...growing buildings out of data fields? : A conversation with Greg Lynn

Christopher Duisberg, Marc Guinand

... growing buildings out of data fields?

A Conversation with Greg Lynn

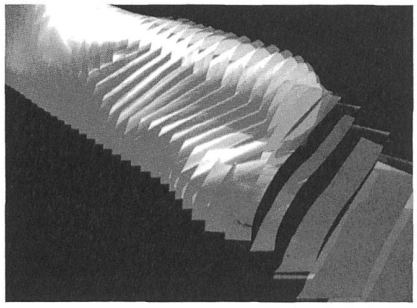
Greg Lynn teaches architecture at Columbia University in New York, the University of California in Los Angeles, and is the principle of the office FORM in New Jersey and Los Angeles. In his projects he attempts to question traditional ideas of architectural design methods using dynamic models in the generation of form. The following conversation with Greg Lynn covers issues of spatial becoming and authorship, questions concerning reductionism and organic architecture, the use of philosophy and the political implications of form.

You have criticized most contemporary architecture as being static; embracing the classical models of pure and timeless form. How would you compare your conceptions of motion and dynamic form to ideas of literal movement?

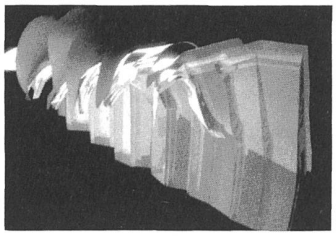
Today science looks at procedures or processes as a way of explaining forms rather than trying to calculate an ideal form. Instead of reducing things to a whole and ideal number, I try to work with a logic based on growth or development and that is where time plays an important role. If you have a tool like animation or fluid dynamic software that is based on motion and growth, you can think through a development in a different way than you could when you just had a piece of paper. When I say architecture is static I do not mean it does not move – I mean that it is based on whole numbers and equilibrium and I prefer to think of design in terms of non-static mathematics. The other thing would be to look at someone like Bergson who said that you can see the history of becoming imbedded in any form. What he meant is that if you look at a rock you cannot understand its form only by reducing it to its components, you also have to understand it as the result of its history. The pressure, the heat and the process are stored as information of the form and he called that energy. He would say that the form, the material and the energy are all the same thing. One of the approaches to design is to build a history into the form, a history of decisions, rather than reducing the form to some ideal state. In the same way that energy is stored in a rock, I am trying to store motion in the form by generating it in a time-based environment. It does not mean that buildings move, but it means that when you walk through the building the surfaces and forms have a stored pathway in them that unfolds. Claude Parent and Paul Virilio stated in their text on the oblique that there is no motion stored in a flat floor; you can move on it in any direction equally. The moment you slope the floor you store motion in it, in the sense that gravity becomes a motor which generates movement. That principle works not only with sloped floors but with any kind of curvature or inflection. You can basically build forces into a building just by the way you form it.

Are the "urban forces" that you use as parameters in your animations only a generator for the design process or are you trying to establish a real relationship to the context?

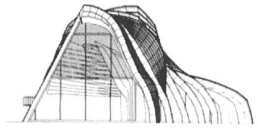
In terms of the perceptual forces which I tend to use, my blind spot used to be the experiential component of a project. I never thought about the experience of walking around or driving by, that was just the residue. With the Cardiff Bay Opera House or the Yokohama International Port we generated a massing relationship to the city that was more similar to the scale of a building infill and urban landscape. It did not have any kind of perceptual model built in. The H2 House was the first time we used a perceptual model to create the form of the building. In this sense, it was urbanistically specified. In using cars

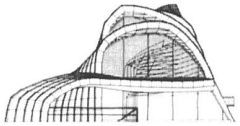


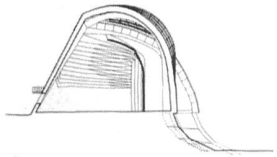
1



2







3

to generate surfaces, a moving car activates and triggers a set of relationships. Instead of having a building that moves, we generated surfaces from motion. Driving pass from different directions, it looks like two different buildings. That was the first time I was perceptually contextual rather than just urbanistically contextual.

For the design of the single-family residence on Long Island you not only used motion-based forces from the context to regulate the process but also an H-shaped diagram that seemed to act like a kind of flexible or deformed typology.

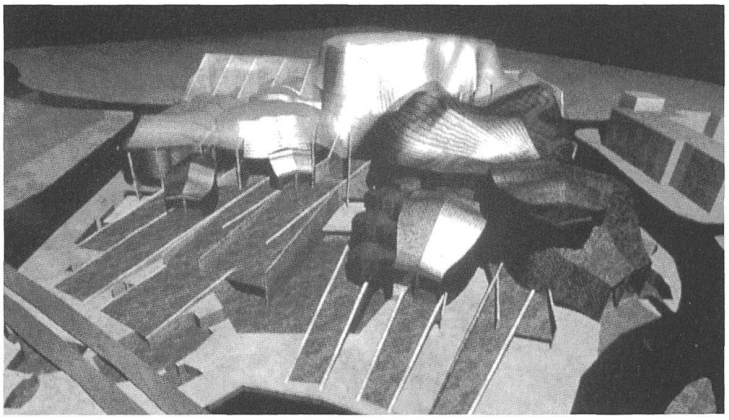
One thing we assumed we could do with this project was to generate a building out of a field. We thought if we could map the field well enough we could generate a building. What I found out quickly is that you needed both external constraints of a field and internal constraints of a typology. The house prototype established a set of internal constraints which had a performance envelope. The site provided another set of external constraints and the two collaborated to design a set of relationships. The idea of growing a building out of data fields is something about which I am not optimistic. The kind of cellular automotive design, where you map the context and generate a form is not how structure works. I think there is a notion of typology which is not reductive but which establishes a set of constrained limits, and there is an environment which provides a set of external limits and the two things collaborate to generate something specific.

Does your use of computer simulations for the design process have anything to do with an interest in rethinking the classical notion of authorship?

Because I tend to use computers a lot, there is an idea that I would be interested in data-automation design or even a kind of 'Gropius-automation' design. From Koolhaas I have been criticized that my design approach is a kind of hyper-functionalism, because we use machines and because in some of our projects we model the building surfaces based on numerical data derived from the context. It is possible one could think that we are trying to automate design to eliminate authorship, but this is not the case. I am trying to develop an intuition and a design approach based on calculus and topology which is artistic and creative. So I am trying to explore the capacities of these systems as a medium and how one designs with these elements. In this sense, I am very classical as a designer and I believe in a certain degree of intuition. Intuition comes out of a rigorous interrogation of media and practice. Architects now have a whole new set of tools, continuous surfaces and vectors, instead of lines, but we are still naive in how we use those things. It is still a kind of expressionistic approach, where we look at these things as shapes, where in fact they have an underlying structure and geometry just like Cartesian geometry.

In the research for your projects, you first establish a design procedure and a whole set of parameters that then generates the architectural form. It is almost a kind of abstract machine that defines the design.

The thing that makes design unpredictable is that in each case there is a set of constraints or sets of information that are rigorously followed, which are always connected with other sets of information, which are not logically the same. In the Cardiff Bay Opera House, we took an analysis of the waterfront bay with its oval basin and connected it with a programmatic bubble diagram of an opera house. It was not functionalism in the sense that we just took a programmatic diagram and built it. Rather, the programmatic diagram was plugged into a waterfront diagram and the two diagrams interacted in such a way that gave us something we would not have anticipated. In all the projects we look at things which are functionally constrained and we try to plug them



4

together in a way that it gives us something unpredictable. In this process the machines are abstract rather than being just functional because you can design creatively rather than just mechanically. The computer is not an automatic designer. It facilitates making connections that one could not make otherwise. Without computers we could not take traffic flows and sunpaths and generate surfaces that respond to both.

The kind of computer program that one uses tends to have a strong influence on the formal language of the architecture it produces. For example, projects designed with "Form Z" often have a strong resemblance to Peter Eisenman's folding projects which are modeled with that software.

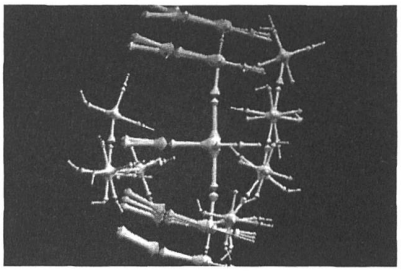
I think the choice of software is one of the most important choices we make on a project. It is just as important as the decision whether to build a study model in clay or in cardboard because there are certain properties of the medium that you can study in clay but you cannot study in cardboard. For me computer programs are a question of media. I think you have to be careful that you really understand how your software works. "Form Z" is a polygon based modeler. If you model a project with this program it is going to give you triangulated surfaces. Thus, most architects who work with "Form Z" get trilateral polygonal buildings.

For the Cardiff Bay Opera House you used models of biological growth processes to create form. Was this work based on an interest in the biological processes themselves or in incorporating unpredictable influences?

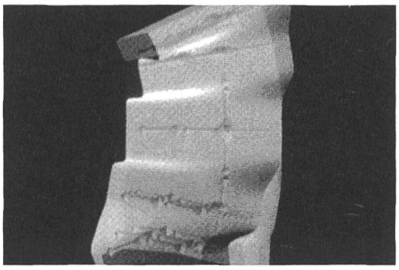
I am interested in starting a project creatively where we do not know what the end result will be. We follow certain design pathways to determine what the project will become rather than predetermining the result and constraining the process. This is my argument against Minimalism. In minimalist architecture one has to preordain the final form of the building and every time a constraint is introduced one must subjugate it to the original idea. Minimalist architects, like disciplinarians, argue that one has to have a clear initial idea and every subsequent decision must follow from that original idea. In minimizing material and formal effects every effort is made to state one simple reduced moment. My approach to design is exactly the reverse. I consider how to put something in motion so that it unfolds and creates something much more complex than one could ever constrain. I am interested in multiplying differences rather than reducing them.

The organic architecture of Modernism originated from a similar criticism of the reduction of natural forms to exact geometries. Would you see yourself following a tradition of organic architecture?

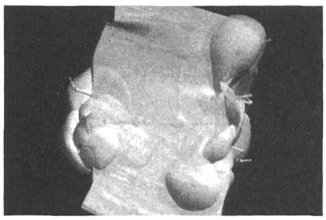
If you look at Piranesi's drawings of the Campo Marzio, you realize that he was operating with a philosophical model of space organized by points; there were orbits around those points and that world was a kind of clockwork machine. The tools he was using, a compass and dividers, and the models of gravity he was looking at were primarily Newtonian. This would not be a mechanical or organic concept but a "Zeitgeist" or a worldview. Architecture should start to look at models of space which are not Piranesian. I would argue that ninety-nine percent of all architects still think gravity emanates from the center of the earth; the ground is flat and the relationships between components are points, lines and planes. I want to work in a cultural space that is more recent than the eighteenth century in term of models of relationships, where I try to use calculus to generate form and topology to model space; based on differentials and curves. While the image that it produces resembles organic architecture, I would not want to be as mechanical as Piranesi. I would not say that it is



5



6



7

natural; it is no more natural than building a cube. I want to be as advanced as possible with the spatial models and architectural techniques but I do not think that that would necessarily mean organicism.

The way you explain your projects in relationship to an epistemology of spatial models and to philosophy seems to be influenced by Peter Eisenman. He has a very direct manner of instrumentalizing philosophy for his use of the concepts in architecture.

Alberti and many other architects would look at philosophy and only see architecture in it. Peter will read philosophy as architecture. People get frustrated with him because he will use terms from philosophy and understand those terms as architectural assets. Sometimes the architectural implications of these terms are completely contradictory to their philosphical origins and philosophers tend to get upset about that. I do not know if I would hold it against him for trying to be an architect and using philosophy architecturally. He structured his career to spend twenty-five years doing theoretical research until he was ready to build. My career is different in the sense that I am building very early and I am building along with the theory. The design and the theoretical research are constantly informing each other and going back and forth. I want to keep building and theorizing simultaneously while Peter separates these activities. I think opportunistic or applied theory is a good thing. Deleuze for example suggests this; the way he completely misunderstood baroque architecture and art. I do not think it is wrong if architects use Deleuze however they can, he did the same thing.

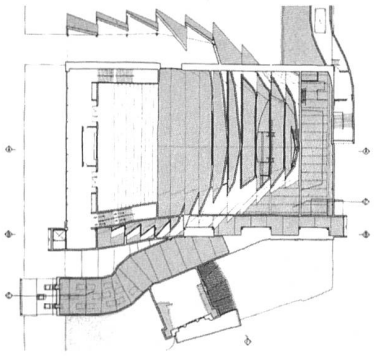
Do you think a book like "A Thousand Plateaus" has been used so much by architects because of the philosophy or more for the reason that Deleuze explains his concepts in spatial terms?

Deleuze is not a philosopher of linguistics and that gives architects more space. Deconstruction burned out so fast because its argumentation was almost purely representational in the way Mark Wigley translated it into architecture. As a result it became purely stylistic. There is no Deleuzian style of architecture and I do not think there will be, because it does not look like anything. "A Thousand Plateaus" is very spatial and geographical, there are a lot of references to mathematics and music and things that architects can understand without having it have any formal implications. The way the book is structured, you can take different pieces and examples without having to use the whole philosophy.

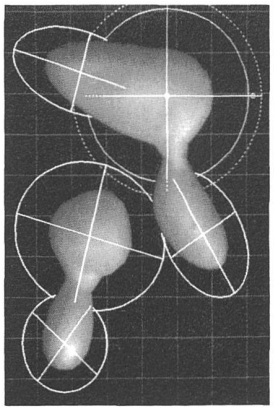
Your publication "folding in architecture" has had quite an impact on discussions in architecture in the past years and has promoted a style of formal folding and curvilinearity. Do you see the risk of Deuleuze's book "The Fold: Leibniz and the Baroque" being translated into architecture in a purely formal and figural way?

What was influential was the aesthetic and I think that is more of a commentary on architects than it is on folding. Not that my book on the fold is a bad understanding of folding, because there are a lot of different interpretations there. I consciously tried to put a diverse range of people in it, like Frank Gehry, Henry Cobb and Bahram Shirdel. Nonetheless, in the end what is understood is an aesthetic and a style that comes out of it.

In your theoretical texts you make a point of setting yourself apart from architects who have been known for their use of the philosophy of deconstruction. One gets the impression that you try to establish your architecture as a new direction in comparison to the outdated theories of deconstruction.



8



9

It is not a question of updating or outdating, because it is really just about how an architect uses philosophy. Deconstruction was used as a linguistic model for architects to think their way out of representational strategies of Postmodernism into alternative systems of representation. A lot of architects since Venturi have viewed the problem of architecture as being representational. The difference is probably that my use of philosophy is not primarily linguistic. I do not start with questions of what a building should look like or what it should symbolize or represent. The philosophers I am interested in are those who are not primarily concerned with the sign or with the image. I tend to be more interested in what architecture does, how it can act in terms of performance and function and spatial organisation rather than in terms of what its image would be. I give a scheme or a strategy to a process instead of providing an aesthetic. In all of the projects we begin with a geometrical diagram, the relationship of components and spaces is not yet a built relationship, it is not about the literal spaces of the building. The priority is always on the diagram - how the diagram gets manifested into built form is more of an aesthetic agenda, but it is not what we start off with.

What is the relationship between the conceptual diagram and the architectural form? Does a spatial diagram like the rhizome for example have to end up rhizomorphous?

Basically my answer would be, yes it does in varying degrees. You cannot have a rhizomatic structure ending in a cube and you cannot have a rhizomatic structure ending in a building thats looks like a potato. It is a question of degree, it never can be absolutely literal or absolutely abstract, it is always some version in-between. We have projects in our office that come closer to the original diagram than others, that depends on all the different factors of the design process.

You promote an architecture that is based on a logic of curvilinearity and compliance rather than on contradiction and conflict. Do you understand this compliance only in a formal sense or does it also have social and and political implications?

There is much more in the work than merely a formal compliance. There is this tradition from which that kind of logic emerges, a tradition starting with Michel Foucault. In his text "Discipline and Punish" Foucault talks about the diagram of Jeremy Bentham's prison – the Panopticon. He argues that it is an organisational diagram that puts certain points in a spatial relation. Inherent in that spatial and formal relationship are a set of social and political possibilities. In that sense, the geometries that are flexible and compliant have a cultural and political dimension. It gives you the opportunity as an architect to be a kind of service provider, an uncritical synthesizer for culture. Michael Hays criticizes such geometries for being too compliant, not critical or oppositional enough. As someone from the late Frankfurt School, he is not capable of being cunning because he is overtly oppositional, which he states as being critical. Hays is not allowing for possible strategies of opportunistic criticality. He calls this strategy "ideological smoothness". I would argue however this process allows one to be cunning or opportunistic in a way that one cannot be if one is simply oppositional. It is the flexibility of the process, of the forms and of the functions, that lets one both accommodate something and be critical of it because one has room to move.

Images:

***1** H2 House, Schwechat, Austria,surface sweeps as phase portraits*
***2** H2 House, Schwechat, Austria, surface tectonics*
***3** H2 House, Schwechat, Austria, sections*
***4** Cardiff Bay Opera House, aerial perspective*
***5 - 7** Studies for a single-family residence on Long Island, N.Y.*
***8** Korean Presbyterian Church of New York, NYC, floor plan*
***9** Blob diagram*