

Tempus Fugit

Transitions and Performance in Architecture

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abstract

Meaning in architecture has isotropic instances of realization, one that can unfold during the design process and one that can be layered onto the artifact of the building; its components and forms constitute a communication flow that emerges from an abstract form of description to its physicality. The internal cognition of this condition situates the subject as the third element, one that identifies the meaning from the extant building to its proxy meaning. In this manner, narrative and aesthetics perform the actualizations (the spatial and physical sequences) so that the occupant may understand its implications.¹ Architecture is thus a one-directional flow of information (the building is an inert object from which meaning is derived, its physicality is static). Even in process-driven design, the synthesis of the many and the ordered, is evident in the materiality of the architectural manifestation; the building, although presented as a result of process cannot be separated from the reading of the generative operations.²

Rather than continue in this manner of constructing meaning from an extensive coding (joining a concept to an object) or the instantiation (producing one from a larger field of possibilities) from a version, we suggest a dialectic that is bi-directional, or even multi-nodal, that is, continually self-renewing in meaning and material configuration with the active participation of the occupant. This representation is one that is time-based.



1. architecture and physical computing

Physical computing is defined here as a designed environment that responds to input. This input can be analog - input from the physical world of human occupation or of atmosphere - or it can be digital - input from other computers, networks, or signals.

Through the integration of physical computing in the conception of the design process, the work of architects in manipulating space with tectonic logic and material affect not only expands, but new territories are found. Architecture gains another medium in computation that is not only critical in the making of digital form or information modeling but in the reassembly of spatial logic. As physical computing and cybernetics becomes increasingly ubiquitous in the practice of building, architecture - as a design discipline - must become a participant in its deployment.³ For physical computing, disciplinary tools must be applied for it to become an Activated Architecture in which we can shape and assess the polemic of its results.

1.1 transitions

Since the incorporation of time-based and agent-based simulation as a mechanism for the production of design⁴, it has become apparent that a shift in architectural paradigm might be related to a technologically based ideology.

In a recent lecture at MIT, Peter Eisenman suggested through his idea of lateness that in the late moments of an epoch – in the highly mannered, baroque, obscured work that resists legibility - before a paradigm shift, the signs of the new are already present⁵. In a similar manner, Patrik Schumacher in his introduction of Zaha Hadid's MAK catalogue, states that innovation does not occur as a completely new act, but always exists in relation to a current or historic model.⁶

In this context, we are positioning a scenario where what is deemed 'new' is not arriving from the late machinations of the critically disturbed, against-the-grain 'late'. The onset of ubiquitous computing and what we determine as Activated Architecture is not linked or archived only in the work of prior generations of architects. It is the purview of the physicists, the engineers and the cyberneticists alongside with architects and designers: those who increase design in their respective fields. Here the argument may move into the re-alignment of a critical discourse of architecture applied to physical computing, or into the dissolution of this outmoded field of architecture into one of networked collaborations. We are interested in trying to find an architectural polemic, a scenario where the efforts are focused at achieving an architecturally meaningful format exchange.

Here we construct a link from Gottfried Semper to Gordon Pask, not as a fictive device but as an inquiry of legacy based on motivation and method. Both were instructors and practitioners of architecture, establishing a new role for architectural production and evaluation, while aware of their positions in architecture in a Kantian vector of history.⁷

2. Semper, Pask and transformations

2.1. representation and simulation – a formal to temporal transformation

For Semper, the idea of expression in architecture is not in ornamentation but as a transformation of a material system, from the original logic of its assembly, into an object of representation. This transformation into *Urmotiv* is a vehicle that holds a prior tectonic method but is transformed by a new technology.⁸ In fact, the reinforcement here is that it is through enactment of primitive social action through which architecture was constructed. The temporal, process based ritual of this weaving, knotting, and joining is a continual reenactment made material. This affirmation of the roots of architecture was in response to a crisis in the deterioration of aesthetic criteria in ornament into what Semper presented as *Practical Aesthetic*.⁹

For Pask, digital simulation is the domain of a new reality, as it no longer needs reification from an external source; the simulation has its own set of rules and patterns making it independent. Rather than a linear, one to one mapping of an stimulus and a predetermined response, there is now a first order and second order, a system aware of being observed and of the other observer system, derived from feedback loops. This is the teleology of an observed system to the cognition of the observing system. This evolved into the use of language, of communication called *Conversation Theory*- one level has a set of goals, the other a set of actions. The response mechanism is not a direct, anticipatory mapping; instead the system has a higher order goal. This Paskian Environment had a capacity for *boredom*, a feedback loop to establish a level of interaction, rather than a simple reaction enforced upon the system. This idea of system participation, and not a regulated manner of information and control is what differentiates Pask when applied to his architecture studio. The phenomenology of *Geist* in observer and observed becomes fulfilled by subjective recognition of itself.

2.2 ordering and organization

For Pask and Semper, there was a need for new criteria to describe existing information. Semper's first interest was in the taxonomy of architectural style and all its constituent elements rather than a historical ordering. Style for Semper was not ornamental vocabularies applied in arbitrary fashion, but a careful re-assembly of meaning from the first industrial methods in what he calls primitive culture. This was in attempt to place his *Practical Aesthetics* as a comparative science, so that the function of these examined parts, were separated from the whole. Here, the industry of textiles is socially informed in the weaving of reeds or branches, the joining of surfaces by knots serialized into a seam that establishes continuity among disparate pieces, and the wreath as the original work of art. The origins of these techniques are then the deductive drivers for the persistence of their appearance on industrial work: industry derived as an evolutionary transformation of their process and not as a materialist idea of the spiritual or the ritual aspect of craft.

Pask's *Interactions of Actor Theory*¹⁰ continues his work on second order environments. In his attempts to discard the notion of user and machine, Pask introduces process as "Concepts persist minimally as stable dynamic resonating triples linked in the Borromean manner."¹¹ It can be determined in the interdependence of process and product in the continual maintenance of a dynamic stability so that a tripartite borromean knot topology is maintained. Any product or process has a simultaneous switching impact on all other products and processes. For his Paskian environments, this can have a impact on architecture that is truly participative beyond simplistic, linearly mapped behaviours.¹²

2.3 architectural implications

Semper's project of the ideal museum was to display his divisions of irreducible elements of process – the hearth, the walls, terrace and roof. These are based on having their own unique interior operation, not a form: the hearth is molded, which is done in ceramics, the walls are spatial dividers woven in textile and autonomous from structure, the terrace is made of joinery and carpentry, and the roof which is a mode of stereotomy or the measure of volumes in masonry.¹³ Each of the four elements were to be separated into their own quadrants, of their varying industrial operations and outcomes. Semper also understood the nature of experiencing artwork over time and from varying positions,¹⁴ although that object does not have any motility outside of the viewer's active gaze and its own artistic affects.

Pask's work in architecture, particularly as a collaborator with Cedric Price's Fun Palace¹⁵, and in his own Colloquy of Mobiles art installations for the ICA in 1968¹⁶, was also carefully defined in definitions and behaviours but his organization scheme occupied a polar difference. The use of control, information, and feedback were vigilantly maintained but Pask was interested in the new meaningful relationships to be explored by this self-organizing system itself. Whereas Semper was cultivating an archivist manner in identifying persistent elements over time and material assembly, Pask was interested in carefully specifying the initial start of the system but then allowing it to manufacture its own logic of connections, even proposing that the system grow new wire connections over time in response to its own impulses.¹⁷

What can be concluded here is that architectural discourse in this meeting of two designers can be maintained within the device of representation that is made of indivisible elements made meaningful in social action. For Pask, those elements are inextricably linked, and in a dynamic equilibrium represented in participative behaviour. The validity of the system is in the mutability of predetermined responses for an adaptive collective experience. Semper's identification of representation is similar as, in his systematic classification of primitive

technique and material transformed in industrial action, he makes a scenario through the primacy of process over form.

3. Activated Architecture: spatial and temporal representations

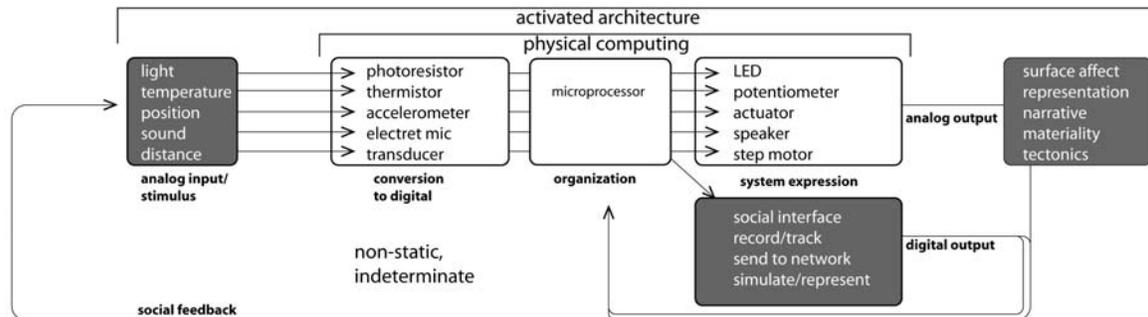
"... The role of the architect here, I think, is not so much to design a building or city as to catalyze them; to act that they may evolve." Gordon Pask¹⁸

3.1. physical computing, a design method

Applying this criticality, physical computing is currently defined as a designed environment that responds to input.¹⁹ Brought into the designed environment, which we instantiate as Activated Architecture, there is a transformation of the input that creates a dynamic response back to the occupant. This information is organized by the microprocessor into an exchange with an output device. In fact, this information is without value until linked with an agent of expression that is made meaningful to the other. It is this application of motive and its conveyance that is potentially troubled. The issue of what is perceived or interpreted is a historical one that can be addressed by the intention without ambiguity. With the intervention of a *Stil*, a release can be found in the idea of electronics having no dominant or privileged viewpoint.

The interesting aspect of this is the nature of what input and what output creates a meaningful relationship with the occupants. The observer as the passive recipient of the building output is now wholly active in initializing the response designed into the building. Buildings now have a narrative structure that can be construed as inbuilt. In electronics, bits are organized to represent a mediated reality. Messages sent in bits to the microprocessor from the sensors, are represented/translated in programming as an output that in turn can be sent back into the system.

3.2. activated architecture, conformal computing, networked urbanism



This is an architectural environment that is embedded and responsive. Its design and its execution are linked to become more than cyclic. What is *generative* is equally *generated* within its constant and dynamic feedback. The critical issues in conformal computing are those of representation and meaning as not only applied to space but to time. The sequence of actions within the system, the delay and patterning of information transfer for legible visualization, and the extensibility from local system to global networks are isotropic in the communication of meaning.

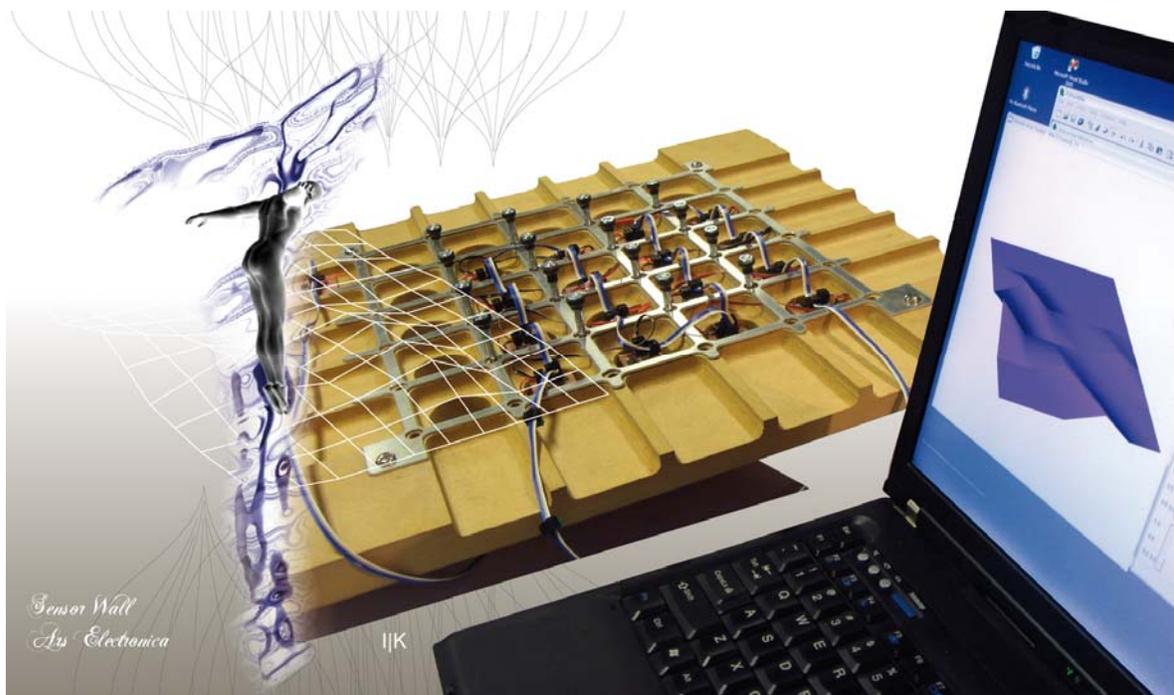
3.3. continuous present – feedback as a spiral design

Activated architecture therefore surpasses traditional built form because of its constant negotiation of inputs and designed outcomes, an architecture that is charged and renewing. It continuously maintains a connection from the initial design phases to its materialization.

The design input is still accessible through the output via the feedback. Inhabitable space becomes an indeterminate *design* experience, not a fixed, *designed* environment – the process remains active. This is not a continuation of the classical idea of a form that is determined from a fixed system, as evidenced in a feedback loop. Rather, we prefer to use the schema of a spiral from what Semper and Pask would both understand to be figure of advancement – in each cyclical motion, the trajectory moves perpendicularly so that at each 'return' there is a transformative shift. For Semper, the binding of architecture is maintained when it moves from rope and wood, to iron as the same cyclic node on the spiral, Pask would have this spiral become constantly challenged where a system response at one time would be a different response based on the impulses within the system itself.

In this context, we are presenting a scenario where the interchange of design as a process and as an advancement in technique and representation is a continually temporal one. The efforts are focused at achieving a format exchange: a reality that occurs in digital format, and a virtuality that occurs as a physical condition. The interesting aspect of this framework is that contrary to the traditional model, one cannot occur without the other. This interaction is characterized by the fact that our physical virtuality requires processing capabilities; and it can only exist in tandem with computational intelligence.

Therefore, the separation between mediums as discrete or isolated instances is replaced by a multi-nodal model; one that places physical computing at the core of architectural design.



an Activated Architecture prototype by the authors.

¹ see Evans, Robin. *The Projective Cast: Architecture and its Three Geometries*, Cambridge: The MIT Press, 1995. This is expanded in the legibility of pure geometry in the centralized church as described by Wölfflin and Wittkower. The encoding of form to be removed from the historical motivation of earlier pagan structure is resolved within symbolic meaning of the circle.

² see Schumacher, Patrik. "Introduction" in *Zaha Hadid Architektur*, Noever (ed) Vienna: Hatje Cantz Verlag, 2003 where he discusses the multi-valent possibilities of complex relationships by digital simulations as a provocation against previously inert or singular geometry.

³ see Kabat, Jennifer. "The Informalist" *Wired*, issue 9.04 2001. Recent publications have pointed to a neutrality or evacuation of the centralized architect/design schema for a peripheral, collaborative network of agents. One of the more compelling arguments for this is the work of Cecil Balmond, interviewed here.

⁴ see DeBiswas, Kaustuv and Kim, Simon. "A Multi-Agent Framework to Morph between Non-Commensurable Perspectives: Game City" in *Cybernetics and Systems 2008*, Vienna: Austrian Society for Cybernetic Studies, Trappl (ed), 2008. We implemented a virtual environment where numerous agents with simple rules, in biased preference orders, could continually change into evolving urban conditions.

⁵ Eisenman, Peter. "Beyond the Index", MIT Lecture Series, March 1, 2007. The discussion of late style was in reference to the work of Edward Said, *On Late Style: Music and Literature Against the Grain*. Said is interested in the conflict and contradiction in the work of artists (specifically of Beethoven as reviewed by Adorno) in their final years as well as in seeds of interruption within epochal transitions.

⁶ Schumacher, Patrik. *Zaha Hadid Architektur*.

⁷ Herrmann, Wolfgang. *Gottfried Semper, In Search of Architecture*, Cambridge: MIT Press, 1984. shows his self-criticality in response to Reigl and Schnaase. For Pask this is asserted in his discussions of beauty here:

<http://www.cyberneticians.com/video/pask-on-conv-and-beauty2.mov>

In *Critique of Pure Reason*, Kant wrote of the *sensus communis* in every person that is an internal knowledge of the external world, but one that is shaped by the pervading culture of that time. It is in these environments that what is perceived and understood is systematized and made understandable. Small increments in knowledge and industry can then be re-ordered by a heroic or a genius act to dramatically shift that environment to another level of purpose.

⁸ Hvattum, Mari. "Gottfried Semper: Between Poetics and Practical Aesthetics", *Zeitschrift für Kunstgeschichte* vol 4 number 64, 2001, pp. 537-564. "...rhythmic patterns were slowly translated into the domain of art and craft, into the rhythmic movement of weaving and the symbolic gathering performed by the knot.... the primordial motifs of art – the knot, the bead, the wreath - are indeed mimetic representations of ritual acts..."

⁹ Semper, Gottfried. *Style in the Technical and Tectonic Arts or, Practical Aesthetics*. trans. Mallgrave, Los Angeles, Getty Trust Publications, 2004.

¹⁰ see Pask, Gordon. *Interactions of Actors (IA), Theory and Some Applications*, unpublished 1992

¹¹ Pask, Gordon. *Interactions of Actors (IA), Theory and Some Applications*, unpublished 1992

¹² see Pask, Gordon. "Cybernetics", <http://www.cybsoc.org/gcyb.htm>

¹³ see Rykwert, Joseph, "Semper and the Conception of Style", in *Gottfried Semper und die Mitte des 19.Jahrhunderts*, Vogt, Reble, Fröhlich (eds.) Basel: Birkhäuser Verlag, 1974, pp.67-81.

¹⁴ see Semper, Gottfried. "The Attributes of Formal Beauty" in *Gottfried Semper, In Search of Architecture*, Wolfgang, Cambridge: MIT Press, 1984.

"... so that the observer experiences its total content by moving around it... which together presents the mind an overall image. It is totally wrong to imagine an art object is perceived in a single unit of time, an assumption that has harmed mainly architecture." pp. 221

This is contrasted to the work of his contemporary, J.N.L Durand, where architecture is not a formal device of order and composition, but an active process of craft that is informed by changes in technology and material.

¹⁵ see Price, Cedric. "Gordon Pask" *Systems Research*, Volume 10, Issue 3, London: John Wiley & Sons, Ltd, 1993 pp.165 – 166

¹⁶ Pask, Gordon "Colloquy of Mobiles" , ICA exhibition, 1968
<http://www.medienkunstnetz.de/works/colloquy-of-mobiles/>

¹⁷ see Cariani, Peter. "To evolve an ear. Epistemological Implications of Gordon Pask's Electrochemical Devices" *Systems Research*, Volume 10, Issue 3, London: John Wiley & Sons, Ltd, 1993 pp. 19-33. Pask had instituted an idea of chemical computation whereby the system could adaptively change its circuitry in a process of bio-technology to grow metal filaments. The devices and associated control equipment enable the programming of many inputs and outputs. This is done with charged electrodes being introduced to a solution of copper sulphate; the resulting growth of new connectivity can be used to not only construct new sensors but to reorganize its own logic of circuitry. The implication is that engaging the system would never be the same way twice.

¹⁸ Pask, Gordon. "Foreword" *Evolutionary Architecture*, John Frazer, London: Architectural Association, 1995, pp. 6-7

¹⁹ an effort is made to dismantle the idea of electronic componentry as simply applied over the architecture as a layer, enabling it as another medium of control. While this is still valid as MEMS (microelectromechanical systems) become more prevalent, it retains a classical model of architecture as form-giver and electronics as a craft.