A Reconsideration of the Architecture of Curvilinearity

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Abstract

In the past few years, the realm of architecture has been excited about a significant change of ideology. The new architectural thought, derived from the philosophy “the Fold”, became the foundation of current discourses. Greg Lynn, an architect and theoretician, substantially incorporated ‘the Fold’ in his works to achieve a complexity in architectural design. This study investigated his works, theory of forms and methodology. This paper describes how these were applied in his designs and it also indicates his achievement in the establishment of his theory and the rigor of his designs. Nonetheless, in some areas of his works, the study found some problems probably needing further comprehensive solutions. Lynn’s works, however, are valuable as primary steps toward new architectural imagination.

Keywords: Lynn, Form, the Fold, curvilinearity, anexact, dynamics, complexity.

Introduction

In the storm of the architectural polemic since 1990, were it not for the debut of Gilles Deleuze’s “the Fold” (Deleuze 1989), there would not be the current polemic, “Folding in Architecture”. Under the new schema, “folding” and “curvilinearity” have been brought into play. The re-interpretation of architectural grammars relentlessly recurs regarding what the direction of form-creation would be. Due to the disparate interpretations of the philosophy, theoreticians maneuvered, bestowed and then yielded products through methodologies. Incorporated with swarm dynamics, catastrophe, morphogenesis, and transformation theories there were attempts to deploy the ideologies rigorously toward new forms. Likewise, Lynn (1993) investigated the fold as a form engendering method, namely the ‘curvilinear form’. Because of his article, ‘The Architectural Curvilinearity’, the argument for an inclusive architecture, based on smoothness and folding in difference—like a food blender that has mixed in different ingredients—became part of other discourse establishments. Although the form-creation strategies in the avant-garde arena share the same neutral idea of complexity, Lynn’s form is more complex and more linked to the premise of the fusion of multiple and disparate systems into an assemblage. Rather than relying on the conventional methods to achieve an ideal architectural form, Lynn was interested in dynamical event simulation, and incorporated possibilities of digital technology in it. Through his unique bottom-up design methodology, he successfully manipulated the idea of dynamic yet stable and ‘anexact’ yet rigorous’ form resulting in winning a Progressive Architecture Award for the Korean Presbyterian Project in 1997 (Lynn 1997b). This architectural study investigates the theory about forms and methodology. It will then describe how Lynn applied it in his architectural design.

Form

“In response to architecture’s discovery of complex, disparate, differentiated and heterogeneous cultural and formal contexts, two options have been dominant, either conflict and contradiction or unity and reconstruction. Presently, an alternative smoothness is being formulated that may escape these dialectically opposed strategies.” (Lynn 1993).

“Smooth mixtures are made up of disparate elements which maintain their integrity while being blended with a continuous field of other free elements.” (Lynn 1993).

The above quotations provide some intriguing clues, as ‘smooth and smoothness’, from
which to proceed. The investigation will begin with what ‘the form’ Lynn invented actually is. In earlier attempt in the area, he established his theory of folding in architecture. It is the emergence of form from disparate systems of forces striving for a new pliant fluid form—as understandable as the cited ‘smooth and smoothness’. He obviously attempted to shift away from the rigid—not smooth—image of Decon; the former mainstream has ubiquitously embedded in the circle since 1988. His new form is embodied as a host of overlapping, uniquely organic lines, none of which settles into a predictable parallel relationship as he urges. Each diverges along its own path, but all are arranged according to definite principles. Within the process, a folded object emerges.

The consequent form is configured like a living creature, or even like a mechanical monster from science fiction films. The incomprehensible architecture is the unique style of his work. This indicates the innovation of architectural configuration, which subsists in the culture of new social norm. Most innovations are dramatically artificial, as obvious in the form of electronically experimental (paranoid) music. This study found that the very origin of the theory derived fundamentally from four sources: Deleuze’s ‘the Fold’, the non-linear scientific notion, the Complexity theory, and electronic media, which are described below:

Deleuzian

The architecture form characterized in Lynn’s and the avant-garde’ ideas is mainly based on ‘the Fold’ theory (Deleuze 1989), which Lynn (1993a) proclaimed in his first article “The Architectural Curvilinearity: The Fold, the Pliant, and the Supple”. Principally, he predicated the doctrine of form-creation in architecture by prescribing that the form should be more fluid and supple. In what parts did he draw the recommendation of authentic architecture from Deleuze, and how did he overcome it?

As described by Deleuze (1989) in “The Fold: Leibniz and the Baroque”, the world is in flux; there is no datum, no static point, and no center. Cartesian duality is abandoned in favor of the philosophy of Des Cartes’ contemporary, Leibniz. Deleuze emphasizes the twists and discontinuities suggested by Leibniz’s mathematical models of particles in motion. The Cartesian grid is replaced by a far more complex system. The notion of time, according to Deleuze (1989) is: “space-time ceases to be a pure given in order to become the totality or nexus of differential relations”. In abandoning Cartesian duality, ‘the Fold’ also suggests an alternative ontology of surfaces, an escape from the binary opposition of surface and depth.

Interestingly, as a result of strong interest in ‘the Fold’ among architects for the last five years, students, magazines, and symposia, especially the “Microscopic Process Conference I*” have all been inundated with architecture that is literally “folded”. This is unsettling because, at first glance, it appears to be based on a trend instigated primarily by the American architects who, having few, if any, opportunities to build, are not necessarily concerned with the social, ethical or political aspects of the profession (Krause and Kuhnert 1997). Indeed, the concept developed by Deleuze does not seem to address folding as a mere formal construct. Even independent of Deleuze, folding seems to be a spatial problem than a formal one, since it implies a breakdown of interior and exterior. The interior is presented as exterior, and vice versa. However, in some of his works, Lynn (1997a) utilized ‘the Fold’ continuously and somewhat rigorously, as in the Artist Space Exhibition, 1995, while in some projects he did not. In contrast, works of some architects brought up ‘the Fold’ literally as the folded surface.

Nonlinear Science

The concept of form is significantly influenced by the diverse sources of post-contradiction works, namely topological geometry, morphology, morphogenesis, and catastrophe theories. The renewal idea of indeterminable events occurs in nature; the discourse so far is on the new scientific equation involving the form of prediction rather than the fixed absolute figure as what we had before in the linear science.

* Held at the Ohio State University, Columbus, OH, USA in 1998, organized by Jeffrey Kipnis.
Lynn’s conceptualization is also categorized in the direction of nonlinear science which more or less relates to Deleuzian philosophy. In Lynn’s theory, he seemingly grounded his explanation on these scientific notions and yet manipulated them architecturally. The gist of his postulate is via the complex adaptive systems or what Peter Eisenman referred to as ‘emergence’. Similarly, these are the kernels of the avant-garde whose endeavor is to invent an accountable solution of the contemporary avenue in accordance with the parallel scientific notion. Meanwhile, for other camps of somewhat more conventional, the ideal architecture is characterized purely by phenomenon, for example, as obvious in the works of Steven Holl (1996). However, there are quite a few architects and theoreticians who are sharing the same path as Lynn via ‘the Fold’. This group of people produced a number of works through various manifestations, many of which emerged from the traditional metaphor or abstraction to procure folds. Lynn’s take on Deleuze’s ‘the Fold’, on the contrary, is the notion of complexity incorporating other scientific notions. It is the representation of basic cosmogenic truth: self-organization, emergence and jump to a higher (or lower) level (Jencks 1997b).

Indeed, his ideology of smooth and supple recurs in various manipulations, theory as well as designs. The characteristic of the supple and pliant form is explained by ‘anexact yet rigorous’—the form described with local precision yet common and be wholly reduced. Obviously, he negated the idea of geometric form, by claiming that it is a classical models of pure, static, and timeless virtue; this discrete [Euclidean geometric] form is no longer adequate to describe the contemporary city and activities that it supports (Lynn 1997a). (Skeptically therefore, what is wrong about the geometry?).

Because the geometry is not a crime, his clear-cut conviction of the prejudiced judgment seems to be too unjust to the geometry—which is, of course, applicable for several cases. It sounds as if reiterating Adolf Loos’ provocative manifesto, ‘The Ornamentation as Crime’ (Kuft 1994), in the age of Modernism. It is somehow in the same tone. However, it sounds too clear-cut to say so, in that geometric forms might be used to support the smooth fluid form. In fact the resulting form, appearing in the Korean Church, is a good example of the inevitable geometric segments, employed now and then in the minor parts.

The negation of geometric forms in his articles might be just a reason to deploy the banal architectural image. If we critically construe the reason why geometry is of no advantage, we might find that it is not as interesting as why it has been being employed for 4,000 years of the architecture history. It is probably due to its directness and easy-to-be grasped descriptiveness. It successfully exists in the realm of architecture because it is easy to build under a constraint technology while a complex curvilinear form is almost impossible. Under today’s circumstances, the construction technology is available for all kind of forms. The possibility is unlimited. All in all, Lynn’s suggestion of new pliant and supple form is now undoubtedly increasingly buildable.

On the basis of architectural form developed from concepts borrowed from science, Lynn suggests that it is similar to organic bodies according to D’Arcy Thompson’s morphology—a theory of transformation and the evolution of living body, which refuses transcendence of static form (Thompson 1992). The architectural form must begin to describe the particular tread of incompleteness, which was rejected by the exactitude of geometry and the symmetry of proportion. The organic body, moreover, was explained by ‘anexact’ form. He particularly refers to the deformation occurring under forces interacting upon the body. Similar to the deformation of animal bodies, architectural form alters in temporal transformation as organic forms. Based on this scientific notion of formal evolution, he applies the deformation idea to his form-creation methodology in his design theory. This life-form process, thus, strikingly becomes his building-form process.

Complexity

Lynn (1993a) developed his concept of complexity further than his forerunners, from
whom he adopted the neutral discourse of complexity, influencing in the past 20 years. It was a cultural debate regarded in the US over the formal system of architecture, beginning with Robert Venturi's “Complexity and Contradiction in Architecture”, Colin Rowe’s “Collage City”, and Philip Johnson’s “Deconstructivism” (Jencks 1997a). The curvilinearity of the supple and fluid form definitely fulfills the notion of complexity to a great degree.

Further in his theory, he pointed out that the autonomous geometric form in conventional Cartesian fashion is self-induced, which should be more complex and dynamic, relying on forces of construction, including, but not limiting to, wind-load, uplift, differential live-load, and non-solid ground conditions. The static architecture will be more rigorous if designed within the methodology of external environmental field of forces. Accordingly, this energy will shape the architecture. By such forces the architecture will not be static but stable. The stability, hence, can achieve within a complex of interacting forces through rhythmic movement and fluctuation. Stability in this case, however, implies a dynamic difference involving time, which shifts away timelessness; “static architecture is conceived timelessly”. Hence, “stable architecture must be conceived in a time-based manner, but not exactly move, rather to conceptualize the dynamic which emerges field-forms” (Lynn 1997).

In such suggestion, times and motions in Lynn’s ideology seem to be filled in the digital-based methodology of simulation and mapping which external forces and logic control the result more rigorously. Apparently shown in his design, it is finally a stop image of the long process animation study. Is it really a new methodology if compared to the popular trite method of manipulation of a Duchamp’s painting “Nude Descending a Staircase”, whose idea was developed many times as experiments in capturing dynamic of the continuum in space and transcribing it into a metaphorical form? Evidently, many architecture created under the concept of this continuum utilized this method in the metaphorical fashion, even some of Steven Holl’s recent works.

Besides, the connection of supple forms of the complexity has the local fluid by logic of vicissitude, Lynn maintains. In fact, it is dependent on both an intrication of local intensities and an exegetic pressure on the element by external contingency.

These external factors seem to be working in his architecture. Is this really pertinent? At this point, the criticism might be a question about which forces would be taken into consideration. Moreover, the logic of force versus form is somehow beyond control, or difficult to be accurate, even by using computers. For instance, the computer simulation of particle emission was found somewhat subjective in terms of how to locate direction and how much controlling ratio or parameter to incorporate, especially in the animation process. It is subjective unless the architect uses fractal mathematics or any other accurate devices to solve such problem.

**Digital Tool: Computer**

Lynn (1995) described the form-emerged of ‘blob’, a computerized form, from magnetic-force field. An interesting point is that the singularity and multiplicity are logically linked, depending on the perspective of either one—that is, internally multiple (multiplicity), or the many that are aggregated into an assemblage (singularity). Despite the elaboration of such logic, the real attitude of the habitable interior space (for the real life) is omitted. It would have been more useful if it suggested some qualities the users actually would like to have. On the contrary, the innovation of new digitized modeling method, as the blob, exhibiting the qualities of multiplicity and singularity, has been developed. This new method, thus, merely shapes a working pattern for a new typology for complexity in design (of the overall form). More noticeable than never, the tool employed by Lynn (1997b), high-end computer, is due to the complex task of the processes. This obviously reflects what De Landa (1997) argues--the nonlinear equations need a computer to solve new problems, which are impossible to be done by hand.

Lynn (1997b) uses computer to transform space and form into highly plastic, flexible, and
mutable entities. He uses typological geometry according to the theory of transformation to deform, bend, twist, and differentiate structure, creating unprecedented departures from preconceived notions of architecture. The unusual form perhaps can be created only in computer. Or because of computer he can get such ideas. In experimenting with this newly invented method, he has charted an innovative direction in design.

By utilizing computer technology in his design, Lynn (1995) chooses to work with Silicon Graphics workstations, the same machines used to create the film Jurassic Park. In seconds, these workstations allowed him to create complex organic forms that would be far too complex to model on paper. Realtime simulations, on the other hand, are one of the things that computer does best. While flying around in cyberspace, the viewer can have a virtual experience of every viewpoint and sequence. The design processes are used to generate the projects through animations, renderings, model photographs, videos, and texts. Using a virtual 3D interface, the viewer is able to navigate through space and select objects and animations to view at different scales. He has applied this kind of simulation technology to the design process.

Using complex-system study, engendering this new architecture is possible, because of computer, especially creating animation through simulation yielding the new notion of perspective and form-creation. This is likely to achieve the thought of capturing the temporal dynamic condition in the environment. In this case, it is clear that Lynn (1997a) was also successful in doing so in various projects, especially in the Korean Church Project in New York in 1995-98. The use of simulation in this project is the paradigm of how architecture emerges from forces. In this project Lynn studied the existing elements of the old factory and used the strategy of the blob to evoke the generation of a single room as nodes, ending as a single surface. He not only overlaid a variety of models, but employed dynamic parameters as well in the studies to construct the models. At the same time, he studied the gravitational force and nodes, as well as environmental forces, through deformation. The form, hence, was transmuted sequentially and logically through the final aggregation.

The computerizing methodology, Lynn's repertoire, however, might produce heterogeneous architectural forms as often found at present in works of the American avant-garde, like Jessie Reiser (1997) and Shoei Yoh (1997). Although their ideologies in architecture were different, their designs were somewhat similar. This happened, perhaps, because of using the same tools and the same constraints. Some of the outputs, therefore, were obviously stylistic. It would be more rigorous if they included a new parameter in their works. Hence, the suggestion might be that the next leap would produce the super-emergence transcending their homogeneity to the pragmatic stage of concerns.

Anexact Form

In the article “Probable Geometry”, Lynn (1994) mentions the genres of forms which are classified into three categories: exact, inexact, and ‘anexact yet rigorous’—explained by forms with local precision yet cannot be reduced. In fact, the boundary of the difference between the latter two are somehow elusive, in which his designs appears many times the combination of all three. It is probably because they are used in the real buildings that cannot avoid the minor use of exact and inexact forms simultaneously, but the attempt to manipulate ‘anexact yet rigorous’ form is admirable, especially in the next example, the H2 House.

Paradigms

The H2 House, another exemplified project, is a house for the OMV Austrian Mineral Oil Company in Vienna, Austria designed in 1996 (Lynn 1997b). In the design, there is a new kind of grammar resulting from the ideology of form-creation. The house features a subtle design with slight rhythmical variation that becomes apparent when driving past it on the adjacent highway. The design is finalized after innumerable simulations of driving, carried out on a Silicon Graphics workstation. The consequent form of the house, although exciting by its appearance, nonetheless, shows lack of anthropomorphic spatiality concern. Further to the architectural
of the movement on the highway translated into a series of skeletons with attached surfaces. As a result, although they could appear to be nothing more than a collage of grotesque shapes from the limited perspective of still media, they achieved their design goals in the interior spaces. His architecture could not be understood except through an experience of visual motion along a temporal axis. This is a completely new design strategy which Lynn’s architecture has developed.

In other words, by analyzing Lynn’s works, the theory on form generation was explicitly applied in every piece of his designs. On the other hand, the methodology of simulating the animation did not tend to model building-form directly, but in fact, it was utilized as a vehicle or strategy to manipulate the result form. This means that even if he did not use the animation the design might get the same result. And yet, the animation itself might have brought about criticism that subjectivity is a medium in the way of attractive presentation more than design method. Also, according to his process, especially in the H2 House, it is still questionable as to “which frame” of animation or the total accumulation should be chosen for developing in the next step. As for the form itself, however, the analysis clearly found that it is likely to be relevant more than irrelevant to his ideology in striving for achieving the supple curvilinearity, especially the emergence in the H2 House.

Once again, maybe because Lynn’s works are transgressive, there are a few criticisms on his idea, like Jencks’ suggestion which is somewhat positive (Jencks 1997b). While the critique on the American avant-garde works by Michael Speaks (1997), a theoretician and the ex-editor of ANY magazine, who is currently backing up the Amsterdam School, has put Lynn on the opposite aspect. Speaks provocatively addressed a counteractive comment on Lynn’s form as the point of Lynn’s restricted view on Deleuze’s and digital means towards the mere consequence of a bootless form. On the other hand, he recommended an opposite pragmatic method, which the European avant-garde evidently utilized.
New Transgression

Lynn’s theory and design could possibly be further elaborated. Comparing to the circumstances in the very first time of the debut of many avant-garde manifestoes the situation of negative unaccepted attitude in the critique on Lynn’s works today is explicitly more severe. This might be because of his very few provable and productive concrete works; rather Lynn usually writes, renders (draws), and animates. Despite the counteracting critique, the works are interesting in the consistency of their qualities in what he intends to express, a substantially straightforward but never changing development direction. The question might be, “Is Lynn working to the aspiration of consumer?” Yet, more alternative exists, namely Lynn’s style of form. The similar situation has been in existence since ancient time—apparently as the transgressor of the Renaissance age; for example, Alberti shed the light on the new form of the re-birth resulting in the weird façade of the Church of San Francesco, Riminy, Italy in 1450-61. Another example is Boullée, whose attempt was to present his envisioned architecture in the very first pure geometric form of the ‘Project for a cenotaph for Isaac Newton’ in 1784 (Roth 1993); neither did he receive a warm welcome in the arena at the first time. Despite the dissatisfaction of their early works, they gradually gained reputation and merit subsequently. Lynn, similarly, might prove the quality in the areas and replenish the points that he is missing according to Speaks’ suggestion.

In conclusion, ‘Architectural Curvilinearity’ of supple and fluid form and the digital methodology of design increasingly becomes the polemic in architectural realm. Lynn seems to be successful in terms of theorizing the idea of form-creation and simultaneously manipulating through his works critically. In some respects, this thought is the first step to approach the ideal architecture. Because the theory and methodology investigated in this study are somewhat new, they bring about a significant argument in terms of how to successfully serve the world physically and socially. Inevitably, such a complexity of different formal strategies could only be worked out on a computer and built by using laser technology and special construction method. The question of construction would be a crucial factor in determining feasibility in such a methodology. This argument, therefore, might not hold in some cases; because of its novel conception, it is impossible to say at present whether or not it achieves its goal of serving humanity. In the area of academics, nonetheless, this creative ideology is considered a precious step toward the ideal, which is a never-ending story.

Bibliography

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