THE ACTION IS THE FORM

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"...tools only exist in relation to the intermingling they make possible or that make them possible." [1]

Digital infrastructure is just one of the things that, in its ubiquity, often becomes more obscure. Infrastructural space is, as the word suggests, customarily regarded as a hidden substrate—the binding medium or current between objects of positive consequence, shape and law, yet it is also the point of contact and access, the spatial outcropping of underlying laws and logics. The pools of microwaves that bounce from satellites or the thickening tangles of fiberoptic submarine cable that lie on the bottom of the ocean, however invisible, nevertheless materialize in everything from atomized swarms of electronic devices to building materials and fixtures of urban public space. Moreover, some infrastructural formulations seem to make manifest and press into view a hyperbolic cartoon of their abstract technical and economic logics. Repeatable formulas for spatial products like resorts, malls, IT campuses or free zones manifest in gigantic world city formations. The building enclosures typically considered to be geometrical, formal objects receiving transportation, communication and utility networks have themselves become infrastructural—physical, spatial media and technologies moving around the world as repeatable phenomena. No longer simply what is hidden or beneath another urban structure, many infrastructures are the urban formula, the very parameters of global urbanism.

With minds trained to name and declare, we parse the world with a nominative habit of mind in which nouns are things that can be known and verbs are things that move. Digital architecture, a function of processes, protocols and topologies, is just the most recent mode of exchange to rehearse a currency in shared processes. Yet, while these tune the imagination to the infinitive rather than the nominative, the discipline of architecture still maintains its primary currency in singular durable objects that can be framed and represented. Even in a broader culture, it is likely that most do not look at a concrete highway system and perceive agency. Agency in networks might only be assigned to the moving cars on the road, the electrical impulses in the fiber or the swooshing sound of the sent email. Things that are not moving or expressing their dynamism in some way are not active. They are not *doing anything*.

Borrowing from Marshall McLuhan, the nominative and kinetic both act as "*the juicy piece of meat carried by the burglar to distract the watchdog of the mind.*"[2] Borrowing from philosopher Gilbert Ryle, the possibility that inert non-human objects have agency becomes a "ghost in the machine," or borrowing from Jacques Rancière, such a conception becomes "inadmissible" evidence in dominant cultural epistemes.[3]

For architecture and urbanism, as for many schools of thought, the distinction between understanding form as object and form as action is something like the philosopher Gilbert Ryle's distinction between "knowing that" and "knowing how." He provides a clown's performance as an example. "Knowing how," like knowing how to be funny, is not something that can be declared or named or reified as an object or event. It is for Ryle, "dispositional."[4] Ryle enjoys the ways in which dispositional expressions thrive in common parlance and are used as a way of describing an unfolding relationship of potential, relative position, tendency, temperament or property in either beings or objects. Francois Jullien has given the example of a round ball and an inclined plane as a situation possessing disposition—the potentials of a situation as they are associated with factors including geometry and position among many other things. [5] But the ball does not have to move or roll down the hill to possess this disposition. Disposition is composed of sequential action. Ryle emphasizes the latency and indeterminacy of this dispositional action in both human and non-human subjects. A person has the capacity or tendency to sing or smoke. A dog can swim. Rubber loses its elasticity. Glass is brittle. A clown is funny. In this way, Ryle demonstrates that seemingly inert objects are actors possessing agency. They are doing something. Ryle finds great sport in noting that while we work with dispositional expressions in everyday speech, in some logical systems this latent activity is treated as a fuzzy imponderable or an occult agency in "a sort of limbo world."[6]

Infrastructure, whether composed of digital, building or urban components is dispositional. It is made of action just as much as it is made of concrete, bits, cables or CPUs. It does not constitute an event, but must rather be observed over time as a potentiality, capacity, ability, or tendency. Its activity is not reliant on movement but rather on unfolding relationships inherent in its arrangement. Designing infrastructure is designing action. The contemplation of disposition tutors these artistic faculties, unused in some disciplines and a staple in others. With highly developed discourses to treat object, content, outline and nominative, architecture and urbanism remains under-rehearsed in making action, medium, relation, or infinitive and may even regard the possibility of active form as oxymoronic.

If making action is not a recognized artistic faculty, one would need to inform the clown in Ryle's example. Indeed, the transposition from the nominative to the active that requires so much ideation and analysis in some schools of thought, like design, is a completely ordinary or practical matter in some other disciplines like theater. Working up to their elbows in the construction of dispositional action, those in the theater come very close to handling action as an essential raw material. An actor adheres to an explicit script, but the scripted words are considered only to be traces or artifacts that provide hints of an underlying action. An actor constructs a scene as a string of sequenced actions. Often it is that action that is the meaning or information conveyed. Actors rarely deal with nominative or descriptive expressions—states of being or mood. One cannot play "being a mother," for instance. Because it is fixed and nominative, this is usually a bad performance that lessens the possibility of listening to and interacting with other performers — a form of over articulation known as "indicating." because its self-reflexivity lessens the possibility of listening to and interacting with other performers. Theatrical techniques often privilege infinitive active expressions. The director asks the actor, "what are you doing?" Letting a vivid action carry the words rather than the other way around is a relatively

1. Gilles Deleuze and Félix Guattari, A Thousand Plateaus : Capitalism and Schizophrenia (London: Athlone Press, 1988). Quoted in Nigel Thrift, *Spatial Formations* (London: Sage Publications, 1996), 264.
2. Marshall McLuhan: *Understanding Media: The Extensions of Man* (New York: McGraw-Hill; London: Routledge & Kegan Paul, 1964., 2001), 19. The quotation: "For the "content "of the medium is like the juicy piece of meat carried by the burglar to distract the watchdog of the mind."
3. Jacques Rancière, *The Politics of Aesthetics : The Distribution of the Sensible* (London ; New York: Continuum, 2004), 85.
4. Gilbert Ryle, *The Concept of Mind* (Chicago: University of Chicago Press, 1949), 27-32, 43, 89, 116, 119-120.
5. Francois Jullien, *The Propensity of Things: Toward a History of Efficacy in China* (New York: Zone Books, 1995), 29.
6. Ibid.,Ryle, 119-120.
7. Sharing a sensibility with theater, Ryle, for instance, makes as distinction between active verbs or "performance verbs" and verbs like "'know,' 'possess' and 'aspire.'" One would not say, for instance "'he is now engaged in possessing a bicycle.'" Gilbert Ryle, *The Concept of Mind* (Chicago: University of Chicago Press, 1949), 130, 116.

durable technique. It is the action or driving intent , referenced as an infinitive expression, that is leading the performance—not movement, gestures, blocking or choreography. [7] Since motherhood is an abstraction, an actor would play not "being a mother" but rather "smothering a child." Not the text, but the action, is the real carrier of information.

The notion that social and technical or socio-technical networks like infrastructure are *performing* is one that Bruno Latour has long posited in his renovation of social "science."[8] Both Ryle and Latour enjoy holding up the artifacts that do not fit into the box or the butterflies not pinned to the board. While many of those studying socio-technical networks were focused on the way social constructs shaped technology, Latour's more radical inquiry considers not only humans, but also technologies as actors. For instance, highways, the electrical grid or a computer are active non-human agents influencing the desires of social networks that reciprocally shape them. Rather than "placeholders" that reinforce existing assumptions, things, whether they are human or non-human have agency; they are actively "doing something." [9] Latour calls attention to an unfolding trajectory of activities between humans and nonhumans that is harder to fix. Action, he writes is "dislocated" or indeterminate. It is "borrowed, distributed, suggested, influence dominated, betrayed, translated." To study social networks is to continually "follow the actors." [10] Latour writes:

It is not by accident that this expression, like that of 'person', comes from the stage....To use the word 'actor' means that it's never clear who and what is acting when we act since an actor on stage is never alone in acting. Play-acting puts us immediately into a thick imbroglio where the question of who is carrying out the action has become unfathomable. [11]

If infrastructural organizations are performing, what are they doing? If their performance is indeterminate, how are they designed? As impossible as these concepts may seem within some disciplinary logics, contemplating dispositional activity opens onto a fresh field of endeavor. For designers and urbanists, such a contemplation redoubles our form-making capacities to include active forms—spatial agents or actors that shape not only the objects, but the way the object plays—what the object is doing. They condition material and immaterial parameters, aesthetic practices and political trajectories. For instance, active forms may describe the way that some alteration performs within a group, multiplies across a field, reconditions a population or generates a network. They may be not only physical objects or contagion, but also topologies or organizational properties within a spatial field. The designer of active forms is designing the delta or the means by which the organization changes—not the field in its entirety, but the way it is inflected, the dispositions immanent within its organization. So, while perhaps intensely involved with material and geometry, active forms are inclusive of, but not limited to enclosure and may move beyond the conventional architectural site. Active forms are not at odds with, but rather propel, expand, (even rescue) form as object. As they may ride larger organizations, they offer additional modes of authorship with time-released powers and cascading effects.

While perhaps initially obscure, the idea that static objects and organizations have agency is only a discovery of something we knew all along, just like we know there is no way to answer the question, "What is funny?" The urban environment grows or changes because of active forms within it, whether they be contagions or topologies. For instance, an elevator, spatial product, law, real estate wrinkle, financial formula, network topology, material imperative, or persuasion may be an active form within the city. They may be designed with immaterial parameters that may only have eventual material consequence. It is of little consequence to alter one house in a suburban field, but it is very effective to design a real estate protocol that is contagious within it. It is relatively meaningless to attempt to represent a process like the Internet, but very meaningful to author active forms that ride that network. Similarly, one cannot design diversity in a city by crafting variability in its individual components, but one can design an urban infrastructure from both geometry and relationship that continues to generate diversity, and is reliant on both the shape of physical form and the scripts that govern their use and growth. These combinations of form and protocol contribute deliberate tools for adjusting organizational constitution, and they are capable of rendering mixtures that are, for instance, homogeneous, heterogeneous, monopolistic, oligarchic, open, resilient or recursive.

Gregory Bateson's adventurous thinking, taken together with that of Ryle and Latour, further delineates how one might begin to inflect political disposition and even temperament immanent in organization. Just as Ryle and Latour see no separation between human and non-human actors, Bateson addresses a world made of everything, not a world subdivided into the subjects of different sciences. He speculates about activity embedded in organizations made of individuals or sounds or circuits or neurons. As a cybernetician, Bateson characterizes information as a universal unit or elementary particle. "Information is a difference that makes a difference," he famously wrote. [12] Objects as well as actions are not anthropomorphized as little selves that possess mood and intentionality, but the degree to which they "make a difference" in the world constitutes influence, intention or *information*.

Information shapes morphology and organization in biological or machinic, human or non-human, systems. Assessing any group—electronic circuits, nations, tribes from New Guinea or Alcoholics Anonymous meetings—with this cybernetic epistemology, Bateson could also transpose sociological assessments of tension and violence to organizations of inanimate objects. Where Ryle describes disposition as inherent properties (e.g. glass that is brittle), Batson can naturally extend an understanding of disposition to include behaviors inherent in groups. He speculated about the violence inherent in binaries, the way in which that violence might escalate as the binaries become more symmetrical, and the way in which it might be relieved by reciprocal or cooperative activity among multiple power centers. Bateson linked information flow in organizations to dispositions of productivity, stability, violence and collapse. In the competitive or destructive states, the

8. Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (Oxford: Oxford University Press 2005), 5, 8-9, 10-11.
9. Ibid., 46.
10. Ibid., 46, 39.
11. Ibid., 46.

12. Gregory Bateson, *Steps to an Ecology of Mind* (Chicago: University of Chicago Press, 2000), 381, 462, 315, 272, 21.

flow of information collapses, whereas in more balanced arrangements information is more easily exchanged. Setting aside some holistic conclusions and codifications of cybernetics, Bateson's simple speculations foster an understanding of stability, tension, violence, aggression, interdependence or competition that are literally immanent in urban organizations.

Again, while it might seem odd to speculate that non-human organizations have temperament over and above the human agency within them, the idea finally only returns to something we already know. A term like disposition perhaps only brings the familiar into focus. For instance, two warring factions marching towards each other are symmetrically arranged in a way that fuels violence. An underground mafia organized as a hub and spoke organization fosters secrecy because of limited contact to administrative decisions. A television or radio organization of mass media similarly has a hub and spoke organization very different from contemporary networks of computation. A skyscraper organizes sequential movement not unlike serial computing. A mat building with multiple points of entry is something like its parallel computing counterpart. A telecom locates its underground fiber-optic cable in relation to only one segment of the population, and it operates as a monopoly. In each of these examples the active forms or directions for activity have a substrate of geometry or arrangement that shapes the disposition of the organization. Each of these topologies or relative power positions possesses a quotient of, for instance, violence, resilience, competition, potency or closure.

The contemplation of disposition also tutors political faculties. The most powerful players have the capacity to make infrastructure, but equally important, infrastructure can escape nominative designations or documented events. As action, it can remain undeclared and discrepant, and, as medium, it can determine what survives. Different from the politics that names and squares off against every opponent or tries to kill every weed in the field, the indeterminate dispositional space of infrastructure may neutralize or adjust by changing the chemistry of the soil. The broad foundational transformations of infrastructure change, like sea changes or changes to an operating system, offer a special political instrumentality that may preclude the fight. While those political traditions that call for inversions and revolutions often call for the absolute annihilation of the preceding system, lateral techniques of dissensus work on the *ongoing* reconditioning of a spatio-political climate.

The projects commissioned for the *Sentient City* exhibition embed digital technologies that we recognize as active into urban surfaces that we customarily consider to be inert. Unlike those digital installations that signal technological anthropomorphism or dynamism with an animation of blinks and beeps, the installations are often heightening an awareness of either a lurking digital technology or a relational agency existing in the urban environment. At their best, while they maintain independence as techno-artistic urban performances, they highlight some of the same territory that Ryle, Latour and Bateson find on the other side of an altered habit of mind. It is territory where the action is the form.

INTERACTION ANXIETIES

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In a recent article[1], interaction design consultant Donald Norman sounded some warnings about the new trend in interaction design - the natural user interface (NUI). NUIs look to replace the graphical user interface (GUI) with more "natural" interactions including speech, touch and gestures. Steve Ballmer, CEO of Microsoft, is quoted saying that 2010 will be remembered as the year when the shift to NUIs took place. Norman is not convinced. He takes exception to the "natural" designation of NUIs and warns against the limits of gestures for interaction design. His reservations include that gestures are not natural, but like graphical interfaces have to be learned. They are ephemeral and don't leave a trace of their path, thus providing little feedback to users, and they can easily be misinterpreted by people and consequently computers. Norman's critique however, is tempered by his recognition that NUIs "will enhance our control, our feeling of control and empowerment, our convenience and even our delight."[2] But that will only come once NUI's develop "well-defined modes of expression, a clear conceptual model of the way they interact with the system, their consequences, and means of navigating unintended consequences."[3]

Norman's objections must be placed in the context of interaction design's historical focus on the workplace machine.[4] Here research has pursued the design of effective interfaces, hardware and software through which information in a computer's memory can be easily accessed and manipulated. Its products, the mouse, keyboard, stylus and GUI, have transformed computers from specialized machines to universal work appliances. Norman's skepticism reflects the limits of NUIs for the types of interactions that we have become accustomed to with our GUIs. It also reflects a deeper anxiety with the changing nature of computing that is increasingly mobile, materially embedded and pervasive. Perhaps the interactive capabilities of the workplace machine are not a suitable model for this type of computing? Or that effective interfacing will not be the measure of effective or affective interaction in the age of pervasive computing? Could it be that interactions will not only be for information exchange but designing, provoking and situating a variety of social and cultural practices? With buildings, clothes, objects and places becoming computationally augmented we need to take a more holistic view of interactivity and explore how it can assist in constructing productive and provocative relations between people, places and computing instruments. What role does space, mobility and embodiment play in such constructions? How will interaction affect our understanding of our own agency in perceiving and acting in space? And what of the agency of sentient systems through and with whom we will interact?

The expansion of our understanding of what interactivity could be as computation becomes pervasive requires a shift away from the instruments of interactions - screens, mice, speech, gestures, tangible interfaces - and towards the relations we expect to achieve from them. These include the ways in which we communicate and socialize with one another and inhabit our cities and world. We need to speculate on the

1. Donald Norman, "Natural User Interfaces are not natural," Interactions, v.XVII.3 (2010): 6-10.
2. Ibid., 6.
3. Ibid., 9-10.
4. See Bill Moggeridge, Designing Interactions, (Cambridge, MA: MIT Press, 2007) which is a personal chronicling the development of computer interfaces.