Animating Site

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Contemporary animation software provides the opportunity to animate data and to give often abstract and disparate information sources a visual legibility in time as 4D models. This provides an opportunity to make visible, invisible phenomena and transcribe them relative to the physical conditions of site. This is not to be misconstrued as a mapping practice that further objectifies site or purports to be neutral in recording the phenomena of site, but rather aligns itself with site strategies that aim to expand the range of phenomena that constitute *site conditions*. Coupling this approach with the structuring bias of animation software, points to a mapping of site that is biased toward a notion of site as *ecology*. To consider architecture and urbanism as ecological is to suggest that a proposal engage multiple scales, and multiple constituencies in time and seeks to generate mutually beneficial relations between the competing demands of program and place. One definition of animation is ''The act, process, or result of imparting life.''[1] The approach to follow looks to animation as a tool for animating site and programmatic data into *living models*. Living models are not solely constituted by the addition of a timeline that subsequently sets information into motion, but also by their abilities to alter or deform in relation to one another. In a studio course conducted at the University of Michigan College of Architecture students were asked to consider the implications of *dynamic diagramming* on their design proposals. Wherein different site conditions and programmatic forces were brought together in a four-dimensional imaging environment in order to amplify the possibility of greater correspondence between the existing and the proposed with time based organizational strategies.

Approaches to digital media in some ways benefit from an understanding of process that extends to modeling software a sense that it is 'just another tool'. At the same time this is not necessarily the case because computer technology by most accounts has been a dramatic shift in the way we process and visualize data. As Dana Cuff has remarked:

> ''Digital Design involves 'smart media' that is different from prior forms of media. It is not a tool but has built in tools; it holds vast quantities of information, which it can translate and reveal; it embeds links to other models, information and versions of itself. Although we can agree that the invention of perspective or tracing paper provoked new architecture, that new way of seeing buildings pales in comparison to the new modes of thinking computers make possible.''[2]

Nonetheless the 'tool' metaphor is helpful for coming to terms with the potentials of specific visualization tools and points to their instrumentality in design processes, this also provides an opportunity to strip away our fascination (or dismay) with this technology and engage it critically and specifically, in other words in order to move away from the use of animation software as a representational tool and toward its use as an analytic/generative tool. In the pedagogical approach to follow, the tool is engaged for its embedded potential to visualize site and program relations *ecologically* and for generating interdependencies over time between the existing and the proposed.

The course was conducted in order to explore the potential of using the animation software Alias/Wavefront Maya in the context of a design studio, and to explore how this software might shift the design sensibility of students toward a greater appreciation of time based models of organization as opposed to architectural proposals that posit buildings as discrete objects. In this regard Maya was explicitly engaged for its deterministic bias, in particular we were interested in connecting its unique organizational structure called the 'dependency graph' or as it became known in the studio 'the inter-dependency graph' to pedagogical

intent. Models in Maya are by their very nature defined by interdependency as stated in the manufacturer's literature, ''Everything in Maya is represented by a node with attributes that can be connected to other node attributes. This node based architecture allows connections to be made between virtually everything in Maya.''[3] The studio took this statement at face value, as a potential architectural strategy. To restate it within our disciplinary frame, would suggest that modeling in Maya would make it possible to model the interdependency of *virtually everything.* As a critical frame for the studio we would utilize the software by attempting to link architectural programming strategies to site conditions and to explore time based interdependencies.

Maya is unique in animation software for its ability to create what I term *living models* — animated models that are characterized by and can be constructed to respond to change dynamically. Elements of a model do not exist in isolation but are defined by their relationship to other things. In this environment all constructions are relational and if so desired all elements of a model are intersected with qualified dependencies constructed through an intricate network of relations. The introduction of time sets into motion a complex interplay of processes that intersect and connect. The *dependency graph* is the unique diagrammatic structure whereby these interrelationships of form, texture, lighting etc… are coordinated. The forms we see on the screen are entirely generated by a system of relations; subsequently they are resultant geometry. Students were asked to generate diagrams that could take advantage of these capabilities by producing models that were rich with *ecological* sensibilities.

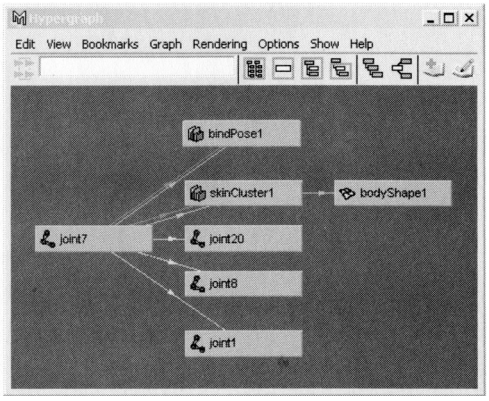

Fig. 1. The Dependency Graph

Pedagogically then, the interest was to link this tool and its inherent structure of connectivity with an exploration of suburban environments, which at a local scale are characterized by disassociative and fragmented organizational patterns. In particular we were looking at the residual sites that are the by-product of these contemporary growth patterns. The position of the studio was to engage in a kind of IMBYism (In My Back Yard) by exploring the catalytic potential of these spaces for linking and intervening in the local fabric. Programmatically the charge of the studio was to examine the recent trend of shopping malls as full-fledged hybrid buildings and look to their potential for acting as suburban social condensers by exploiting the adjacencies provided for, in these suburban residues. A report by The Walt Whitman Institute recognizing the importance of shopping malls in the social fabric of suburbia suggests:

> ''The primary public spaces in the suburbs today are, by default, shopping malls. Shopping malls represent one of the few common spaces in suburbia where neighbors who are otherwise strangers congregate. But since their activities in malls are strictly commercial there is very little productive civic interaction among these people — they act and look like consumers while in malls, not as citizens. But there are some indications that the people who use malls are looking for much more than just a shopping arcade. Because malls are the only public spaces in many areas, people are increasingly using malls as their social gathering place and even as a venue for voicing their political opinions.''[4]

This agenda of productive citizen interaction was explored in as much as this program could actualize the potential of the site in explicitly timed relationships. Intrinsically, bound up in this, is the notion that an approach to site is necessarily inclusive in that it is preoccupied with processes rather than with objects. A sensibility of extreme interdependence permeated the studio in order for students to look for overlaps between site conditions and program and to develop tactics to fortuitously link them in time. This was referred to as an *ecological sensibility* wherein models were developed that documented the interdependence of the existing and the proposed.

In order to put aside preconceived notions of what ecology is and to avoid metaphorical reductions of how these systems work (symbiosis etc…) as well as to shift the students sensibility to a thinking process that is consistent with the capacity of the tool, students were asked to begin the term by researching and modeling a biome. A biome is a distinct ecological system such as a coral reef or wetland. The students were asked to consider the intricate interleaving that characterizes these systems, considered in ensemble, these living things maintain a dynamic stability continually juggling resources without waste. The students modeled

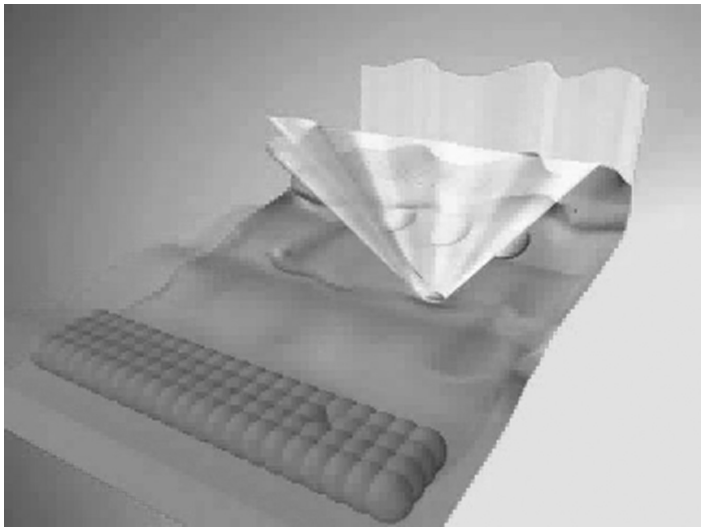

Fig. 2. Ecological Analysis

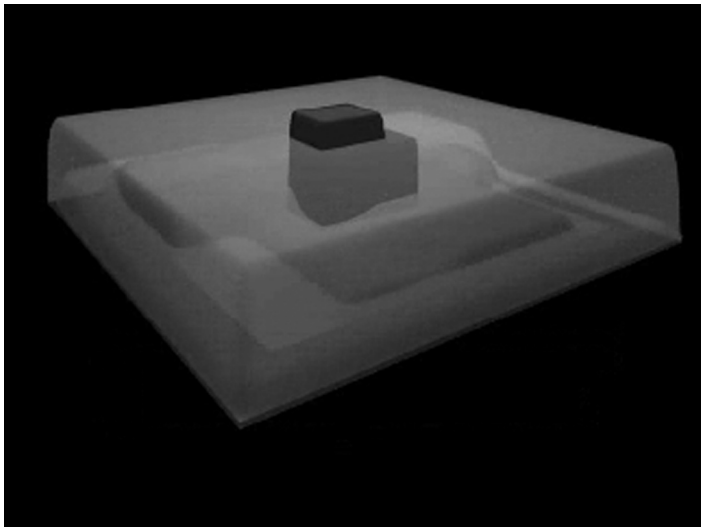

Fig. 3. Dynamic Programming Study

through the abstraction of the software, to understand the way in which these systems worked without modeling the way they looked. In this form of bio-mimicry the student uses the ingenuity and engineering practices of nature to examine a human condition. This should not be understood as being too literal or metaphorical but rather as an effort to shift the design process to a preoccupation with the interrelationship of processes in time and over time. In this case the programmatic developments and connections to be made between urban systems and natural systems. These ecological models were marked by two distinct qualities; they occur in time and they are characterized by interdependencies. For instance, one model is based on looking at the interrelationships of the Marine Iguana and its intertidal habitat. By isolating the different parts of the system we see an indexing of other parts of the system, this is the evidence of linkages. To see the Iguana diagrammatically we see that this organism is at some level a result of the intersection of environmental conditions. As a diagram, the Iguana has certain internal capabilities for exploiting the surroundings in time (variability, duration) and over time (adaptability). Ultimately this exercise was not designed to provide the students with a formalism per se but rather a sensibility or an ambient knowledge of the interactions of a complex system. In general, an ecological sensibility might be defined as an awareness that incorporates exigent conditions, time, and is relational and resourceful. Subsequently design strategies were pursued that sought to multiply the relationships between distinctly different kinds of phenomena in conjoining program and site.

Programming ideas were developed along these lines, in which students developed mall prototypes that were 4D diagrams. These prototypes were independent of site but not ignorant of site in that site conditions were posited in prototypical ways while the diagrams were designed with a built in elasticity that was predicated on future scenarios. This may sound familiar but should not be confused with prototypes for chain food restaurants and the like. In these cases the prototype responds to a very limited set of exigent conditions and usually it adapts to variation cosmetically or with landscape strategies that never significantly alter the internal organization or spaces. Prototype within the context of the studio might be best described as proto-organism because of the receptiveness of the diagram to respond to a specific location at a number of levels and subsequently for those relationships to play themselves out internally. As diagrams, these are not designed as objects but instruments that see site as ripe with potential and not so much intervene in a site as much as they *reside* in site looking to site conditions as resources by absorbing exigent conditions and putting them into play. With an ecological sensibility intact, the students were asked to examine site through this filter. Site was seen as a resource, not as a problem or even something in need of a solution. Site conditions were interrelated *through* their proposals. This is fundamentally different than a reactive architecture; here the proposal acts as an urban catalyst, temporarily bringing into relation, natural and artificial phenomena in a synthetic mixing of urbanism, architecture, landscape and interiors. Ultimately the spatio-organizational strategies explored in the studio were characterized by inclusiveness and sought to optimize relations between existing variable phenomena such as program, circulation, lighting, wind and hydrology.

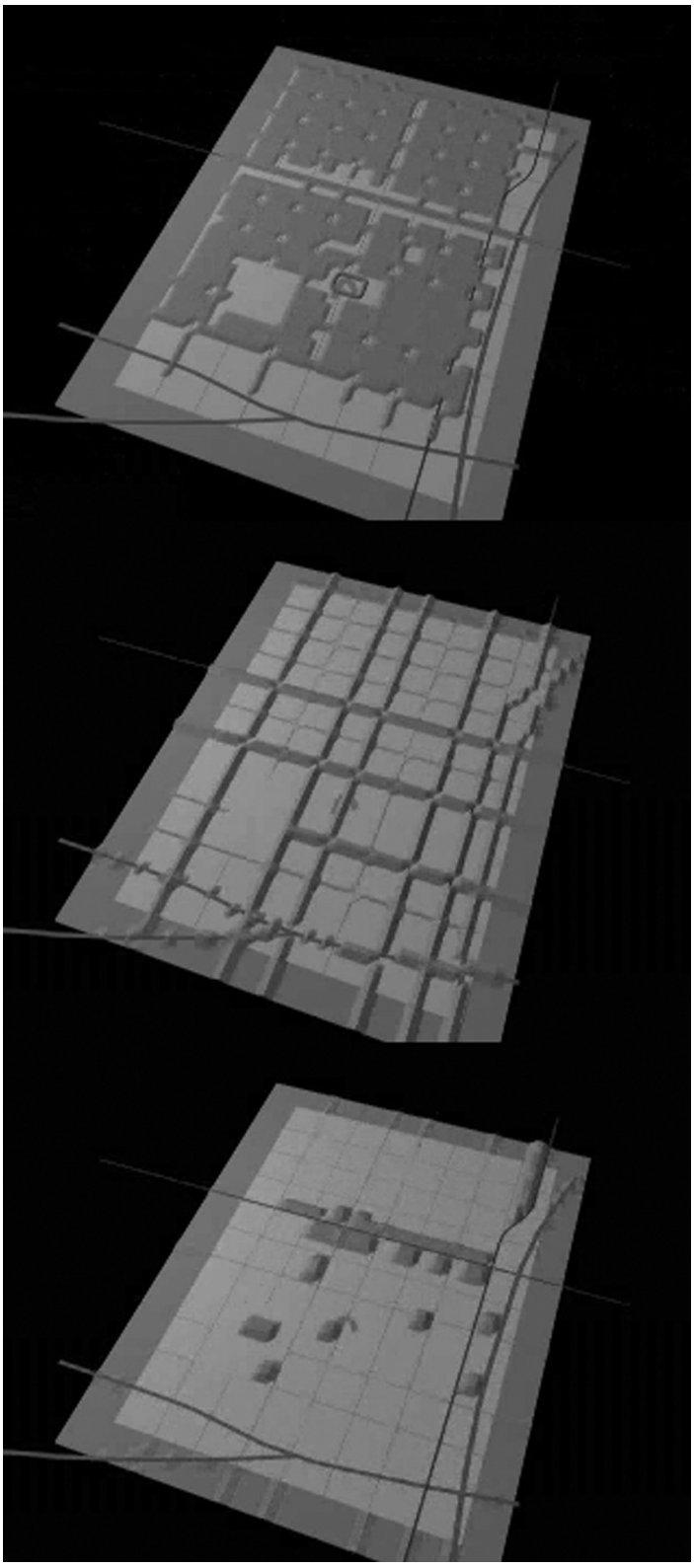

Fig. 4. 4D Models of Site Circulation and Occupation

As the figure of the city becomes more and more ephemeral and elusive the ability to map phenomena over time becomes essential to making the contemporary city legible. The city, as we know it today, is no longer a distinct compact environment that sits in contrast to rural or natural landscapes, but is increasingly defined by the intersection of temporal densities of information and place. *Geodata* is the transcription of data relative to location; Geographical Information Systems (GIS) are powerful in the way that they map information relative to location, often though this information is understood as 'objective and neutral'. In addition to GIS there is a wealth of information for a given site available to the designer from a number of other sources (demographics, census, national weather center, USGS, NOAA). Digital media is inherently open-ended in that many software programs use a layering system to organize data into ''sheets''. This simple structuring device allows for almost unlimited layers of information that intersect a site to be modeled separately or in selective combinations. The designer's sensibility comes into play by considering the potency of combining layers of information in time for particular effects. The approach presented here is not to know the site in its entirety, which is impossible and undesirable, but rather to expand the notion of what constitutes site. Here the bias is toward mapping practices that conceptualize sight as ecology, not a literal ecology or a metaphorical ecology, but an analogous ecology. Thinking ecologically allows one to conceptually link seemingly unrelated phenomena and to artificially posit their interdependency into synthetic relationships. As architects are more and more charged with the coordination, choreography, and ultimately visualization of design data over time, animation could be folded into the designer's repertoire as a more fully integrated tool in the design process. The ability to model multiple streams of information in time provides an imaging environment in which design opportunities present themselves dynamically allowing for the designer to capitalize on the interrelationship of design data over time not just in single instances.

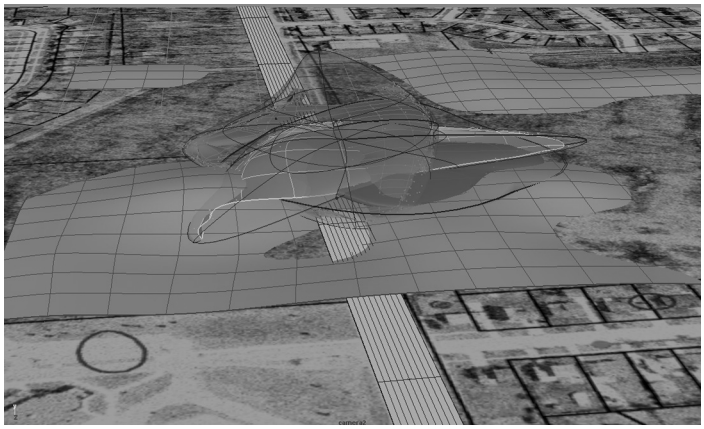

Fig. 5. Compo-Site Site Map

Time based data is inherently characterized by change, subsequently a consideration of this kind of modeling substantiates processes that are by their nature open ended, inclusive and flexible. The process described above attempts to shift the students sensibility from fixed urban and architectural design proposals to processes that have coherence and bias but are more capable and willing to incorporate exigent conditions. The primary exploration with this tool has been to use it as an instrument for developing mapping practices that are capable of combining diverse types of data and that redefine the notion of what site is, and to include time based information in this definition. In recent practice, notions of site have lacked a conceptual rigor to complement the enormous and fluctuating data available for a place. GIS mapping continues mapping practices that shroud themselves in so-called objectivity while at the same time lacking a design sensibility in the synthesis of information. Nonetheless, composite mapping techniques allow invisible phenomenon to occupy the same space as physical data. These virtual constructions have the potential for projecting new realities that are more sympathetic to architectural proposals that correspond to contemporary need in as much it is driven by time. An emerging interest in what Alec Robertson has termed, ''4D Design'' points to the interdisciplinary thought needed on this matter where the design of complex urban and architectural proposals will involve not just the more static condition of an architectural object but will extend into the elaborate choreography and coordination of implementing, occupying, and maintaining contemporary architecture. In this regard architects have much to learn from a diverse array of disciplines, dance, biology, music, geology and our closer cousin landscape architecture, that are characterized by their understanding of dynamic processes and their work with unstable materials. Animation as a visualization tool in the design process has the potential to include time as a generative condition within architecture by more fully exploiting relationships between site and program.

NOTES

[1] ''animation.'' *The American Heritage Dictionary of the English Language, Fourth Edition <http://www.bartleby.com/61/10/A0311000.html>* (10 September 2002).

[2] Dana Cuff. ''Digital Pedagogy,'' Architectural Record (September 2001) p. 175.

[3] Alias Wavefront. *The Art of Maya*. (2000).: p. 31.

[4] *Benjamin Barber , Kevin Mattson, and Michael Moody.* ''Mall Town Square'', *<wwc.rutgers.edu/mallspace.htm>* (1997).