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# Physical Order and Disorder in Folding Architecture Style

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**Abstract:** Folding emerged as an architectural discourse aspiring to become the new architecture of the end of the 20th century. Folding philosophy was introduced by passed French philosopher Gilles Deleuze for the first time. He is one of the philosophers of post construction ideology like Jacques Derrida.Folding philosophy also call Aristotelian logic into question. According to (his philosophy) there is no preference in the superstructure. Folding is looking for diversity and wants seeks eliminate the discrimination. Folding would fail vertical method, classification and hierarchy, and instead of that arises horizontals. According to Folding everything is at the same surfaces. Folding architecture has been in France and America. Flexible forms are neither in a shape of geometric completely nor desirable one. In city standard these folded and flexible layers in relation to the nearby context neither have difference nor harmony but they utilize environmental circumstances and replace them in their curved and twisted logic.Max Bense who is one of the founders of informative aesthetic believes that, order has three degrees: chaos, being structured and being shaped. When we consider complete chaos that there are no regulations for connection between different components. In this case the possibility of prediction equals zero and innovation in maximum. Definition of being structured is one organized order with a structure that might have different forms. Bense calls the third part of order as a "chaos or disorganize order".In all three factors above replacement of components affected by a general organization whatever the rate of order is more and this order is more complicated, the informative content is less. In this paper first we have introduced this style briefly , we described order and disorder in the architecture and we have analyzed Evidences of order and disorder in this style.

**Key words:** Physical order and disorder, Folding architecture style, Evidence

***Folding Architecture:***

Folding emerged as an architectural discourse aspiring to become the new architecture of the end of the 20th century. In the perspective of a concise genealogy we can consider the Architectural Design Profile, guest-edited by Greg Lynn. Folding in Architecture: its early manifesto. The issue released in 1993 comprises an anthology of essays and projects by a group of architects seeking an alternative to the contradictory formal logic of Deconstructivism and includes among others Cobb, Eisenman, Gehry, Kipnis, Lynn and Shirdel. Featuring an excerpt from Deleuzes's, at that time recent English translation. The fold, Leibniz and the Baroque; Folding in Architecture, draws philosophical substance from the work of Deleuze, a radical understanding of Leibniz, employing the Baroque as a theoretical tool to analyze contemporary artistic and intellectual movements.

Greg Lynn, in his contribution to the above issue, titled Architectural curvilinearity - the folded, the pliant and the supple', introduces folding as a third architectural response to complex and disparate cultural and formal contexts, operating neither by conflict and contradiction as Deconstruction nor by unity and reconstruction as Neo-Classism, New-Modernism and Regionalism. Etymologically relating complexity with pliancy, the architecture of the fold is considered a cunning tactic for intensive integration of difference within a heterogeneous yet continuous system, working beyond addition by smooth layering, a concept demonstrated with analogues from geology as mineral sedimentation, and culinary mixing techniques. Forms of viscosity and pliability are considered its new instruments: forms that are sticky and flexible, 'where things tend to adhere to'. For Lynn curvilinearilty is the formal language of 'pliant architecture'. Husserl's unexact geometries are essential for the comprehension of pliant forms: rigorous geometries that in contrast to exact geometries, cannot be reproduced identically, are irreducible to average points or dimensions but can be determined with precision.

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As a paradigm for geometry of multiple probable relations Lynn introduces the supple topological surface of Rene Thom's catastrophe graph.

In The fold, Leibniz and the Baroque Deleuze submits a set of Baroque traits that stretching outside its historical limits are contributing to the appreciation of contemporary art.

Considering them crucial for the understanding of the evolution of the discourse on the fold into a practice of folding architecture these traits are summarized:

1. The fold: the infinite work in process, not how to conclude but how to continue, to bring to infinity.
2. The inside and the outside: the infinite fold separates or moves between matter and soul, the facade and the closed room, the inside and the outside.
3. The high and the low: being divided into folds, the fold greatly expands on both sides thus connecting the high and the low.
4. The unfold: not as the contrary to the fold but as the continuation of this act.
5. Textures: as resistance of the material, the way a material is folded constitutes its texture.
6. The paradigm: the fold of the fabric must not conceal its formal expression.

Deleuze regards inflection as the ideal generic element of the variable curve of the fold. Quoting his student Bernard Cache, he defines the point of inflection as an 'intrinsic singularity' involving three transformations: vectorial, projective and infinite variation. In this frame Cache argues for a new definition of the technological object, the 'objectile' as an event-assuming place in a continuum by variation where industrial automation or serial machineries replace stamped forms. This new status of the object no longer refers to a spatial mould but to a temporal modulation that implies as much the beginnings of a continuous variation of matter as a continuous development of form. In Earth moves: the furnishing of territories', published in 1995 Bernard Cache proposes to re-define architecture as a folded practice of interior and exterior relations and as the art of the frame. Cache sets the conditions for the new in architecture by the 'inflection image' focusing on furniture as hinge between geography and architecture.

Perhaps the most influential unexecuted project of the 90's and probably the earliest to transcribe Deleuzian traits in an architectural design are 2 Bibliotheques at Jussieu, Paris by OMA in 1993. In this competition entry for the public library on the university campus folding is employed both as organizational diagram and a spatial device that produces density. Koolhaas uses the metaphor of the 'the social magic carpet addressing the continuous floor surface of the building. The floors slabs are sloped to coincide with the superceding and underlying ones, producing a continuous path, 'a warped interior boulevard that exposes and relates all programmatic elements' thus transforming the library experience into that of an urban landscape. Folding as a spatial device abolishes the 2.5-meter human occupation heightconstraint while instigating a flaneurie through the library interior. In S,M,L,XL the paperfold is not only illustrated as a concept model but also introduced into the practice as a new architectural strategy and imagery.

The design exemplifies architecture neglecting the idea of the facade, rather concentrating on the floor as a catalyst of spatial connectivity and social interaction.

Investigating the origins of Jussieu's continuous sloped floors we should acknowledge as precedents Virilio's concepts of the oblique ground and habitable circulation. Paul Virilio and Claude Parent published in 1966 Architecture Principe, a series of architectural and urban manifestos. Here Virilio develops the theory of the 'oblique function', an angular plane that constitutes the 'third spatial possibility for architecture' subverting the norms of horizontal and vertical oriented space. The oblique plane is considered the instigator of a tactile relationship between building and body primarily activated by disequilibrium. The oblique is idealized as the field where the corrupted by the static architecture of horizontal-vertical intense spatial perception is re-gained, by a kind of eroticization of the ground. 'Architecture will no longer be dominated by the visual, the facade, but will relate to the human body as a receptive totality'. The oblique plane alters the relationship of space and weight: gravity affects perception since 'the individual will always be in a state of resistance-whether accelerating as going down or slowing down as climbing up, whereas when one walks on a horizontal plane weight is nil. Virilio claims the origins of the theory of the oblique in his childhood explorations. Interiors of upturned or tilted bunkers on the coast of Normandy provided his first experiences of 'unstable spaces'. The oblique plane, as third axis in the Euclidean system, offers the opportunity for habitable surface and circulation to become one continuous space. The allocation of human activities on sequences of oblique surfaces, cannot be exactly defined but require a geometry of multiple probable relations, including zones of predictability of activities as in Thom's catastrophe curves that are constrained by percentage of inclination and material texture.

The oblique plane as habitable circulation will prove to be one of the most fertile concepts in the evolution of innovative Architecture in the nineties, admittedly a prolific decade in respect to folding. The Jussieu library project fertilizes the folding discourse into architectural practice, spawning a series of single surface projects

in a generation of architects worldwide. Particularly in the Netherlands the oblique floor acquires tectonic substance in a number of projects becoming a simulation of a landscape. Since an exhaustive enumeration of such designs would exceed the limits of a concise survey only a few references will proceed. The continuous slopped surface evolves within OMA's practice into the folded floor. Kunsthall, Rotterdam 1993, comprises a knot of paths, circulation spaces involving different kinds of movement: exhibition visitors, passersby and vehicles. The folded concrete floor manifests tectonic mastery in the Educatorium, Utrecht 1997, a central facility shared by the faculties of the University of Utrecht. Described by Bart Lootsma 'the Educatorium brings about an entirely new kind of spatial experience in which is hard to tell where the exterior ends and the interior begins. Passing through doors without noticing the transition, one does not observe any staircases or even thresholds-visitors glide into the building. Once inside, movement is imperceptible from one level to another, even though staircases are here and there, where vertical distance to be bridged is sufficient to warrant one.'

If we consider flow as a prerequisite of a continuous surface, the garage as well as the Guggenheim Museum of Modern Art would qualify as architectural prototypes of inhabitable circulation. Vehicular movement as an overriding architectural program is the ideal brief for a folded organization. Avoiding repeated reference to the car, another paradigm of the oblique continuous plane as a superseding architectural element would be bicycle parking. The bicycle-flat or fietsflat in Dutch designed by Amsterdam based VMX Architects in 1998 and completed construction in 2001, is conceived as a continuous-enfolded bicycle path. In the process of infrastructure upgrading, the Amsterdam municipality decided to free the entrance plaza of its Central Railway Station from the mass of bicycles, by installing temporary storage for 2500 bicycles. VMX architects proposed a three level self-supporting, de-mountable structure consisting of a continuous strip unfolding in length to 110 meters. Bicycles can be stalled on both sides of the track. The architects state that the design is based on a very functional storage: 'Using the existing height difference along the station square of 1.25 meters a system of slopes (3 degrees) has been created on which the bicycles can be stored. Red asphalt will be laid over the slopes like a carpet. Short cuts for going up do exist in a number of bicycle stairs, but undoubtedly cyclists will prefer to go down using the ramp. The expression of the building will be made by an efficient detailing and material choice, but chiefly by the sculptural form of the slopes. ' Despite this, the building in its performance appears to be transgressing the infrastructural efficiency of the bicycle-storage to become a new kind of public space and a contemporary icon for the city of Amsterdam. Besides the mass of commuters, the bicycle-fiat hosts a number of other visitors: tourists, filmmakers and bmx-freestylers, whose presence supports Virilio's claim for inhabitable circulation as an instigator of social interaction.

Having elaborated on the continuous oblique surface, a major feature of folding architecture, a new notion will be exemplified further through the folded texture: the fabric revealing its form. A reference to the work of Diller Scoffidio serves as an ideal introduction here.

In Bad Press folding materializes as a process resulting in the re-configuration of the masculine shirt as a critique to standardization and a subversion of the constitution of contemporary self-image. In the winning competition entry for Eyebeam, Museum of Art and Technology in New York completed in 2002 the folded strip is deployed both as spatial and organizational diagram. The new Eyebeam building will house a museum of art and technology, artist-in-residence studios, education center, multi-media classrooms, state-of-the-art Theater and digital archive. The facility will provide unprecedented production and exhibition opportunities for artists exploring new media in video, film and moving image art, DVD production, installation, 2D/3D digital imaging, net art and sound and performance art forms. The double folded strip displays the buildings formal determination: it provides the interface for the digital media space and encloses its supporting infrastructures. The pleated section of the Eyebearn building computes. It is a plexus of technological infrastructures and their interfaces, into an intelligent architectural smoothly layered skin.

The final reference in this survey embraces an emergent architectural paradigm of a folded organization, considering the projects scale and influence: the Port Terminal at Yokohama Osanbashi Pier, completed in 2002 by Foreign Office Architects.

In their 1995 winning international competition entry, Yokohama Port Terminal, architects Alejandro Zaera-Polo and Farshid Moussavi delivered a single surface prototype where folding traits permeated all scales of the design. The urban proposal introduced the continuous ground as a mechanism for the penetration of urban space on the terminal's roof and an instigator of a public space at the interface of terminal functions and city events. It has been described by the architects as...a public space that wraps around the terminal, neglecting its symbolic presence as a gate, de-codifying the rituals of travel and a functional structure which becomes the mould of an a-typological public space, a landscape with no instructions of occupation' . The cruise terminal program, consisting of a bundle of diffuse and directed movement including the flows of citizens, passengers,

visitors, vehicles and luggage, is organized by the layering and interlacing of paths. The building's formal determination manifests a topological surface concept in sequences of inclined curvilinear spaces that accomplish smooth transitions between programmatic elements. The structural and construction principles intensify the overriding spatial concept by assigning the origami folded steel plate as the structural principle thus demolishing the traditional separation between building envelope and structure.

During the seven years implementation period of the project the stress has shifted towards research based construction pragmatics. As Alejandro Zaera-Polo states 'the structural development of the project has become the main source of ideas for Its implementation and a trail of discovery that reaches far beyond the images that have become the better known side of the project' . Research on engineering processes in different levels was conducted in collaboration with Japan based SGD engineers. A series of alternative structural prototypes where developed before resolving to the combination of girders and a folded plate structure. An origami archetype, the fishbone pattern is the origin of the folded plate visible on the roof of the terminal's halls. Origami structure can be appreciated as regional reference supporting 'the introduction of context as a process of material organization rather than image'. Even though the fishbone comprises a regular generic structure, every unit in the specific folded plate is differentiated. Following the terminal's geometric guidelines that are themselves inflected: the geometry of the pattern is tangential to the circles regulating the complex curvilinear girders, constantly varying in a lesser degree. Thus the structural pattern extends through an infinite series of variability.

In conclusion, Folding Architecture - Concise Genealogy of the Practice has registered the effect of the discourse of the fold in the practice of architecture focusing on a small number of landmark projects that have essentially contributed to its evolution in the 10 years following 1993. The purpose of this survey was to ground the studio research Folding as a Morphogenetic Process in Architectural Design in a theoretic and professional framework. This genealogy has, however, omitted a line of work intersecting Deleuzian discursive traits with computer generated design, narrowing the perspective to end of 20th century techniques. Given the opportunity of an extensive survey an update on the recent work of Bernard Cache and Greg Lynn would be fundamental.

The traits introduced by Deleuze stimulated the thinking of a generation of architects. Consequently the fold has acquired architectural substance, manifested tectonic properties and can be delivered now as design knowledge. The attributes of the new architectural object emergent in the re-definition of the practice are contended below in a set of propositions:

1. Extension: the object as an infinite series, serial variability
2. Multiplicity: the object as a plexus of elements, potential interactivity
3. Curviliniarity: inflection, obliqueness, warping of surfaces and non Euclidean geometries
4. Stratification: layering and interfacing between contradicting architectural factors
5. Continuity: topological properties of surfaces and organizational principles
6. Fluidity: interlacement of boundaries, fuzzy demarcations and zones of probability

By which I can submit the fold, Deleuze and the re-definition of the practice, as an alternative title which may further the research presented in this essay Folding Architecture - Concise Genealogy of the Practice. Given the fact that a new generation of architects is being educated on the foundation of this discourse we can only expect an even more rigorous and innovative performance in the future.

Greg Lynn in definition of folding architecture says: Folding means integrating irrelevant factors in a connected mixture. Folding architecture is also named New Baroque. In Baroque architecture, Greek, Roman, Eastern, Romanesque, Gothic and classic are folding on each other and the body of construction and curled surfaces of walls are flexible in relation to conditions.

Peter Eisenman as the founder of folding philosophy in the field of architecture has brought up the term "Week Form" A form which is flexible and adapts itself with environmental conditions as jelly adapts with its container. Therefore the forms and layers of folding architecture have settled in the site level and next to each other with flexibility and adaptation with body (physical) social, historical conditions of environment.

***Physical Order and Disorder in Architecture:***

The architecture is composed of different part. The connection between these components has been organized. It means that all these components are subsystem of an organism. This system or organism might be very simple or complicated. Max Bense who is one of the founders of informative aesthetic believes that, order has three degrees: chaos, being structured and being shaped. When we consider complete chaos that there are no regulations for connection between different components. In this case the possibility of prediction equals zero and innovation in maximum. Definition of being structured is one organized order with a structure that

might have different forms. Bense calls the third part of order as a "chaos or disorganize order". When we talk about this order that in which all materials have been replaced that displaying the choices have been picked up freely and in united system.

In all three factors above replacement of components affected by a general organization whatever the rate of order is more and this order is more complicated, the informative content is less .But we should not think that more complication equals chaos automatically. This order couldn't be recognize easily and could even cause mistake. More order equals less innovation .In complete chaos the probability of all components are equal, so squandering information equals zero and in consequence the possibility of new combination or maximum creation is possible.

Continuing of a style is in connection with order and squandering information and not to be with innovation. The contrast of styles comes from the difference of its components and its dominated order .In this case they have been more or less complicate and by means of that they have been connected by viewer or user. For example in Indian temples in India there is an order that they are not identifiable at the first glance because their components are almost complicated.

Order means obligation automatically. Whatever this order is sever the open space is less so it could be remained for the variety of components. And each part should obey these rules more and more. In a case that some these parts couldn't even do their main task and in reverse a kind of complicated order creates more freedom and this freedom creates more open space for forming the components and causing opacity. The two kinds of orders, of course, have some exceptions just in a condition that the main factors of organism stay stable and without changing.

Buildings which are in order and are not flexible give us less freedom. In the other word changing one factor in this system could hardly possible. But in the opposite, these architectures give us their messages very clear and straight and nothing for personal interpretation for buildings with complicated order the issue is something else. Here in this case, we are completely free to act. Personal interpretation and opacity are possible. Such building expects us to be more active. We ourselves should discover the order of that and also search for its system. We can compare this building with Picasso's painting named Guernica. In there also this is viewer wants to comprehend the painting and this is also the viewer who is obliged to search about the organism and thoughts, problems which lay behind of the painting.

Architectural styles of Mies van der Rohe and Venturi are eventually the same (Spectrum). The contrast between the two even influenced the choice of materials. But which one of these two styles is better or more beautiful?

For answering this question it would impossible find a definite answer. As we will see the value of aesthetic of objects could be measured or adjusted. This value equals with the consequence of the division of order by complication. Whatever a building is more complicated its organism should be more expanded that we will be able to find a measurement for its aesthetic.

Buildings with severe order like many of Mies van der Rohe's works, either gives no opportunity to complication or it ends to chaos. In the other words, the Robert Venturi's open order needs complication that wouldn't be naively.

The important note is that in each style should be equivalent between complication and relevant order the comparison between two styles is impossible. We couldn't consider any style as the best in architecture absolutely.

But which or who make it clear that how the dominated order should be, simple or complicated?

In T .Munro's opinion that: the complication in an organism continuously being increased in an art till it makes studying harder occasionally. The consequence of this hardship is the general turning point and return to a more simplified organism. The trueness of this Munro's idea could be confirmed by informative theory.

Peter smith proves that during architecture history, one phase with three steps is really recognition which has been repeated several times.

- A severe and distinct order dominates in first step. Coordination and simplicity has basic role in this era.
- The main characteristic of second step is tension.
- Lack of clarification and seduction are the main traits of third step. Order in here is that complicated which we are approaching to the maximum capacity of our conceptual.

There is a direct connection between the rate of regularity and division of information to semantic and aesthetics quota of semantic information and with the same ratio the effect of wisdom on emotion will be more and vice versa: when aesthetics information has had more quota or order is more complicated emotion dominates on wisdom.

An introvert person who is rationalist basically prefers the clear order and extrovert person is more emotionalists and prefers the complicated order more.

***Evidences of Order and Disorder in this Style:***

Generally on a Small scale this style confirms a kind of disorder, but this disorder with soft and slow trend, on a large scale drives itself towards order and organized designs. Projects evidences of this expression are:

- In Deleuze's opinion the universe is not extract from the bases of Mathematical Intelligence and wisdom is everywhere.
- Folding philosophy also call Aristotelian logic into question. According to this philosophy there is no preference in the universe. Folding is looking for diversity and wants seeks eliminate the hierarchy; the goal of this philosophy is eliminating duality.
- Fold means wrinkle and thousands of layers that in which each layer is beyond the other layer, all the things are beside each other.
- No thought never preferences over the other, and no interpretation is over as further of the other. Everything is horizontal in the other words Folding wants to alternate divalent into deconstruction and multiplicity and incommensurability to replace
- Deleuze always sees existence and its components in the state of becoming.
- From viewpoint of west rationalism, the universe is vertical hierarchy, dendroid and centripetal, but Deleuze and Guattari viewpoint (in « Rhizome » article) try to revolutionize west thought and called the primary principles questioned its base.
- Greg Lynn in definition of folding architecture says: Folding means integrating irrelevant factors in a connected mixture.

***Conclusion:***

Generally on a Small scale this style confirms a kind of disorder, but this disorder with soft and slow trend, on a large scale drives itself towards order and organized designs. Folding philosophy also call Aristotelian logic into question. According to this philosophy there is no preference in the universe. Folding is looking for diversity and wants seeks eliminate the hierarchy; the goal of this philosophy is eliminating duality. Greg Lynn in definition of folding architecture says: Folding means integrating irrelevant factors in a connected mixture.

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