Design Thinking: From Object-Centered to Situational

KENNETH WARRINER
Rensselaer Polytechnic Institute

Some years ago Herbert Simon characterized designing in a deceptively simple manner: "Everyone designs who devises courses of action aimed at changing existing situations into preferred ones."[1] I hang a shelf over my desk to keep some of the clutter at bay; I am a designer. For my kids, I make a rule limiting TV to one hour a day; again, I am a designer. Or, with some very specialized knowledge and skills I come up with a legislative proposal to offer universal health insurance, or, closer to home, I produce the documents necessary to build a new Metro station, or elementary school. In all these cases, I am a designer.

To most architects, this perspective is likely to seem too simple, and in the end, useless; it says nothing about how to produce these "preferred situations" or what architecture is "in essence," that one might prefer it. But Simon's use of "preferred" and "situations" is not value-free or innocent. Pushed a bit, they announce a shift in onto-logical perspective, and as a consequence, a shift in design thinking, challenging both how and what we design.

Consider Simon's use of "situations" rather than objects, products, things, or artifacts, the terms typically associated in most dictionaries with designing. This choice seems odd but deliberate; we have a long history of regarding architects (and engineers) as designers of objects, of artifacts. Architecture, in most history books, critical appraisals and monographs, is framed as a relatively autonomous entity, sometimes situated in a context but generally taken as a discrete thing to be described, analyzed and judged by comparison to other similar discrete entities, idealized types, selected exemplars - all embodying normative criteria. Like Peter Eisenman's argument for architecture's autonomy, the theorist Monroe Beardsley said of artworks: "The first thing required to make criticism possible is an object to be criticized - something … with its own properties against which interpretations and judgments can be checked."[2]

The feeling that the entities can, without prejudice, be lifted out of their context, is supported by the feeling that it is the *natural* thing to do - natural because the practice springs from the deeply held belief that reality is, after all, composed principally of things. For much of Western history the dominant ontological presupposition has been an essentialist reality comprised of things in various relations to one another. Each thing has an essential identity guaranteed by possession of a fixed set of properties that it must possess if it is to be that particular kind of thing. These entities may, for the idealist, be products of our minds, or in the various realist traditions, they may be mind-independent but equally pre-formed, ready-made, fixed – deriving their identity from a set of fixed essential properties.

Even in contemporary times we still feel essentialist echoes of perfect Platonic Ideal Forms, of Aristotelian Natural Kinds and Essential Types, of the Enlightenment's Autonomous and Rational Individual, and even further back, the Naming of the Animals in Genesis. In each case the entity in question is autonomous and timelessly stable. In this way of thinking each discrete thing also must be named. Naming establishes a boundary, encapsulating the entity within a frame of reference, distinguishing it from its larger situation. While necessary for certain kinds of thought and action, insisting on naming is not without consequences in conferring categorical purity and inviolate stability to the phe-

nomena thus named. As Ted Koppel quipped, "He who names it and frames it, claims it."[3]

Most of the architectural design methods in use today aim to produce namable, relatively autonomous objects; the Albertian whole is still alive, a universe so perfectly composed that nothing can be added or subtracted or moved without loss. Many conventional design methods start (and end) with an object; there are several versions: a type or exemplar; an out-of-date building program that is de-composed into components and recomposed in a more functional arrangement; an entity generated by a set of rules; and more recently, as in Greg Lynn's (and other's) work, an initial geometric object that is transformed by the dynamics of the field within which it is placed.[4] And more casually, there are the innumerable figural shape exercises made easy by computer software.

It is true that some portions of architectural production have always been valued as identity markers, as statements of power and importance: the boastful triumphal arch, the city's cathedral, the proud public library or school or court house, the tallest tower, the mansion on the hill. There will be continued value in erecting monuments, though the impulse to design *everything* (in market terms) as an *advertisement*, we might hope, may eventually play itself out. But the pressure now – from sponsors, from the speed-dominated media, from fashionable "with it" trends in academia - is toward making figural objects, distinctively shaped, often smooth surface objects, valued for their one-of-a-kind eye-catching shape or, conversely, for their easily recognized branding repetition. Both are predicated on having the capacity to announce their visual presence in overt competition for attention with the object expressions of rival institutional claimants. These arrays of competing objects, one can easily conclude, contribute to the construction, or at least the maintenance, of a commodity ethos, a preoccupation with *getting and consuming good things*, or in architectural terms, consuming good experiences. Thus, by default, many architects risk complicity with the contemporary culture of consumption.

There are of course important practical reasons for this focus on the object, other than societal pressures and aesthetic proclivities. To build anything, to understand the performative capacities of the materials and systems with which one builds, requires an acute focus on specifics, and thus, to some degree, the isolation of the built set-up as a discrete entity. This capacity to focus on the pragmatics of building is absolutely necessary, but does not require the resulting physical set-up to be configured as a perceptually figural object, nor does a concern with an aesthetic of tectonic expressiveness require the figural either.

Landscape architects, and more recently, landscape urbanists, working with extended field conditions, with situations, have largely avoided the architect's object-obsession. We have much to learn from them, without assuming all building should be configured to resemble landforms.

Some architectural design approaches *do* work within a conceptual logic oriented toward producing preferred situations rather than objects. But before looking at the conditions enabling this approach, we need first to understand something of what is involved in a shift from objects to situations.

NO MAN (OR ANY ENTITY) IS AN ISLAND

In recent decades thinkers and practitioners in many disciplines have come to recognize that nothing actually exists that isn't always already *in* a context or situation, and that reciprocal interactions among entities and the situation of which they are a part must be the starting point in understanding reality. The implications of this insight, long understood by some artists and "minor" thinkers, is finally being taken seriously by those working with phenomena as diverse as embryonic cell division, ecology, climate change, manage-ment of bureaucracies, the morphogenesis of human settlements.

The advances made in the postclassical sciences have convincingly shown that nothing – even the helium atoms manufactured from hydrogen in the stars – is without a formative history, a history of complicated and complex interactions with the other co-present com-ponents in the situation. A shift to designing preferred situations rather than preferred things is recognition that, while in some cases lifting entities out of their situation for analysis makes sense (those conditions that are merely complicated), there are many conditions such as political actions, ecological policies, the neighborhood park, the Internet, the local

highschool (all complex), that require methods of understanding and designing that recognize the situation's non-linear relations. Paul Cilliers, in speaking of systems (or assemblages), has put this distinction in everyday terms:

> Some systems have a very large number of components and perform sophisticated tasks, but in a way that can be analyzed (in the full sense of the word) accurately. Such a system is complicated. Other systems are constituted by such intricate sets of non-linear relationships and feedback loops that only certain aspects of them can be analyzed at a time. Moreover, these analyses would always cause distortions. Systems of this kind are complex. I have heard it said (by someone from France, of course) that a jumbo jet is complicated, but that a mayonnaise is complex. Other examples of complicated systems, systems that can, in principle, be given an exact description, would be a CD-player, a snowflake, the Mandelbrot set. Complex systems are usually associated with living things: a bacterium, the brain, social systems, language, [and ecologies].[5]

The environments we inhabit, whether Sao Paulo's flavelas or London's Mayfair, are *complex* situations, not just complicated situations. The design of a dam or an airport or bridge, each having a clear hierarchy of requirements (hold back the water, board the plane on time, cross the gap), involves working with *complicated* situations. But human settlements and households and elementary schools are now understood as *complex* situations – ecological assemblages - very different that complicated phenomena (an understanding Christopher Alexander, using different language, demonstrated in the 1960s with the publication of "A City Is Not a Tree").[6] Successive entities added to human settlements are, by default, interventions, in that they perturb a complex situation or assemblage, and thus inevitably enter into the ongoing ecological dynamic. Some of these designed interventions will be relatively complicated (hierarchically organized), some will be complex (a meshwork of interactions), but in the end their engagement together in intervening into an ecological dynamic will create a changed *situation* - one *preferred*, or not.

The distinction between complicated and complex, for design thinking, suggests differing notions of both how one might design and what is actually aimed at in designing. The theoretical background for this distinction is important to understand.

ASSEMBLAGE THEORY

Manuel DeLanda,[7] building on the work of Gilles Deleuze and Félix Guattari,[8] has proposed a way to conceptualize the formative processes associated with both complicated and complex phenomena that can lead to a renewed sense of *what* we might design, and as well, *how* we might design. They take a process-based realist ontological position. Reality, in the general realist tradition, exists independently of human presence, having been there before humans arrived. Idealist positions are thus set aside. However, rather than a naive realism which assumes reality is composed of entities each having an essential fixed set of properties (without which it is not the entity it is claimed to be), in Deleuze's non-essentialist realism all entities emerge from specific historical processes that are immanent in the given situation. Entities, at whatever scale, are assembled from smaller entities and in turn can assemble into more inclusive entities. All of these assembled entities, at all scales, are called assemblages. Micro and macro give way to continua - up and down the scales of assembling.

The specific composition of these assemblages varies. Every assemblage has the capacity to combine or interact with other assemblages (though this capacity may not always be utilized) in forming larger scale assemblages. An assemblage may be part of one larger assemblage at one time but become part of another at some other time; that is, "a component part of an assemblage may be detached from it and plugged into a different assemblage in which its interactions are different."[9] But, given that its capacities are responsive to its interactions with the other components in the assemblage as well as from its own constitution, it performs differently in each specific situation, each differing assemblage. Relations of this sort are called external, as distinguished from the common (internal) assumption in holistic theory, in which the component entity takes its character from its larger whole and cannot be separated from it. In our design realm, an assemblage includes the actions of those who utilize its affordances (both spontaneous actions and instituted practices) as well as the material set-up. The performances it enables are dependent on the situation or larger assemblage of which it is a part, as well as the intervening assemblage itself.

Although assemblages can be characterized by a number of dimensions, for this discussion, understanding them by their processes of formulation is particularly useful. Deleuze and Guattari (and DeLanda) laid out two basic processes found in both human and natural formations. One kind of assemblage is characterized by the process of separating heterogeneous entities into homogeneous groupings followed by "cementing" the result into a relatively stable form. These are called *stratified systems* (Deleuze and Guattari) or *hierarchies* (DeLanda). Examples of this formative process are social classes, lime-stone, animal species, bureaucracies. All result from some mechanism that separates heterogeneous entities into like groupings that are then stabilized. For example, social groupings formed by the differential access to resources are maintained by the cementing power of custom, religion, law; or animal species formed by natural selection are later cemented into stable form by reproductive isolation. Some of these stratifications become organized into hierarchies, such as bureauc-racies with their carefully defined task realms and authority charts, but some, like limestone do not. The important characteristic is the lumping of diverse components into homo-geneous, relatively stable strata.

The second kind of assemblage is formed by the aggregation of heterogeneous components in ways that retain their overall hetero-geneous composition and are then stabilized; these are called *self-consistent aggregates* (Deleuze and Guattari) or, more simply, *meshworks* (DeLanda). Examples of this process are animal brains, granite, human settlements, ecologies, non-manipulated markets. In each of these, heterogeneous components are connected in a relatively stable assemblage without loss of each component's characteristics and without subordination to a central regulator. And some meshworked assemblages are fleeting: "In the assemblage formed by a walking animal, a price of ground and a gravitational field, three heterogeneous individuals are joined together as such without the need for any homogenization."[10]

These two kinds of assemblages, produced by differing formative processes, roughly match Cilliers' distinction between complicated and complex. One may also say tree or rhizome, top-down or bottom-up, striated or smooth, and mean roughly the same thing. Michael de Certeau's distinction between strategy and tactics could be added: the place-bound com-prehensively planned versus the nomadic opportunistically maneuvered,[11] and Nietzs-che's characterization of the singular order as Apollonian and the infinitely linked as Dionysusian.[12] So we have strata/hierarchies, complicated, arborescent, top-down, strategic, Apollonian at one end of a continuum and, at the other, self-consistent aggregates/ meshworks, complex, rhizomatic, bottom-up, smooth, tactical, Dionysusian.

Stratified and meshworked assemblages at one scale can be assembled from smaller scale stratified systems or smaller scale meshworks, or, as likely, from mixtures of both. That is, there can be meshworks of strata and meshworks, or strata of meshworks and strata, or strata of meshworks, and so on. In any given design situation, if we recognize the need for some institutional set-ups that require a strong identity and thus an autonomous and figural architecture, we can see that assemblage theory does *not* eliminate autonomous or figural buildings; it grants them a place in a more complex situation along side meshworked assem-blages. The figural object then becomes a special case in a larger conceptualization, countering the historic tendency to see *all* architecture as object (and non-architecture as mere background).

This stratified/meshworked description, in-tended as a continuum, can be, and has been, drawn into the Western habit of assuming all pairings are oppositional, with the identity of the first term defined in opposition to the second which is its negation; X / not-X, the first term positive, the second inferior, lacking. Such oppositional dichotomies pre-empt the consideration of alternatives.[13] As a polarized choice, to value one, say meshworks, is to invalidate the other, strata, or visa versa. But both can be present in any situation: stratified assemblages and mesh-worked assemblages. (DeLanda recently has moved to sidestep this tendency toward polarization.[14]) Each assembly should be taken as a potential component of a larger assemblage.

In considering an assemblage - a wooded area, a path through it, a proposed shelter at the edge of the wood's meadow, the hikers present on good days - the question turns, not to What is it, in essence? but rather, What *capacities* does it (the

proposed shelter) have *to affect the situation and in turn be affected by it*? If one is concerned with producing preferred situations, it is crucial to understand the capacities to affect and be affected possessed by any given intervention, so that the its *consequences* may be *valued as preferred, or not*. This includes both those assemblages produced by natural processes and those produced by human design. For those who believe designing ought to involve making preferred situations rather than only autonomous objects, it is necessary to understand the *dynamics that can potentially play out in situations*, and an assemblage perspective is directed to that end.

PROBLEMATIZATION AND THE VIRTUAL

Assemblages, as actualized in the material world, are expressions of what Deleuze, after Bergson, calls *virtual diagrams* (or abstract machines, abstract diagrams). Virtual dia-grams, expressive of *problems* immanent in the real world, do not have a transcendent relation to assemblages, as Plato's Forms or Aristotle's "natural tendencies" and types would, imposing form on matter as an ideal essence from outside and above. *Virtual diagrams are immanent in the problematics of material situations,* that is, they are "intrinsic features of matter-energy flows."[15] A "problem" in this usage is not a deficiency relative to a normative expectation, as in popular problem-solving parlance, but is more like an existential question, such as: How can a productive tension be maintained between the kind of openness that fosters interactions among people and the kind of openness that can be used as surveillance to control people? A simple example DeLanda frequently uses from the natural sciences illustrates how the *problem of minimizing energy expenditure* found in material formations, engendering a *single* virtual diagram, can actualize into *multiple radically different* material configu-rations.

> The spherical form of a soap bubble … emerges out of the interactions among its constituent molecules as these are constrained ener-getically to "seek" the point at which surface tension is minimized [the problem]. In this case, there is no question of an essence of "soap-bubbleness" somehow imposing itself from the outside, an ideal geometric form (a sphere) shaping an inert collection of molecules. Rather, an endogenous topological form [or virtual diagram] … governs the collective behavior of the individual soap molecules, and results in the emergence of a spherical shape. Moreover, the same topological form, the same minimal point [or virtual diagram], can guide the processes that generate many other geometrical forms. For example, if instead of molecules of soap we have the atomic components of an ordinary salt crystal, the form that emerges from minimizing energy (bonding energy in this case) is a cube. In other words, *one and the same topological form [or virtual diagram] can guide the morphogenesis of a variety of geometrical forms*.[16]

Contemporary design thinking is heavily influenced by diagramming, along with mapping. Diagramming per se is old hat in architecture, but the virtual diagram at the heart of Deleuze's ontology breaks with this history. The process of identifying the generative problem underlying any given virtual diagram - that can then actualize into a concrete material assemblage - is only beginning to be understood. Many seriously miss the point of Deleuze's virtual diagram by working with the topological relations within only a *single* factor; the virtual diagram involves the dynamic among the *multiple* factors immanent in the situation, a virtual condition with actualization potential. The point in the virtual diagram is to reveal the topological relations among the *multiple* forces intrinsic to a given problem. Bubble diagrams, or flow diagrams, or air movement diagrams, for instance, give us singular movement patterns without considering the confounding tensions with other vital movements, and thus are not virtual diagrams in the sense suggested by Deleuze.

CONCLUSION

Why might designers regard this as relevant to design thinking? Most of the formative processes noted here occur in nature, or, as in the case of bureaucracies or social classes or information networks that one might encounter in designing, they arise from human actions but do not always involve deliberate acts of designing. Designing, moreover, is generally seen as a top-down process, (though, in the use of materials we are beginning to understand the bottom-up formative capacities intrinsic to specific materials). Most designing will continue to be the result of intentional decisions, of selecting what is relevant to the situation, of deciding what groups of issues need engagement, of positing a problem toward which one experiments. This is not inconsistent with assemblage theory; as DeLanda notes, hierarchical or stratified decisions, (e.g., human design) can intensify the flow of energy through meshworked assemblages, as in settlements and many buildings. One simple

example is the medieval marketplace, a pure bottom-up meshwork, where the top-down introduction of a standardized money system greatly intensified the transactions previously afforded by barter.[17] Design, top-down, may assist the effectiveness of self-organizing bottom-up situations.

More generally, to design preferred situations - they may be projectively explorative or more soberly critical - one must better understand the particular situation into which one is intervening. In recent years significant advances have been made in mapping and diagramming the multiple forces or energies occurring in specific overall situations, and, as well, specific internal programmatic perform-ative expectations. Practices investigating these processes and making significant progress include SHoP and FOA, among others, goaded on by theorists such as Stan Allen, James Corner and Sanford Kwinter.[18]

Some designed interventions will be preferred because they support stratified conditions, and some because they afford self-organizing or meshworked conditions. It is not either/or; both are nested in the larger meshworked ecological dynamic of human settlements. For those seeking the design of preferred situations, which includes doing something about ecological degradation, assemblage thinking makes sense.

ENDNOTES

1. Herbert Simon, "The Science of Design: Creating the Artificial," *The Sciences of the Artificial* (Cambridge: MIT Press, 1969), 55.

2. M. C. Beardsley, *The Possibility of Criticism* (Detroit: Wayne State Univ. Press, 1970), 16; cited in Richard Shusterman, *Pragmatist Aesthetics: Living Beauty, Rethinking Art* (Oxford: Blackwell, 1992), 30.

3. Ted Koppel, "Take My Privacy, Please!" (*The New York Times* Op-Ed, June 13, 2005).

4. For Greg Lynn's ontological distinction between architecture and the environment see "Form and Field," *Anywise*, ed. Cynthia Davidson (Cambridge: MIT Press, 1996): 96-97.

5. Paul Cilliers, *Complexity and Postmodernism: Understanding Complex Systems* (London: Routledge, 1998), 3, emphasis added.

6. Christopher Alexander, "The City is Not a Tree", *Design after Modernism: Beyond the Object*, ed. John Thackara (London: Thames and Hudson, 1988): 67-84.

7. Manuel DeLanda, *A New Philosophy of Society: Assemblage Theory and Social Complexity* (London: Continuum, 2006).

8. Gilles Deleuze, *Difference and Repetition*, tr. Paul Patton (New York: Columbia University Press, (1968) 1994); Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, tr. Brian Massumi (Minneapolis: University of Minnesota Press, (1980) 1987).

9. DeLanda, *A New Philosophy of Society*, 10.

10. Manuel DeLanda, *Intensive Science and Virtual Philosophy* (London: Continuum, 2002), 64.

11. Michel de Certeau "'Making Do': Uses and Tactics," *The Practices of Everyday Life*, tr. Steven Rendall (Berkeley: University of California Press, (1974) 1984): 29-42.

12. Fredric Nietzsche, *The Birth of Tragedy*, ed. Douglas Smith (Oxford: Oxford University Press, 2000).

13. This is elaborated in the work of Jacques Derrida, and shown relative to gender issues in Doreen Massey's "Politics and Space/Time," in *Space, Place, and Gender* (Minneapolis: University of Minnesota Press, 1994): 255-257.

14. DeLanda, in *A New Philosophy of Society*, 12, reconceptualized the strata/meshwork distinction: any given assemblage as positioned within a matrix registering the degree of *mixture among components* in one direction and the degree of *boundary integrity* in the other.

15. DeLanda, *A Thousand Years of Nonlinear History*, 308-309, n. 94.

16. Manuel DeLanda, "Deleuze and the Open-ended Becoming of the World," presented at *Chaos/Control: Complexity Conference*, University of Bielefeld, Germany, 27.06.98 (on the Web), emphasis added.

17. DeLanda, *A Thousand Years of Nonlinear History* (New York: Zone Books, 1997), 35.

18. Robert Somol, in an otherwise excellent discussion of the divergent uses of diagramming, never once deviates from the presupposition that architecture is autonomous, an object. Also, while using Deleuze as authority, he misinterprets him as being a thinker within the tradition that claims everything is essentially semiotic - the linguistic turn in philosophy - a position Deleuze rejected in conceptualizing his realist ontology. R. E. Somol, "Dummy Text, or The Diagrammatic Basis of Contemporary Architecture," in Peter Eisenman, *Diagram Diaries* (London: Thames and Hudson, 1999): 6-25.