INFRASTRUCTURE INSIDE OUT
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“I dreamed that I could make public art grow from inside a public infrastructural system outward to the public and that the growing would affect both the inside as well as the outside.”
—Mierle Laderman Ukeles

In his geologic page-turner from 1989, The Control of Nature, the American writer John McPhee profiles three mid-twentieth-century, Herculean efforts to thwart, stall, or otherwise tame earthly forces: massive navigation locks installed along the Mississippi River to maintain its flow to Baton Rouge and New Orleans; seawater sprayed furiously upon molten lava to forestall its encroachment on the port of Vestmannaeyjar, Iceland, after a volcanic eruption; and sublime-scaled debris basins erected at the base of the swiftly eroding San Gabriel Mountains to trap mud and dirt before it inundates the metropolis of Los Angeles. Each of these cases highlights the monumentality of modern technology coupled with (and driven by) a deeply hierarchical approach toward urban versus environmental reality—one that expressly dis-engages the two. In an interview shortly after the 2011 Tohoku earthquake and tsunami, which led, among other things, to spectacular infrastructural failure in the partial meltdown of the Fukushima Daiichi Nuclear Power Plant, the Japanese architect Toyo Ito cited the utter anomie and alienation of such a human-over-nature paradigm, insisting we must abandon it at once:

“Our way of life is still based in twentieth-century ideas, specifically a modernist philosophy that assumes we can use science and technology to conquer nature. So we try to isolate ourselves from nature; our cities are completely segregated from the environment. [...] That kind of modernist thinking has reached its limit.”

With current proposals to manipulate the climate in order to stem global warming, however, it seems we are in fact facing an unprecedented intensification and culmination of geo-engineering. In this new phase, interventions are designed for Earth systems at the planetary scale. In all of the various schemes tossed about—from the sequestration of carbon via artificial plankton blooms catalyzed by ocean “fertilization,” to the deflection of sunlight away from Earth by means of aerosols injected into the stratosphere, the placement of reflective sheets atop glacial ice, or “space mirrors” launched into orbit—humans are figured to be in direct combat with a nature of their own making.5

SCAPE’s Living Breakwaters, building from its ongoing Oyster-ecture research, reverses such a control-nature modus operandi, instead drawing attention to complex human and natural ecologies (see pp. 236–59). In “thickening” New York City’s coastline with oyster reefs to mitigate storm surges resulting from rising sea levels and increasingly destructive weather patterns, infrastructure is reimagined as connector rather than barrier. More accurately, it functions as a substrate, or scaffold: not solid ground, but a platform upon which multiple human and nonhuman actors are set into motion and interactions are expected to evolve over time. As opposed to canonical modernist paradigms, the emphasis here is on networks, processes, flexibility, and porosity, or “soft” edges. Living Breakwaters is exemplary of a new orientation in which hypertextual solutions supplant a clean slate, one-size-fits-all approach; interdisciplinary collaboration is highly valued; and primary concern lies with users rather than monuments. Here, the work of feminist thinkers who have long been concerned with questioning and countering (inherently patriarchal and anthropocentric) cohesive, view-from-above perspectives by insisting on the partial, embodied, and situated nature of all knowledge—not to mention the presence and importance of more-than-human assemblages—is highly pertinent. An endeavor like Living Breakwaters furthermore coincides with a surge of interest in landscape and ecology within the field of architecture, reflected not least in the emergence of “landscape urbanism” and “ecological urbanism” as influential discursive vectors. The urban theorist Charles Waldheim points to a “disciplinary realignment currently underway in which landscape replaces architecture as the basic building block of contemporary urbanism.” Landscape’s move to center stage entails a fundamental rethinking of the city relative to environmental contexts (e.g., hydrological, biological, geological, climatological) as well as broader territorial scales. The field of architecture, in this version, pertains no longer to discrete objects but rather to intricate and dynamic systems.

To turn something “inside out” can mean to flip it, but also to investigate it thoroughly, to consider it from all possible angles, to know it anew. Within contemporary art, there is indeed a rich vein of work that has engaged the urban built environment, and especially infrastructure (e.g., freeways, sewage systems, levees, sidewalks, power grids, oil and gas pipelines), probing its function within the city as well as the ways that it connects the city to broader structures and operations. At the root of many such projects is a desire to bring that which is largely invisible, because too big, naturalized, or subterranean (the prefix “infra-” denotes below, under, beneath), into the light. In the process, they actively alter our urban-natural imaginaries.

In the 1970s, Mierle Laderman Ukeles inaugurated a multi-decade body of work on what we might call the “social ecology” of waste in New York City. Having claimed “the whole city as her site,” she studies her subject “through a system that keeps it running.” Since 1977, she has been the official artist-in-residence of the New York Department of Sanitation, a position she created for herself (which was previously both nonexistent and arguably
unthinkable). Many of her pieces have focused on the marginalization and stigmatization of sanitation work. Within the context of her Touch Sanitation series of performances from 1978–80, she spent nearly a year meeting face-to-face with each and every one of the 8,500 employees in the department to shake their hand and say, “Thank you for keeping New York City alive.” Follow In Your Footsteps involved the artist traveling into the field with workers, where she carefully observed and mimicked their movements—thereby enacting a choreography of everyday tasks. These gestures, in addressing people as part of infrastructure rather than separate from it, recast infrastructure as being as much about specific actions as about built forms—thereby also implying the potential for new kinds of (inter-)action, engagement, and intervention. Elsewhere, Ukeles has participated in union efforts, orchestrated a “barge ballet” at the transfer station where garbage is off-loaded from trucks and shipped from Manhattan, and contributed to reclamation designs for the Fresh Kills Landfill, the longtime repository for much of the city’s refuse. The art historian Miwon Kwon has noted that Ukeles’s art, while specializing in the social and physical infrastructures of trash, opens onto “the economy of labor that structures our entire society—from homes and offices, to communities, institutions, and cities.”

Meanwhile, the Center for Urban Pedagogy (CUP), founded in 1997, is a New York-based nonprofit organization busy creating research-intensive projects to “demystify the urban policy and planning issues that impact our communities, so that more individuals can better participate in shaping them.”

Dozens of projects, generated by even more contributors, have addressed topics ranging from zoning laws to air pollution, affordable housing, and geographies of electrical power. CUP’s efforts are directed at the interface between governance, administration, finance, and the urban lived environment—where the rubber hits the road, so to speak. Damon Rich, one of its founders, explains that the group’s prolific and diverse production is cohered by its “use of design and art in the service of popular education around cities and how they work.” As suggested by its name, education is central to CUP’s practice. Roughly half of its activities are carried out with public school students, the rest with community-based and advocacy groups focused on particular issues. In contrast to a top-down model of teaching, CUP’s programming emphasizes mutual, on-the-ground learning, ultimately meant to foster empowered civic engagement.

In one final example, the British artist Nils Norman, in his 2000 book, *The Contemporary Picturesque*, documents the profusion of small-scale infrastructures throughout London in the 1990s, meant to curtail loitering, heighten surveillance, and prevent the public from assembling en masse. His deadpan photographs capture spiked windowsills, caged entryways, anti-climb and anti-graffiti paint, bus shelter benches angled to make sure no one lingers too long, and more. When brought together, this constellation of curious, if by now familiar, fixtures spurs all sorts of questions about the surreptitious refashioning of contemporary urban space, including the rampant privilization and “securitization” of once-public sites that have in many cases transpired in broad daylight yet largely under the radar.

This type of work takes a direct interest in the civic sphere, grappling head-on with the politics of public space. Often associated with what the artist Suzanne Lacy in 1994 termed “new genre public art” and has more recently been called “social practice,” it often involves a dialogical component, as well. A key aim is to stimulate critical debate about thorny spatial issues and/or to expand frameworks for citizen involvement in ground-up planning.
Within architecture, too, there seems to be growing consensus that infrastructure represents a crucial nexus for socially and politically relevant design. Architect and urban theorist Dana Cuff argues that, rather than representing a purely pragmatic or technical "other" to architecture, infrastructure is the site "where design is most needed" and "the heart of the next generation's public sphere." Urban infrastructure, as a form of commons, becomes the terrain for architects who "give a damn"—who want to reconfigure cities in meaningful ways, to enrich civic life, to wrest at least some power from urban planners and, increasingly, from private developers. Architect Stan Allen similarly identifies infrastructure as one locus where architecture might assert its "capacity...to actually transform reality." He advocates a move beyond the prevailing concern with form and representation in architecture and toward a renewed emphasis on architecture's usefulness as a material practice. He is clear, however, to differentiate this material orientation from earlier, technologically deterministic varieties, declaring: "Architecture's instrumentalities can be reconceived—not as a mark of modernity's demand for efficient implementation but as the site of architecture's contact with the complexity of the real."

Safari 7 Tour

Safari 7, led by Kate Orff and Janette Kim of the Urban Landscape Lab at Columbia University and Glen Cummings of MIT/WTF, delves precisely into "the complexity of the real" (see pp. 150–65). Designed as a self-guided podcast tour for riders of the Metropolitan Transit Authority's 7 subway line, it maps and interprets urban wildlife in New York City. This project resonates closely with the artworks discussed prior in its objective to render insights into the city as a vibrant, multidimensional, socio-ecosystem. It furthermore aligns with a strain of "critical tours" by contemporary artists intent on complicating our understandings of the hard-to-see forces that condition the world around us. In the case of Safari 7, a heavily utilized infrastructure—the public transportation system—is transformed from a medium used to get from one place to another into a platform from which to see the city anew. The 7 line offers a specific transect of the urban environment, narrowing our focus to a handful of points between Times Square and Flushing Meadows, in Queens. Along the way, we are introduced to a series of thoroughly entangled human-nature tales that serve to de-familiarize both habitual ways of looking and assumptions about any clean division between nature and culture. One stop on the tour, for example, explores a vacant lot. "Whole lot—of nothing?" it asks. "Not at all," the narrator proceeds. "The microclimates of vacant lots are just as complex as the financial systems that leave them vacant." This vignette asks us to think simultaneously across vast scales and registers, recognizing links, for instance, between bacteria or insects in the soil and globalized capitalism—to see them as part of the same story.

Living Breakwaters, of course, encompasses a significant shift from interpreting ecosystems to designing them. This sort of large-scale, permanent, built project is categorically distinct from the more ephemeral, representation-based interventions typical of social practice by artists, even as it shares many of the same imperatives. It does a different kind of work in the world, we might say. Physical form here enables new human-nature interactions. If, in Ito's assessment, science and technology have been employed in the past to establish dominance over nature, in this case, they are put to work precisely in the service of reintegrating the social and environmental. It is no coincidence that the primary science influencing Living Breakwaters is ecology, which itself focuses on interrelations and, as such, stands apart from more specialized branches like hydrology or even biology. Rather than an attempted return to some sort of "baseline" nature (if we believe that ever existed), the work of SCAPE comes closer to what some forward-thinking scientists are now calling "ecological novelty," a concept that acknowledges the constant flux and entwined human and nonhuman elements-processes characterizing all environments today.

Orff refers to the eastern oyster, a species that has played a key role in the ecology, economy, and culture of the New York Harbor historically, as an "environmental engineering partner." In addition to this collaborative approach to nature, Living Breakwaters diverges sharply from most (infra-)structural engineering in its prioritization of layered multifunctionality. Many parts are meant to do many things at once. Artificial reefs, as they agglomerate over time, protect the coastline from flooding and erosion by attenuating waves while at the same time expanding recreational opportunities for beach users, creating new habitat for aquatic life, and invoking the highly textured landforms from the pre-dredging days of the harbor. Equally important, infrastructure is intended to grow over time in tandem with
growing community involvement and stewardship. A number of ambitious outreach programs are integral to Living Breakwaters, many of them geared toward middle- and high school students. Together, they aim to extend a network of people on the ground, who will help cultivate and sustain the project through enhanced ecological awareness, water awareness, risk awareness, and so on. Design itself is here meant to network, to be responsive, to engage humans and nonhumans on an even playing field, and to gain its power exactly through distributed agency.

Living Breakwaters clearly needs also to be considered relative to the anthropogenic climate change it explicitly addresses. Perhaps more than any other environmental phenomenon imaginable, climate change is dizzyingly convoluted, entailing many (often correlated and at times seemingly contradictory) things happening in many places at once, at varying rates and scales, and with myriad types and degrees of consequence. Orff has argued that a problem of the magnitude of climate change demands solutions on the same scale. The Office of Mayor Bill de Blasio, upon releasing the New York City Panel on Climate Change’s 2015 report—with its bleak predictions for increased heat waves, cold snaps, and rain, spikes in certain diseases, and coastal inundation from rising sea levels—noted that the findings “underscore the urgency of not only mitigating our contributions to climate change, but also adapting our city to its risks.” There has been a flurry of activity in the last several years toward developing innovative measures for such urban modification, with cultural and governmental institutions joining forces in certain cases to underwrite it.

Along with this swell of public-private investment in preparing cities for threats associated with climate change, the notion of “urban resilience” has taken hold with remarkable swiftness and potency, especially in the United States. Resilient: robust, able to spring back, irrepressible. It is indeed hard to argue with something that promises to hold catastrophe at bay, preserve human settlements and ways of life, grow the economy, and foster a seemingly more balanced relationship with the natural world all the while. As was the case with “sustainability,” one of its discursive-rhetorical precursors, part of the power of “resilience” lies in its projected sense of inevitability as the only appropriate mode with which to face the present and future. This apparent neutrality or even benevolence, from another perspective, however, might be read as eclipsing and/or de-politicizing equally urgent (if less spectacular) matters at hand. Activists and scholars working toward “climate justice,” for instance, maintain that attention to climate change must be coupled with attention to issues like the stark unevenness between those cities that bear the brunt of the climate crisis and those which are most responsible for its existence (and furthermore have the most resources with which to confront it). Others point out that, as with countless urban revitalization efforts carried out since the 1980s in the name of “sustainable development,” nature is harnessed by resilient urbanism in ways that are not only ecological in character, but also (if not foremost) meant to consoli- 

date power and generate revenue. A handful of critical geographers and political ecologists have offered especially incisive commentary on “resilience” as an extension of neoliberal governance, asserting that “the anxious race to reconnect New York City’s natural surroundings, technical systems and human communities into a resilient system appears not only as a new mode of government or regime of accumulation, but as a desperate attempt to keep the present system on life-support.”

Distinct from plain old “sustainability,” “resilience” has folded within it the idea of a disaster that is imminent, even underway—the future as present. In her 2007 book on the “rise of disaster capitalism,” Naomi Klein demonstrates the extent to which global capitalism and its free market ideologies and policies have facilitated the exploitation (if not, in some cases, the blatant engineering) of new investment opportunities opened in the wake of various catastrophes. With resilient urbanism, in a slight twist, imagined future crises likewise become fuel for commercial development. In this light, qualities such as flexibility, adaptability, and softness take on another, darker guise—more suggestive of the capacity to seep into any available space and to fill it.

If McPhee’s mid-twentieth-century urban planners and civil engineers were up against risks of a primarily geological variety, today, cities are increasingly structured by the paradigm of risk itself, with perceived threats—whether potential storm surges, terrorists, or lawsuits—being the proclaimed basis for the massive reordering of urban built environments. The increasingly prevalent rhetoric of resilience in many cases facilitates a one-size-fits-all approach to urban design that sweeps aside crucial questions of difference—by whom, for whom, at cost to whom—plowing through and leveling all in its path. How might we carefully evaluate such trends, without being fully swept up in charges that are so fast as to make the head spin or in images so arresting as that of Manhattan underwater?

One role of critical art and design practices, I would argue, is precisely to help carve out time and space, while sharpening our tools, for scrutinizing transformations of contemporary urban space and their intended and unintended, visible and invisible, repercussions. What is at stake in a project like resilient urbanism, for instance, and for whom? How does it relate to earlier modernist-technological paradigms as well as to current and emergent ones? Which publics are most impacted by climate change, within a particular city and across global expanses? When might retreat make more sense than adaptation? The kinds of projects examined in this essay push us to turn over and inside out the city and its infrastructures, including the specific powers and ideas that shape them. The most compelling among them, to return to Ukeles’s vision, moreover contribute directly to the cultivation of a lively public sphere, in which there is ample debate and even dissensus, perhaps especially about “the commons.”
22. Ibid, 52.