

UNPRECEDENTED MEDIA

Digital Methods:

Design and Media

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whenever technology reaches its real fulfillment it transcends into architecture¹

—Mies Van der Rohe

The borderland existing in contemporary digital technology is **the** unexplored terrain. Representing the same manifest destiny of the newly discovered American continent, the self-sustainability of westward expansion and monetary potential of the 1980's world of high finance has each been usurped by the current opportunities of the digital realm. The new landscape breeds promise and possibility represented by the edge condition and the outlaw: the individual that employs the lack of orderly cultural domination to re-evaluate their moral boundaries by defining their own way of living. The train-robbing bandits have redefined the six-shooter as John Draper discovered that a Cap'n Crunch™ whistle produces a tone activating AT&T's free calling in 1971 birthed the hacker.²

A revolution is underway. The beginning of the twentieth century witnessed the industrial revolution where material innovation and mechanized production transitioned the conceptual considerations of architecture. Buildings reached the sky, mass-production increased product availability, and industry altered social boundaries. The late 20th century, led by information, has re-positioned every aspect of modern life from the automated coffee maker to the patriot missile system³. Each innovation forces transition by expanding the sphere of knowledge and experiences to engulf terrains previously unconsidered or even conceptualized. Architectural production and design methodology have similarly been altered. The traditional parameters and methods have become anachronistic. Their augmentation has resulted in an evolutionary cyborgenic⁴ hybrid governing the methods of interface operation.

The borderland between the digital realm and the physical realm is constructed with virtual technologies. A physical fissure, through a conceptual transition, snaps the historical continuity of cognitive production with schizophrenic operation in multiple distinct realms within

the same framework⁵. A trigger mechanism initiates the oscillation of the mind between each of the detached personality realms where transactions operate uniquely to each of the parallel realities. The body physically experiences everything, but the mind compartmentalizes and separates. The individual becomes multiplied, existing in several inseparable realms simultaneously with each varied personality representing the polarities of the human condition. The digital realm employs this hybrid mentality without functioning with the same independence or naivety, but rather simultaneously indulging the cognitive responsibilities by mapping the history and culture of the collective conscious to the physicality of media. This tactile meditation demands the synthesis of the instinctual where the cognitive joins with the biological to allow for an interaction briefly merging man and machine generating a cyborg.

Biologically, the hierarchy of the mind and the body facilitating compartmentalization is discarded to permit the instinctual to transcend the systems, methodologies and barriers of physical occupation. The physicality of the interactive system assimilates the tactile and visual abilities of interface to extend the physical realm by bridging the cognitive realms of the irrational mind with the obsessively ordered numerical realm of code. One wields the body to traverse a cognitive landscape and produce an ephemeral intellectual result the way one wields a hand tool to accordingly govern a physical result. The elaboration of this primitive foundation alternates the parameters by transitioning form and production from the physical to the cognitive realms.

The manual dissection of this process reveals the impact of the new digital media upon the production of architecture. In recent years, with modernism and the mass production of materials, greater abilities and greater constraints have confronted the architect. The individual governing is usurped by the collective conscious of various concerns and talents from multiple professions. The collaboration transitions the focus of architectural production to the media of: drawings, models, textual specifications that represent the process of fabrication rather than the actual making itself. The computer transitions the traditional parameters culminating in the personal cognitive production occurring during this representational stage.

The method of intermediary production imposes and reveals its methodology in the finality of *re*-production. The parameters of rep-

resentation convey a depiction simultaneously resulting from, and emerging out of, the methods of conceptual process as the "how" inherently influences the "what." The systemization of methodological investigation imposes a distinct effect upon the product of that system. The operator employs the rules to define their liberation. The ability to work within a system is the foundation of all social interactions. Rules establish boundaries. Dave Hickey illuminates the ability for rules to liberate the individual by sustaining the parameters within which one must re-invent oneself to advance the group. Hickey proclaims that basketball, as the most democratic of all sports represents the quintessential framework for liberation. Dr. J and his under-over behind the back shot, allowed for a deflecting re-invention of the sport of basketball⁶. An understanding of the system allows the parameters to define a way to overcome their limitations by turning back into the fold to use the system against, and ultimately for, itself. Digital technologies provide the new moves in architecture.

The output of physical action causes a physical reaction isolating and depositing through systems of language and information a detached conveyance of a virtually occupyable satellite of the mind. The informational positioning and fracturing is amebic⁷ in its cellular reproduction: able to duplicate, persevere and amplify its conceptualization infinitely into the environment like the foundational principles of contemporary pop culture founded in serial image production and information dispersions via the global informational web of the Internet. The serial dispensation of satellite cognition allows for the unintentional and ultimately chaos theory based informational interaction that spasmodically invades the perceptual realm. The digital realm orchestrates an archive of information that systematically reproduces outside of the formal system of fabricated presence.

The machine as a vehicle of exploration self-maps the internal workings of the mind for external consideration. Isolation recognizes structural formulation and perceptory consideration allowing for the manipulation of the systematized digital media to redirect the destination. This innate process is employed as a liberative means. Robin Evans in his essay "Translation from Drawing to Building⁸" addresses the removal of the architect from the resultant. Unlike the allied disciplines of painting or sculpture, architecture employs intermediate means to accomplish fabrication resulting in reliance upon a language of production that conveys the conceptual intention and material processes to *collaboratively* produce a "construction." The architect operates in a borderland realm distinctly "between" the individual and the collective where the architectural remains removed, placing its production in the language of investigation and graphic communication. The syntax as the final element, uniquely defines its own presence, suggestive and dependent upon the implications of its representation. The resulting object thus imbibes its presence with

the methods of its production defined simultaneously by its self-worth and its representative worth.

The employment of digital representation when positioned against more traditional architectural media parallels the artistic debate of photographic production. In all creative disciplines, an exact understanding of the media governs the production of the output. The collaboration of the conceptual intention with the technical processes is represented in a unique method of disciplinary output. Painting relies upon the two-dimensional manipulation of surface, while sculpture a three dimensional manipulation of collaged materials; each directly engaged in the process of fabrication. The conceptual instigator simultaneously assumes responsibility for the physical realm. The inherent qualities, capabilities and limitations of the manipulation permit the process to inform the output of production. A Jackson Pollack painting synthesizes the method of Pollack's physical dance and the drip of paint running down his hand with a conceptual and instinctually visceral reaction to directly and simultaneously determine the resultant⁹. Photography transitions production to a mediated *multi-staged* system orchestrated through the mechanical lens of the camera. The removal from immediate production culminates in a detached resultant as the photographic production process is separated into two distinct phases, each technologically dependent upon a mechanized system. The additive factor of this multi-tiered process is the insertion of time. The immediacy of action to reaction is extended through the complexity of the process innately fracturing the resultant from the instance of inception and occurrence. The fissure of time creates a relational distance of occupyable terrain. The architect similarly phases his role from active production to passive orchestration with an exaggerated fissure extending the sequential distance through the scope and magnitude innate to the scale of a constructed undertaking. Digital media allows for the simultaneous fabrication of the process and the resultant through the model of the cyborg.¹⁰

The body, as a sensorial environmental mediator displaces the mind from reality. Limited by ten digits and a prescribed language,¹¹ the fissure between cognitive action and physical reaction is innate. The instinctual bridges as habit and experience synthesize an immediate hybrid of action and reaction. Digital technology exaggerates this relationship through a virtual realm indebted to the rationality of its system maintaining similar semiotic delineations to contemporary linguistics where meaning derives from a contextual stance of relation.

Digital space is dependent upon this association, compounded by interface resulting in a variant system between the pro-active flow of the mind and the passive stasis of the machine. The resulting lag, maintaining a detached system of communication, provides distinct

methods of systemized information conveyance inherently influencing the product as illustrated by the recent flourish of digital constructs as: blobs, wiggles, folds and distortions. The traditional constraints of rectilinear standardization that derive from the fabrication and rationality of the Miesian box are being replaced with an increasingly complex rationality. The key variant in the new digital method is the separation of influence from the conceptualization of production to the conceptualization of cognitive production. The tangible tactility of the result removes itself from digital methodologies, as the product becomes information itself.

The removal of the object from a direct mediation becomes fundamental to the manipulation. The veil of the operating system, that conceptually includes the rigidity of hardware and software interface systems alike, becomes *the* link that maps the ability for the transformation from input to output. This barrier, which governs techno-phobia in its discontinuity with individual intuition, establishes the regulatory rules of operation forcing translation of the personal methods of the individual.¹² Digital media celebrates its communicability and rationalizes its employment transcending any complexity of process, by the overwhelming sophistication of its resultant.

The result of digital operation is a conceptualization of a fissure that no longer permits the maintenance of the "individual" forum for representation and design process, as uniqueness must succumb to the rules of the system in order to mediate its constraints. It is however these rules that represent themselves in all aspects of architectural design to provide the action to which one can re-act. Capabilities have never been limited by constraint, simply re-directed and amplified in consideration to accomplish the desired resultant.

The digital realm, like Dave Hickey's description of the game of basketball, allows for the individual to interpret the rules to manipulate their operation. The relationship of accomplishment to a frame of reference establishes the greatness of its achievement. Everest represents a mountaineering feat in its scalar comparison with other global terrains. It is not *a* mountain but *the* mountain as one comprehends the extreme limitations of temperature, air quality and weather. Digital representation transitions the physical burden of manual abilities to the cognitive realm. No longer limited by the traditional constraints of representation, the machine liberates the mind.

The synthesized production of architecture within the digital realm forces interface methodology to become a hybrid: the *cyborg*. The synthetic model operates by simultaneously linking the manual nature of production with the conceptual foundations of intention by relying upon instinct:¹³ the uncontrollable intellectual realm that governs our subconscious presence. Habit and experience imbibe the digital mediator with instinctual responsibility in the method of production.

The balance of the system of production and the product itself emerges out of the individual cyborgenic model. Chuck Yeager, in his treatise on dog fighting¹⁴, speaks about the relationship between man and machine. The cyborg is the hybrid, created when man enters into a union of both body and mind with the intricate technologies of the vastly complicated airplane. The necessity is a simultaneity that allows for the individual to push ones anatomy and the machine's engineering to the maximum. At this extreme edge, the two become one as the cognitive shuts down defaulting to the instinctual. The merger allows for the individual to stop flying the plane and rather "fly the bullet."¹⁵ This synthesis is essential in the foundations of digital interface. Conception emerges out of a system unseen to the mind (operator) and hybridized by the limits and extremities of technology.

The introduction of the fourth dimension is the revolutionary foundation of cyborgenic production. Time, as the mediating factor of physical conceptualization, is ever accelerating. Speed as a relationship of time to space increases both the physical as well as cognitive realms of responsibility. Like the exaggerated reality of the photographic process, architecture succumbs to a removal of inception from resultant. Digital media remains employed by a pedestrian mentality in contemporary architectural realms. The capabilities have simply been employed to accelerate the traditional methodologies of architectural conceptualization and production denying the innate opportunities presented by the digital realm. The phased timeframe of production allows for the digital collapse of traditional boundaries.

Though still a technological infant, computer prototyping¹⁶ represents the direct relationship of digital technology in linking the mind to product. The resulting transformation shifts the framework of the architectural profession as a service industry by inserting an actual methodology of craft that provides simultaneous responsibility for the production of architectural space in *both* a physical *and* representative way. The machine links the traditional means of symbolic illustration to a physical and literal end unleashing the parameters of material and form.

Current fabrication abilities are in transition as innovation and economics constantly evolve the process, thus the immediate impact is witnessed by digital media's geometric generative capabilities. The traditional perspectival and formal manipulations that can conventionally be undertaken by Renaissance derived construction methods of shallow projected space are accelerated through the digital media's mathematical efficiency. The result is not the illustration of new forms, simply an acceleration of their generation and liberation from the traditional parameters of operation. The introduction of the systematized mediator into the design process allows for transition through

working within the system. The synthesis of man and media allows for an instinctual hybridization of thought and action to fabricate digital architectural spaces. Digital technologies have unique parameters that liberate through their fundamental conceptualization generating a new formal realm of blobs, wiggles, folds and distortions, dealing innately with issues of representation. Focusing on the transition of design conceptualization, issues of scale, geometry, form, materiality, view, light and sequence each transition their parameters of consideration. Digital media re-interprets, and advances a new perceptual system of organization and understanding.

SCALE

Representation is no longer a proportional scaling of the resultant, but a literally dimensioned fabrication.¹⁷ Digital media, by employing a direct 1:1 scale provides a dimensional authority that imbibes the process of fabrication with a monumental scale. The transition implies new parameters of perception and responsibility.¹⁸ The increased scale expands the production in intensity and precision expanding the microscopic and macroscopic views to an infinite threshold. The expansion of conceptual consideration now includes the molecular realm of materiality and the object quality of the *entire* composition. The simultaneity of scale possible to occur within the same composition assimilates the perceptory presence of the ultimate resolution of fabricated product. The new scale positions the process closer to the product

Geometry - The conceptualization of digital construction innately emerges out of the subscribed organization of the operating system founded in the mathematical constructs of Euclidean space. Digital technologies advance the parameters of perception by rapidly extending visual conceptualization in three-dimensional space. The formulation of constructed elements is dependent upon their geometric origins thus production of form is digitally definable through two primary methods: the construction of standardized primary geometric forms, and the planar assembly of elements.¹⁹ The systems of union can be defined as either additive (union) or subtractive (subtract) in the development of producing a language of totality out of the distinct building blocks. The componential construction thus demands an elemental tectonic understanding of the structuring primitives and their innate properties. The variations of geometric application reveal themselves through a comparative presentation. The following examples illustrate the subtleties of a singular factorial variation's formal effect. The first series represents the variation in the number of sides of a torus. The resulting formal change is evident in the drastic alteration along the section as the perceived torus curvature flattens to a "flying saucer-esque" diskobolos.

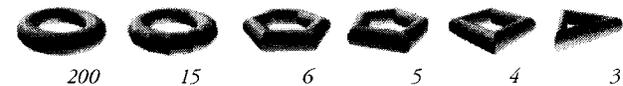
Similar variation occurs when the alteration operates on the seg-

iterations of sides



ments, changing the parameters of curvature around the circle. The geometric alteration transitions torus to hexagon, hexagon to square and square to triangle changing all visual definition.

iterations of segments



Other methodic realms of production include: surface mesh, solid shape insertion, face variation, banded layers and segmental accumulation. Each of these methods allows infinite alterable delineations within its variable parameters, but when employed in unison establish a matrix of calculable shape opportunities.

alterations



Form - The conceptual frameworks that define geometry thus define form. The production of shapes occur in either: a two-dimensional mode purely fabricated by segments,²⁰ or in a two-dimensional closed mode that creates a plane (geometric surface with no thickness which allow for a transmutability to the three-dimensional)²¹, or a three-dimensional form allowing for multi-faceted dimensional design.²² These disparate modes work in conjunction with one another while distinctly segregating their presence. Each system of operation declares its autobiographical rules of engagement permitting variable resultants dependent upon the distinction of their methods. The formal generation subscribes to a digitally internalized cyborgenic relationship of generative cognitive systems with technical fabrication abilities. The geometric parameters²³ dominate the variables to generate the increased catalogue of formal opportunity.

Materiality + Light - Material application allows the textured relationship of formal spaces. While digital media's capability for simulation is traditionally employed, the media's greater potential lies in the visual documentation of the conceptual intention. A relative scale of coloration, texture and gradation allow an investigation of material application and adjacency. Virtual forms fabricate

and represent themselves with identical response to biological optics.²⁴ Employing the construction principles of projected light and its transitional movement provides the simulation and potential orchestration of both natural and artificial conditioning. The ability to employ complex gradation increases the approximation of specificity in *effectua*²⁵ simulation. The expansion of the parameters of investigation liberates the mode of tactile operation linking digital technologies closer to physical fabrication.

View - The transition of digital positioning from tangible architecture allowing for physical inhabitation, to the virtual realm, visually occupyable, establishes a removed filter mediated by the method of projective construction. The point of view of the picture plane is the greatest liberative tool of digital media. Transforming the vantage of investigation from the traditional orthographically projected view to an internalized vista occupying a position within the composition. The resulting perspectival vantage, (in conjunction with the animated sequence), provides a fragmented and receding view duplicating the interpretive methodology of the mechanized camera lens. The accelerated speed of geometric calculation inherently capable through digital media allows the practical employment of the constructed sequence for investigation. The projected view simultaneously defines the vantage with the composition establishing a unique threshold inserted into the design process previously held by occupation of the finalized, constructed product.

Sequence - Time animation - Motion - The organizational axes rely upon the legacy of the x, y and z planes, distinctly charted points and linking equations formulaically and geometrically defining perimeters. Time, when quantifiably accommodated as the fourth dimension, enters as a disjunctive devise that accordingly reframes the previous boundaries of visualization. In 1920, photo-chemist Louis Lumiere published an account of a new method for still photography termed "photo-stereo-synthese."²⁶ Employing this method, Lumiere: *"subjected the camera lens and photographic plate to proportional, axial movement around the profilmic object, (a man's head) creating photographs in which only a specified plane within the space of the object remains in fixed relation to the plate during a single exposure. This fixed plane of the object registers as the sole area of focus on the photographic plate; the remainder of the object appears blurred due to the relative movement of the apparatus. Shifting the apparatus by increment perpendicularly "into" the space of the object with each successive shot, Lumiere exposes a series of plates until every designated plane of the object is recorded. Printing a faint negative from each plate, he then stacks these prints in succession, reconstructing the space of the object in a laminated visual*

*composite. The claim is this composite of images offers a precise geometric register of the contained space of the profilmic object, whereas a single image of the same object shot with a greater depth of field offers only a pictorial sensation of depth.*²⁷"

The result produced a system that allowed for a physical spatial mapping of a captured image to phenomenologically approximate its initial state by heightening the parameters of spatial reproduction and mimicry. The digital arena constructs the direct dimension of our perceptual reality. The mediating factor of perceiving this virtual reality (like the mediating ability to inform this virtual reality) becomes the interface.²⁸ Presently traversed by the two-dimensional surface of the monitor's screen as a conceptual window into another realm. The interface is visually constructed of a conceptual "shallow space" rather than a physical projection of a separated mapping. The additive role of perceptory advancement transforms the methods of visual engagement. The shift in the parameters of perception from traditional methodologies of operation, detaches the viewer from the object by simulating a two-dimensionally perceived sequence. The result is a re-conceptualization of the spaces themselves. Traditional methods of tangible model representation (external object) allow only for experience from a false and ultimately unoccupyable vista. Architecture is never experienced in a simultaneous autonomous realm, the architectural promenade allows for the orchestrated sequential experience of compositional fragments. Digital media produces an exploratory method for approaching the sequence directly mapping its consideration into the design process.

Each of these resultants of contemporary digital media is defined by the interface. The accentuation of the two-dimensional visual attachment combined with the accelerated calculation of geometric equations results in an exaggerated hybrid condition of existing methods restructured *amidst* the new systems and *by* the new systems governing the methods of input and orchestrating the methods of working within the media. The factors governing limitations are found entirely within the methods of the operating system expressing output impossible without digital technology. The transition of reactionary time shatters previous limitations of conceptualization by expanding their parameters. Calculated precision previously preventing such investigations liberates the constraints and dependencies of individual responsibility. The culpable realm demands a new method, mentality and product. Digital media has re-invented the standards by accelerating the rules.

NOTES

¹Kostof, Spiro. *History of Architecture: Settings and Rituals*. Oxford University Press: New York. 1995. p 727.

²Quain, John R. "Hacker Trackers" *Popular Science*. February 2001. p. 56-59.

³The patriot missile system employs the AN/MPQ-53 radar to combine in a single set the target search, detection track, identification functions and missile tracking, guidance and electronic countermeasures.

Friedman, Colonel Richard S., Bill Gunston, David Hobbs, Lt. Col. David Miller, Doug Richardson and Max Walmer. *Advanced Technology Warfare*. Harmony Books: New York. 1985.

⁴The legacy of the *cyborg* has long since been depicted and evolved in film through characters that are more machine than man or more man than machine including: R2D2 and C3PO from George Lucas' *Star Wars*, *Robocop* and *Terminator* from the self titled multi-series films, #5, "5 is alive" from the *Short Circuit* series, Data from *Star Trek: The Next Generation* television and movie series, and even Tim Burton's dark depiction of *Edward Scissor Hands*; which all subscribe to the componentially constructed individual first illustrated by Mary Shelly's Frankenstein.

⁵Schizophrenia is a mental disorder characterized by indifference, withdrawal, hallucinations, and delusions of persecution and omnipotence, often with unimpaired intelligence.

⁶Hickey, Dave. *Air Guitar*. Art Issues Press: Los Angeles, California. 1997.

⁷Amebic reproduction, found in single celled animals living in stagnant waters or as a parasite in other animals, multiplies by fission simply breaking itself apart to produce an identical other.

⁸Evans, Robin. *Translations from Drawing to Building and Other Essays*. MIT Press: Cambridge, Massachusetts. 1997.

⁹Pollack's action paintings of his latter years making him iconic as a modern abstract expressionist.

¹⁰The technical "how-to" of this process will be more elaborately discussed later when the specifics of the new method are outlined.

¹¹Linguistic approach encompassing over 3,000 various global dialects and their fracturing based on the secondary system of the alphabet

¹²The foundation of translation is change - not change that emerges in the resultant when cognitive intention is maintained, simply change that emerges in the methodology of representation and expression altering personal physicality and rationality to subscribe to the systematized standardization dictated by the linear rationality of a code capability.

¹³The traditional tasks of breathing and the consistent electrical impulses that maintain the heartbeat, circulatory system and thus life.

¹⁴General Chuck Yeager. "How to Win an Dog Fight." *Men's Health*. November 1994.

¹⁵Kwinter, Sanford. "Flying the Bullet or When Did the Future Begin?" Rice University Press: Houston, Texas. 1993.

¹⁶Via milling machines, three-dimensional scanners, laser cutters and Z form three dimensional printers to name a few

¹⁷Photoshop, AutoCAD, Form Z, Rhino, Alias, MicroStation and other drafting, graphic and modeling programs each subscribe to a literal scaling of both dimension and resolution. The proportional relationship of the two gradients, collaborate to orchestrate the retinal perceptual of our biological limitations for cognitive digestion.

¹⁸despite the proportional vistas monitors offer for mediation

¹⁹Computer-aided modeling programs typically employ either surface construction (volume) or Boolean solids (mass) in the construction of three-dimensional entities.

²⁰The unique maintenance of a modified version of the traditional two-dimensional realm of representation.

²¹An intermediary stage of the system still in the two-dimensional realm, but closed and thus poised for conversion (extrusion) to the digitally three-dimensional.

²²The new virtual realm of three-dimensional fabrication.

²³The formal principles were previously touched upon during the discussion of virtual geometry. The innate attachment maintained in the physical world is only amplified by the "digital."

²⁴The exception to the understanding of three-dimensionality as a gradient and cognitive reference to light is the wireframe. Its artificial structural presence illustrates the digital vista of shape understand but allows for an abstract methodology of graphic interpretation.

The eye is able to traverse the solid surfaces while cognitively maintaining their separating presence. Thus the cubist collage is perspectively collapsed to maintain foreground, middle ground and background simultaneously while employing only lines to depict a typically planar system of recognition.

²⁵It is key to note that digital media employed as a simulation of reality to provide a snapshot of reality denies the innate potentials of its innovations. The subjection of digital media to produce a true to life condition denies the conceptual potentials of the new arena.

²⁶Compte Rendu des Seances de l'Academie des Sciences 171. 1920.

²⁷Cartwright, Lisa and Brian Goldfarb. "Radiography, Cinematography and the Decline of the Lens." from Jonathan Crary and Sanford Kwinter. *Incorporations*. Zone Books: New York. 1992.

²⁸Engeli, Maia. *Digital Stories: The Poetics of Communication*. Birkhauser: Boston, Massachusetts. 1999.