everyday life of the architect. While their undisputed precision has made the architect's task into something akin to applied science, and their efficiency is now deemed to be a proof of quality, the problem of architectural representation still begs discussion. Tools of representation underlie the conceptual elaboration of a project and the whole process of the generation of form. Even though most enlightened architects would recognize the limitations of tools of projection such as plans, sections, and elevations and predictive planning in relation to the actual meaning of their built work, no alternatives are seriously considered outside the domain of modern perspectivism, which has deeply conditioned our knowledge and perception.

The functional motivations of a technological world 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 the 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. For purposes of descriptive documentation, depiction, construction, or any imparting of objective information, the architectural profession has generally identified architectural drawings as projections. These reductive representations rely on syntactic connections between images, with each piece only a part of a dissected whole. Representations in professional practice, then, are easily reduced to the status of efficient neutral instruments devoid of inherent value. Devices such as drawings, prints, models, photographs, and computer graphics are perceived as a necessary surrogate of the built work. It is therefore crucial to see the implications of such a reductive attitude on the creative process in architecture.

This descriptive set of projections that we today take for granted is in fact our inheritance from the geometrized, homogeneous space of the nineteenth century. Our implicit trust in the application of a scientific methodology to architecture derives directly from the techniques prescribed by Jacques Nicolas Louis Durand in his Précis des Leçons d'Architecture (1802 and 1813). Durand's legacy is the objectification of style and technique, and the establishment of apparently irreconcilable alternatives: technological construction (functional) versus artistic architecture (formal), the false dichotomy of necessary structure and contingent ornament.
1 Mae West, Salvador Dalí, c. 1934.
3 J.N.L. Durand gave us the first architectural theory whose values were
directly extrapolated from the aims of applied science and technology. Never
before Durand had the concern for meaning been subordinated to the pur-
suit of efficiency and economy in the production of design. For the purpose
of this article it is particularly crucial to keep in mind the connection between
this system of values and its tools, i.e., Durand’s Mécanisme de la Composition,
the first design methodology thoroughly dependent on the predictive quality
of the projections of descriptive geometry.

4 This statement recognizes the politi-
cal and public aspect of architectural
meaning. The technological vision, the
enframed vision, is our vision. The first
step for the architect interested in
retrieving an ethical praxis is to accept
the necessity of self-transformation, of a
recollection of being through our
embodiment. The terms embodiment
and embodied reality are used in their
phenomenological sense. Embodiment
refers specifically to a nondualistic, post-
Cartesian understanding of conscious-
ness where mind and body are not in a
functional, mechanistic relation, and the
boundaries between the external and
internal worlds of experience vanish.

5 A short list of philosophers following
this path could start with Friedrich
Nietzsche and include E. Husserl,
Martin Heidegger, Jose Ortega y Gasset,
and, more recently, George Gusdorf,
David M. Levin, and Hans Blumenberg.
The implications of myth are obviously
complex and often contradictory in the
work of these writers. We don’t use myth
as a false story aimed at perpetuating
the abhorrent exploitative political struc-
tures of our history. Myth cannot simply
be added to form to make some kind
of meaningful architecture. Our conten-
tion with Blumenberg is that myth is
ultimately unavoidable in human
culture and that it is our only means of
articulating a truth grounded in our
mortality and rationality. Even contem-
porary scientists now realize that narra-
tives are crucial to the substantiation of
specific theories; that the greatest precision
leads to uncertainty. This mythopoetic
articulation must be the point of departure
of our fictive and historical narratives as
we try to develop an ethical praxis. This is
indeed the basis of a theory of architecture
that is not a methodology.

Though the formalization of descriptive geometry promoted a particularly simplistic
objectification, the projective tool is a product of our technological world grounded in a
modern world-view that we cannot simply reject. But a different use of abstraction,
related to modern art, has been generated from the same historical situation. Its inten-
tion, the model of which, as we will show, is closer to a film montage, is to transcend
perspective, to transcend dehumanizing technological values (often concealed in a
world that we think we control) through the incorporation of a critical position about
the contemporary situation that might allow a new creative process to emerge.

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. The
fact is that the process of making the building endows it with a dimension that can-
not be reproduced through the picture or image of the built work. Reciprocally, archi-
tectural representations must be regarded as having the potential to embody fully an
intended order, like any other work of art.

Today we recognize serious problems with our postindustrial cities and our scientistic
way of conceiving and planning buildings. Many philosophers and cultural historians
have described the crisis of modern science and emphasized the necessity of transcend-
ing reductionist thinking in all disciplines of human endeavor. They have accepted
the ultimate need for a mythopoetic dimension of discourse, a narrative that involves an
accounting of the existential anxiety that is the transhistorical nature of our mortal
human life. A similar intention must be incorporated into architecture. 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 res-
ponsibility demands our concern for the making of a world that is not merely a com-
fortable or pragmatic shelter, but that offers the inhabitant a physical, formal order
that reflects the depth of our human condition. In this essay we will explore the
conception of building as a poetic translation rather than as a prosaic transcription of
its representation.

2 Port D’Ostie, J.N.L. Durand, 1800.
There is an intimate relationship between architectural meaning and the modus operandi of the architect, the nature of his techne. We must learn to recognize the differences among the representational artifacts in our architectural history. Since the Renaissance, the relationship between the intentions of architectural drawings and the built objects that they describe or depict has changed. Though subtle, these differences are nonetheless crucial. They can only be perceived if the objects are understood hermeneutically, in the "world of the works," i.e., in the context of their respective cultural worlds and particularly the conceptions of space and time on which they are grounded.

On examining the most important architectural treatises in their respective contexts, we have concluded that the systematization that we take for granted in architectural drawing was once less dominant in the process of maturation from the architectural idea to the actual built work. Prior to the Renaissance, architectural drawings were rare. In the Middle Ages architects did not conceive of a whole building idea, and the very notion of a scale was unknown. Filarete, discussing in his treatise the four steps to be followed in architectural creation, was careful to emphasize that in each translation from proportions to lines, to models, and to buildings, the problem is autonomous, and that the connection between the different steps is analogous to an alchemical transmutation, not to a mathematical transformation. Architectural drawings could not therefore be conceived as instrumental artifacts that might be unambiguously translated into buildings.

During the Renaissance, architecture came to be understood as a liberal art, and architectural ideas were thereby increasingly conceived as geometrical lineaments, as bidimensional, orthogonal projections. A gradual and complex transition from the classical theory of vision to a new mathematical and geometrical rationalization of the image was taking place. But the new understanding of a perspectival image remained directly related to the notion of classical optics as a science of the transmission of light rays. The pyramid of vision, the notion on which the Renaissance idea of the image as a window on the world was based, was inherited from the euclidean notion of the visual...
Alberti's central point (punto centrico) of the perspective construction is often wrongly associated with the "vanishing" point projected at infinity. In fact the point of convergence in the construzione legittima is determined and fixed by the point of sight as a "counter-eye" on the surface of the "window."

This is obviously a complex issue. The painter's interest in mathematical depth, in a measurable order of experience through layers of events, had as a corollary the use of architectural backdrops as the ideal means to express this concern. It would be naive to deny the often-stated connection between Renaissance paintings and the work of architects. However, as we will contend here, the use of perspectivus artificialis is particularly the province of painters. These complexities are the source of many simplistic misinterpretations of linear perspective as the origin of architectural idealization in the fifteenth-century. The construzione legittima as developed by Brunelleschi and Alberti for the art of painting was associated with architectural construction because the subject of representation had to be architectural for the perspective depth to appear.

Alberti had also emphasized the difference between drawings of the painter and those of the architect. In De Re Aedificatoria or Ten Books, Book 2, ch. 1, Alberti pointed out, in the context of the usefulness of rough, undecorated models in design, that the architect and the painter both revealed depth (prominentias/rilievi) in very different ways. While the painter "takes pains to emphasize the relief of objects in paintings with shading and diminishing lines and angles" (indeed, through the methods of linear perspective that he discussed in Della Pittura), the architect recognizes depth (rappresentazioni rilievo) by means of drawing the plan (mediante il disegno della pianta/e fundamenti descritti) and represents in other drawings the shape and dimensions of each elevation "without altering the lines and maintaining the true angles." The architect draws as one who desires his work to be judged "not by the apparent perspective" (James Leoni's translation, London: Alec Tiranti, 1965), or "deceptive appearances" (Joseph Rykwert, London: MIT Press, 1988), but "valued exactly on the basis of controllable measures" (our translation). In attempting to grasp the difficulties involved in the argument, it is interesting to compare the two English translations of the text with the Italian translation by Giovanni Orlandi (Milan: Il Polifilo, 1966) and the Latin

Even though fifteenth-century painters were experimenting with methods of linear perspective, the geometrization of pictorial depth was not yet systematized and did not immediately influence the experience of the world or the process of architectural creation. It was impossible for the Renaissance architect to conceive that the truth of the world could be reduced to its visual representation, a two-dimensional diaphanous section of the pyramid of vision. Brunelleschi, to whom we attribute the earliest example of linear perspective, worked mostly from models in his architectural practice.

This transition between perspectivus naturalis et perspectivus artificialis constituted a first step toward a greater rationalization of the visual image and the detachment from medieval tradition. "Natural" perspective had first been introduced into the quadrivium of sciences together with music without even referring to the art of drawing. Saint Thomas Aquinas associated perspective with music, considering it as a visual harmony, not a graphic method.

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original. The translation of prominentia as "projection from the ground plan" by Rykwert/ Leach/ Tavernor is particularly problematic.

15 Robert Klein elaborates upon the problem of transition between perspectivus naturalis and perspectivus artificialis in his article "Pomponius Gauricus on Perspective," *Art Bulletin*, 43, 1961, 211-13. Klein draws opposite conclusions with regard to the constructive quality of Renaissance perspective, emphasizing the common reading of perspective as the origin of architectural ideation to which we have referred.

16 The best examples of this mathematical treatment of perspective are to be found in Egnazio Danti's commentary on Jacopo Barozzi da Vignola's *Due Regole della Prospettiva Pratica* (Rome, 1583), and Guidobaldo del Monte's *Montis Perspectivee libri sex* (Pesaro, 1600).

17 The distance point that determined the foreshortening was projected on the same picture plane on the horizon line at a distance from the central point equal to the distance between the eye of the observer and the plane of the image. In other words, Vignola's method introduced a second observer at the same distance from the central point who looked perpendicularly at the beholder, thereby adding an element essential for the representation of stereoscopic vision. Prior to this, with the apex of the cone of vision as a simplified eye, perspective had been monocular.

18 Dürer's machine is a wonderful metaphor for the objectification of reality that is brought about by scientific mentality. Philosophically, this coincides with the inception of what Heidegger calls "the age of the world picture," the substitution of presence (or openness to a transcendental Being) with a represented reality that necessarily conceals its ground of truth, i.e., the horizon of the object, excluded by the frame.

In treatises on perspective as the art of drawing, starting with Alberti's *Della Pictura*, binocular vision was reduced to a fixed point that was the apex of the cone of vision. The necessity of stereoscopic vision to perceive depth, however, required the introduction of a second element that would determine the foreshortening. In Alberti's method of perspective, this new element became an abstract screen (known today as the picture plane) intersecting the visual rays at a given distance. Foreshortening, however, remained the result of intuition. There was no systematization in fifteenth-century perspective treatises.

During the sixteenth century, treatises on perspective tried to translate the primarily empirical understanding of this phenomenon into a system, and became increasingly distanced from treatises on optics. These, however, remained theoretical or mathematical elucidations and had almost no practical use in perspectival representation. In Vignola's *Due Regole della Prospettiva Pratica*, a second observer was introduced and became the distance point. To create a perspective, the artists of the Renaissance abstracted themselves from the experienced world; the geometrization of depth in painting was a sign of an increasing rationalization of 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 bidimensional section of the cone of vision was thus made literal.
Even though the drawings by Dürer and Philibert de l'Orme may be seen as the origin of the reductionism of computer graphics, just as these artists' interest in projections marks the origin of our own belief that reality can be represented via geometrical perspective (and, later, through journalistic photography), 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 the built place. Plans and elevations were not yet systematically coordinated within the framework of descriptive geometry. These drawings were not instrumental and remained much more autonomous from the building than those that result from typical contemporary practice.

Before Dürer, a plan was generally conceived as a composite "footprint" of a building, and an elevation as a face. Vertical or horizontal sections were not commonly used.
Michelangelo's entire emphasis was upon life and movement, qualities that were most often excluded from architectural theory in the Renaissance. Architects were increasingly concerned with the clarity and fixity of measure and proportions. This is Michelangelo's criticism of Dürer's Four Books on Human Proportions (Nuremberg, 1528): "...[he] treats only of the measure and kind of bodies, to which a certain rule cannot be given, forming the figures as staff as stakes; and what matters more, he says not one word concerning human acts and gestures." (From Condivi's Life of Michelangelo, quoted by David Summers, Michelangelo and the Language of Art, Princeton University Press, 1981, 308; and Helmut W. Klassen, Michelangelo: Architecture and the Vision of Anatomy (Montreal: McGill University, 1990), 8).

Michelangelo achieved the fundamental dimension of depth by capturing the movement of a figure through foreshortening. Foreshortening as understood in the tradition of Renaissance perspective consists of the visual construct of a frontal geometrical plane within whose frame the depth of a body might be articulated. Things and their proportions are flattened to correspond to the intelligibility of this frame, so as not to be distorted. The extreme understanding of this is Dürer's coordinated system of projection. Foreshortening as developed by Michelangelo negates the reality of this frame field by including peripheral vision as well as what frontally stands out. This quality of vision is what also defines the conception and experience of Michelangelo's architecture. One senses in his work that our bodily presence haunts the built place in that the architecture moves with us. Including the peripheral experience, his architecture remains intelligible even when distorted. (Klassen, Michelangelo: Architecture and the Vision of Anatomy, 85–86.)

19 It is well established that no complete drawings of his major works were produced before the execution of the projects; the Campodoglio in Rome is a good example. For a very extended analysis of Michelangelo's work see James S. Ackerman, The Architecture of Michelangelo (London: A. Zweimmer, 1970).
22 In the original Vitruvian context, the Greek word *idea* refers to the three aspects of a mental image (perhaps akin to the Aristotelian *phantasm*), understood as the germ of a project. These *ideas* allowed the architect to imagine the disposition of a project’s parts (Vitruvius, *The Ten Books of Architecture*, Book 1, ch. 2; Morris Hicky Morgan’s translation, New York: Dover Publications, 13-14). *Ichnographia* and *architographia* would eventually be translated as “plan” and “elevation” but do not originally involve the systematic correspondence of descriptive geometry.

23 *Sciagraphy*, or *sciographia*, derives etymologically from the Greek *skia* (shadow) and *graphou* (to describe). It thus becomes related to the projection of shadows in linear perspective. In the architectural tradition, however, *sciagraphy* meant a “draught of a building, cut in its length and breadth, to display the interior,” in other words, the profile or section. This use of the term was still present in the nineteenth century (Encyclopedia of Architecture, London: The Caxton Press, 1852). Modern Latin dictionaries translate *sciagraphia* (the actual term as it appears in the first existing Vitruvian manuscript) as the drawing of buildings in perspective, and generally assume that this word is synonymous with *sciographia*. The fact is that perspective was unknown in ancient Rome, and even when Vitruvius speaks about the three types of stage sets appropriate to tragedy, comedy, and satire (Book v, ch. 6), there is no mention of perspective in connection with classical theater. Vitruvius describes the fixed *scena* as a royal palace façade with *peristasi*, “triangular pieces of machinery which revolve,” placed beyond the doors, and whose three faces were decorated to correspond to each dramatic genre.

In northern Italy Daniele Barbaro, Palladio’s friend and patron, was also very careful to emphasize that perspective was not an architectural idea in the Vitruvian sense. Its use was mainly recommended for painters and stage-set designers. Barbaro believed that *sciographia* (the third Vitruvian idea), translated as “perspective,” resulted from a misreading in the original text of the word *sciagraphia*, whose application was important only in the building of stage-sets. Indeed, the frontal perspective used in scenography was concerned with the surface of the picture plane and did not involve the three-dimensionality of “lived” space, which explains its restriction to painting and theater. It is in such media that perspective fulfilled its symbolic function as a means to disclose an ontological depth. Such distinctions, the norm rather than the exception during the Renaissance in Europe, reveal the difficulties involved in conceiving a work of architecture in terms of a two-dimensional set of projections.

Indeed, it was only in the seventeenth century that perspective 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 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. The architecture of Versailles, for example, is not expressed merely in the plans and sections of the palace; its meaning rests primarily in the implied (perspectival) order of the garden, the city, and the world, and in the ephemeral stage sets and theatrical fireworks that were a part of palace life. Similarly, the architecture of the Jesuit church in Vienna by Andrea Pozzo can hardly be reduced to its section and elevation. Pozzo’s fresco is inextricably tied to the three-dimensionality of the architectural space. Rather than remaining in the two-dimensional field of representation, the perspective is projected from a precise point situated in actual space, and fixed permanently on the pavement of the nave with a bronze marker. The spatial order of the dome is revealed only at the precise moment that a human presence occupies the station point of the illusionistic *quadriatura* fresco.

Even though the theory of perspective, as an offspring of the new science, allowed man to control and dominate the physical reality of his existence, the arts, gardening, and architecture during the seventeenth century were still concerned with the reconciliation of subject and object and with the revelation of an ordered cosmos. While man considered himself autonomous from external reality, perspective allowed him to dwell...
In Book 1, ch. 2, Vitruvius describes this scenographia as "frontis et laterum absconditum ad circlinique centrum omnium linearum respondit." Both Frank Granger (London: Harvard University Press, 1931) and Morris Hicky Morgan (New York: Dover Publications, 1962) in their translations of Vitruvius read this as "perspective." Granger’s translation reads: "Scenography (perspective) is the shading of the front and the retreating sides, and the correspondence of all lines to the vanishing point (sic) which is the centre of the circle." Hicky Morgan’s translation is also problematic: "Perspective is the method of sketching a front with sides withdrawing into the background, the lines all meeting in the centre of a circle." These modern translations fail to do justice to the original text, in which there is no allusion to a vanishing point or to linear perspective. Even if scenographia means "to draw buildings in perspective," the Latin origin of perspective, perspicere, is a verb that means simply "to see carefully or carefully, to see through." Barbaro argues that scenographia, which is "related to the use of perspective," is the design of stages for the three dramatic genres. Appropriate types of buildings must be shown diminishing in size and receding to the horizon. He does not agree with "those that wish to understand perspective (perspettiva) as one of the ideas that generate architectural design (disposizione)," ascribing to it the definition Vitruvius had given to scenographia. In his opinion it is plain that "just as animals belong by nature to a certain species, the idea that belongs with plan (ichnographia) and elevation (orthographia), is the section (profilo), similar to the other two "ideas" that constitute architectural order (disposizione). In Vitruvius’s conception, the section "allows for a greater knowledge of the quality and measurement of building, helps with the control of costs and the determination of the thickness of walls," etc. Barbaro, in fact, assumes that in antiquity "perspective" was applied only to the painted representations on the side of the periaktoi. *(La Practica della Perspettiva, 130).*

24 A suble distinction was often drawn between perspettiva, generally understood as the art of drawing complex geometrical volumes constructed from their planimetric elaborations (so as to represent them three-dimensionally), and perspettiva, which dealt mainly with the surface of the picture plane. Both words come originally from the Latin verb spectare, to see. Perspettiva, meaning to see clearly or carefully, seems to have more passive connotations than perspettiva, meaning to look out at, to look forward or toward an object. On the other hand, the Italian perspettiva and perspettiva were often used interchangeably to name the new linear perspective. Piero della Francesca declared painting a mathematical art in *De Prospectiva Pingendi* (Parma: Biblioteca Palatina, ms. 1576; reprint, Florence, 1942). He introduced the problem of constructing regular and irregular bodies (the latter being more important for painters) as part of his treatise on linear perspective. Luca Pacioli in *De Divina Proportione* (Venice, 1509), after emphasizing the sacred (Christian) character of the golden section, most useful for architects, added fifty-nine full-page woodcuts of regular and irregular bodies drawn in perspective and based on models prepared by Leonardo.

Interestingly, Pacioli explained that the two most important solids for architects were the 26-faced solid and the 72-faced solid, both capable of approximating the constructive reality of domes and vaults. Barbaro made a distinction between the content of his published book, *La Practica della Perspettiva* (Venice, 1569), and an unpublished manuscript of practically the identical title, *La Practica della Perspettiva* (Venice: Biblioteca Marziana, ms. 17. iv., 39-5446). In the former he teaches how to render buildings in perspective in order to construct stage sets, starting from detailed instructions concerning polygons and polyhedra, while in the latter he deals mostly with the study of geometrical bodies and their relationship to perspective. Perspettiva, according to Barbaro, addressed the practical concerns of artists and architects, assuming that the essence of built architecture was evidently the geometrical lineamenti of these constructed bodies.

25 These crucial distinctions stand despite the well-documented interest of architects in the theater and the often perceived continuity between the "tragic stage" and the city of classical architecture, as exemplified in Serlio’s famous engravings and Palladio’s Teatro Olimpico. This ambivalence is in our opinion not a logical fault but an asset. It is, in fact, a fundamental character of Renaissance architectural intention and must be understood as having contributed to the magical depth of many architectural works and representations as we know them today.

26 The radical changes brought about in the realm of thinking by the scientific revolution cannot be overemphasized. Alexander Koyre has shown in his *Metaphysics and Measurement* (London: Chapman & Hall, 1968) how a world of fixed essences and mathematical laws deployed in a homogeneous, geometrized space, much like the Platonic model of the heavens, was assumed by Galileo to be the truth of our experience of the physical world. As an example, Galileo believed, after postulating his law of inertia, that the essence of an object was not altered by

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9 Illustration of a projected fresco on a ceiling, Andrea Pozzo, 1705.

10 View of the quadratura fresco on a shallow dome at the Jesuitenkirche, Andrea Pozzo, Vienna, 1705.
motion. This notion, now an obvious truth, was at odds with the traditional Aristotelian experience of the world, in which perception was our primary access to reality. This new conception eventually led to skepticism regarding the physical presence of the external world. In the terms of Descartes, man became a subject confronting the world as res extensa, as an extension of his thinking ego.

Anamorphosis as a projection of forms beyond the limits of the image was already known by the painters of the Renaissance. In fact, one of the earliest references to the art of anamorphosis can be found in Vignola's _Due Regole della Perspettiva Practica_, where he described a basic method that follows the same laws of visual rays that he applied to develop his theory of linear perspective. But the manipulation of images was still perceived as an act of magic, and the technique of anamorphosis remained secret. It is only during the seventeenth century that Jean-François Niceron systematized the technique as a geometric construction and made it into a method. For a detailed history of anamorphic art, see Jurgis Baltrušaitis, _Anamorphic Art_ (New York: Harry N. Abrams, Inc., 1976).

This is also revealed in the aims of philosophical systems throughout the seventeenth century. For example, in his _Studies in Geometry of Situation_ (1679), G. W. Leibniz proposed a science of extension that, unlike Cartesian analytic geometry, would be integral and not reducible to algebraic equations. But this project of a descriptive geometry more universal than algebra could still magically describe the infinite qualitative variety of natural things. This transcendental geometry was part of Leibniz's lifelong dream to postulate a universal science, called by him at various times _lingua universalis, scientia universalis, calculus philosophicus_, and _calculus universalis_. From all the disciplines of human knowledge, he tried to extrapolate the simplest constitutive elements that would allow him to establish rules of relation by which to organize the whole epistemological field into a "calculus of concepts."

Niceron considered perspective as a tool partly magic, partly scientific. Rather than a technique of reduction, it was for him a vehicle by which to attain truth. In the context of the Cartesian revolution, Niceron's _Thaumaturgia Optica_ (Paris, 1646) was his reflection on appearance and reality. meaningfully in the physical world by changing its geometric dimension. In the extreme, anamorphosis, another type of perspective projection, involved the distortion of the reality it represented. Here a geometrical theory, now clearly dominant, subjected normal perception to its own structure by placing the point of view in unexpected places, often on the surface of the drawing or painting itself. By geometrizing the world in such a confounding way, man gained access to a new transcendental truth.

The dual nature of baroque perspective is evident in anamorphic works, whose perspective both revealed the truth of reality and reflected man's power to modify it; that is, it was a kind of magic. Even though perspective became increasingly integrated with architecture, perspectival systematization remained restricted to the creation of an illusion, qualitatively distinct from the constructed reality of the world. Perspective marked the moment of an epiphany, the revelation of meaning and the God-given geometric order of the world. For a brief time, illusion was the locus of ritual. The revelation of order occurred at the precarious moment when the vanishing point and the position of the observer met.
While most seventeenth-century philosophers were still striving to formulate the appropriate articulation of the relation between the world of appearances and the absolute truth of modern science, the work of Gérard Desargues appeared as an anomaly. Desargues disregarded the transcendental dimension of geometry and the symbolic power of geometrical operations, and he ignored the symbolic implications of infinity. He sought to establish a general geometric science, one that might effectively become the basis for such diverse technical operations as perspective drawing, stone and woodcutting for construction, and the design of solar clocks. Until then, theories of perspective had always associated the point of convergence of parallel lines with the apex of the cone of vision projected on the horizon line. Desargues was apparently the first one in the history of perspective to postulate a point at infinity. He maintained that all lines converged toward a point at an infinite distance. Thus any system of parallel lines, or any specific geometrical figure, could be conceived as a variation of a single universal system of concurrent lines.

Desargues's method allowed for the representation of complex volumes before construction, implementing an operation of deductive logic. Perspective became a prescriptive science that controlled practice. The scientific revolution had witnessed in Desargues's system the first attempt to endow representation with an objective autonomy.

Nevertheless, the prevailing philosophical connotations of infinity, always associated with theological questions, as well as the resistance of tradition-minded painters, craftsmen, and architects, made his system unacceptable to his contemporaries. Desargues's basic aims would eventually be fulfilled by Gaspard Monge's descriptive geometry near the end of the eighteenth century.

Once geometry lost its symbolic attributes in traditional philosophical speculation, perspective ceased to be a preferred vehicle for transforming the world into a meaningful human order. Instead, it became a simple representation of reality, a sort of empirical verification of the way in which the external world is presented to human vision. Pozzo's treatise Rules and Examples of Proper Perspective for Painters and Architects occupies an interesting, perhaps paradoxical, position as a work of transition. From a plan and an elevation, his method of projection is a step-by-step set of instructions for perspective drawing that establishes the absolute proportional relationship of those elements seen in perspective. The last part of the book develops the method of quadratura, wherein the three-dimensionality of architectural space is subjected to the law of geometry. The consequential homology of "lived" space and the geometric space of perspectival representation led the architect to assume that the projection was capable of truly depicting an architectural space, and therefore supported the possibility of actually designing in perspective. The qualitative spatiality of our existence was now identical to the objectified space of perspective.

In the eighteenth century artists, scientists, and philosophers lost interest in perspective. The process of geometrization that had started with the inception of modern science was arrested by the focus on empirical knowledge spurred by Newton's work and the identification of inherent limitations in euclidean geometry. Architects seemed ready to accept the notion that there was no distinction between a stage set constructed following the method per angolo of Galli-Bibiena, one where there was no longer a privileged point of view, and the permanent tectonic reality of their craft. Reality was transformed into a universe of representation. The baroque illusion became a delusion in the rococo church. Even the vanishing point of the frescoes became inaccessible to the spectator, while the building appeared as a self-referential theater, one in which traditional religious rituals were no longer unquestionable vehicles for existential orientation. Despite all this, and in addition to the early eighteenth-century academic attempts to ridicule the secrets of the guilds and the ensuing systematization of construction after 1750, the primacy of the built work over the desis, the comprehensive project with specifications, still remained. Drawings were not yet mere predictive tools.

Architectural Representation Beyond Perspectiveism

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[31] Parallel lines did not converge in euclidean space, where tactile considerations, derived from bodily spatiality, were still more important than purely visual information. See Maurice Merleau-Ponty, Phenomenology of Perception, Part I, chapters 1–3.

[32] Kepler had already introduced a point at infinity in a work on the conic sections, Ad Vitellionem palatium wines astrononimiae pars optica traditur (1604). He was interested in the laws of optics and generally in the nature and properties of light. Desargues was in fact the first to apply that notion to different theories on perspective and stereotomy. Such an accomplishment remains difficult to appreciate from a contemporary vantage point, which regards visual perspective as the only true means of comprehending the external world.

[33] Orthogonal projection as we understand it today was for Desargues a simple case of perspective projection where the projective point was located at an infinite distance from the plane of projection.
Pozzo avoids the geometrical theory of perspective, and his theoretical discourse amounts to a collection of extremely simple rules and detailed examples of perspective constructions. His work can appear paradoxical if we compare his frescoes in quadratura, which involve an epistemological recentering of man, to this very systematic establishment of proportions that seems related to Desargues’s understanding of geometry.

Even though it is easy to recognize a relationship between Pozzo’s perspective method and Durand’s use of projections, descriptive geometry could not have been postulated as a systematic science before the nineteenth century. Euclidean geometry was conceived as a science of immediacy whose principles had their origin in perception. Euclid’s theorems are verifiable only insofar as the things to which they make reference are accepted as variable and imprecise. The achievements of seventeenth-century geometicians had attained a limit of abstraction and were never developed further. Throughout the eighteenth century geometry as a scientific discipline was becoming obsolete. Diderot writes in his treatise De l’Interprétation de la Nature that “before a hundred years there will be scarcely three geometers left in Europe.” For more details about this aspect of eighteenth-century philosophy, see Yvon Belval, “La Crise de la Géométrisation de l’Univers dans la Philosophie des Lumières.” Revue Internationale de Philosophie (Brussels, 1952).

Karsten Harries examines this problem in his excellent study The Bavarian Rococo Church (New Haven: Yale University Press, 1983).

Systematic coordination of plan and elevation with perspective, Andrea Pozzo, 1707.
Contrary to the post-Heideggerian understanding of mythopoiesis to which we make reference in note 5 (i.e., the articulation of truth as aletheia, the Beaux-Arts attempt to retrieve the classical style amounts to the imposition of a myth, in the negative sense, as a fallacious representation of repressive social hierarchies. The rendering of drawings in the Beaux-Arts tradition does not change the essence of the architecture it represents, nor does it succeed in formulating an alternative to the architecture of the Ecole Polytechnique. The Beaux-Arts does not retrieve myth through drawings, but rather, only formalizes appearances, indeed much the way “post modern” styles do. This is at odds with the possibility of retrieving meaning through a phenomenological understanding of symbolization.

The question concerning the application of computers to architecture is, of course, hotly debated and as yet unresolved. The instrument is not simply the equivalent of a pencil or a chisel that could easily allow one to transcend reduction. It is the culmination of the objectifying mentality of modernity and is, therefore, inherently perspectival, in precisely the sense that we have described in this article. Computer graphics tends to be just a much quicker and more facile tool that nonetheless still relies on the projection as its base, a radical tool of industrial production. The tyranny of computer graphics is even more systematic than any other tool of representation in its rigorous establishment of a homogeneous space and its inability to combine different structures of reference. It is, of course, conceivable that the machine would transcend its binary logic and become a tool for a poetic disclosure in the realm of architecture. The fact is, however, that the results of computer graphics applications are always disappointing. The objectification of another reality appears more intense, and the tool seems clumsy at best to show animated pictures of a fallacious building.

The unnameable dimension of representation refers to a wholeness that can be recognized but not reduced to words and is, in the context of Gadamer’s hermeneutics, the “signified” of the artistic symbol. See below, note 40.

Hans-Georg Gadamer has given us one of the clearest elucidations of the question of representation in art in The Relevance of the Beautiful, (Cambridge: Cambridge University Press, 1986). The work of art, regardless of its medium or its nature as figurative or non-objective must reveal the presence of being, the presence of the invisible in the world of the everyday. This dimension is perhaps the only constant of true art through history. Partaking of this condition, the architectural works of the city allowed for existential orientation, cultural belonging, and the perpetuation of tradition. They were never merely “buildings.” Understood primarily as an abstract order, architecture could be embodied at the scale of the reliquary, the garden, the ephemeral canvas-wood structure, or the machine for manifold celebrations and theatrical events. This notion is connected to the original Greek understanding of symbol as a token that would allow an old friend to be recognized by members of the household (or any institution) as a member of the same group, a part of the whole, belonging to a cosmic place. (We must remember that the word agone meant both a place, and an assembly of citizens participating in the decision-making process concerning the future of their polis.) A symbolic architecture is one that represents, one that can be recognized as part of our collective dreams, as a place of full inhabitation. This recognition is inherently difficult in a postmodern world where man is generally oblivious to his mortality and has grown accustomed to exploitation, simulations, and technological control, but it happens to be, whether intentionally or not, the most striking feature of the most admired architectural artifacts in our tradition, in which the manifold symbols reveal an order that is immediately accessible to us. Thus, creation as representation must be the ultimate objective of architectural work if our profession is to have any social meaning at all. In a technological world, this objective can be attained only after recognizing the fallacious neutrality of our tools for the generation of form.

An understanding of the autonomy and polysemy of the symbols employed by the architect is an important first step in overcoming our predicament. One object, one model, or one drawing may indeed embody the full intentionality of a building. We can recognize the invisible (the ground of existence in the sense of Gadamer, a glimpse of our place in a totali-

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ty) in the artist-architect’s work, similar to our recognition in the spatial experience of the building.

When seen from the front, the shadows cast by the “ready-mades” are seen as anamorphic projections stretched out on the surface; the bottle brush, which is the only three-dimensional object piercing the surface of the canvas perpendicularly to its plane, is reduced to a dot. But seen from the side, shadows of the “ready-mades” become “corrected” until they disappear again in the thickness of the canvas. At this point, the brush releases itself from the canvas and becomes the only visible reality of the hidden picture. In a series of essays on the work of Marcel Duchamp, Abecedaire (Paris: Centre Georges Pompidou, 1977), Jean Clair compares the painting Tu m’ to classical theories on anamorphosis.

The Green Box (a written thought process for the Large Glass) reveals Duchamp’s interest in scientific developments in the field of noneuclidean geometry.

In the White Box Duchamp asserts that “all form is the projection of another form according to a certain vanishing point and a certain distance.” By analogy with this notion of projected reality, all solid bodies would constitute the possible projection of an infinity of four-dimensional entities. The entire visible domain is for Duchamp an incessant flow of anamorphosis generated by those invisible entities.

To understand the fundamental distinction between the two uses of projection in art and architecture, it is essential to grasp the difference between truth as exactness in the Platonic sense (the absence of shadow of Western science and metaphysics) and truth as ontologia, the unveiling of being never given in its totality, such as Heidegger posits it in his late philosophy.

Marcel Duchamp also explored the paradigm of projection and investigated the ambiguous dimension between illusion and reality. His last oil on canvas, Tu m’ (1918), is a recapitulation of all the perspectivist deceits allowed by an opaque medium. It is his most explicit study on anamorphosis, the perspectival distortions that writers of the early seventeenth century believed dangerous in their capacity to manipulate and change the given appearance of the world. In Tu m’ Duchamp questions the distinction between appearance and apparition. The painting is constructed as an anamorphosis, though in contrast to all traditional works of this kind, the truth of the image is no longer revealed to the beholder from a fixed position. As one walks around it, certain elements of the composition become visible, while others vanish.

The Bride Stripped Bare by Her Bachelors, Even (Large Glass) (1915-23) and the Esant Donné (1916) embody Duchamp’s life-long struggle to reveal an invisible dimension of projection, one beyond the conventional boundaries of Renaissance painting, sculpture, and architecture. The projection on the lower part of the Large Glass (the realm of the bachelors) was conceived according to the rules of classical perspective, derived directly from the Renaissance concept of painting as a window intersecting the cone of vision. The upper domain, however, addresses the ambiguity between illusion and reality in terms of a four-dimensional object (the bride) projected in a three-dimensional world.

Duchamp’s bride in the Large Glass is analogous to a shadow. The shadow, taken as a projection or as an entity in itself, is in some way determined by the object that casts it. It reveals the invisible side of the thing, outlines its hidden face as a negative vision. At a distance from the projecting light, however, the shadow becomes an autonomous entity (as in a shadow play), an abstraction of the object projecting its absence.

The early twentieth century saw the recovery of aspects of projection that had been lost to the reductions of nineteenth-century industrialization. Like Duchamp’s shadows, the shadows of cinematographic projection re-embodied motion and retrieved tactile space from the perspective frame. Film offered a possibility to transcend the limitations of the technological, enfamed vision through the juxtaposition of different realities. A previously invisible, uncharted aspect of experience found expression.

The projection of the cone of light through the darkness of the cinema can be seen as an inversion of the Renaissance notion of the cone of vision. It illustrates the reciprocity of light and shadow as an analogue of the complementarity of presence and absence and disrupts the fixed gaze of the perspective, which is the objectifying vision of Western science and philosophy. During the cinematographic projection, we sit immobile between the light and the projected images, in the enduring present of a space-time of no fixed dimensions.
45 "Western metaphysics emerges from a worldly vision which takes the gift of daylight for granted and assumes, deeply unconscious of itself and its projections, the permanent presence (parousia) of our source of illumination: conditions of total unconcealment, making possible a vision of total lucidity in perfect possession of its (transparent) object. Western metaphysics reflects a worldly vision of truth which sees only sharp boundaries and division, the opposition permanently fixed in duality…. But this is a vision of truth which occludes our experience with shadows and shades (of meaning); the enchantment of the sunset hour, the uncanny light of the twilight…” David Michael Levin, *The Opening of Vision* (London: Routledge, 1988), 370-51.

46 We can only witness the extremes and recognize their complementarity, at best (and here the quality of the film is important) the reciprocity of actio and thinking in *Gelassenheit*. (We use this term in the sense of Heidegger’s late writings.) As in architecture, the spectator is not passive, but rather, creatively participates in the reconstruction of tactile space suggested by the montage.

47 *The Large Glass; The Bride Stripped Bare By Her Bachelors, Marcel Duchamp, 1915-23.*

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From its inception, perspective has had a potential to unify the relative time of our world with the absolute time of the image. The surrealists and, more specifically, surrealist filmmakers, were attempting to redefine the distance between the world and its representation, a distance that would allow man to recognize his place in a new order. The cinematographic montage provokes a disruption of the spatial and temporal perspective. Its narrative confounds the linear structure of filmic time, deconstructing homogeneous, geometric space. The projection of cinematographic montage is analogous to the experience of an embodied, subjective spatiality, to the experience of architecture as it "could be."44

In the last two hundred years, 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. Architects such as Giovanni Battista Piranesi questioned the basis of perspective and sought new modes of meaningful representation. Piranesi’s Carceri embody the first use of montage in architecture to deconstruct the linear perspective of space and time.45 In the Carceri meaning is saved at the expense of perspectival logic. The mystery of his projective method dismembers spatial continuity and involves the beholder in a represented space that invites inhabitation but that ultimately awaits the rebuilding of its dislocated parts.

47 Sergei Eisenstein describes his “Intellectual Cinema” as a structure of composition that defines the abstract and makes it appear. His method is based on analogy, a metaphor between the figurative image and human experience:

“The power of montage resides in that it includes in the creative process the emotions and mind of the spectator. The spectator is compelled to proceed along that same creative road that the author traveled in creating the image. The spectator not only sees the represented element of the finished work, but also experiences the dynamic process of the emergence and assembly of the image just as it was experienced by the author.” Sergei Eisenstein, The Film Sense (New York: Harcourt Brace Jovanovich, 1942).

48 In this connection see M. Merleau-Ponty, Phenomenology of Perception (London: Routledge & Kegan Paul, 1962), in which he establishes what embodied perception “could” be by disclosing its original reality. Merleau-Ponty’s thesis, together with the posthumous notes published under the title The Visible and the Invisible (Evanston, Illinois: Northwestern University Press, 1968), are still among the most crucial readings for the professional architect.

49 Sergei Eisenstein’s interest in Piranesi’s explosion of perspective is well known. Piranesi’s etchings on the Carceri are characterized by the entanglement of beams, stairways, and hung bridges that emerge from the depth of the image and are projected beyond the limit of the frame. The contrast of shadows creates an ambiguity between interior and exterior space. The structure of Piranesi’s etchings is projected forward, beyond the edge of the drawing, into the space of the observer. Similarly, Eisenstein’s intellectual montage attempted to include the presence of the spectator in the creation of the dynamic image.

18 Carceri, no. XI (second state), G.B. Piranesi, 1761.

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There is, of course, no way to define in absolute terms the boundaries between painting, sculpture, and architecture; these have shifted constantly through time and are closely connected to their respective content. In the recent Venice Biennale (1990) a critic noted that painters were doing sculpture, while sculptors were dealing mostly with flat surfaces.

Theoretical projects from Piranesi to Duchamp, including some works in film montage, establish a space that resists the domination of the rational/perspective vision. Some of the most outstanding works of architecture, such as examples by Gaudí and Le Corbusier, subverted the reductive instrumentality of architectural representation and also aimed at transcending the enframing vision. These powerful works unveil the true potential of architecture in a postmodern world.

Piranesi actually rejected many commissions and called himself an architect, while Boulleé emphasized, in his *Essai sur l'Art*, that his architecture was of the sort of Newton's cenotaph, and not his many buildings. An important challenge that has been taken up by John Hejduk is the implementation of fictional narratives as part of the montage in order to ground the theoretical project in the world of experience. This is a complex and important aspect of the discussion that unfortunately cannot be pursued here.

This architecture represents a potentially different future order beyond the conventional categorization of the "fine arts," now obviously obsolete. Such architecture cannot be seen as reduced to a syntactic set of projections. Theoretical projects have been both experimental in scientific pursuit of discovery and poetic in artistic pursuit of the world's given order. Neither intuitive nor irrational, these works are suffused with the Logos of myth.

Continuing in this tradition, 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 poststructuralist criticism. Through their authors' radical revision of the task of making as it relates to architectural ideation, these projects attempt to recover an architecture that might reveal the presence of being. Such an architecture would remove the objectifying, instrumentalizing screen of industrial technology and would speak to our prereflective, embodied awareness.

The critical dimension implicit in these projects is well known. They are not formalistic or self-referential games, nor are they merely unbuilt works. Theoretical projects question the possibility of a truly poetic architecture in a prosaic world. In this sense the projects are the architecture; they are not a surrogate for anything else.

In the context of our cities of shopping malls and traffic networks, the images of fashion, whether of old Europe or modern technology, are empty simulations. They carry no meaning except to weakly reaffirm the repressive structures of power of which those images speak. To assume that the tools of projection and perspective are supported by some sort of transcendental truth is equally nostalgic. A critical step toward our retrieval of an architecture throughesthetic wonder is to question the hegemony of perspectivism and its simulations. When projections function as surrogates of buildings, when sets of drawings attempt to provide us with a "picture" of an architectural place or object, the buildings produced by such techniques must necessarily reflect the predictive quality of their conception: the possibility of a revelatory dimension is abandoned and the actualization of the architect's imagination will inevitably be lost in the translation. That this assumption of a literal relationship between the project and the building is basic to industrial production in the modern city makes a critical reassessment of this issue all the more pressing.

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