Keller Easterling

Extrastate craft : The Power of infrastructure space

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The Power of Infrastructure Space

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Introduction

Microwaves bounce between billions of cell phones. Computers synchronize. Shipping containers stack, lock, and calibrate the global transportation and production of goods. Credit cards, all sized 0.76mm, slip through the slots in cash machines anywhere in the world. All of these ubiquitous and seemingly innocuous features of our world are evidence of global infrastructure.

The word "infrastructure" typically conjures associations with physical networks for transportation, communication, or utilities. Infrastructure is considered to be a hidden substrate—the binding medium or current between objects of positive consequence, shape, and law. Yet today, more than grids of pipes and wires, infrastructure includes pools of microwaves beaming from satellites and populations of atomized electronic devices that we hold in our hands. The shared standards and ideas that control everything from technical objects to management styles also constitute an infrastructure. Far from hidden, infrastructure is now the overt point of contact and access between us all—the rules governing the space of everyday life.

Picture the places where we live: the parking places, skyscrapers, turning radii, garages, street lights, driveways, airport lounges, highway exits, big boxes, strip malls, shopping malls, small boxes, free zones, casinos, retail outlets, fast food restaurants, hotels, cash machines, tract housing, container ports, industrial parks, call centers, golf courses, suburbs, office buildings, business parks, resorts. In the retinal afterglow is a soupy matrix of details and repeatable formulas that generate most of the space in the world—what we might call *infrastructure space*.

Buildings are often no longer singularly crafted enclosures, uniquely imagined by an architect, but reproducible products set within similar urban arrangements. As repeatable phenomena engineered around logistics and the bottom line they constitute an infrastructural technology with elaborate routines and schedules for organizing consumption. Ironically, the more rationalized these *spatial products* become the better suited they are to irrational fictions of branding, complete with costumes and a patois of managementese.[1] This familiar confetti of brightly colored boxes nestling in black asphalt and bright green grass—the same in Texas or Taiwan—weaves elaborate, emotional stories about Starbucks coffee, Beard Papa cream puffs, and Arnold Palmer golf communities.

Now not only buildings and business parks but also entire world cities are constructed according to a formula—an infrastructural technology. We no longer build cities by accumulating singular masterpiece buildings. Instead the most prevalent formula replicates Shenzhen or Dubai anywhere in the world with a drumbeat of generic skyscrapers. Computer-generated videos that fly through shining skylines have become a standard signal of aspirations to enter the global marketplace. Here, manifest in these stock specifications, infrastructure is then not the urban substructure, but the urban structure itself—the very parameters of global urbanism.

Operating System

In *Notre-Dame de Paris*, Victor Hugo famously observed that "architecture [like that of the cathedral] was developed in proportion with human thought; it became a giant with a thousand heads and a thousand arms, and fixed all this floating symbolism in an eternal, visible, palpable form." The novel proposed that Gutenberg's new technology threatened the giant; the printed word usurped architecture

as the vessel of cultural imagination and stole its supernatural power. Hugo prophesied, "This will kill that. The book will kill the edifice."

While evidence of infrastructure space within the contemporary city might appear to confirm the death of architecture, perhaps it really only demonstrates that the giant is alive again. Architecture makes unique objects—like stones in the water—while a constant flow of repeatable spatial formulas constructs a sea of urban spaces. Architects and urbanists typically characterize this state of affairs as disempowering, but if architecture was indeed killed by the book, perhaps it is reincarnate as something more powerful—as information itself. Infrastructure space has become a medium of information. The information resides in invisible, powerful activities that determine how objects and content are organized and circulated. Infrastructure space, with the power and currency of software, is an operating system for shaping the city.

That operating system is something like the "medium" in Marshall McLuhan's famous dictum "the medium is the message." McLuhan highlighted the difference between the declared content of media—music on the radio or videos on the internet—and the means by which the content was delivered. The content, he argued, is like the "juicy piece of meat carried by the burglar to distract the watchdog of the mind."[2] In other words, what the medium is saying sometimes prevents us from seeing what the medium is doing. In the urban context, we can identify the singularly crafted building—the stone in the water—as the declared content. Yet, the activity of the medium or infrastructural matrix—what it is doing rather than what it is saying—is sometimes difficult to detect.

We might not think of space as an information technology unless it is embedded with sensors and digital media, and there is digital software to generate and analyze urban arrangements. Yet infrastructure space, even without media enhancement, behaves like spatial software. And while we also do not typically think of static objects and volumes in urban space as having agency, infrastructure space is *doing something*. Like an operating system, the medium of infrastructure space makes certain things possible and other things impossible. It is not the declared content but rather the content manager dictating the rules of the game in the urban milieu.

Infrastructure space is a form, but not like a building is a form; it is an updating platform unfolding in time to handle new circumstances, encoding the relationships between buildings, or dictating logistics. There are object forms like buildings and active forms like bits of code in the software that organizes building. Information resides in the, often undeclared, activities of this software—the protocols, routines, schedules, and choices it manifests in space. McLuhan's meme, transposed to infrastructure space, might be: the action is the form.

Keller Easterling

Dubai, 2005

Extrastatecraft

Contemporary infrastructure space is the secret weapon of the most powerful people in the world precisely because it orchestrates activities that can remain unstated but are nevertheless consequential. Some of the most radical changes to the globalizing world are being written, not in the language of law and diplomacy, but in these spatial, infrastructural technologies—often because market promotions or prevailing political ideologies lubricate their movement through the world. These stories foreground content to disguise or distract from what the organization is actually *doing*.

Far removed from familiar legislative processes, dynamic systems of space, information, and power generate de facto forms of polity faster than even quasi-official forms of governance can legislate them. Large-scale spatial organizations like infrastructure projects (e.g., US rail in the nineteenth century, or global submarine cable networks) have long created the need for an administrative authority comparable to that of the state, and they continue to require direction from new constellations of international, intergovernmental, and nongovernmental players. As a site of multiple, overlapping, or nested forms of sovereignty, where domestic and transnational jurisdictions collide, infrastructure *space* becomes a medium of what might be called *extrastatecraft*—a portmanteau describing the often undisclosed activities outside of, in addition to, and sometimes even in partnership with statecraft.

For example, the world has dominant software for making urban space: the free zone—the formula that generates Shenzhens and Dubais all around the world. Some version of the zone is found in King Abdullah Economic City in Saudi Arabia, New Songdo City in South Korea, Cyberjaya in Malaysia, HITEC City in Hyderabad, and everywhere in between. Operating under authorities independent from the domestic laws of its host country, the zone typically provides premium utilities and a set of incentives—tax exemptions, foreign ownership of property, streamlined customs, cheap labor, and deregulation of labor or environmental laws—to entice business. The world has become

addicted to incentivized urbanism, and it is the site of headquartering and sheltering for most global power players. So contagious is this spatial technology that every country in the world wants its own free zone skyline.

Keller Easterling

Ordos, Inner Mongolia, 2008

While promoted as relaxed, open, and free from inefficient state bureaucracy, the politics written into the zone's spaces and activities often diverges from the declared intent. It is usually an isomorphic exurban enclave that, exempt from law, can easily banish the circumstances and protections common in richer forms of urbanity. Labor and environmental abuse can proceed unchecked by political process. Moreover, given its popularity, the zone has become a self-perpetuating agent in the growth of extrastate urban space—space beyond the reach of state jurisdictions. Yet, at the same time, it has also become an essential partner for the state as it attempts to navigate and profit from the very same shadow economies. In this form of extrastatecraft, far from overwhelming state power, the zone is a new partner that strengthens the state by serving as its proxy or camouflage.

In addition to the zone, the global networks of broadband computing and mobile telephony are another pervasive and consequential field of infrastructure space. Mobile telephony is the "world's largest distribution platform," and the broadband infrastructure that supports it is touted as a resource as important as water. Between 2000 and 2013, the global number of cell phone subscriptions went from 740 million to 6.8 billion phones with over three-quarters of the phones in the developing world.[3] East African countries like Kenya have only recently received international fiber-optic submarine cable. They are nevertheless using their large populations of mobile phone users to develop the world's newest business models. M-PESA, an app developed in Kenya that uses the mobile phone for exchanges of money, has become a global banking phenomenon. Advertisements for Safaricom and other telecoms in the region typically show Masai warriors, in full tribal garb, standing out in the savannah with a spear in one hand and a cell phone in the other, able to remotely

access the world with an airborne technology.

Still, there is a disconnect between the stories and promises associated with the technology and what the urban space is actually doing. Both urban space and telecommunications are technologies and mediums of information. Fiber-optic cable buried in the ground gives land a new value much like a highway or railroad. Mobile telephony, while atomized and airborne, must nevertheless tap into that physical broadband network, and at these or any other switching points, a bottleneck or monopoly can develop. The position of the fiber in urban and rural areas or the character of new enclaves and roads are all spatial factors with the power to either amplify or diminish the access to information.

As Kenya has become an investment field for global telecoms, the state must also convene a ballooning number of other nonstate actors—intergovernmental institutions, consultancies, and nongovernmental institutions. All are hovering, advising, funding, researching, investing, and potentially controlling the urban space—offering expertise as well as outmoded forms that may foreclose on the real innovations to broadband urbanism. While Kenya is uniquely poised to make those innovations, its version of extrastatecraft must make spatial and digital software work together to enrich rather than obstruct information both realms.

Yet another field of infrastructure space, at once more immaterial and more ubiquitous, is able to contact any kind of infrastructure space anywhere in the world. If law is the currency of governments, standards are the currency of international organizations and multinational enterprises. ISO (International Organization for Standardization) is an extrastate parliament of this global standard-making activity. A private nongovernmental organization, convening both private companies and national representatives, ISO oversees global technical standards for everything from credit card thickness to dashboard pictograms, computer protocols, and the pitch of screw threads. Enhancing the influence of a raft of global organizations (e.g., The ITU [International Telecommunications Union], the IEC [International Electrotechnical Commission], the ICAO [International Civil Aviation Authority], NATO, the World Bank, the IMF, and the WTO), standards create a "soft law" of global exchanges.[4]

ISO's seemingly innocuous technical specifications dictate the world's critical dimensions, yet their most popular standard, ISO 9000, is a management standard that promotes the ritualized incantations of something called "quality." Quality standards do not dictate specifications for a product but rather offer management guidelines for a *process* or quality system that may address everything from the environment to governance itself. ISO 9000 has been adopted as an essential credential in most countries of the world. ISO compliance is even a condition for the trading partners of EU countries. The whole world now speaks a dialect of ISO Esperanto, one that often resembles the hilarious, upbeat argot of self-help gurus.

While lacking any specific content or binding requirement, ISO is a perfect conduit of undeclared activities and intentions with potentially dangerous consequences. Companies may be certified as responsible players with regard to labor or the environment without having to abide by any global compact regarding, for instance, worker safety or dangerous emissions. Of all the things ISO addresses, remarkably the organization offers almost no standards that directly address the conflicted global frontiers of infrastructure space—where formulaic urban space confronts sensitive landscapes, failed economies, and complex political situations. Yet both the failure of ISO to create more consequential standards as well as its success in shaping global habits inspires a rehearsal of *spatial* protocols that join the bargains and offsets of contemporary global governance.

While space may be enormously consequential in these infrastructure developments, private enterprise and other forces of extrastatecraft often speak in other technical languages. The financial industry quants format the housing landscapes, the carbon market regulates rain forest landscapes, informatic specialists shape the mobile telephony technoscape, McKinsey consultants offer econometrics, and ISO intones management jargon. Political and economic data come cloaked in the rationality of science even though they may really present false logics or systems of belief. Despite its relative physical durability—infrastructure space is often only regarded as a byproduct of more volatile markets and political games. Who is treating space itself as information? Who is writing the software or the protocols in which spatial variables take the lead?

The interaction of people and technology in the development of social/technical networks like infrastructure already calls on several areas of theory and scholarship, among these: social sciences, arts, business history, science and technology studies, history of science, organization studies, informatics, media and communication studies, architecture, and urbanism. Some of the most innovative thinkers in these disciplines now insist on stretching disciplinary habits to question the authority of their science or the purity of their master narratives. Rather than reinforcing the presumptions of theory, they want to discover what is actually happening on the ground. Not only the sciences, but also the *arts* of architecture and urbanism contribute to the conversation at this juncture. In the search for a more complex context, infrastructure space may be a fresh and potent field of evidence.

This book visits three different strata of infrastructure space: the free zone phenomenon, broadband mobile telephony in Kenya, and ISO's global management standards. Each is a crossroads of transportation, communication, management, trade, and development networks. Each addresses a pressing contemporary issue in infrastructure space while also harking back to the late nineteenth century when the growth of international infrastructure, organizations, and corporations began to accelerate and global travel and communication times began to shrink (the Suez Canal and the US transcontinental railroad were both completed in 1869). Each visits infrastructure space in developing countries to find new intelligence on the flip side of this early infrastructure history. And each is a potential test bed for spatial software.

Exposing evidence of the infrastructural operating system is as important as acquiring some special skills to hack into it. Interspersed between evidentiary chapters are more contemplative chapters. Ranging more freely over other examples of infrastructure like rail, internet, and mass-produced suburbs, these chapters dwell on an expanded repertoire of form-making, history-telling, and activism. Together they consider the art of designing interplay between spatial variables—an interplay powerful enough to leverage the politics of extrastatecraft.

Mark Twain, once a steamboat captain on the Mississippi, developed techniques for navigating the river. While the passengers saw "pretty pictures" of landscape scenes, he was extracting information from the changing "face of the water." A little ripple, eddy, or "faint dimple" signaled turbulence or obstacles in a complex and potentially dangerous organization below the surface. These were markers of unfolding potentials or inherent agency in the river—what can only be called its *disposition*. Disposition is the character or propensity of an organization that results from all its activity. It is the medium, not the message. It is not the pattern printed on the fabric but the way the fabric floats. It is not the shape of the game piece but the way the game piece plays. It is not the text but the constantly updating software that manages the text. Not the object form, but the active form.

For each technology in infrastructure space, to distinguish between what the organization is saying and what it is doing—the pretty landscape versus the fluid dynamics of the river—is to read the difference between a declared intent and an underlying disposition. The activities of a technology may be difficult to see even though, given the ubiquity of infrastructure space, they are hidden in plain sight. Examining each one, each active form—like each dimple or ripple on the water or each bit of code in the software—makes it more palpable. Detecting and developing the active forms that shape disposition is an essential skill of the urbanist in infrastructure space, and it is the topic of a chapter following the discussion of free zones.

Examining the power of the stories, persuasions, or ideologies that accompany a technology also helps in detecting disposition. For instance, infrastructure has often been groomed as either an instrument of militarism, liberalism, or universal rationalization. Yet we might question the dominance of these stories in organizing history. The pyrotechnics of war may distract from other more insidious forms of violence; theories of economic liberalism may ironically generate profound constraints on freedom; and dreams of universal rationality may sponsor their own special forms of irrationality. Well-rehearsed theories, like those related to Capital or neoliberalism continue to send us to the same places to search for dangers while other concentrations of authoritarian power escape scrutiny. Moreover, the less dramatic or upstaged histories—regarding the growth of international organizations, the division of the radio spectrum, or the creation of satellite, fiber-optic, and mobile telephony networks—have often been treated as bureaucratic or technical footnotes, despite the long-term impact these developments have had on our lives. Shaping and managing the story is then also an essential skill in infrastructure space. A chapter about these persistent ideological stories follows the examination of broadband.[5]

Following the discussion of ISO, the final chapter considers an enhanced repertoire for political activism tuned to more effectively address the powers of infrastructure space. The most familiar forms of political activism demand declaration. Yet, while there are moments in which to stand up and give it a name, dissent is often fooled by the sneaky way the world works, as the real power players maintain a currency in undeclared activities. Infrastructure space constitutes a wilder mongrel than any familiar Leviathan for which we have a well-rehearsed political response. The things that make infrastructure space powerful—its multipliers (e.g., zones, cell phones, spatial products), its irrational fictions, or its undeclared but consequential activities—are perhaps the very things that make it immune to righteous declaration and prescription. The rational, resolute, and righteous, while cornerstones of dissent, are sometimes less consequential than the discrepant, fictional, or sly. Infrastructure space tutors a shrewder, cagier counter to the lubricated agility of most global powers—an alternative extrastatecraft.

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1 For a discussion of spatial products, see Keller Easterling, *Enduring Innocence: Global Architecture and Its Political Masquerades* (Cambridge, MA: MIT Press, 2005).

2 Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: McGraw-Hill and London: Routledge & Kegan Paul, 1964, 2001), 19: "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 "A 2010 Leadership Imperative: The Future Built on Broadband" (ITU, The Broadband Commission for Digital Development, 2010); Mohsen Khalil, Philippe Dongier, and Christine Zhen Wei Qiang, "Overview," in *Information and Communications for Development: Extending Reach and Increasing Impact*, ed. World Bank Development Data Group and World Bank Global Information & Communication Technologies Dept. (Washington, DC: World Bank, 2009); ITU, "World Telecommunications/ICT

Indicators Database, 17th Edition," June 17, 2013, at itu.int.

4 Nils Brunsson and Bengt Jacobsson, "The Pros and Cons of Standardization—An Epilogue," in Brusson and Jacobsson eds., *A World of Standards* (London: Oxford University Press, 2000), 171; Peter Mendel, "The Making and Expansion of International Management Standards: The Global Diffusion of ISO 9000 Quality Management Certificates," in J. W. Meyer, G. S. Drori, and H. Hwang, *Globalization and Organization: World Society and Organizational Change* (Oxford: Oxford University Press, 2006), 137–66.

5 This discussion of the stories that attach to infrastructure space gestures to a few terms (e.g., script and narrative) already in play in a highly developed discourse about the reciprocity between social and technical networks—one that will be more fully engaged in the course of the book. For just two of many titles that contribute to this discourse, see Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (Oxford: Oxford University Press, 2005) and David E. Nye, *Electrifying America: Social Meanings of a New Technology* (Cambridge, MA: MIT Press, 1990).

CHAPTER 1

Zone

Promotional videos for the free zone invariably follow the same template. A zoom from outer space locates a spot on the globe. Graphics indicating flight times to major cities argue that this spot, wherever it is, is the center of all global activity. While the soundtrack for low-budget versions of these videos may be a tinny, canned fanfare, many have high production values. Stirring music, appropriate for an adventure film or a western, is ethnically inflected to suit the culture at hand. A deep movie-trailer voice describes the requisite infrastructure. As the zoom continues, clouds part to reveal multiple digital sun flares and a sparkling new skyscraper metropolis.

The zone has not always been the world's global urban addiction. Once relegated to the backstage, it has, in the space of a few years, evolved from a fenced-off enclave for warehousing and manufacturing to a world-city template. Yet the wild mutations of the form over the last thirty years only make it seem penetrable to further manipulation.

Free ports have handled global trade for centuries, but the mid-twentieth-century development of the Export Processing Zone, or EPZ, as a more formalized economic and administrative instrument, marks the beginning of the modern zone. With persuasive arguments about nation-building and free trade, the United Nations and the World Bank promoted the EPZ as a tool that developing countries should use to enter the global marketplace and attract foreign investment with incentives like tax holidays and cheap labor. Although intended as a temporary experiment and judged to be a suboptimal economic instrument, the zone spread widely during the 1970s even as it also spread new waves of labor exploitation. There were, however, unexpected consequences: rather than dissolving into the domestic economy, as was originally intended, the EPZ absorbed more and more of that economy into the enclave.

The next generations of the form, incubated in China or the Middle East, essentially became entire cities or city-states, rendering urbanism as a service industry. In the late-1970s, China's experiment with the zone as a free market tool was so successful that it generated its own global trading networks, which in turn accelerated zone growth worldwide. For Dubai, the zone was a fresh form of entrepôt not unlike those that had figured in its longer history. As zones multiplied they also upgraded, breeding with other increasingly prevalent urban forms like the campus or office park. Merging industrial and knowledge economies, the zone has begun to incorporate a full complement of residential, resort, educational, commercial, and administrative programs—a warm pool to spatial products that easily migrate around the world, thriving on incentivized urbanism.

Having swallowed the city whole, the zone is now the germ of a city-building epidemic that reproduces glittering mimics of Dubai, Singapore, and Hong Kong. While in the 1960s there were a handful of zones in the world, today there are thousands—some measured in hectares, some in square kilometers. No longer in the shadow of the global city as financial center (New York, London, Tokyo, São Paulo), the zone as corporate enclave is the most popular model for the contemporary global city, offering a "clean slate" and a "one-stop" entry into the economy of a foreign country. Now major cities and even national capitals, supposedly the centers of law, have created their own zone doppelgängers, like Navi Mumbai; Astana, the newly minted capital of Kazakhstan; or New Songdo City, a Seoul double that developer Stanley Gale considers to be a repeatable "city in a box." Economic analysts chase after scores of zone variants, even as they mutate on the ground, oscillating

between visibility and invisibility, identity and anonymity.

As the zone mutates, it also resembles history's various intentional communities with their mixtures of withdrawal and aspiration—mixing ecstatic expressions of urbanity with a complex and sometimes violent form of lawlessness. Maintaining autonomous control over a closed loop of compatible circumstances, the isomorphic zone rejects most of the circumstance and contradiction that are the hallmark of more familiar forms of urbanity. In its sweatshops and dormitories it often remains a clandestine site of labor abuse.

For all of its efforts to be apolitical, the zone is often a powerful political pawn. While extolled as an instrument of economic liberalism, it trades state bureaucracy for even more complex layers of extrastate governance, market manipulation, and regulation. For all its intentions to be a tool of economic rationalization, it is often a perfect crucible of irrationality and fantasy. And while as spatial software, the zone is relatively dumb—the urban equivalent of MS-DOS—it has quickly spread around the world. Yet, for all these reasons, the zone is ripe for manipulation, and its popularity makes it a potential multiplier or carrier of alternative technologies, urbanities, and politics.

The Zone Is Ancient and New

The zone is heir to the mystique of ancient free ports, pirate enclaves, and other entrepôts of maritime trade. The Roman port of Delos in Greece is frequently cited as the primordial moment of the free port.[1] The Mediterranean fostered free ports for trade along Italian, Phoenician, Armenian, and Muslim trade routes. From the thirteenth to the seventeenth century in the Baltic and the North Sea, the Hanseatic League established a network of "free cities." Fiercely independent, the Hansa traders created a quasi-monastic society, living and dining together in their trading halls and factories where, in foreign cities, they were also sometimes confined. Hansa cities like Hamburg and Bremen traded with London, Lübeck, Rostock, Gdańsk, Königsberg, Brügge, Köln, and Novgorod.[2] In the Mediterranean, Marseille, Genoa, and Livorno were early free ports. By the seventeenth century, the European free cities or free ports included Naples, Venice, Trieste, Porto, Dunkirk, and Copenhagen. Hamburg would remain a prominent free port for centuries, able to evade the jurisdictional power of monarchies and national regulation.[3]

In the late eighteenth and early nineteenth centuries, as trade began to include the Americas in a truly global network, Spain, Portugal, Holland, and Great Britain established free ports in South America and the Caribbean. British and French free ports in Hong Kong (1841), Singapore (1819), Djibouti (1859), and Aden (1853) followed.[4] While the usefulness of the Caribbean ports declined, the Asian ports, notably Hong Kong, endured, and both Hong Kong and Hamburg continued to be global models into the twentieth century. When Hamburg joined the German Empire in 1871, the city refused to become a member of the German Customs Union, for fear of losing its various trading freedoms, and only joined in 1888, when it was allowed to fence off an area that remained outside of the union's control. Within this area, the city was granted increased freedom for sorting, manipulating, and manufacturing warehoused goods before re-export.[5]

In 1934, after sending delegations to Copenhagen and Hamburg, the United States passed the Foreign Trade Zone Act. Based in part on the Hamburg model, Foreign Trade Zones (FTZs) allowed for the sorting and manipulation of goods.[6] The first FTZs in the United States were in New York, New Orleans, San Francisco, and Seattle. In 1950, FTZ law was amended to allow for

manufacturing. Yet until the 1970s only three more zones—in Toledo, Ohio; Honolulu, Hawaii; and Mayagüez, Puerto Rico—were created.[7]

A number of installations, specially tailored to enable manufacturing, appeared around the world after World War II and served as forerunners of the Export Processing Zone—the formula that arguably spawned a global proliferation of zones. Although diminished after World War II and the Korean War, Hong Kong rebounded as a member of this new species of free port in part because of its own high volume of exported goods.[8] When Shannon Airport in Ireland was no longer needed for refueling, it began a deliberate campaign to attract both manufacturing and service industries with laws that established a Customs Free Airport (1947) and the Shannon Duty Free Airport Development Company (1959).[9]

In 1947, Puerto Rico, already a duty-free supplier for the United States during wartime, ventured to build manufacturing and warehousing facilities tailored to US businesses. A ten-year tax holiday and prebuilt modular buildings attracted almost 500 US firms by 1963. One promoter of the program characterized it as the "first significant effort to alleviate human suffering in the Caribbean." The development organization staff were trained to deliver clients to their new building, turn on the lights, step aside, and say "This is your factory, señor."[10]

The Colón Free Trade Zone in the Republic of Panama, established in 1948, was also designed to take advantage of existing relationships with the United States that had been forged during World War II. Plans for an international free zone had been discussed since 1917, three years after the opening of the Panama Canal, and investors from New York were interested in financing the project. By 1946, Panama had hired the executive secretary of the US Foreign-Trade Zones Board, Thomas E. Lyons, to study the feasibility of the project.[11]

In 1964, Mexico inaugurated the Border Industrial Program (BIP) just as the US-Mexican Bracero (or guest-worker) program was expiring.[12] The BIP allowed foreign companies to operate maquiladoras (or factories) within a twenty-mile strip along the border between Mexico and the United States, and by 1972 these factories could be established anywhere in the country. Taking advantage of cheap, mostly female labor, these zones were essentially inexpensive twins of factories in the home country.

These early outposts prompted experiments in other countries. Hong Kong and Shannon were models for Taiwan's Kaohsiung Export Processing Zone in 1965. All of these served as templates for zones in Africa, South America, the Middle East, and other parts of Asia.[13] South Korea established six free-trade zones, three in Seoul and three in Incheon in 1965.[14] India established Kandla in the same year.[15] Brazil established Manaus in 1967.[16] Prefiguring their later use as a market experiment in China, in 1963 the socialist country of Yugoslavia legislated trade zones along the Danube.[17]

Although descended from historic free ports, since the 1970s the zone had become a more thoroughly abstracted and formulaic instrument now distinct from the maritime spaces that had previously shaped trade. As container shipping became the global standard, wherever a plane could land or a truck could travel, new diasporic centers of global trade could develop—even in inland areas, borderlands, and backwaters that would never have sponsored the cosmopolitanism typically associated with global trade. Yet, as it opened its door to manufacturing and to new populations of workers, the zone also began to develop its own peculiar form of urbanity.

Keller Easterling

Maquiladoras, Tijuana, 2009

The Zone Is Extrastatecraft

Perhaps the most important factor contributing to the exponential growth of zones in the 1970s was an endorsement from the United Nations Industrial Development Organization (UNIDO). Established in 1966, UNIDO began to study and disseminate data and economic statistics about the zone as a prescription for developing countries. It established a Free Zone Unit to work with the Shannon Free Airport Development Company, Kaohsiung, and the World Bank to instruct potential zone developers. Shannon and Kaohsiung held seminars on EPZ formation around the world. By 1971, UNIDO claimed that "more than 30 developing countries" were seeking the "technical assistance services of UNIDO" in creating zones.[18] The zone was becoming a global contagion—a widely copied legal and economic template.

UNIDO characterized the zone as a temporary phenomenon that could jump-start economies. When no longer useful in one country, it would be taken up by another on the threshold of the global market. UNIDO even hoped to create an international "federation of free trade zones" that would convene representatives of governments around the world.[19]

Zone growth accelerated throughout the 1970s. In the United States alone, there was a dramatic increase from fewer than ten in 1970 to 118 by 1986.[20] Counting the number of free zones globally is, however, fraught with difficulty, since the form has been mutating as it migrates around the world. The Organization for Economic Cooperation and Development (OECD) and others often repeat the International Labor Organization (ILO) figures with tallies that reflect the recent exponential growth. In 1975, there were twenty-five countries and a global total of seventy-nine EPZs employing 800,000. By 1986, those numbers had nearly doubled. In 1997, 93 countries hosted 845 zones employing 22.5 million. In 2002, 116 countries hosted 3,000 zones employing 43 million. In 2006, 130 countries hosted 3,500 zones employing 66 million.[21]

As a legal and economic instrument, the zone presides over a cocktail of enticements and legal exemptions that are sometimes mixed together with domestic civil laws, sometimes manipulated by

business to create international law, and sometimes adopted by the nation in its entirety. Incentives vary in every location but might include: holidays from income or sales taxes, dedicated utilities like electricity or broadband, deregulation of labor laws, prohibition of labor unions and strikes, deregulation of environmental laws, streamlined customs and access to cheap imported or domestic labor, cheap land and foreign ownership of property, exemption from import/export duties, foreign language services, or relaxed licensing requirements.[22]

The host state also creates a legal entity, the zone authority, that has the power to negotiate with businesses and foreign governments. As an early free zone analyst wrote: "The exemptions granted to FTZ operators by these entities are exhaustive enough to strip the most stringent code of civil law of substance; in fact in most countries the FTZ investors cannot be sued in ordinary domestic courts by individuals." The FTZ thus often supplants "domestic ministries, courts, revenue offices, central banks, planning authorities, etc."[23]

A country may have strict laws regulating labor, the environment, sanitation, health and safety, or human rights, and it may be a signatory to global compacts. Yet the zone authority frequently has the power, in individual deals, to grant exception from any law. In other zones, the local government may help to manage the zone in exchange for a majority share, and, in theory, a state ministry for labor, environment, or economic affairs can work with the zone authority in implementing selective regulation. In communist countries and Middle Eastern kingdoms the state may retain even more control.[24]

While UNIDO initially promoted the EPZ, a 1980 report expressed caution about treating the format as anything other than a temporary catalyst. UNIDO evaluated a number of factors, from gender roles to the benefits of introducing new technologies into developing countries. They first determined that the form was attractive for both host and foreign countries because it strengthened collaboration between them and frequently created conditions better than those outside the zone. Yet the report also highlighted the dangers posed by the zone as it redirected national resources that might have been used to improve infrastructure, business platforms, and other potential relationships with foreign interests within the regular territory of the state. They argued that "the disadvantages of the EPZ would appear to lie in the continuation of their enclavistic nature. The choice facing host governments is whether to retain the enclave or to remove it. Perpetuation of the enclave will retain the problems, the social and economic costs, without the obvious off-set of further benefits." UNIDO recognized that the zone would be a losing proposition if it remained distinct from the rest of the host economy, yet it realized that the form would likely persist.[25]

OECD and World Bank publications similarly acknowledged that, rather than an EPZ, simple investment in a domestic economy was the best way to encourage trade and prosperity. Considering the associated infrastructure investments and lost tax revenue, the zone approach as opposed to the "enterprise approach" did not always yield significant value or "spill over" effects in the host country. The OECD characterized EPZs as "a suboptimal policy from an economic point of view."[26]

China's more powerful version of the zone would, however, soon turbocharge zone growth and turn it into a self-fulfilling prophecy.[27] In China, the zone often represented the first growth of a communist-style free market. As part of Deng Xiaoping's "Open Door" economic policies, the first five Special Economic Zones (SEZs) of the 1980s—Shenzhen, Xiamen, Shangtou, Zhuhai, and the entire province of Hainan—were planned as experiments with market economies. By 1984, China had created sixteen more zones. Since then, the country has established a multitude of special zones of various types, most of which diverge from the typical EPZ formula. An SEZ like Shenzhen is an entire

city, including both business and residential programs. As the ILO tracked the zone in 2006, of the 66 million workers in the world's EPZs, only 26 million were employed outside of China. The country had generated it own category of zone phenomena.[28]

The Zone Is Breeding

As interest in the early EPZ form waned in 1980s and '90s, the zone began to breed more promiscuously with other enclave formats, or "parks," merging with container ports, offshore financial areas, tourist compounds, knowledge villages, IT campuses, and even museums and universities. It did not dissolve into the general business and industrial climate of its host country, but rather became a persistent yet mutable instrument, transforming as it absorbed more and more of the general economy within its boundaries. Reconsidering the role that their domestic labor was forced to play in the typical EPZ, many countries began to "upgrade" their zones, offering, instead of manufactured goods, services related to IT or finance.

Adapting to the growing knowledge economy, many of the early upgraded zones took the form of Science Industrial Parks (SIPs), based on the research park or campus.[29] Palo Alto's Stanford Research Park, established in 1951, was the model for scores of such parks in the United Saates, including Research Triangle Park in North Carolina (established in 1959 and becoming an FTZ in 1983), Cummings Research Park in Alabama (1962), and the Austin Technology Incubator in Texas (1989).[30] The USSR built one of the first science cities in Siberia in 1957—Akademgorodok (the Academic City), near Novosibirsk—but more recent science cities have been based on the Asian SIPs.[31] Japan developed Kyushu Silicon Island in 1965 and Tsukuba Science City in 1968, along with fourteen other SIPs before the 1990s. Taiwan and South Korea, upgrading from processing industries dependent on cheap labor, were also early adopters of SIPs.[32] A number of high-tech parks for IT, electronics, and pharmaceuticals appeared in China in the 1990s.

In 1991, the Indian government established Software Technology Parks of India (STPI) to broker broadband from the country's satellite fleet. As they attracted IT companies, Bangalore and Hyderabad quickly developed cybercity programs and helped to make the call center into a globally popular spatial product. In Hyderabad's HITEC City, buildings resembling futuristic spacecraft rose up in an otherwise dusty landscape.[33] In 2007, India added Special Economic Zone incentives to the mix of infrastructural offerings. Building on a long-standing cultural link to Mauritius, STPI was even engaged to advise the island country on Ebene Cybercity, which began construction in 2001. Bolstered by broadband from international submarine cable and offering EPZ status throughout the entire country, Mauritius has deployed new zone formulas to become one of the most prosperous countries in the African continent.[34]

In 1996, Malaysia's Multimedia Super Corridor (MSC) used the special economic zone as part of a national information technology initiative with urban ambitions on a different scale. Based on a study by McKinsey, the initiative would allow the country to leapfrog into the twenty-first century armed with IT skills, facilities, and educational institutions. The MSC established a 750-square-kilometer zone of incentivized urbanism between the Petronas Towers and the Kuala Lumpur International Airport, offering, for instance, premium infrastructure, tax exemption for ten years, and duty-free import of multimedia equipment. The plan was to develop cybercities and cybercentres around the urban hub of Cyberjaya.[35]

Enjoying quasi-diplomatic immunities, global corporations provided nations with support or expertise as well as credentials when seeking funding from the IMF or World Bank. Construction companies and infrastructure specialists like Bouygues, Bin-laden Group, Mitsubishi, Kawasaki, and Siemens delivered technologies for high-speed rail, automated transit, airport, and skyscraper engineering. Conglomerates such as PSA (Port of Singapore Authority), P&O, Hutchison Port Holdings, and ECT (European Container Terminals) served as post-colonial counterparts of the old British or Dutch East India Company franchises. To container ports around the world, they delivered automated transshipment and warehousing technologies, "justin-time" management techniques, and other materials-handling expertise for sorting and tracking all of the contents of all of the containers moving between zones on increasingly larger and larger ships.[36]

In 1995, the sociologist and political scientist Xiangming Chen sketched an evolution of zones in three stages. The first, from the mid-1500s to the 1930s, he associated with the free port and early free trade zones. The second, from the late-1950s into the '70s, was characterized by the inclusion of manufacturing EPZs such as maquiladoras. The third stage, beginning in the 1980s, saw the rise of the Special Economic Zones (SEZs), Economic and Technological Development Zones (ETDs), and Science Industrial Parks (SIPs). Chen also drew attention to the development of cross-border conurbations of zone formations on, for instance, the Tumen River between Russia and Korea, as well as cross-national growth zones in the South China Sea. These zones were beginning to aggregate opportunistically to circulate products between jurisdictions, trading exemptions and filling quotas within the complex engineering of supply chains.[37]

Following the perfectly paradoxical scripts of liberalism or neoliberalism, private-enterprise boosters have argued that the zone's evolution has repaired its reputation and that labor unions may be responsible for any further failures. Labor unions presumably manipulate the market, thus spoiling the purity of an instrument for manipulating the market. The World Export Processing Zone Association (WEPZA) recently claimed that, "While the old free zone was often described as a static, laborintensive, incentive driven, exploitive enclave, the new zone paradigm is a dynamic, investment-intensive, management-driven, enabling, and integrated economic development tool."[38] In 1985, the tax and foreign trade experts Walter H. Diamond and Dorothy B. Diamond launched a quarterly newsletter for investors that tracked and mapped tax-free trade zones across the world, considering them to be "utilities" that exist "to serve the public."[39]

In his 1995 book *The End of the Nation State: The Rise of Regional Economies*, a former McKinseyite, Kenichi Ohmae, sketched a new neoliberal region state that bore a strong resemblance to zone urbanism—a conurbation of 5–20 million people with an international airport and a harbor capable of handling international freight, all servicing a lean, Japanese-style multinational corporation. He claimed that region states would be blessed with a new economic freedom from state governance, and with boundaries that could only be "drawn by the deft but invisible hand of the global market."[40]

The increasing complexity of the zone has further confused those economists attempting to classify it, even as it has continued to spread in waves across the world. In addition to "EPZ," the most popular designation, a 1998 World Bank report tracked nineteen different terms for the zone.[41] By the first decade of the twenty-first century there were sixty-six terms in circulation.[42] None of the modes of classification coincide.[43] As the OECD notes, "The diversity of EPZs is matched only by the diversity of terminology used by analysts."[44]

The urban world that the sociologist Manuel Castells described in *The Informational City:*

Information Technology, Economic Restructuring, and the Urban Regional Process (1989), and the world that he and Peter Hall described in *Technopoles of the World: The Making of Twenty-First-Century Industrial Complexes* (1994), was, in part, the world of zone urbanism—what Castells called a space of information "flows." The zone was not an accumulation of buildings, but urban space as the product of more formulaic drivers. Digital capital created the landscapes of logistics and IT within which, as Kevin Kelly has written, cars were "chips with wheels" and airplanes were "chips with wings."[45]

Dubai Internet City, 2012

The Zone is a City

The zone, in its next incarnations, began to call itself a "city"—an enthusiastic expression of advancement since its origins in warehousing and shipping. Some nations used EPZs as a means of announcing their entry into a global market and their availability as contractors of outsourcing and offshoring. Countless zones were called "cyber cities," "technocities," or "logistics cities," where "city" might describe a small office park anchored by one or two buildings. Nevertheless, Malaysia's Multimedia Super Corridor as well as China's SEZs were beginning to deliver an entire skyline of buildings. While banishing many of the circumstantial frictions of urbanity, the zone transformed itself into a model for the metropolis that welcomes every conceivable residential, business, or cultural program.

Just across the water from Hong Kong, one of the oldest and most powerful of free ports, Shenzhen, once an experimental enclave sited in a former fishing village, has ballooned into a megacity sprouting stalk after stalk of generic concrete skyscrapers. With a transient population of around 14 million, the SEZ has expanded over the years to encompass all seven districts of the city spread across approximately 2,000 square kilometers.[46] The entire city offers free zone privileges,

although there are also distinct EPZs within the SEZ, like the Shekou Industrial Zone (SKIZ), that allow businesses to negotiate with a zone authority rather than the Guangdong Provincial Administration that controls Shenzhen SEZ. The SEZ offers a number of tax reductions or tax holidays and exemptions, but the biggest attractions for business are the low rent and cheap labor. There are incentives to create joint ventures and to initiate the desired high-tech industries. Most of the city's investment comes from Hong Kong—a competitor that nevertheless finds advantage in Shenzhen's throbbing growth.[47]

After a quarter century of growth, Shenzhen has also become a crucible for its own forms of civic activism. A new middle class has, on occasion, acted to protect its new property interests, organized a boycott to protest increasing real estate prices, or agitated against the construction of a new highway. Others have formed a research group, Interhoo, to monitor development activities or run for government office at the municipal or district level.[48] As an industrial coal smog envelopes the skyline, lax environmental rules, together with a seemingly inexhaustible source of inexpensive labor migrating from the hinterland, have compounded both the corruption and the pollution. There are also thousands of labor strikes each year and petitions for higher wages, but these can be squelched by the state.[49] The sheer size of this city, the distance between the modern downtown, the factory, and the underworld, comprises a complex urbanity, a city in the shadow of a repressive regime that nevertheless grows out of control in ways both productive and dangerous.[50]

As Shenzhen is to Hong Kong, Pudong is to Shanghai. Pudong was established as an SEZ in 1993 on the east bank of the Huangpu River. At 1,200 square kilometers it is comparable to the size of Shanghai and home to over 5 million people. With a skyline aspiring to signature rather than generic outlines, the central skyscrapers and hotels—the Oriental Pearl Tower, the Jin Mao Building, and the Shanghai World Financial Center among them—signal luxury and world-class facilities.

Shenzhen and Shanghai are part of "city clusters" in the Pearl River Delta Economic Zone and the Yangtze River Delta Economic Zone that develop industrial synergies. Sometimes the term "cluster cities," or "supply chain cities," refers to backstage installations that optimize the logistics of manufacturing for one type of product. But "supply chain cities" or "super factories" can also refer to zones that concentrate all the phases of production from design to manufacturing into one area to minimize shipping costs and compress schedules. For instance, Chaozhou specializes in wedding dresses and evening gowns, Shengzhou in ties, Datang and Zhuji in socks, Jinjiang and Shenhu in underwear, and Xintang and Zengcheng in jeans.[51]

Perhaps even more so than China, the UAE has used the zone to its distinct advantage—to control foreign influence, elevate the status of privileged nationals, and leverage the region's oil and gas to create diversified industries. Shenzhen is a city as zone, but Dubai is a city-state as zone. For Dubai—an ancient entrepôt of trading and smuggling recently reawakened by oil—the zone may have seemed remarkably familiar while nationhood may have seemed a bit like a quaint custom necessary to join a global club.

Dubai's first free-trade zone, the Jebel Ali Free Zone, was established in 1985. Since then, Dubai has rehearsed the "park" or zone with almost every imaginable program, such that its urban fabric is now an aggregate of zones, each of which has often been named a "city." There is Dubai Internet City, which opened in 2000 (the first to mix the IT campus with the free-trade zone), Dubai Health Care City, Dubai Maritime City, Dubai Silicon Oasis, Dubai Knowledge Village, Dubai Techno Park, Dubai Media City, Dubai Outsourcing Zone, Dubai Industrial City, Dubai Textile Village, and Dubai International City, among many others. Each enclave offers a different set of incentives including

streamlined customs, inexpensive labor from South Asia and Africa, foreign ownership of property, or rights to own real estate in special projects like the Palm Islands.[52] Dubai is an offshore financial center for the whole of its territory. Each zone may even have its own laws. For instance, Dubai Media City, the headquarters for major news outlets, allows some freedom of speech not technically permitted elsewhere in the state of Dubai.[53]

The resident population in the UAE is not offered as cheap labor, but rather is the beneficiary of free trade and other special bargains of extrastatecraft. Inexpensive labor is imported from South Asia and elsewhere like machinery or other equipment. After becoming ruler in 1966, Sheikh Zayed issued land grants to each national to ensure they would profit from development, and by 1976 he had also offered 5,000 units of "people's housing."[54] The land grants were similar in principle to the many other laws stipulating that partnerships or enterprises must include UAE nationals as either associates or beneficiaries. The UAE government also established a program to channel foreign investment into industries that would support the country's long-term goals.[55] Since the number of nationals is small, the UAE has managed to convert the typically corrupt relationship between government and private-interest lobbies into a form of hyper-representation for a manageable handful of constituents.[56]

After many cycles of breeding around the world, some surprising traits have surfaced in the Middle Eastern zone city. Dubai Humanitarian City, for instance, is an outpost of relief agencies and NGOs.[57] Abu Dhabi's Masdar City, established by the Abu Dhabi Future Energy Company, is a free zone for green-energy enterprises. Masterminded by Norman Foster, the zone's square grid resembles that of an ideal town, while the sectional shape of the city is designed for shade and solar energy collection. An underground channel for automated rapid-transit vehicles transfers to urban transportation technologies first developed in transshipment landscapes.[58] Qatar Education City uses the campus/park/zone model to provide headquarters for the franchises of major universities around the world. Corporate sponsorship makes of the university a kind of incubator of intelligence and manpower for the corporation as well as the region. While none of these programmatic ideas of greening, humanitarianism, or education are redemptive, each demonstrates the extreme mutability of the zone form.

Rendering of city center, King Abdullah Economic City

In King Abdullah Economic City (KAEC), on the Red Sea near Jedda, the zone is again an aggregate component of a full-blown city. Launched in 2006 by the Saudi government and the Dubai real estate developers Emaar, the city will eventually cover 168 square kilometers (about the size of Brussels). The Saudis also plan to build Knowledge Economic City in Medina, Jazan Economic City in Jazan, and Prince Abdul Aziz bin Mousaed Economic City in Hail, among others. In KAEC (pronounced "cake"), the first area to be developed will be an industrial zone covering a third of the city's entire area. The zone will house its own worker's dormitory, mosque, and prayer rooms, but it is not clear whether workers will have full access to the other "high-class" and "prosperous" securitized areas of the city.

The KAEC plans also envisage a manufacturing zone called "Plastics Valley" as a means to take advantage of auxiliary petrochemical resources as well as an international container seaport with logistics, warehousing, and transshipment facilities. As the city continues to grow over the next fifteen years, it hopes to incorporate resort functions, e-governance, home automation, and a connection on the Mecca-Medina rail line—part of a larger network of high-speed rail planned for Saudi Arabia. Incentives for foreign investment include ownership of property, low-cost financing, exemptions from import duties, no personal income tax, and a minimal 20 percent corporate income tax.[59] Digital fly-throughs render KAEC as a golden city with both modern skyscrapers and references to traditional Islamic buildings—all serving as a monument to the state and its "wise leadership."[60]

The Zone Is a Double

Shenzhen is a double of Hong Kong. Pudong doubles Shanghai. CIDCO, the City and Industrial Development Company of Maharashtra, operating under the motto "We make cities," is making Navi Mumbai the double of Mumbai.[61] Not only has the zone become a city, but major cities and even national capitals are now engineering their own zone doppelgängers—their own non-national

territories in which to create newer, cleaner alter-egos, free of any incumbent bureaucracy. The zone embodies what political scientist Stephen D. Krasner calls "hypocritical sovereignty"—where nations operate between multiple jurisdictions with potentially conflicting allegiances and laws—or what international relations professor Ronen Palan calls "sovereign bifurcation," where "states intentionally divide their sovereign space into heavily and lightly regulated realms."[62] The world capital and national capital can now shadow each other, alternately exhibiting a regional cultural ethos, national pride, or global ambition. State and non-state actors use each other as proxy or camouflage as they juggle and decouple from the law in order to create the most advantageous political or economic climate.[63]

Hong Kong and Shenzhen are like twins who can trick the world or trick each other. Hong Kong uses its sister city as a source of cheap labor and rent; Shenzhen competes with Hong Kong while accepting investment from its businessmen. Shenzhen also smothers its island sibling with symbiotic overachievement. *China Daily* projects the mainland's ambitions when it chirps that, given Shenzhen's spectacular success, Hong Kong will surely want to form a single metropolitan region.[64]

New Songdo City under construction

Conforming to a global standard, the promotional video for New Songdo City in South Korea flies in from outer space and through a digital model, accompanied by a new-age soundtrack from the Icelandic band Sigur Rós. A complete international city designed by Kohn Pedersen Fox, Songdo is a double of Seoul in an expansion of the Incheon free-trade territories. It is the "city in a box" that developer Stanley Gale plans to reproduce elsewhere in the world. Aspiring to the cosmopolitan urbanity of New York, Venice, and Sydney, the city has a Central Park, a World Trade Center, and a Canal Street, as well as commercial, residential, cultural, and educational programs including an international convention center, a hospital, a Jack Nicklaus golf course, office buildings, luxury hotels, and shopping malls. There are also additional free-trade zone areas like a "Techno-park" and a "Bio Complex."[65] Songdo will eventually cover only 15,000 acres and house a projected

population of a quarter of a million.[66] Yet it already claims to be a major world city, a "smart city," a "green city," an "aerotropolis," and "a commercial epicenter of Northeast Asia" that provides access to one-third of the world's population in three-and-a-half hours.[67] The video's emotional soundtrack targets international business families looking for a home in the "world community."[68]

In some cases, surpassing all irony, the national capital and the zone have become the same entity, making the zone itself the seat of governance from which it is selectively exempt.[69] In 1997, the capital of Kazakhstan was simply moved from the old city of Almaty to the more strategic Astana, forming a central SEZ called "Astana-New City."[70] Even though Astana has a population of a little more than 600,000, it calls itself a "megacity."[71] President Nursultan Nazarbayev unabashedly created a twenty-three-square-mile (5,900 ha) area in which the nation could advertise its market enticements and display urban buildings saturated with national pride and regional imagery.[72] Astana is, in many ways, part of a campaign to position Central Asia as a paleo-Genghis corridor ready to compete with Dubai.

Bayterek Tower, Astana

In 1997, Kisho Kurokawa, the late Japanese Metabolist architect, designed an axial master plan for Astana-New City anchored by Norman Foster's pyramidal Palace of Peace and Reconciliation. The religiously neutral icon offers, at the top of the pyramid, a place of retreat and summit for world leaders—the zone as a permanent version of an Olympic opening ceremony. Joining Foster's pyramid was the Khan Shatyr (roughly translated as the "tent of the Khan"), a 500-foot-tall, 140,000-square-meter ETFE tent creating an interior microclimate for recreation, shopping, restaurants, and green space.[73] Colored lights illuminate the buildings, the graphic flower beds, and the expressive Bayterek observation tower. Multicolored fountains and water shows, like those in Las Vegas or Macau, are also recognized as necessary accoutrements of the new zone.[74] In 2010, three days of celebrations—coinciding with Nazarbayev's seventieth birthday—marked the opening of the indoor park with its

monorail, tropical zone, wave machine, and beach. A performance by Andrea Bocelli, together with a circus and other spectacles, entertained the world leaders who gathered for the event.[75]

The Zone Prefers Non-State Violence

Administered by an authority independent from the state and able to grant a raft of legal exemptions, the zone would appear to be a quintessential example of a state of exception.[76] The zone aspires to lawlessness, but it is also distinct from the legal tradition of exception that applies to a nation. Zones cheat just as most maritime city-states have cheated for centuries, and in cross-national or cross-border growth zones products may circulate between a constellation of zones taking advantage of different laws, wage scales, or factory quotas.[77] Zones preside over a mongrel form of exception that is more resilient and potentially more insidious. The matrix of exceptions—between state and non-state jurisdictions—is harder to trace than the kind of exception associated with a single emergency of the state. While seeking out relaxed, tax free, extrastate spaces, businesses may also lobby for legislation in their home state, in order to promote, for instance, favorable trade agreements.

Rendering of residential villas, King Abdullah Economic City

In the zone, war is bad for business. The zone harbors not the violence of nations but the violence camouflaged by nations, and while some zones advertise their presence, others remain hidden. From its inception, the most overt and routine forms of violence have been aimed at workers. The zone has been a site for the fabled "3D" jobs (dirty, dangerous, and demeaning), as well as one of the chief instruments in the so-called race to the bottom—the competition between countries to provide the cheapest labor and the most deregulated conditions at the expense of workers and the environment. The 2013 Rana Plaza collapse in the Dhaka EPZ in Bangladesh revealed a list of retailers like Wal-Mart that had located production in Bangladesh because the wages were at the lowest end of the scale. Every player in that disaster had cheated the rules or chiseled the budgets to deliver inexpensive labor.[78]

Yet the zone is also capable of organizing a form of labor exploitation that is relatively stable within the law. Workers confront unsafe, strenuous, physically abusive, and psychologically

intimidating situations. They have a job, but their wages fail to support a decent standard of living. Attempts to organize or form labor unions are squelched with lockouts, threats, and firings. Accusations of abuse or unsafe conditions may trigger an audit, but the audit will then be carried out after the accusers have been fired or during a temporary cleanup. Companies also dodge charges of abuse by simply disappearing or changing their name.

Since the zone's profits are quarantined and allowed to return directly to the multinational enterprise, there may be few lasting dividends for the host country. And if one country decides it is no longer proud to offer up its citizens as cheap labor, the zone will simply migrate to another poorer country, or will import the cheap labor like any other component of the industrial process.

In her discussion of "zoning technologies," the anthropologist Aihwa Ong notes that Carl Schmitt's definition of exception is a useful tool in analyzing the "variegated sovereignty" present in global trade. Yet, she argues, "The sovereign exception that I am interested in here is not the negative exception that suspends civil rights for some but rather positive kinds of exception that create opportunities, usually for a minority, who enjoy political accommodations and conditions not granted to the rest of the population."[79] In the altered landscape of neoliberalism, populated by new institutions of governance (e.g., NGOs, IGOs) and by states that have given up some of their power to proxies, she finds both new dangers and new opportunities.[80] Intermediary organizations may act as watchdogs, support groups, voluntary regulatory agencies, or, alternatively, as administrative shills for camouflaging, even perpetuating, abuses. Ong suggests that, rather than deliver laws and protections through citizenship (an offering that many workers do not even want), the cartography of this NGO constellation might render stronger and more salient forms of leverage.[81]

The ILO, the International Trade Union Confederation (ITUC), and the International Textile Garment and Leather Workers Federation are among the most prominent organizations in a much larger network of NGOs that have been monitoring the zone and advocating for worker's rights for over forty years. The ITUC has fought for a social clause in WTO agreements that will ensure minimum labor standards, including freedom of association, collective bargaining, and the abolition of forced labor, child labor, and labor discrimination.[82] The ILO has compiled a similar list of standards, but while many of the countries hosting the zones are signatories, the United States and most of the major Western powers are not.

In the absence of any other rights, often the only legal instrument that labor can use to redress grievances is a contract. In Dubai, workers can call a Ministry of Labor hotline to register a complaint. The Ministry of Labor can pressure a contractor to make restitution, or it can deport either the laborers or the contractors. In some cases, third parties that train, support, or contract workers in various locations have the power to create contractual pressures. There have also been riots and demonstrations that engaged both the Ministry of Labor and the police.[83]

The labor compounds in some of the more recent zones have become areas cordoned off *within* the global city. Many zones now have a new model village for labor, with sports fields and air-conditioned dormitories. One such labor village forms part of Dubai Industrial City, located some distance from the center of Dubai. The workers in these villages often have insufficient funds to travel within the cities where they work, and thus have no choice but to board the bus that takes them back to the labor camp—far enough away from the city center to ensure they will not be seen. A Shenzhen worker, for example, asked if he ever visited the downtown skyscrapers and shopping malls, replied saying that he had never had the time: "I have to work every day."[84]

Countries claiming to have upgraded their zones have often portrayed them as essential tools for

generating jobs and training. WEPZA advisor Richard Bolin continued to promote the zone in newsletters, once even quoting a 2001 letter from Peter Drucker claiming that "to create wealth, jobs and incomes in desperately poor countries, it [WEPZA] is the only poverty program that works."[85] The IT campuses in India and Malaysia insist on the presence of an educational institution to offer their citizens substantial training in software writing. Zones may also offer childcare and community or global contacts for young entrepreneurs. Some countries claim that the jobs outside the zone are far worse than those inside.[86]

Yet, despite the so-called upgrades, some of the zone's problems have simply been camouflaged. A clean, air-conditioned, high-tech firm like Foxconn in Shenzhen is a mega-mutation of the typical zone factory. As the world's biggest electronics maker, it is the Wal-Mart of zone suppliers, with 800,000 employees wearing crisp white overalls. Foxconn experienced a rash of worker suicides in 2010 that appeared to be a consequence of overwork in the highly regimented conditions as well as intimidation, stress, and isolation from family and friends. Most of the big brand names in electronics use components made by Foxconn, and claim to have reviewed the conditions at the factories. Steve Jobs was quoted as saying that the Foxconn facilities were "not a sweatshop."[87] The Fair Labor Association's relatively positive assessment of Foxconn has drawn further criticism since the NGO is partially funded by companies like Apple.[88]

While the zone often delivers the slow, debilitating, extrastate violence of denial, it can nevertheless exacerbate the larger military conflicts between states. For instance, in Khartoum, the capital of Sudan, development experts from Abu Dhabi and Dubai helped the Alsunut Development Company to plan Almogran, a project of 1,660 acres of skyscrapers and residential properties at the confluence of the White and Blue Nile. While the project may never go forward, the north's plans for overt expressions of oil wealth are the very things that intensify tensions between Sudan and the new country of South Sudan.[89] In the promotions for Al-Mogran—laced with persuasions about brotherhood and unity—the disconnect between rhetoric and disposition were all too apparent. Similarly, since 1967, Israel has been using zones as well as settlements to develop outposts in Palestinian territory in East Jerusalem and the West Bank. Offering wages to Palestinians workers that are difficult to refuse, zones have been characterized as a benefit. Still, those workers, in order to survive, must indirectly support the Israeli occupation.[90]

The Zone Is on Vacation

Operating in a frictionless realm of exemption, the zone quite naturally adopts the scripts of the resort and theme park, with their ethereal aura of fantasy. IT campuses in India and Malaysia sometimes even refer to themselves as *resorts*. Here, businesses are "members" in a special mixture of small-scale vernacular buildings and shiny offices set in lush vegetation. The transient workers, businessmen, and tourists create a temporary population that, like temporary agreements and shifting identities, is good for business. The tourists arrive to spend their vacation money at shopping festivals, golf tournaments, and theme parks, and leave without making any demands on government.

In keeping with its maritime history, the zone often gravitates to island retreats. In China, the largest SEZ, the island of Hainan, has some industrial facilities, but it largely attracts Japanese investment for beachside resort installations. Macau, which along with Hong Kong is a Special Administrative Region (SAR), remains a global tourist destination with special rules permitting gambling and other indulgences previously available on the Portuguese colony before independence

in 1999. Since 1965, the United States Foreign Trade Zone Number Nine—a series of duty-free areas in Hawaii—has mixed free-trade business activity with tourism.[91] Dubai has marketed and expanded its waterfront resorts for expat businessmen, and is one of the top vacation destinations in the Middle East.

Jeju, off the coast of Korea, is a quintessential island retreat that, like many others, has sheltered all those programs or illicit activities that do not fit into the logics of the mainland. Yet today it has transformed itself from a penal colony and strategic military position into a "free economic city." Citing Dubai, Singapore, and Hong Kong as models, the Jeju island zone "guarantees the maximum convenience for the free flow of people, goods, and capital and for tax free business activities." A place of ecological purity, boasting casinos and a golfer's "amnesty" (a 50 percent reduction in green fees), this corporate retreat also hosts global sporting events and diplomatic summits.[92]

Already the perfect spatial instrument for externalizing obstacles to profit, most zones also function as tax havens of some sort, and some merge the island resort with the offshore financial center. British territories like the Cayman Islands, the Turks and Caicos Islands, Anguilla, Bermuda, the British Virgin Islands, Gibraltar, Montserrat, and the Channel Islands are at the core of a global money-sheltering network that radiates from the City of London. Beyond the outposts of former colonial possessions, there are now many other such global networks tied to New York, as well as cities in the Middle East, Central Asia, and China. A company like Halliburton that receives US contracts paid by taxpayer dollars is perfectly free to move its headquarters from Houston to Dubai to take a break from taxes. The zone is also a natural interstice in the networks of transfer-pricing games in which corporations inflate the prices of items moved internally to hide profits or take advantage of currency differentials.[93] Investigative journalist Nicholas Shaxson has assembled evidence indicating that "over half of all bank assets, and a third of foreign direct investment by multinational corporations, are routed offshore." As offshore practices become more prevalent and as they collide with global lending and corrupt governments or individuals, the zone can become the vortex of an enormous drain of capital.[94]

No longer relying merely on a hidden address or a bit of server space, countries now deploy elaborate forms of high-profile urbanism to celebrate the vacation from taxes as a sound economic tool essential to the operation of global corporations. Such corporations are often only reservoirs for liberated money, and real estate operators will outfit the zone with the spatial environments and amenities that appeal to this kind of wealth. While corporate headquarters around the world once portrayed a sober atmosphere of business-like competence, the new-style headquarters often project an image of kingdoms with unlimited wealth.

Dariush Grand Hotel, Kish

Harking back to its history as an ancient crossroads of traders and explorers like Marco Polo and Ibn Batuta, the island of Kish, off the coast of Iran, became a free-trade zone shortly after the revolution. The Kish Free Zone Organization provides spaces for warehousing and business as well as the regular menu of tax and duty exemptions to which corporations have grown accustomed. The island is also notorious for allowing a loosening of headscarves and greater opportunities for socializing between men and women. It is the third most popular tourist destination in the Middle East offering resorts, malls, and other leisure activities as extra incentives. Nearby fantasy hotels like the Dariush Grand Hotel recreate the grandeur of Persian palaces with peristyle halls, gigantic cast stone sphinxes, and ornate bas-reliefs depicting ancient scenes—a perfect place for petrodollars to get away and relax.[95]

The Zone Launders Identities

Yet the zone launders more than money. Countries just entering the global marketplace may use the zone as a front while maintaining the purity of state rhetoric. China's SEZs are the model of this phenomenon. In 1993, following the Chinese, North Korea's law on Free Economic and Trade Zones established the usual set of tax exemptions and options for foreign investment in Rajin-Sonbong, and the country has since established other economic free zones. Some of these contribute to the vast zone conurbations that continue to proliferate in the Tumen River Region between the DPRK and Russia. The Stalinist dynasty of DPRK understood the zone protocols so well they even characterized their Mount Kumgang resort near the Demilitarized Zone as a "special tourist zone."[96]

Announced in 2009, the newest Russian science city, Skolkovo, near Moscow, departs from the previous norms for secret science compounds while also distancing itself from the Russian state bureaucracy. Like many new sparkling cities, it has attempted to attract famous global architects and world-class businesses with its incentivized urbanism. Part of Skolkovo's laundered identity relies

on its membership in the TECHNOPARK-Allianz. Founded in 2002, this global federation is a network of branded communities including Aargau, Luzern, Winterthur, Zürich, and now Skolkovo. Demonstrating that the city itself has become an *uber*-transnational spatial product, all members must adhere to the network's method for creating urbanism.[97]

AllianceTexas, north of Ft. Worth, a classic corporate city as office park and distripark, redistributes many of the products made in Mexico under NAFTA agreements so that they can be sold in the United States for a profit. Designated in 1993 as the 196th Foreign Trade Zone in the United States, AllianceTexas is a planned city with a broad range of urban programs in a 17,000-acre site, approximately 10,000 acres of which is the actual Foreign Trade Zone with a freight airport and huge intermodal installation.[98] Subsuming the name of the state within its own name, AllianceTexas, as a global space dropped into a national space, wears "Texas" as a brand.[99] Pushing goods through AllianceTexas, the US auto industry now relies on a new Detroit composed of a constellation of manufacturing sites from Mexico to Canada.[100]

Some zones launder products in the name of diplomacy. Different from the industrial zones that Israel has established in the West Bank and East Jerusalem, Qualifying Industrial Zones (QIZs) are a special zone variant legislated by the United States in 1996. In the QIZ, Israel and either Jordan or Egypt are encouraged to collaborate in making a product. Those products are granted duty-free access to the United States as long as Israel has contributed a percentage of their value—8 percent for Israel-Jordan and 11.7 percent for Israel-Egypt.[101] Filling the remaining percentages, many companies from all over the world can operate in the QIZ and take advantage of the duty-free access to the US market. In Jordan in 1998, the Al-Hassan Industrial Estate in Irbid was designated as the first QIZ, and by 2010 six more "specialized investment compounds" were established.[102] Egypt did not enter the QIZ program until 2005, but has since established fifteen QIZ sites.[103]

Many of the QIZ employ inexpensive workers, most of whom are women. In Jordan some of these workers even come from the nearby Palestinian refugee camps. Still, some Chinese, Sri Lankan, and Bangladeshi manufacturers have found that it is cheaper to import labor from southern Asia. The ILO alleges that forced labor and trafficking occur in the QIZs.[104] In her studies of the Al-Hassan Industrial Estate, filmmaker Ursula Biemann concludes that "the poorest and most marginalized segments of the population, the Palestinian refugees, find themselves ironically tied into an economic agreement that normalizes the very relations that segregate them." In Biemann's film, the young women in the factory, wearing work smocks and head scarves, smile because they are shy about being filmed. They hold up the finished product: a flesh-colored girdle for Victoria's Secret stamped "Made in Israel." [105]

In 2011, the Institute for Global Labour and Human Rights began reporting cases of serial rape and abuse that had been occurring since at least 2007 in the Classic Fashion Apparel factory in Jordan. The considerable amount of evidence they collected caught the attention of the global press and exposed clients of the factory like Wal-Mart, Target, Macy's, Lands' End, Hanes, and Kohl's. Better Work Jordan, an organization partnered with the ILO, claims that it has been unable to substantiate the allegations. Nevertheless, it acknowledges that "there may be a culture of quid pro quo sexual harassment at the factory in question," and notes that 25 percent of all "Jordanian garment workers feel that sexual harassment is a concern for workers in their factory." Meanwhile, to cleanse a tarnished image, the Classic Fashion Apparel website bristles with certifications and awards from ISO and other organizations. The site provides virtual tours of its bright, clean factories as well as photos of nearby dormitories. It congratulates itself on championing sustainability, corporate social

responsibility, and progressive labor relations, all accompanied by images of smiling workers.[106]

The Zone Is Its Own Antidote

In some ways, the only reason for the universal appeal and continual proliferation of the zone has been the continual proliferation of the zone. Although rationalized by many experts, perhaps its popularity stems less from economic principles, and more from irrational social and cultural desires to conform to a global norm. Despite everything learned from the EPZs, thirty years after their most explosive growth spurt, there is a persistent belief that the form can continue to help the world's developing countries as a reliable economic instrument. Each uninitiated country angles for a new zone as their ticket into the global market. Each also anticipates the jobs that the zone may bring. Decades later, poorer countries like Kenya are eagerly awaiting fresh new SEZs, even as their own business and technical innovations may have outgrown the form.

Even as many projects fail, countries continue to play a confidence game with the global market, announcing fluid plans and gambling heavily, perhaps even recklessly, on the zone or on new cities supported by zones. Countries and companies with zone expertise export the form as a heavy industry and a new foreign outpost. Lekki Free Zone—the largest free zone in West Africa and a double of Lagos—continues its expansion, with Chinese, not Nigerian, interests as the largest stakeholders.[107] India is building the $90 billion Delhi Mumbai Industrial Corridor with nine "mega-industrial zones," high-speed rail, three ports, six airports, and a superhighway funded in large part by Japanese loans.[108] On the other side of the world, Korean entrepreneurs have proposed a new science city called Yachay for the highlands of Imbabura north of Quito in Ecuador. [109] While the project has now been canceled, in April of 2012, Georgia announced plans for the new city of Lazika near the Black Sea. The customary promotional video scanned golf courses, fields of identical cartoon villas, and a cluster of skyscrapers that, sited on a swamp, would require foundations eighty feet deep.[110]

Fueling growth of the form, stories about the zone as a rational economic instrument join stories about the liberalism, freedom, and openness it promises to deliver. The zone is a quintessential apparatus of the neoliberal state, a mascot of "Washington Consensus" economics.[111] Yet paradoxically, state bureaucracy may be merely replaced with a more complex extrastate administration. The zone offers a clean, relaxed, air-conditioned, infrastructure-rich urbanism that is more familiar to the world than the context of its host country. Yet the masquerade of freedom and openness turns very easily to evasion, closure, and quarantine. Zones foster self-reflexive networks, and the same subset of corporations stick together in legal habitats that can be recreated anywhere in the world. The optimized, RFID-tagged zone promotes fluid, information rich, and error free environments. Yet because it only receives or recycles compatible information in closed loop, there is also the risk of what the industry calls "control error"—a potentially fatal denial of information to maintain the status quo.[112]

Promotional video, New City Lazika, Georgia

The story that the zone is a perfectly apolitical city is also decoupled from its reality on the ground. Not yet a site of intensified urbanity, the zone is often a place of secrets, hyper-control, and segregation. It oscillates constantly between closure and reciprocity as a fortress of sorts that orchestrates a controlled form of cheating. Moreover, as the entrepôt of the world's resources, the zone, despite its attempts to be apolitical, invariably ends up in the crosshairs of pirates, terrorists, and traffickers of all kinds.

Yet all the paradoxical stories together with the mutability of the zone suggest that this, the MS-DOS of urban software, might be productively hacked. Despite its internal isomorphism, the global epidemic of zone building also means that it has become a powerful multiplier, one capable of carrying messages that unravel the zone formula itself. Its ubiquity represents at once a threat and opportunity. The first hack to the zone formula might deploy any number of active forms related to, for example, labor, the environment, building construction, telecommunications, or security—forms that might circulate within a population of zones with compounding effects. Reconditioning a transnational network already in place, these multipliers can encourage alternative urban dispositions and political goals.

Yet the most important manipulation of the zone software is even simpler. The wisest urban entrepreneurs will ask a question already posed by some of the earliest critics of the zone: Why create an enclave? Despite the infrastructure conditions that existed at the advent of the zone, and despite its antecedents in fenced compounds, how does incentivized urbanism benefit from being physically segregated from the urban space of existing cities? What are the economic and technical benefits that accrue from constructing a double of the city? The new zone entrepreneurs may find in the enclave not freedom but entrapment, just as do many of the transient populations who labor within them. Of the many irrationalities driving the development of the zone, the enclave may be the least productive component.

Zone incentives can be mapped onto existing cities instead of exurban enclaves, thus returning zone operations to the rule of law and bringing more financial benefits to the domestic economy. Different from an object form as master plan and more like an active form as contagion, this simple shift could have enormous impact on contemporary global urbanism. The most highly prized zone models—Singapore, Hong Kong, and Dubai—are already city-states. Given the zone's ambition to be a city, perhaps ironically, it is the carrier of its own reversal or antidote—an antidote that can be

multiplied throughout the global population of zones.

Rather than giving away national assets in exchange for the zone, a more transparent bargain with foreign investment uses the existing city as a medium of information and intelligence—the other half of an interplay that leverages more infrastructure and resources. The next countries in line to adopt the zone might surprise the global consultancies and financial institutions that are pushing the form in its current state. They might proudly offer *selected* economic incentives as well as the symbolic capital that attends higher labor and environmental standards. A program to eliminate the expense of the old mirror-tiled skyline and to reinvest in the city itself would set these countries apart in the next negotiations of extrastatecraft.

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1 Guangwen Meng, "The Theory and Practice of Free Economic Zones: a Case Study of Tianjin, People's Republic of China" (PhD diss., Ruprecht-Karls University of Heidelberg, 2003), 25; Guangwen Meng, "Evolutionary Model of Free Economic Zones—Different Generations and Structural Features," *Chinese Geographical Science* 15, no. 2 (2005), 1; R. J. McCalla, "The Geographical Spread of Free Zones Associated with Ports," *Geoforum* 21, no. 1 (1990), 122; D. L. U. Jayawardena, "Free-Trade Zones," *Journal of World Trade* 17, no. 5 (1983), 427.

2 See Helen Zimmern, *The Hansa Towns*, 2nd ed. (London: T. Fisher Unwin, 1889).

3 Meng, "The Theory and Practice of Free Economic Zones," 29.

4 Meng, "Evolutionary Model of Free Economic Zones," 105. By 1900, there were, by some counts, eleven free ports in the world. In the first half of the twentieth century, eighteen more free ports were created in Europe, primarily in Sweden and Switzerland. See McCalla, "The Geographical Spread of Free Zones Associated with Ports," 123; and Meng, "The Theory and Practice of Free Economic Zones," 27. Of the eight created in Latin America, five were *puertos libres* created after Mexico established free port laws in 1924. See Dara Orenstein, "Foreign-Trade Zones and the Cultural Logic of Frictionless Production," *Radical History Review* 109 (Winter 2011), 36–61. Free zones were also established in Africa and Asia. See McCalla, "The Geographical Spread of Free Zones Associated with Ports," 127.

5 McCalla, "The Geographical Spread of Free Zones Associated with Ports," 125, 127.

6 Approaching manufacturing, this "manipulation" often involved refining or curing processes. The manipulation of goods made zones distinct from the bonded warehouses already permitted in the United States since 1846. See Orenstein, "Foreign-Trade Zones and the Cultural Logic of Frictionless Production," 7.

7 McCalla, "The Geographical Spread of Free Zones Associated with Ports," 130.

8 Hong Kong is now a Special Administrative Region (SAR) of the People's Republic of China.

9 McCalla, "The Geographical Spread of Free Zones Associated with Ports," 128–9.

10 Richard L. Bolin, "What Puerto Rico Faced in Being First to Create EPZs in 1947 … And Its Huge Success" (paper presented at the Award Ceremony during the conference of the Latin American Free Trade Zones Committee, San Juan, Puerto Rico, 2004).

11 See colonfreetradezone.com; and Thomas E. Lyons, "Report on Proposal to Create a Foreign-Trade Zone in the Republic of Panama: An Analysis of Some of the Many Direct and Indirect Benefits Which Would Accrue to the Republic of Panama by the Establishment of a Foreign-Trade Zone," Washington, DC: US Dept. of Commerce, 1946. Despite installations that precede them, both Puerto Rico and Colón claim to be the first free trade zone.

12 Jean-Paul Marhoz and Marcela Szymanski, "Trade Union Campaign for a Social Clause, Behind the Wire: Anti-Union Repression in the Export Processing Zones" (1996), at http://actrav.itcilo.org

13 The countries using Kaohsiung as a model included: Ivory Coast, Liberia, Mauritania, Jordan, Columbia, Panama, Costa Rica, South Korea, South Vietnam, The Philippines, Indonesia, and India. See McCalla, "The Geographical Spread of Free Zones Associated with Ports," 129.

14 D. L. U. Jayawardena, "Free-Trade Zones," *Journal of World Trade* 17, no. 5 (1983), 433.

15 McCalla, "The Geographical Spread of Free Zones Associated with Ports," 132. It was not until 1978 that a zone was established in Sri Lanka. Bangladesh and Pakistan did not develop zones until 1980.

16 Walter H. Diamond and Dorothy B. Diamond, *Tax-Free Trade Zones of the World* (New York: Matthew Bender, 1986).

17 McCalla, "The Geographical Spread of Free Zones Associated with Ports," 129–30.

18 Tsuchiya Takeo, "Introduction," *AMPO: Japan-Asia Quarterly Review, Special Issue on Free Trade Zones and Industrialization of Asia* (1977), 4. While Takeo refers to an organization with the acronym WIFZA, the World Economic Processing Zone Association (WEPZA) claims these same origins with 1978 as an inaugural year. In 1980, although there were other free zones of various types in both developing and developed countries, UNIDO listed the following developing countries as operating what it regarded

to be export processing zones: Liberia, Malta, Mauritius, Senegal, and Tunisia in Africa; India, Malaysia, The Philippines, South Korea, Singapore, Sri Lanka, and Taiwan in Asia; Barbados, Belize, Brazil, Chile, Columbia, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, and Puerto Rico in Latin America; Egypt, Jordan, and Syria in the Middle East; and Western Samoa. See "Export Processing Zones in Developing Countries," in *UNIDO Working Papers on Structural Changes*, International Centre for Industrial Studies Global and Conceptual Studies Section (UNIDO, 1980).

19 Takeo, "Introduction," 4; and wepza.org. While initially established by UNIDO as an organization of governments, when WEPZA privatized in 1985 it was managed as an independent non-profit research organization. The director, Richard Bolin, had helped to prepare a 1964 study for the Mexican government that influenced the maquiladora program. As the WEPZA described itself, "the Institute is also active in educating governments, international organizations, and regional and global trade organizations on the efficiency of EPZs in attracting Foreign Direct Investment to poor countries and the importance of their economic freedoms in many aspects of national and global development." The WEPZA was perhaps characteristic of the so-called "neoliberal" shift in global organizations from intergovernmental organizations with member nations to nongovernmental organizations with membership from private enterprises.

20 McCalla, "The Geographical Spread of Free Zones Associated with Ports," 131–2.

21 In 1986, forty-seven countries hosted 176 EPZs. See Michael Engman, Osama Onodera, and Enrico Pinali, "Export Processing Zones: Past and Future Role in Trade and Development," in *OECD Trade Policy Working Papers* (OECD Publishing, 2007), 12; Takayoshi Kusago and Zafiris Tzannatos, *Export Processing Zones: A Review in Need of Update* (Washington, DC: Social Protection Group, Human Development Network, World Bank, 1998), 5; Jean-Pierre Singa Boyenge, "ILO Database on Export Processing Zones" (Geneva: International Labour Office, 2007), 1, at ilo.org; and Thomas Farole and Gokhan Akinci, eds., *Special Economic Zones: Progress, Emerging Challenges and Future Directions* (Washington, DC: The World Bank, 2011).

22 Kusago and Tzannatos, *Export Processing Zones*, 6–7.

23 Jayawardena, "Free-Trade Zones," 428.

24 Xiangming Chen, "The Evolution of Free Economic Zones and the Recent Development of Cross-National Growth Zones," *International Journal of Urban and Regional Research* 19, no. 4 (1995), 595–6.

25 UNIDO, "Export Processing Zones in Developing Countries," 40–1. While UNIDO may have envisioned the zone as a temporary catalytic agent in a changing market environment, the zone authority was even able to issue legal guarantees that the host nation would not reabsorb zone territories.

26 See Engman, Onodera, and Pinali, "Export Processing Zones: Past and Future Role in Trade and Development," 6, 25, "Improvement of the business environment through trade and investment liberalization, establishment of good infrastructure, rule of law and administrative simplification remains the optimal policy option to promote investment, employment and growth." Kusago and Tzannatos, *Export Processing Zones*, 16–22. Labor representatives have called the zone a "health and environment 'time-bomb.'" See Jesper Nielsen, "Export Processing Zones or Free Zones—The Experience Seen from a Trade Union Point of View," at labour-inspection.org.

27 Gary Gereffi, "Development Models and Industrial Upgrading in China and Mexico," *European Sociological Review* 25, no. 1 (2009), 37, 40–1, 46–9.

28 Engman, Onodera, and Pinali, "Export Processing Zones: Past and Future Role in Trade and Development," 8; and Boyenge, "ILO Database on Export Processing Zones," 1, at ilo.org.

29 Manuel Castells and Peter Hall, *Technopoles of the World: The Making of Twenty-First-Century Industrial Complexes* (London: Routledge, 1994).

30 See rtp.org; and Diamond and Diamond, *Tax-Free Trade Zones of the World* . In 1983, RTP applied for Foreign Trade Zone status and has headquarters and warehouses as well as sites of over 800 acres that qualify as tax-free zones. RTP now has a population of almost 3 million and covers a sixty-mile radius. See Chen, "The Evolution of Free Economic Zones," 605.

31 The USSR also built a number of top-secret science cities like Sverdlovsk-45 for developing Cold War technologies. More recent science cities, some of which are located in the old science cities, include: Tomsk, Dubna, Zelenograd, and St. Petersburg. See Chen, "The Evolution of Free Economic Zones," 605.

32 Starting in 1980, Taiwan eventually established three science parks (Hsinchu Science Industrial Park, followed by Southern Taiwan Science Park and Central Taiwan Science Park); and South Korea, Singapore, France, the UK, and Germany also established SIPs. See http://eweb.sipa.gov.tw/en; singaporesciencepark.com; Meng, "The Theory and Practice of Free Economic Zones," 35–6; and Chen, "The Evolution of Free Economic Zones," 605.

33 See stpi.in; and Keller Easterling, *Enduring Innocence: Global Architecture and Its Political Masquerades* (Cambridge, MA: MIT Press, 2005), 135–60.

34 See e-cybercity.mu.

35 See mscmalaysia.my.

36 For a discussion of the development of global automated ports see Easterling, *Enduring Innocence*, 99–122. In the 1990s, Schiphol Group launched their plans to manage and build twenty-four-hour "airport cities" worldwide. With Schiphol Airport as a model, they hoped to create a formula or spatial product that synchronized layover times with shopping times and optimized tonnage of freight and numbers of passengers. See panix.com/~keller/wildcards/Index.html. This 1999 website collects research about a range of spatial products including the proposed airport cities of Schiphol Group.

37 Chen, "The Evolution of Free Economic Zones." Chen settled on the term "Free Economic Zone" for all of these forms and

speculated on the ensuing phases of growth. Building on this analysis, Guangwen Meng identified seven generations of FEZ development that largely conformed to those described by Chen. A first generation associated with trade evolves to a second that includes manufacturing. The third generation includes service and the fourth includes science. Meng designates the fifth generation as comprehensive, inclusive of many business and industry functions. The sixth and seventh he designates as cross-border and cross-national types, noting, as does Chen, that these conurbations often now operate independently from the local state jurisdiction but in multiple extrastate networks. See Meng, "Evolutionary Model of Free Economic Zones," 103.

38 Robert C. Haywood, "Free Zones in the Modern World," in *World Economic Processing Zones Association, Evergreen, Colorado, USA, CFATF Meeting* (Aruba, 2000).

39 Diamond and Diamond, *Tax-Free Trade Zones of the World*.

40 Kenichi Ohmae, "The Rise of the Region State," *Foreign Affairs* 72, no.2 (1993), reprinted in Patrick O'Meara, Howard D. Mehlinger, and Matthew Krain, eds., *Globalization and the Challenges of a New Century* (Bloomington: Indiana University Press, 2000), 93, 95.

41 The list included: free trade zone, foreign trade zone, industrial free zone, free zone, maquiladora, export free zone, duty free export processing zone, special economic zone, tax free zone, tax free trade zone, investment promotion zone, free economic zone, free export zone, free export processing zone, privileged export zone, and industrial export processing zone. See Kusago and Tzannatos, *Export Processing Zones*, Annex 1.

42 Meng, "Evolutionary Model of Free Economic Zones," 103.

43 See wepza.org. The World Export Processing Zone Association, has, like the ILO and the OECD, kept databases tracking zone growth. The WEPZA categorizes the various types as "wide area"—zones with a residential population that act as new cities, such as China's Special Economic Zones; "small area"—zones smaller than 1,000 hectares and surrounded by a fence; "industry specific"—which includes those zones related to a particular industry, such as an offshore banking zone that can attract investment from anywhere in the world; and "performance specific"—zones that conform to established criteria such as "degree of exports, level of technology, size of investment etc"; a maquiladora or research park would be an example of this type. Meng, for instance, indentifies a number of cross-border zones in an area around the confluence of national borders between the Netherlands, Brussels, and Germany. Yet, according to WEPZA, there are no EPZs in Brussels. WEPZA has a designation for industry specific zones that would include offshore banking facilities, and yet while Dubai is an offshore facility for the whole of its territory, the UAE is listed as a country without industry specific zones. See Meng, "The Theory and Practice of Free Economic Zones,"104. A World Bank publication from 2011 listed four types of zones: Free Trade Zone, Traditional EPZ, Free Enterprises, Hybrid EPZ, and SEZ/Freeport; see Farole and Akinci, eds., *Special Economic Zones: Progress, Emerging Challenges and Future Directions*, 2.

44 Engman, Onodera, and Pinali, "Export Processing Zones: Past and Future Role in Trade and Development," 6–7.

45 Kevin Kelly, *New Rules for the New Economy* (New York: Penguin Books, 1998), 76.

46 See english.sz.gov.cn/gi/; and "A Work in Progress," *Economist*, March 17, 2011.

47 Expansion was intended to ease real estate prices in downtown Shenzhen while also providing more citizens with the better health care and education now available in the zone. See Diamond and Diamond, *Tax-Free Trade Zones of the World* ; and Jayawardena, "Free-Trade Zones," 438.

48 Howard W. French, "In Chinese Boomtown, Middle Class Pushes Back," *New York Times* , December 18, 2006; see interhoo.com.

49 The All China Federation of Trade Unions, of which the Guangdong Federation of Trade Unions is a part, permits only trade union activity organized from within the state hierarchy. Organizations of migrant workers who frequently work in abusive and dangerous situations are without much recourse. See clb.org.hk.

50 Howard W. French, "Chinese Success Story Chokes on Its Own Growth," *New York Times*, December 19, 2006.

51 Gereffi, "Development Models and Industrial Upgrading in China and Mexico," 46–7.

52 See freezonesuae.com.

53 Keller Easterling, "Extrastatecraft," in Kanu Agrawal, Melanie Domino, and Brad Walters, eds., *Perspecta 39, Re_Urbanism: Transforming Capitals* (2007), 2–16.

54 Mohammed Al-Fahim, *From Rags to Riches: A Story of Abu Dhabi* (London: The London Center of Arab Studies, 1995), 140; Frauke Heard-Bey, *From Trucial States to United Arab Emirates: A Society in Transition* (Dubai and Abu Dhabi: Motivate Publishing, 2004, first published by Longman, 1982), 405.

55 See tec.tawazun.ae. The UAE Offset Program Bureau, recently renamed The Tawazun Economic Program, was established in 1992 to diversify the UAE's economy by partnering with defense contractors. These offset projects have funded a variety of industries including fish farms, air-conditioning, health care, agriculture, shipbuilding, banking, and education.

56 uaestatistics.gov.ae; uaeinteract.com.

57 See ihc.ae.

58 See masdarcity.ae. It is in this way that the zone may be a peculiar form of intentional community like the repeatable urban formats of Spain's Laws of the Indies or the experiments of defecting religious groups in the New World of the Americas.

59 See kingabdullahcity.com and "Saudi Arabia to Allow Foreign Ownership in KAEC," at arabianbusiness.com.

60 Emaar press release, September 12, 2006, at emaar.com.

61 CIDCO is to deliver infrastructure that is the zone standard: an airport, mass rapid transit, railway stations, industrial compounds,

a harbor, a central park, a golf course, and residential areas. A similar company, SKIL Infrastructure Ltd., will contract for some portion of the infrastructure as a private-sector endeavor. Navi Mumbai will be equipped with infrastructural and legal environments like those in Shenzhen and Pudong—city-states with not only commercial areas but also a full array of programs. See cidco.maharashtra.gov.in and skilgroup.co.in.

62 Krasner describes several forms of sovereignty that the nation must juggle: Westphalian, Interdependence, Domestic, and Legal. The zone sometimes eliminates conflicts between these different jurisdictions to streamline relations with foreign investment even as it creates yet another independent jurisdiction. Stephen Krasner, *Sovereignty: Organized Hypocrisy* (Princeton: Princeton University Press, 1999), 3–25; Ronen Palan, *The Offshore World: Sovereign Markets, Virtual Places, and Nomad Millionaires* (Ithaca, NY: Cornell University Press, 2003), 8, 182. See also Roy E. H. Mellor, *Nation, State, and Territory: A Political Geography* (London: Routledge, 1989), 59.

63 This argument joins those of other scholars who note that new incarnations of statehood, like those the zone sponsors, strengthen rather than diminish the power of the state. As professor of urban theory Neil Brenner writes, "the notion of state rescaling is intended to characterize the transformed form of (national) statehood under contemporary capitalism, not to imply its erosion, withering, or demise." Neil Brenner, *New State Spaces: Urban Governance and the Rescaling of Statehood* (New York: Oxford University Press, 2004), 4.

64 "Shenzhen SEZ Aims to Be 5 Times Bigger," *China Daily*, May 22, 2009.

65 See songdo.com.

66 Chungjin Kim, "A Study on the Development Plan of Incheon Free Economic Zone, Korea: Based on a Comparison to a Free Economic Zone in Pudong, China" (master's thesis, University of Oregon, 2007), 13. Korea's four main Free Economic Zones are Incheon, Busan, Jinhae, and Gwangyang.

67 For a discussion of the Airport City see John D. Kasarda and Greg Lindsay, *Aerotropolis: The Way We'll Live Next* (New York: Farrar, Straus and Giroux, 2011).

68 "A Brand New City," at songdo.com.

69 In Hong Kong, Macau, Singapore, Mauritius, Fiji, Gibraltar, and Thailand, zone laws are permitted throughout the entire territory. See Diamond and Diamond, *Tax-Free Trade Zones of the World*, Far East, iii.

70 "Privileges for Participants in Special Economic Zones," at http://invest.gov.kz.

71 "Industrial Zones," at jordaninvestment.com.

72 In line with other world powers, Kazakhstan develops conurbations in business park units called "cities." Alatau IT City, one example outside of Almaty, follows the familiar template and features mirror-tiled buildings and towers with monumental but indeterminate reference.

73 See fosterandpartners.com.

74 See astana.gov.kz/en/.

75 "Giant Indoor Park Opened for Kazakh President's Birthday," at telegraph.co.uk.

76 The state of exception, a legal concept deployed by the German jurist Carl Schmitt, granted the Third Reich an exemption from law during a moment of war or emergency—essentially legalizing the lawlessness of the concentration camps and other atrocities. Giorgio Agamben's recent analysis considers the state of exception in light of Roman law and as a spatial entity—the camp. He suggests that the idea of the camp is even naturalized in ordinary spaces—the "*zones d'attentes* of our airports and certain outskirts of our cities." Georgio Agamben, *Homo Sacer: Sovereignty, Power and Bare Life* (Stanford: Stanford University Press, 1995), 175.

77 Chen, "The Evolution of Free Economic Zones"; and Xiangming Chen, *As Borders Bend: Transnational Spaces on the Pacific Rim* (Lanham, MD: Rowman & Littlefield Publishers, 2005).

78 Sarah Butler and Saad Hammadi, "Rana Plaza Factory Disaster: Victims Still Waiting for Compensation," *Guardian*, October 23, 2013.

79 Aihwa Ong, *Neoliberalism as Exception: Mutations in Citizenship and Sovereignty* (Durham, NC: Duke University Press, 2006), 103, 7.

80 Similarly, the philosopher Etienne Balibar considers the possible instrumentality of intermediary organizations outside of the state's limited palette of options for labor in a global market. See Etienne Balibar, *We, the People of Europe?: Reflections on Transnational Citizenship* (Princeton, NJ: Princeton University Press, 2004).

81 Ong, *Neoliberalism as Exception*, 12–13, 21.

82 The ITUC was formerly the International Confederation of Free Trade Unions or ICFTU. See Marhoz and Marcela, "Trade Union Campaign for a Social Clause, Behind the Wire: Anti-Union Repression in the Export Processing Zones", at http://actrav.itcilo.org.

83 See mol.gov.ae.

84 French, "Chinese Success Story Chokes on Its Own Growth."

85 See wepza.org. Richard Bolin was an original advisor to WEPZA when it was established by UNIDO in 1978. In 2003, he was named "Director Emeritus" of WEPZA. The WEPZA website includes a number of his undated "editorials" promoting zone development.

86 Author interview with Tariq Yousef, Global Art Forum, Doha, Qatar, March 17, 2013. Yousef is a director of Silatech, an initiative promoting youth employment and entrepreneurship in the Arab world.

87 David Barboza, "Electronics Maker Promises Review after Suicides," *New York Times*, May 26, 2010; "After Suicides,

Scrutiny of China's Grim Factories," *New York Times*, June 7, 2010.

88 "Fair Labor Association Finds Progress at Apple Supplier Foxconn," at fairlabor.org.

89 "Glittering Towers in a War Zone," *Economist*, December 7, 2006.

90 Jodi Rudoren, "In West Bank Settlements, Israeli Jobs Are Double-Edged Sword," *New York Times*, February 11, 2014.

91 Diamond and Diamond, *Tax-Free Trade Zones of the World*.

92 See jeju.go.kr.

93 John Christensen, "Dirty Money: Inside the Secret World of Offshore Banking," in Steven Hiatt, ed., *A Game as Old as Empire: The Secret World of Economic Hit Men and the Web of Global Corruption* (San Francisco: Berrett-Koehler Publishers, 2007), 41–68.

94 Nicholas Shaxson, *Treasure Islands: Uncovering the Damage of Offshore Banking and Tax Havens* (Palgrave Macmillan, 2012), 11, 14, 16, 88, 140–1; James Henry, *Blood Bankers: Tales from the Underground Global Economy* (New York and London: Four Walls Eight Windows, 2003), xxiii–xxxii.

95 See kish.ir.

96 For a discussion of the Mount Kumgang resort see Easterling, *Enduring Innocence*, 15–38.

97 Aleksander Vekselberg, "The Politics of Innovation: Skolkovo and its Impact on the Modernization of Russia," senior thesis, Yale University, 2011; see also Natalia Kolenikova, "A Russian Silicon Valley Is Being Built from Scratch," *New York Times*, April 11, 2010.

98 Diamond and Diamond, *Tax-Free Trade Zones of the World*.

99 See alliancetexas.com.

100 Diamond and Diamond, *Tax-Free Trade Zones of the World*.

101 See qizegypt.gov.eg. Thirty-five percent of the entire value of the product must be derived from work in the actual zone in either Egypt or Jordan. Portions of each zone must be in both partnering countries, but they need not be contiguous. Although there are other sectors in play, in most cases the QIZ protocol applies to industries that import fabric from Israel, often at a relatively high price, and then export garments to the United States.

102 See "Qualifying Industrial Zones" at moital.gov.il. Recent QIZ include the Al-Hussein Ibn Abdullah II Industrial Estate in Al Karak, the Aqaba Industrial International Estate in Aqaba, Al-Tajamouat Industrial City in Amman, Ad-Dulayl Industrial Park near Zarqa, Cyber City in Irbid, and Al-Mushatta and Hallabat Industrial Park in Zarqa. See jordaninvestment.com.

103 See the FAQ at qizegypt.gov.eg.

104 See "Forced Labour and Trafficking In Jordan—A Pilot Programme on the Qualified Industrial Zones," at ilo.org.

105 Biemann and Oroub El-Abed, then a PhD at the Graduate Institute of International and Development Studies (IHEID) in Geneva, were among the first to research and film the QIZ in Jordan. Biemann's video research, *X-Mission*, features interviews with Oroub El-Abed. A web article, "The Refugee-Industrial Complex: The QIZ in Jordan," at arteeast.org, provides additional information.

106 See "Campaigns" at globallabourrights.org; "Sex Abuse Alleged at Apparel Maker," *Wall Street Journal*, June 30, 2011, B3; "Major American Brands Silent on Alleged Rights Abuses at Overseas Factories," *Huffington Post*, July 21, 2011; and "Response to Classic Fashion Apparel Industries Allegations," at http://betterwork.org; classicfashionapparel.com

107 See lfzdc.com and lekkizone.com.

108 See delhimumbaiindustrialcorridor.com. The author is indebted to Swarnabh Ghosh for sharing his research on DMIC.

109 See yachay.ec.

110 Ellen Barry, "On Black Sea Swamp, Big Plans for Instant City," *New York Times*, April 22, 2012. See also "New City Lazika" on YouTube. Giorgi Vashadze, a deputy minister of justice, "was browsing on the Internet when he came across the idea of a 'charter city,' with distinct regulatory and judicial systems that could attract foreign investors to build factories." A charter city is similar to a special economic region. Like a zone variant, it uses foreign investment to establish a new city with an autonomous government. Some exemptions from law may also be granted. See also "Lazika Construction to be Stopped in Georgia," *Black Sea News*, October 10, 2012. See blackseanews.net.

111 Referencing an argument of geographer Bae-Gyoon Park, urbanist Jonathan Bach describes the zone as a tool for selectively implementing neoliberal policies. Jonathan Bach, "Modernity and the Urban Imagination in Economic Zones," *Theory, Culture & Society*, 28, no. 5 (September 2011), 105. See also Bae-Gyoon Park, "Spatially Selective Liberalization and Graduated Sovereignty: Politics of Neo-liberalism and 'Special Economic Zones' in South Korea," *Political Geography* 24 (2005), 850–73.

112 For a discussion of "special stupidity" see Easterling, *Enduring Innocence*, 195.

CHAPTER 2

Disposition

Highways, first promoted with stories about freedom and uninterrupted movement, possessed an organizational logic that actually caused congestion. ARPAnet, first characterized as a stealth network for the military, lent itself to the kinds of exchanges that finally generated the internet. Promises of decentralization accompanied the first electrical utilities, just as promises of open access have accompanied contemporary broadband networks. Yet both networks, at certain junctures in their evolution, have sponsored constricting monopolies, whether scattered or centralized. The mass-produced suburbs sold unique country homes but delivered the virtually identical products of an assembly-line organization. Facebook, a platform created for social networking on a college campus, revealed another initially unrecognized potential when, in the Arab Spring, it was used as an instrument of dissent. Likewise the zone, created and promoted as a tool of free trade and economic liberalism, has often produced closed, exurban enclaves.

In all these cases, some of the most consequential political outcomes of infrastructure space remain undeclared in the dominant stories that portray them. Information resides in the technologies—from telecommunications to construction—as well as in the declared intent or story—from decentralization to stealth. Yet information also resides in a complex of countless other factors and activities. All these activities, taken together, lend the organization some other agency or capacity—a disposition—that often escapes detection or explanation.

Reading disposition in infrastructure space is like Twain's reading of the water's surface. The shiny new technology or the persuasive promotional story may command attention just like the pretty landscapes of the river, but in excess of that material, spatial organizations are always providing information about their inherent, if undeclared, activities. While beyond complete comprehension, disposition describes something of what the organization is doing—activities that may diverge from the stated intent. This misalignment with the story or rhetoric is one means of detecting disposition, but additional organizational attributes are also helpful in assessing it.

Perhaps the idea of disposition is not really so mysterious. A ball at the top of an inclined plane possesses a disposition.[1] The geometry of the ball and its relative position are the simple markers of potential agency. Even without rolling down the incline, the ball is actively doing something by occupying its position. Disposition, in common parlance, usually describes an unfolding relationship between potentials. It describes a tendency, activity, faculty, or property in either beings or objects—a propensity within a context.

Infrastructure space possesses disposition just as does the ball at the top of an incline. Few would look at a highway interchange, an electrical grid, or a suburb and perceive agency or activity in its static arrangement. Spaces and urban organizations are usually treated, not as actors, but as collections of objects or volumes. Activity might be assigned only to the moving cars, the electrical current, or the suburb's inhabitants. Yet the ball does not have to roll down the incline to have the capacity to do so, and physical objects in spatial arrangements, however static, also possess an agency that resides in relative position. Disposition is immanent, not in the moving parts, but in the relationships between the components.

When navigating the complex dispositions of a river, dimples or ripples on the water serve as markers; and when navigating or hacking the complex dispositions of infrastructure, some simple

markers are equally useful. The infrastructural operating system is filled with well-rehearsed sequences of code—spatial products and repeatable formulas like zones, suburbs, highways, resorts, malls, or golf courses. Hacking into it requires forms that are also like software. Different from the object forms of masterpiece buildings or master plans, these active forms operate in another gear or register, to act like bits of code in the system. Active forms are markers of disposition, and disposition is the character of an organization that results from the circulation of these active forms within it. Since these forms are always changing, as is the complexion of disposition, they cannot be catalogued as elemental building blocks or terms in a glossary. Rather, identifying just a few among the many active forms that might be manipulated, redesigned, or rewritten only begins to crack the code, making more palpable the dispositions they inflect and providing some instruments for adjusting political character in infrastructure space. Still, as signs of ongoing processes—like the ripples used for river navigation—the practicality of these forms relies on their indeterminacy.

An important diagnostic in the fluid politics of extrastatecraft, disposition uncovers accidental, covert, or stubborn forms of power—political chemistries and temperaments of aggression, submission, or violence—hiding in the folds of infrastructure space.

Active Forms

Multiplier

A field of mass-produced suburban houses is a common phenomenon in infrastructure space, and it is an organization with clear markers of disposition. In the case of the US suburb of Levittown, the developer did not set out to make 1,000 individual houses, but adopted a kind of agricultural method of house building—1,000 slabs, 1,000 frames, 1,000 roofs, and so on. The site was effectively an assembly line separating the tasks of house building into smaller activities each of which could be applied across the entire population of houses in sequence. Beyond the activity of the humans within it, the arrangement itself rendered some things significant and others insignificant. The organization was actively *doing something* when it directed urban routines. It made some things possible and some things impossible (e.g., the building of an individual house different from all the others). There were different kinds of form involved: the object form of the house and the active forms that organized the components of the field. Levittown was simple software, and one obvious marker or active form in its organization was the multiplier. The house was not a singularly crafted object but a multiplier of activities. The developer, William Levitt, turned the site into an assembly line and the homes into a population of commodities, from their frames and roofs to their TVs and washing machines.

Redesigning a single house, or the object form of the house within the suburb, may not be as powerful as addressing the active form—in this case a multiplier. A designer who intervenes in the repetitive fields of suburban space with a single house will have little impact. But designing something to be multiplied within a population of houses has the potential to recondition the larger suburban field or hack the suburban software. For instance, when the car arrived in suburbia, it was a multiplier that required a garage to be attached to every house, and today recalibrating or reconceiving the car and its garage would multiply and spread spatial changes throughout a field of houses. More powerful than a single object form in these landscapes, multipliers piggyback on repetitive components.

The city grows or changes because of the multipliers that circulate within it—cars, elevators,

mobile phones, laws, real estate formulas, structural innovations, and security technologies among them. Just as the car is a multiplier that determines the shape and design of highways and exurban development, the elevator is a simple example of a multiplier that has transformed urban morphology. In the late nineteenth century, the elevator, together with the stackable floors of structural steel skeletons, made vertical buildings possible. Those that first appeared in Chicago and New York have evolved into the modern skyscraper—a prevalent spatial product in cities around the world. The elevator's propagation, rather than its movement up and down, makes it an active form with a disposition to multiply in urban environments. Since the elevator carries the genetics of the skyscraper, altering its routines potentially has collateral effects. For instance, contemporary elevator technologies that experiment with horizontal as well as vertical movements are the germ of a very different urban morphology. The designer who deploys a new conveyance vehicle may not design the vehicle itself but the way in which it propagates in and rewrites the urban landscape.

The presence of a multiplier is not the only reason why a mass-produced suburb does not deliver on its promise of a leafy country home, just as the elevator, as multiplier, is not the only reason for the urbanity of a city like New York or the isomorphism of the zone skyline. The multiplier is only one active form, one factor in assessing or adjusting a disposition, but it is present in almost all of the software of infrastructure space.

Switch/remote

In addition to the multiplier, another common active form in infrastructure space is the switch. An interchange in a highway network acts like a switch. A dam in a hydrological network, a terminal in a transit network, an earth station in a satellite network, or an internet service provider in a broadband network are all switches. Like the ball on the inclined plane, they establish potentials. Like a valve, they may suppress or redirect. The switch may generate effects some distance down the road or the line. It is a remote control of sorts—activating a distant site to affect a local condition or vice versa. Exceeding the reach of a single object form, the switch modulates a flow of activities. However deliberate the activities of the switch, it cannot control all of its own consequences any more than one could account for every use of the water flowing through a dam.

Infrastructure space is filled with switches and remote controls, most of which are also multipliers repeated throughout the system, and tuning these active forms tunes the disposition of an organization. For example, at the end of the nineteenth century and in the first part of the twentieth, the electrical networks that spread across developed countries promising decentralized access to power were often actually composed of a patchwork of local utilities—powerful nodes or switches in the network that had controlling monopolies.[2] In the development of telegraph, telephone, and fiber-optic submarine cables, any landing point for the cable acted like a switch in the network that could similarly develop a monopoly and affect onward service and pricing. In both cases, generating redundant switches in the form of multiple cable landings and multiple service providers potentially gave the network a more competitive and more robust disposition.

A typical highway interchange offers only a change of direction at constant speed. It is a switch in the network, but not a very smart switch. In traffic engineering, it was believed that statistical evidence of larger and larger populations of cars warranted more and more lanes of traffic. Yet increasing capacity only increased congestion, in part because of inadequate switches. Tuning the switches in the network would be one way of addressing the fallacies of the traffic engineering interchange. Volumes of traffic, like those in rush hour, could best be handled by the larger capacities of mass transit. A smarter, more resilient transportation interchange or station might then offer an

intermodal switch between highway, rail, air, and mass transit.

The character of the switches in electrical or highway networks is not the only reason why they can foster monopolies or congestion. But in each case the switch is one active form—one lever or dial in determining unanticipated dispositions in the networks.

Wiring/topology

The Königsberg Bridge Problem started with a bet in a pub. The challenge was to find a route through the eighteenth-century Prussian city of Königsberg that went from the city's central island and back again without crossing any of its seven bridges more than once. In 1735, the mathematician and physicist Leonhard Euler demonstrated that there was no possible route satisfying that criteria. In doing so, he developed a mode of analysis fundamental to contemporary thinking about network topologies—expressions of relative position and sequence in a network. Topologies model the "wiring" of an organization. It is perhaps telling that topological thinking originated with a game about circulating through urban space. Just as an electronic network is wired to support specific activities, so can space be "wired" to encourage some activities and routines over others.

Topologies are intuitive markers of disposition in an organization, and they can be considered to be assemblies of multipliers and switches. Just as we know the potential of the ball at the top of the incline, we are familiar with the potentials and capacities of networks that have, for example, linear, multi-centered, radial, serial, or parallel topologies. A linear network connects successive points along a line, as in the case of a bus, a train, or an elevator that connects sequential floors. The disposition of a linear rail system or a linear fiber-optic cable buried in the ground is different from the disposition of an atomized sea of mobile telephones. In a radial, or hub and spoke, network, like massmedia television or radio, a single central point controls the flow of information. Mainframe computing was a serial network that passed information sequentially, while a parallel network might be modeled as a more open mesh with information flowing simultaneously from many points.

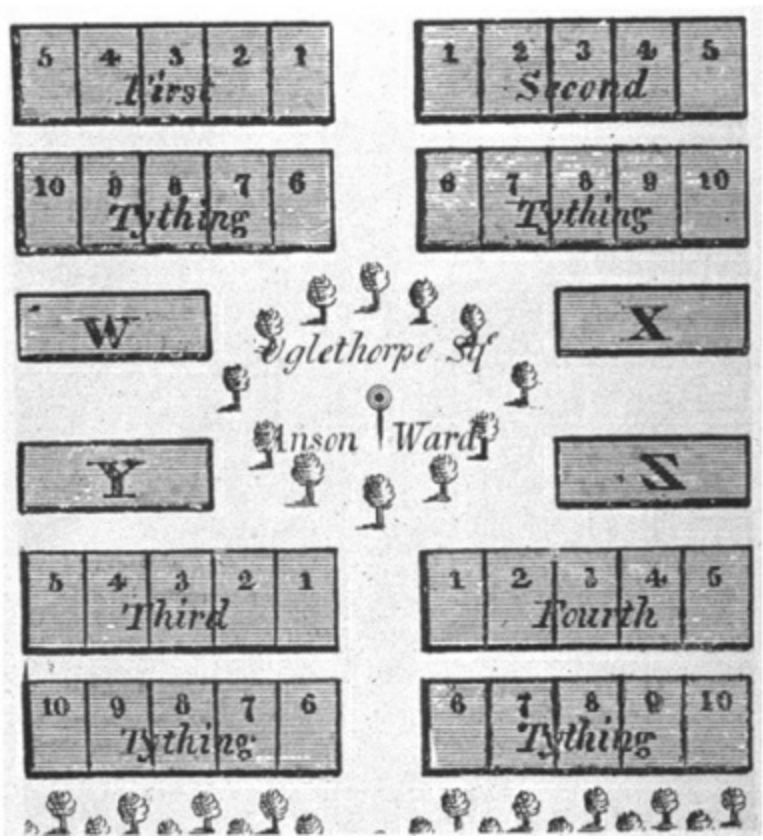
Topologies are also markers of political disposition insofar as they highlight the ways in which the authorities circulate or concentrate information. In the United States, the patchwork of local electrical utilities that generated a scattering of monopolies and inefficiencies was eventually absorbed into larger centralized monopolies like General Electric and Westinghouse. The internet, often theorized as an open mesh in which every point in the network can reach every other point, may really be more like a multi-centered organization. Sites like Google or Facebook may either help to filter information, making the web more salient and less chaotic, or shape an internet that operates more like a utility network with monopoly control.[3] While portrayed as relaxed and open, the zone enclave often assumes the disposition of a closed loop that will only recirculate compatible information. Yet mapping some of the zone incentives onto the city potentially changes its wiring and disposition, inviting more channels of information, circumstance, and contradiction that are the hallmarks of open, public urban space.

Again, although a contributing factor, topology alone does not determine the disposition of an organization. The same topology can sponsor very different kinds of social and political activity. Disposition in infrastructure space almost always involves compound conditions, relying not just on multipliers, switches, or their topological arrangement. It can be modeled as a network or as an *interplay* of many different kinds of active forms to create increasingly complex spatial software.

Interplay/governor

In 1733, James Oglethorpe designed a scheme for the New World city of Savannah, Georgia. To

control real estate speculation and damage from fire, he produced not a graphic master plan—a plat or a complete set of rectilinear blocks—but rather a growth protocol or governor that established relationships between different species of urban space. The town was to grow by wards, each of which was to contain a ratio of lots to green open space. A percentage of the lots around the green, called tythings, were reserved for residential and commercial properties, while another percentage was reserved for public or civic functions. For each ward that was developed, a quotient of agricultural space outside of town was automatically reserved. The ward was at once a multiplier and, like a calculus function, an expression of variability and interdependency where components balanced and offset each other. The Savannah protocol provided explicit geometrical instructions for each ward, but the pattern of accumulated wards could evolve without having to determine a fixed boundary or master plan of the town.



Typical ward, Savannah, Georgia

Savannah provides a vivid example of a suite of active forms, like multipliers and remotes, linked as interdependent variables in simple but sophisticated software that regulated an urban disposition. The growth protocol was like a governor in an engine or a thermostat that modulated the relative proportions of public, private, open, and agricultural space over time. It could direct not only additional development but also its cessation or contraction. Different from an object form, the Savannah software established the terms of an interplay between spatial variables.

The golf course community—another quintessential global spatial product—involves an interplay of active forms that, like the Savannah software, links interdependent spatial variables to perform as a governor. If the goal of Savannah was to control speculation, the goal of the golf course suburb or any spatial product is to maximize profit. Two crucial interdependent variables are the debt incurred from creating the golf course and the surface area of the course itself. The surface area determines the number of lots for course-side golf villas that can be sold to offset the debt incurred in constructing the course. The surface area governs the shape of the course and vice versa. Securing a celebrity

endorsement from the likes of Jack Nicklaus or Arnold Palmer adds 15 percent to the value of each villa—just one of many variables in the game the developers play. While the appearance of the course is important, the object form is less important than its software—the powerful bits of code underlying millions of acres of development all around the world.

Many active forms circulating in the software that makes up infrastructure space can be used to hack that software. While not offering comprehensive control over an organization, active forms can nevertheless be inserted to counterbalance or redirect a disposition. They can multiply across a field, recondition a population, or generate a network. Like cos*x* or the mathematical *delta*, they can be part of an explicit expression for one way that the field changes. Active forms establish a set of parameters for what the organization will be doing over time. They have time-released powers and cascading effects. When the object of design is not an object form or a master plan but a set of instructions for an interplay between variables, design acquires some of the power and currency of software. This spatial software is not a thing but a means to craft a multitude of interdependent relationships and sequences—an updating platform for inflecting a stream of objects. Like the engine of interplay that philosophers Gilles Deleuze and Félix Guattari call a "diagram," an active form does not represent a single arrangement. It is an "abstract machine" generative of a "real that is yet to come."[4]

As the levers of disposition in infrastructure space, active forms, in different linkages and interplays, are tools of extrastatecraft.

Knowing That and Knowing How

Ascriptions of dispositions are actions.—Ludger Jansen[5]

Most urban and architectural designers—perhaps reflecting sentiments of the broader culture—are trained to work on object forms or master plans rather than active forms in interplay. When summoned to create an active form, designers naturally rely on what they are best trained to create—a formal object *representing* action or dynamic process. A more simple-minded confusion (made more powerful by being simple-minded) arises when action or activity is confused with movement or kineticism. A building is shaped to suggest a dynamic blur of motion, or the circulation of inhabitants is mapped with a blizzard of arrows. The more complex or agitated these tracings, the more "active" the form is seen to be. Or, reflecting a modernist faith in the succession of technologies, the form might be considered to be active only if it is coated with the newest responsive digital media.[6]

The distinction between form as object and form as action is something like philosopher Gilbert Ryle's distinction between "knowing that" and "knowing how." With characteristic clarity and simplicity, Ryle once explained the difference between the two by using the example of a clown. The clown does not possess the correct answer to the question, "What is funny?" The clown's antics are not a single reasoned executive order. His knowledge and experience unfold in relation to the situation, from encounter to encounter, circumstance to circumstance. He has well-rehearsed knowledge of how to do a pratfall, exaggerate his facial expressions, modulate his voice, or introduce any other gag from his bag of tricks. What is funny involves a set of choices contingent on the audience's reactions, and the clown's performance relies on "knowing how" rather than "knowing that." For Ryle, the clown's skill represents "disposition, or a complex of dispositions."[7] "Knowing how" is, for Ryle, *dispositional*.[8]

Ryle's contemplation of disposition supports his broader critique of the mind-body split—a consequence of what he regarded to be the false logics of Cartesian dualism. He relished the fact that he often had to look no further than expressions in everyday speech to find the most withering challenges to these logics. Intelligence is often measured in terms of the amount of knowledge that can be acquired, identified, or named. Yet, as Ryle points out, a skill is not a logical proof that can be correctly or incorrectly reasoned. He argues for an intelligence or way of knowing that has to do with *knowing how* in mind and body. "A soldier does not become a shrewd general merely by endorsing the strategic principles of Clausewitz; he must also be competent to apply them. Knowing how to apply maxims cannot be reduced to, or derived from, the acceptance of those or any other maxims."[9] Addressing the designer, Ryle might have said that the object form of a master plan betrays a desire for *knowing that*, while a growth protocol like Savannah that unfolds over time exhibits a desire for *knowing how*. In infrastructure space, to ask "what is the master plan?" is like asking "what is funny?"

With simple examples Ryle demonstrates that disposition is something we already understand given that we use dispositional expressions to explain many common phenomena in everyday life. Ryle cites Jane Austen's changing perspective on the dispositions or temperaments of her characters as each novel unfolds. Only multiple observations of a person dealing with events over time can provide clues to their likely behaviors.[10] He also notes that non-human objects possess disposition. Only multiple deformations of rubber signal the material's disposition to elasticity, and only after time can one observe that it has lost its elasticity.[11] Just as the ball that does not need to roll down the incline, glass does not have to be shattered in order to be brittle. There is no need for movement or event. Disposition remains as a latent potential or tendency that is present even in the absence of an event. To "possess a dispositional property," Ryle writes, "is not to be in a particular state, or to undergo a particular change; it is to be bound or liable to be in a particular state, or to undergo a particular change, when a particular condition is realized."[12] It is a "hypothetical proposition" about the glass different from an event or "episode."[13]

To assess disposition is to assess how an organization deals with the variables over time—how it absorbs or deflects the active forms moving within it. Disposition does not describe a constant but rather a changing set of actions from which one might assess agency, potentiality, or capacity. Considering disposition to be determinate would be impractical. For Ryle, it is a subject of some mirth that dispositional attributes are sometimes regarded as fuzzy imponderables because they cannot be reified in an event or name. Ryle refutes those theories that associate disposition with "occult" agencies or regard things like the unshattered glass as temporal processes that are in "a sort of limbo world."[14]

Architecture and urbanism might have been a subject of Ryle's sport. Treating active forms and dispositions as mysterious, unknowable conditions that cannot be legitimatized as objects or representations risks losing access to the enormous political power residing in infrastructure space.[15] The designer is left, for instance, trying to address a machine for making golf villas with a single house, or a volatile landscape with a master plan.

Active form is not a modernist proposition; it does not replace or succeed object form but rather augments it with additional powers and artistic pleasures. The potential for both kinds of form is always present in any design. Using either is an artistic choice. Active form may partner with and propel object form determining how it will align with power to travel through infrastructure space. A design idea for suburbia becomes more powerful when it is positioned as a multiplier that affects a

population of houses. An urban scheme designed as a governor has a greater likelihood of remaining in place to influence growth.

Active forms, while perhaps under-rehearsed in the design disciplines, are quite ordinary in many others. A geneticist cannot represent all the gene sequences of DNA with an image of a double helix but can engage the ongoing development of an organism with an active form that alters one of those gene sequences. An environmentalist does not attempt to manage a forest by wiring every bird in every tree or planting every sprig of undergrowth, but will send in instrumental players that inflect ecologies over time. Entrepreneurs design not only the product but also its passage through a market, perhaps using a mobile phone network or a repetitive suburb to multiply products and desires. A computer scientist would never attempt to fully represent the internet but would rather author active forms that ride the network with very explicit instructions. In all these examples, there is no desire for a singular, comprehensive or utopian solution. Power lies rather in the prospect of shaping a series of activities and relationships over time.

The extrastatecraft of infrastructure space is artistically and intellectually attracted to the idea of designing action and interplay as well as designing objects. Even though design orthodoxies may favor a training in *knowing that*, some of the real power players in the world, for whom infrastructure is a secret weapon, would never relinquish their faculties for designing both object and active form—for *knowing that* and *knowing how*.

Temperament

When the social scientist and cybernetician Gregory Bateson referred to a man, a tree, and an ax as an information system, he made self-evident the idea that the activities of infrastructure space can be a medium of information. For those like Bateson who foretold the digital revolution but were not yet completely surrounded by digital devices, it was perhaps easier to understand that anything—human or non-human, digital or non-digital—could be a carrier of information. Like Ryle, Bateson did not regard this activity to be "supernatural" or occult, but rather saw information as an ordinary currency for exchanges between humans and non-humans.[16] "Information is a difference that makes a difference," he famously wrote.[17] Objects do not need to be enhanced by digital technologies or coated with sensors. To the degree that they "make a difference" in the world, they create influences, intentions, and relationships that constitute information. The information manifests, not in text or code, but in activity.

Bateson's work also tutors an understanding of the active forms that manage information in infrastructure space. He wrote about "governors," like those found in a thermostat or a steam engine, as mechanisms for modulating information—the temperature or pressure in a system—just as Savannah was a governor for modulating real estate speculation. Of switches, he wrote that a switch is a thing that "is not." In other words, the switch controls a dispositional flow of changes—a flow of information. "It is related to the notion 'change' rather than to the notion 'object.'"[18]

While Bateson's more comprehensive cybernetic speculations about homeostasis in organizations are perhaps to be avoided, his work further deepens an understanding of disposition with its speculations on temperament or political bearing—the tension, violence, stability, or resilience immanent in organizations. Bateson's catholic intelligence ranged across mathematics, communication technology, neurophysiology, game theory, and logic and did not subdivide the world into the subjects of different sciences. Assessing any subject with this cybernetic epistemology—be it electronic

circuits, nations, tribes from New Guinea, or Alcoholics Anonymous meetings—Bateson could also transpose sociological assessments of tension and violence to behaviors inherent in groups or to simple topologies and network relationships.

Bateson began by looking at a number of binary patterns in human behavior, whether between individuals or between groups, as in "Republican-Democrat, political Right-Left, sex differentiation, God and the devil, and so on." He noted that people even attempt to square off in binary oppositions over things that are "not dual in nature—youth versus age, labor versus capital, mind versus matter." So ingrained are these binary habits for group behavior that they induce myopia in their proponents. Bateson was interested in ternary systems as an alternative to binaries. He suggested that the proponents of binary relationships "lack the organizational devices for handling triangular systems; the inception of a 'third party' is always regarded, for example, as a threat to our political organization." He was especially interested in how and why such binaries generate divisive situations.[19] Three models of binary relationships receive the most attention in Bateson's writings: symmetrical, complimentary, and reciprocal.

In symmetrical relationships both sides of the binary compete for same dominant position. They mirror each other, and their mimicry may escalate toward "extreme rivalry and ultimately to hostility and the breakdown of the whole system."[20] Imagine identical twins competing for parental affection. Some of these binaries he characterized as complementary motifs: "dominance-submission, succoring-dependence, and exhibitionism-spectatorship."[21]

In complementary behavior, one party provides an ingredient necessary for the other. Think of the beta dog consistently submitting to the alpha dog to maintain the stability of the pack hierarchy. While submission might be reinforcing and stabilizing in some instances, it can also lead to hostility if "submissiveness promotes further assertiveness which in turn will promote further submissiveness."[22]

In reciprocal relationships, individuals or groups oscillate between symmetrical and complementary relationships. There is an understanding that dominance might be shared, or that one group might be submissive in some encounters and dominant in others. Reciprocal relationships distribute power over time and allow for the trading of roles in a way that stabilizes the relationship. Imagine a group of poker players who take turns letting each other win so that no one member is wiped out and the entire group can continue playing.[23]

It may seem far-fetched to assign temperament to infrastructure spaces, but concentrations of power, tension, competition, and submission are immanent in their arrangements. Applied to urban space, it is easy to see the latent violence in binaries of competition and submission such as East and West Jerusalem, San Diego and Tijuana, North and South Sudan, or the mirroring shores of Spain and North Africa.

Bateson also treats violence, tension, competition, and submission in terms of information flow. In competitive or destructive states, the flow of information collapses, whereas in balanced reciprocal organizations, information is more easily exchanged. Bateson considers the stabilizing effects of breaking binaries and increasing the possibility of exchange. His thinking highlights network arrangements that concentrate authority or constrict information, spatial relations that escalate violent situations, as well as organizations that are plural and robustly networked. Restrictions of information, like the closed loop of the zone or the monopolies in electrical or telecommunication networks, are—like the surface ripples on the river—markers of more complex and potentially dangerous dispositions.

Stories are Active Forms

Stories that a culture tells about infrastructure space can script the use of that space; yet in the case of highways, ARPAnet, electrical utilities, Facebook, or the zone, the organizations slipped away from the stories that were attached to them. The misalignment between the activity of an organization and its stated intent is often the first signal of an undeclared disposition. Yet beyond the declaration of intent, some social stories play an additional, powerful role in the ongoing process of shaping disposition.

The sociologist, anthropologist, and theorist Bruno Latour has long recognized that networks like infrastructure space are *active* and that they are composed of social and technical actors. Humans shape infrastructure space deciding, for instance, that electricity will be used for power, lighting, and telecommunications as a public utility accessed via sockets and plugs. But for Latour non-human technologies are also actors. Humans create computers, for example, but computers in turn act upon humans. They are shaped to human needs as devices that respond to hands and laps, but they also inspire further human uses and even the very mental structures that conceive of them. That altered way of thinking influences in turn the next iteration of the computer. In other words, technologies are non-human actors or "actants" influencing the desires and practices of the humans who reciprocally shape them. Indeed, beyond the human/non-human binary for Latour nothing is *merely* an object. Everything is "doing something" and cannot be separated from its actions.[24]

Latour uses this observation to destabilize the habits of his own discipline. He has been critical of those studies of social-technical networks that use evidence merely to confirm existing presumptions about social patterns or habits.[25] In response, he offers an analytic framework that he calls actor-network theory (ANT) to renovate and "[redefine] sociology not as the 'science of the social', but as the *tracing of associations*."[26] Rather than codifying or taxonomizing the social or cultural story, he describes a dialogue between humans and non-human technologies that is constantly unfolding and impossible to fix.

An active form can be organizational like a multiplier, a remote, a switch, or a governor, but since the social and technical interact with each other, an active form can also be a social story—not a vessel in which to fix meaning but a carrier to channel a flow of meanings. Form, Latour writes, is "simply something which allows something else to be transported from one site to another … To provide a piece of information is the action of putting something into a form."[27]

A story as an active form, however immaterial and non-spatial, can inflect disposition in infrastructure space and can be deployed with spatial intent. For example, the developer William Levitt associated his suburban housing with familial and patriotic narratives that were particularly infectious in the post-war period, and such stories accelerated the spatial effects of the house as multiplier. The house, its repetitive organization, and the story attached to it all constitute information that contributes to disposition. Similarly, cultural stories about the zone as a rational, apolitical instrument of economic liberalism are active forms that, however disconnected from the actual activities of the organization, drive the zone's popularity and shape its disposition. A new persuasion about the zone mapped back onto existing cities can be designed as a multiplier with both social and technological components—actors and actants that together alter urban space.

Latour, like Ryle, also uses theatrical performance as a model for the ways in which a string of social actions or stories can influence social-technical networks. Noting that it is "not by accident" that words like script and actor are used in social studies, Latour writes, "Play-acting puts us immediately into a thick imbroglio where the question of who is carrying out the action has become

unfathomable." Actions are "dislocated … borrowed, distributed, suggested, influenced, dominated, betrayed, translated."[28] Social networks are "a conglomerate of many surprising sets of agencies that have to be slowly disentangled. It is this venerable source of uncertainty that we wish to render vivid again in the odd expression of actor-network."[29]

In some of his formulations of ANT, Latour even makes passing reference to the sociologist Erving Goffman. While distancing himself from more conventional sociology, Latour uses Goffman to make palpable the activities that surround social interactions in excess of declared intentions. Goffman used the word "disposition" to refer to all the gestures, postures, facial expressions, and myriad subtexts deployed in an individual's almost theatrical presentation of self.[30] He marveled that while all these signals often overwhelm, or are "discrepant" from, what a person is actually saying, they are rarely "systematically examined."[31]

Discussions of performance, indeterminacy, and discrepancy in Ryle, Latour, and Goffman are suggestive of special aesthetic practices used to confront the politics of infrastructure space. With an artistic repertoire like that of a performer, the designer of active forms, comfortable with less control, works on an unfolding stream of objects rather than a single shape. For the designer of stories as active forms—social forms that are nevertheless intended to have spatial consequences—discrepancy presents additional opportunities. Just as the powers that be in infrastructure space are usually offering persuasive stories that are decoupled from what their organizations are actually doing, performers are accustomed to the idea that action is a carrier of information that may be discrepant from the stated text. Actors have a script (e.g., "come home son"), but their real work lies in crafting an action, usually with an infinitive expression (to grovel, to reject, to caress).[32] The action, not to be confused with movement or choreography, is the real carrier of information, meaning, and change, and it may be entirely disconnected from the text. Comfort with crafting discrepant, indeterminate action allows design to engage both the naturally occurring dislocations of meaning as well as the duplicitous politics of extrastatecraft.

Diagnostics

> *Neither deterministic nor wholly malleable, technology sets some parameters of individual and social action … Different technologies make different kinds of human action and interaction easier or harder to perform.*—Yochai Benkler[33]

Disposition is an extra diagnostic tool for assessing undisclosed capacity or political bearing in infrastructure space. A multitude of active forms can be used to both detect and adjust a disposition. Like powerful bits of code that can hack the infrastructural operating system, these forms may be technological, organizational, or social. Indeterminate in order to be practical, such forms deliver not a plan but an interplay capable of adjusting different situations and managing a disposition over time.

A contemplation of disposition also summons Michel Foucault's theories about a social and political "apparatus" or "system of relations" that he called a *dispositif*. For Foucault a *dispositif* was "a thoroughly heterogeneous ensemble consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions—in short, the said as much as the unsaid."[34]

The designer of disposition in infrastructure space is a performer. Active form supplements the aesthetics of object form while addressing the politics of discrepancy in extrastatecraft. Not limited to prescription, the designer can engage in improvisation—in the pleasures of *knowing how* as well

as *knowing that*.

Finally, a reading of Latour also offers cautions that are further discussed in the chapter titled "Stories." The stories that humans attach to technologies like infrastructure space can become enshrined or ossified as ingrained expectations. Stories may evolve beyond fluid scripts for shaping a technology into ideologies that dictate the disposition of an organization. However immaterial, these ideological stories have the power to buckle concrete and bend steel, and they can often be difficult to escape.

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1 François Jullien, *The Propensity of Things: Toward a History of Efficacy in China* (New York: Zone Books, 1995), 29.

2 Thomas P. Hughes, *Networks of Power: Electrification in Western Society 1880–1930* (Baltimore: Johns Hopkins University Press, 1983), 14, 404–60; David E. Nye, *Electrifying America: Social Meanings of a New Technology* (Cambridge, MA: MIT Press, 1990), 182, 266, 349, 385–9.

3 Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (New Haven: Yale University Press, 2006), 20, 7–16, 19–20, 278–85.

4 Gilles Deleuze, *Foucault*, trans. S. Hand. (Minneapolis: University of Minnesota Press, 1988), 37; Gilles Deleuze and Félix Guattari, "On Several Regimes of Signs," in *A Thousand Plateaus* (Minneapolis: University of Minnesota Press, 1987), 141, 142.

5 Ludger Jansen, "On Ascribing Dispositions," in Max Kistler and Brouno Gnassounou, eds. *Dispositions and Casual Powers* (London: Ashgate, 2007), 161.

6 Many contemporary architects use computer software and parametric thinking in the design of object forms. The discipline rarely applies parametric thinking to active forms—to the relationships *between* objects in the time and space of an expanded urban field. While digital software is not necessary to the contemplation of spatial software, Bruno Latour muses about digital software that not only manipulates geometry but also draws into interplay a web of other urban circumstances and consequences. See the interview with Bruno Latour by María J. Prieto and Elise S. Youn, "Debriefing the Collective Experiment," July 5, 2004, at academia.edu. Carlo Ratti and Joseph Grima's "Open Source Architecture" is a manifesto that imagines a more diverse role for digital media in architecture and urbanism. Digital media provides a common platform, like a wiki, to collect shared components, direct fabrication, and interface with the city—a city so embedded with digital devices that it has become an "internet of things." Carlo Ratti, Joseph Grima and additional contributors, "OSArc," *Domus Magazine*, no. 948 (June 15, 2011); Keller Easterling, "An Internet of Things," *E-flux*, (Spring 2012), at e-flux.com.

7 Gilbert Ryle, *The Concept of Mind* (Chicago: University of Chicago Press, 1949), 27–33.

8 Ibid., 27–32, 17–33.

9 Ibid., 31.

10 Ibid., 42–4.

11 Ibid., 125.

12 Ibid., 43.

13 Ibid., 89, 116.

14 Ibid., 119–20.

15 Artists and architects have, at various junctures, pursued design as software or an interplay of active components. For artists like Jack Burnham or Les Levine, software was at once a literal tool and a model or metaphor. The architect Cedric Price designed architecture as a performance of components rather than a single object, in projects like Fun House or Generator, among many others. Architect and mathematician Christopher Alexander used set theory to organize the relationships between components of urban and architectural design, arguing for the semi-lattice rather than the hierarchical tree as the underlying structure. Nicholas Negroponte's Architecture Machine Group attempted to use urban space as a physical test bed for an expanded field of computing. While the occasional desire for determinacy arguably weakened some of these experiments, they have, however anecdotally, nourished the project of active forms. See Jack Burnham, *Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of This Century* (New York: G. Braziller, 1968); Cedric Price, *The Square Book* (London: Wiley-Academy, 2003), reprint of Cedric Price, *Works II* (London: Architectural Association, 1984); Christopher Alexander, "The City is not a Tree," *Architectural Forum* 122, nos. 1 and 2 (April-May 1965), 58–62; and Nicholas Negroponte, *The Architecture Machine* (Cambridge, MA: MIT Press, 1970), 70–93.

16 Gregory Bateson, *Steps to an Ecology of Mind* (Chicago: University of Chicago Press, 2000), 464, 472.

17 Ibid., 381, 462, 315, 272, 21.

18 Gregory Bateson, *Mind and Nature: A Necessary Unity* (New York: Hampton Press, 2000), 101.

19 Bateson, *Steps to an Ecology of Mind*, 95.

20 Ibid., 68.
21 Ibid., 95
22 Ibid., 68.
23 Ibid., 68–9.
24 Latour, *Reassembling the Social*, 52.
25 STS scholars and theorists would include Bruno Latour, Wiebe E. Bijker, Trevor Pinch, Thomas P. Hughes, Thomas J. Misa, and David E. Nye among others.
26 Latour, *Reassembling the Social*, 8n11, 5. Latour criticizes Durkheimian practices and steps away from, for instance, Erving Goffman's or Pierre Bourdieu's work. Goffman and Bourdieu both use the term "disposition" in a way most pertinent to social studies. Bourdieu, who was also transposing his work to an active realm of practice, used the word to describe a repeatedly structured set of cultural activities or *habitus*. Latour perhaps extends this by suggesting that sociology might overcome its own *habitus* to further consider evolving practices. In this he departs from a branch of sociotechnical studies, arguing that it sometimes enshrines social forms as structured patterns and habits or reifies the structures of social "science." These are the very constructs he wishes to renovate by considering both humans and things, actors and non-human actants, in networks. He raises questions, for instance, about Wiebe Bijker's account in *Social Shaping of Technology* (1995), because "the social is kept stable all along and accounts for the shape of technological change."
27 Ibid., 39, 223.
28 Ibid., 46.
29 Ibid., 44.
30 Ibid., 46; Erving Goffman, *The Presentation of Self in Everyday Life* (New York: Anchor Books/Doubleday, 1959), 141–66.
31 Goffman, *The Presentation of Self in Everyday Life*, 254–5.
32 Sharing a sensibility for theater, Ryle, for instance, makes a distinction between active or "performance" verbs and verbs like "'know,' 'possess' and 'aspire.'" One would not say, for example, "'he is now engaged in possessing a bicycle.'" See Ryle, *The Concept of Mind*, 130, 116.
33 Benkler, *The Wealth of Networks*, 16–17. Network theorist Yochai Benkler refers to what STS philosopher Langdon Winner called the "political properties" of technology, or what sociologist Barry Wellman called its "affordances," which describes some of the special capacities of social media and the internet; see also Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010).
34 Michel Foucault, "The Confession of the Flesh," a round table interview from 1977, in Foucault, *Power/Knowledge: Selected Interviews and Other Writings*, ed. Colin Gordon (New York: Vintage Books, 1980), 194.