01. OPEN SYSTEMS

One

What does not kill me will make me stronger. It will cause me to adjust. I will improve. I will survive the catastrophe and go on. Not just endure; enhanced and ennobled by my experience I will meet the world with greater resilience, more useful tools, a wilier intelligence, an increased capacity for dealing with the slings and arrows that are thrown my way. I will emerge from my small struggle a better person. Myths and legends, local stories, family anecdotes, movies, romances and crime novels are rooted in the device of overcoming, of the hero (me, you, her) breaking a conflict situation and through this catharsis becoming something new or better. The narrative of self-improvement is based on the trope of renewal after disaster - because of disaster. The epic poem, such as the *Odyssey* or the *Iliad*, requires disaster to enable the hero to create a new condition; for the old order to be swept away and a new order ushered in. We see it in films and novels too: any Clint Eastward movie, for instance *Gran Torino* or *The Unforgiven*; Jane Austen's novels, where the heroine and hero alike become improved through hardship and the asymptotal nearness/farness of the loved one. It is the same in real life: war cleanses and purifies, the rat eats her young and the rat community flourishes, the frightened young officer is wounded and, spurred on, leads her company to victory.

And who is this subject for whom the figure of emergence is so apt, so peculiarly descriptive? This subject is, of course, a system, for it is systems that are emergent in this world. More specifically, the subject is a set of systems, nested hierarchically, level after level of system from macro to micro, from the lofty heights of nonphysical consciousness to the microscopic, almost nonphysical but oh so material systems of sub-molecular events in terms of which evolutionary biologists say consciousness itself can be explained. And, blending with this vertical systemic subjectivity is a horizontal field of systems overlapping, drifting through each other, passing into other systems, social, geographical and cultural. Vertical systems and horizontal systems comprise the subject in contemporary life. When we meet a friend or hold a flower to our nose one set of systems confronts and mingles with another. And all these systems are open …

Two

It is noted in *Emergence in Landscape Architecture* (Barnett 2013: 20) that "system" is a metaphor, a theoretical construct that enables us to understand (perceive, describe, explain, interpret) observed behavior in a language that is formulated especially for the job. One of the most important features of the construct when applied to people is the sense it gives of human entanglement in other systems, the complete and unavoidable imbrication – embeddedness – of landscape and body. The sense, as Merleau-Ponty put it, of the human body "being caught in the fabric of the world" (Merleau-Ponty 1969: 256). The idea of system reinforces a phenomenology of landscape-human relations as indissoluble and of the human agent as a becoming that occurs always inside the intertwining landscape systems in which it is immersed. The supposition that there is a mind (or a subject) over here and a landscape (an object) over there, mute, physical, external, is no longer tenable. Any discussion of open systems will entail the decisive concepts of emergence: time, disturbance, instability, equilibrium, inclusiveness, resilience, self-organization, adaptivity. All of these concepts, developed or adapted to explicate certain kinds of phenomenal behavior, are characteristic of open systems, merging the open systems of human existence with those so often considered separate, of landscape.

Three

The study of open systems, and the development of this language, began in earnest in the twentieth century

after nineteenth century innovations in thermodynamics and related disciplines. Classical, Newtonian physics had based its account of natural phenomena on the analysis of the behavior of closed systems. In a closed system a kind of experimental purity is possible. System events and circumstances can be controlled and repeated, as they are not influenced by anything but the experimenter's interventions. Observations of the system's behavior are therefore reliable and determinate. However, the observation of closed systems is now considered an artificial and misleading way of finding out about nature, including human nature. Natural processes are always interacting with each other and are highly susceptible to change. A landscape, therefore, is a system that changes and evolves according to information continually being received from an environment that includes itself. Once we have open systems, we can speak of self-organization, of which autocatalysis is a crucial characteristic. Autocatalysis, or positive feedback, occurs when the output, or result, affects the input of the system, thus altering its operation. Put another way, information generated can influence the generation of further information. An autocatalytic process is one, therefore, that catalyzes or accelerates itself. Classical physics did not have the tools for finding this out. Newton could predict the moon's orbit from the laws of gravity, but did not have the equations to describe the nonlinear feedback produced if another moon is introduced into the system, when orbits become chaotic and linear prediction impossible. For the first time in history, the study of feedback loops enabled researchers to distinguish between the pattern of organization of a system and its physical structure.

Four

As noted earlier, an open system is part of its environment. While this means that its future behavior is not able to be determined, it can nevertheless attain a structure and maintain it in far-from-equilibrium conditions. This undermines the traditional view that systems must be examined as if they were isolated from their environment. Instead they are seen as embedded, or nested within an interactive cascade of mobile networks. For this reason scale is critical in the consideration of landscape systems. In landscape studies space is dynamic, flexible, relative. It is not an absolute, not a container for form. Within a watershed or a city we can observe spatial changes at different scales. As a whole, a city does not seem to change much in a week, but at the level of the street the change in one week can be radical: buildings vanish, families move on, crushing accidents occur. What is most crucial is that we can see different relationships depending on the scale at which we look. At the scale of Oceania, we can observe economic flows between Pacific islands, and this causes us to understand these islands in certain ways, as part of a global system. At the scale of the bay we see different aspects of these economic flows, and understand their relationship to landscape conditions: harvest, management and husbandry; weather patterns, kinship influences and so on. In fact, scale itself is a framing device that separates and isolates systems that are in reality connected.

 The flow of energy in open systems allows them spontaneously to self-organize by developing novel structures and new modes of behavior. Self-organizing systems are therefore said to be creative, and their bifurcations the source of diversification and innovation (Prigogine 1996: 70). They are adaptive, and actually require conditions of instability and disturbance in order to evolve to new levels of order and vigor. Matter/energy, and its flows and coagulations, is the basic subject-matter of landscape architecture. The regulation of these flows and coagulations as a design strategy is developed by Zaera-Polo, a designer with Foreign Office Architects. For FOA, design is seen as a way to "permit organizationally complex landscapes to emerge through the production of topographies artificially generated by a mediated integration of rigorously modeled orders" (Zaera-Polo 2005: 23). Open systems are complex. Their parts are so numerous that there is no way a causal relationship between them can be established. Instead, their components are connected by networks of feedback loops operating at different levels, different scales and different rhythms. Landscapes work like this. This is why it is not necessarily useful to think of them in terms of types. As complex adaptive systems their higher order

patterns are the result of their continual interactions within and without, of their ongoing openness and responsiveness to quite specific, changing conditions. We should think of landscapes as generated by, and therefore imminent to, the specific conditions they comprise. How we remodel landscapes is a question how we gather and direct these forces and, indeed, this is just what gardening is: the production of difference through the husbandry of natural processes.

Five

In Chapter 02 of *Emergence in Landscape Architecture* cities are described as dissipative structures. As such, they are in contact with various sources and sinks. Flows of matter/energy from sources to sinks enable ordered structures to be formed, maintaining them in time. In the end these flows are dissipated as wastes and other pollutants to external sinks. If a landscape is static, like a nineteenth century park, it becomes a sink not a source. It requires maintenance in the form of physical and economic input. One of the objectives for the landscape architect is to make sources not sinks. The project is to encourage the development of open systems, and to place human beings into these systems in such a way as to enhance the exchange that occurs between the multiplicity that is human personhood and landscape multiplicity. The operations of landscape architectural making - the poetics of landscape architecture - are entirely adequate to this project. Garden making, city making, the creation of parks great and small, have always required of landscape architects a special sensitivity to the openness of becoming. An immersion in the unique processes of human-nonhuman interaction that only landscapes can afford, and a careful rehabilitation of the operations that are specific to landscape making - a commitment to the intimate association of humans and the world that makes them human - can invigorate the discipline and re-orient its approach to the complicated terrains that confront it. This will require a revision of expectations on the part both of landscape professionals, and the constituencies with whom they work, to realize the designed open systems of the twenty-first century. An open system will evolve into something that has not been envisaged. Any design investigation must take into account the responses not only of the natural system but also of the human participants with their partly compatible and partly opposing goals. The system is not simply the terrain and its affordances. It includes sub-systems: the weather, climate cycles, municipalities, funding organizations, real estate values, stock market reports. By means of the transmission and exchange relations it enters into with these the system selects its own trajectory. While this trajectory may not suit everybody, everybody has been involved in it. The system does not just take - it gives.

Six

Koolhaas's Downsview Park Tree City is emblematic. Now widely assumed to have failed, Tree City was an early example of designed landscape emergence, the winning entry in a competition to repurpose an abandoned airfield as an urban park in Toronto. Its nonlinear strategy was as open as is possible to future entailments, and evolved accordingly. This always meant that the "rapidly changing and constantly shifting urban field," as Waldheim put it in his 2001 review of the competition, could move the system in unforeseeable directions, as a result of the downward causation that typifies emergence. After the three phases that established the green infrastructure of the park, the scheme left the remaining terrain "to be returned to its native ecological state or left fallow for an indeterminate future" (Waldheim 2001: 85). Only by 2006 would pathways and programmed activities be introduced. Therefore managing public expectations, as Smith says in an article written after a visit to the park in 2006, was a critical part of the project that was somehow overlooked, or under-realized, and the project has indeed shifted (Smith 2007:37). New commercial and residential developments are now under construction, working reassuringly towards a final state, rather than the awkward and unintelligible (because slow and informal) natural and cultural succession phases that would never reach an achieved condition. It might be, as Smith states, that the problem was a lack of clear communication strategies that might explain the

basis of the proposal and what stage it was at in regular and appealing transmissions. It might be the lack of interim detailing to provide formal, legible visual, physical statements about progress. It might be, as Berger suggested in a 2001 review, that an inattentiveness to the specifics of topography and hydrology meant that the envisaged self-organizing plant ecologies were never going to flourish and the whole thing just sit there looking like an underfunded, half-hearted arboretum project (Berger 2001: 131).

Seven

But this is too simple. An urban system comprises, among other things, sets of social systems and ecosystems. The success or failure of Tree City cannot be judged in terms of one or the other. It is particularly because humans are part of the Tree City system that it could branch off into any one of a number of different organizational states. There is no "correct" or "preferred state." Like the three moon problem that Newton could not explain with classical dynamics, the park that evolves rather than remaining static will elude description unless we attend to the frame by means of which the description is developed. This requirement is as fundamental to the establishment of the system in the first place, as it is to future analyses of it. Both the designers and the readers of any self-organizing urban landscape must necessarily identify the important components of the envisaged landscape, their interrelationships, a sense of the system as a whole, and the system's relationship with its context. And these aspects of the landscape must be understood as undergoing continuous change. Ecologist J.J. Kay has explained how a system description is always developed from the perspective of an observer. Since a system is not "out there," but "inside us," he says, any situation can be described in a number of ways. No description is complete or correct, and there is always the question which description should be used. Kay emphasizes that when we look at a system we see its structure but not the processes that inform it (Kay 2008: 17). The urban processes that Tree City selected, as its conditions of evolution are complex and difficult to pin down. Additionally, the state that an urban landscape occupies at any one time is as much a matter of its history as its current context. As self-organizing regimes, designed landscapes will develop according to what has happened in the past. The Downsview Park trajectory began in 1994 when the Canadian federal government announced the site as an urban park, and its future states were portended by the establishment of Parc Downsview Park Inc. as mandated to create an "urban recreational greenspace" in 1996. These initial conditions formulated the DNA that would actualize the park by defining its possibilities. Political, social, financial and cultural perturbations could push the system from one regime into a very different one. Tree City tells us a lot about the difficulties of strategizing open urban systems.

Eight

As Kay's insistence on the appropriateness of system descriptions implies, a big picture is made up of many little pictures. Turning to ecocritical literature for insight, we find Robert Watson, in his "Ecology of Self in a Midsummer Night's Dream," noticing that Shakespeare's characters are "motivated by uncontrollable forces within and without." They occupy worlds that are reliant on each other, that even merge. The play's interspecies couplings and metamorphoses remind us that there is more going on than "cool reason comprehends," and that an environment does not necessarily refer to clouds and trees (Watson 2011: 36 *passim*). Setting aside cool reason, then, let it be stated that an open system is a multiplicity. As a multiplicity a landscape offers itself to composition with other multiplicities, such as ourselves, in ways that urge us to become involved. A landscape, in this sense - as multiplicity - is not defined by simple materiality, or the space it occupies, or its organic structure, and nor are we. When we become involved with a landscape it is the relations between its parts that strike us - and the actions and reactions these provoke. So it is not simply tree, but how the tree develops its distinctions through placement, orientation, distance ("external" milieu) and sunlight filtration, scent, color gradients, interaction with other plants and materials, the spatiality it creates,

the ephemerality it assumes, the involvement it enables other bodies to develop with each other under its influence. A tree is a body, I am a body, and a body is more than the physical suggestion of my frame. Above everything my body has a capacity for being affected by other bodies, and when there are landscape systems that consist of magnitudes and dimensions that are in continual change - like me - I can open up to them, enter their elements and relations, their porosity, intransigence, elisions and divisions, and become affected by their powers. I bring the entire field of my lived experience to this encounter: past encounters, significant events, historical determinations, concepts, memories, capacities, habits, persuasions, predilections and powers.

Nine

As an open system the landscape simultaneously lays out its own semiotic, material and social flows. It does this, as I do, in ways that elude the separation of the situation into world, representation and subjectivity. A landscape has no outside, for its connectivity to other multiplicities is always complete. Any figuration of a multiplicity is, in the manner of a systems description, at once a subjectification, a projection and an artificial partitioning. Perhaps it is more apt to say that a landscape is only and always an ecotone, an edge, a continuous immanent spatiality, a set of borderlines that continually present themselves as elements to be dissolved, disassembled and reassembled through my contact with them. This compelling admixture of body and body, produced by congeries of landscape difference (height, color, light, moisture gradient, adjacency etc) is not, then, an interpretation or an experiential condition, even though it is phenomenal, but an individual realization of the concrete constituents of time and place. When we encounter landscape multiplicities, we are always encountering them in time and place.

Ten

The human subject-system that is doing this is itself a moving location of affects, not a thing. The kind of individuation we find in a person is more akin to the variable differentiation of something like a day, a season, a life, a climate, a wind, a fog, a swarm, a pack. A landscape is like this too. It is not some kind of backdrop or background that situates subjects or holds things to the ground. It is the entire assemblage incorporating the situation and its aggregates. In my capacity as an effect, an event, a component of the assemblage that is arranging around me, I am inseparable from the hour, the season, the air, the street, the "weeds" in the cracks of the paving. I am always in composition with the landscape I am connecting to. The wetland I discover at the end of the street is as much a part of the walking human-boardwalk-heron assemblage as the designer who initiated it and the collectivity whose neighborhood it skirts.