Global Cities vs. "global cities:" Rethinking Contemporary Urbanism as Public Ecology

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A Point of Departure Human beings have always wrought destruction in their natural environments. Until the twentieth century, however, this damage was either limited and local or it was widespread in only a handful of large conurbanations centred in the imperial economies of the planet's northern hemisphere.[1] Today, however, the inhabitants of hundreds of large cities all over the world are relentlessly reshaping the traditional and modern economies of every continent as they exert global and local demands in "glocalized" spaces for energy, foodstuff, information, labour, and materiale through world markets.[2] Hence, this analysis responds to the call for paying more attention "to urban ecologies and the policies developed around them as part of the formation of world cities"[3] by exploring the environmental impact of generalized urbanism or "global cities."

Because of this unchecked proliferation of such citified spaces in the twentieth century, it is no longer as clear that "Nature" is what surrounds humans in cities.[4] Instead, one must ask if the worldwide webs of energy, information, material, and population exchange flowing between cities around the world now are infiltrating "Nature" so completely that this new artificial ecology will undercut entirely the survival of human and nonhuman beings?

Plainly, there is a handful of major metropoles—like London, Frankfurt, Hong Kong, Tokyo or New York—where the command, control, communication, and intelligence func-

tions of transnational commerce is highly concentrated. Many researchers have investigated the peculiar qualities of urban life in these Global Cities and they are, in many ways, the limit cases of global urbanism.[5] In many other ways, however, focusing upon such extraordinary Global Cities misses another qualitatively different transformation unfolding behind the quantitative proliferation of urbanized living in all "global cities."[6] While the work of Global Cities leads into the spread of "global cities," it is at the latter sites, rather than the former, where the rising level of a globalized urbanization is overwhelming the Earth's natural ecology to the point of threatening the sustainability of the entire planet's human and nonhuman life.

Today's "global cities," then, are entirely new built environments tied to several complex layers of technological systems whose logistical grids are knit into other networks for the production, consumption, circulation, and accumulation of commodities. Along with sewer, water and street systems, cities are embedded in electricity, coal, natural gas, petroleum, and metals markets in addition to timber, livestock, fish, crop, and land markets. All of these links are needed simply to supply food, water, energy, products, and services to their residents. Thus "global cities" leave very destructive environmental footprints as their inhabitants reach out into markets around the world for material inputs to survive, but the transactions of this new political ecology also are the root causes of global ecological decline.[7]

In 1900, only 10 percent of the world's 1.6 billion people lived in cities. During 2000, just over 50 percent of the world's six billion people lived in cities. And, by 2050, 67 percent of a projected population of 10 billion people supposedly will live in cities.[8] Today's premier Global Cities plainly are intriguing but the more ominous numbers posed by all "global cities" taken together are far more threatening. Urbanism on this scale is creating a set of contested regions where command and insubordination, control and resistance, communication and confusion, and intelligence and incomprehension must all be rejiggered daily as transnational commerce dumps an ever-accelerating turnover of goods and services into the global economy. With over 50 percent of humanity now residing in urban areas, the quantitatively growing logistical pull of

all global cities together constitutes a new political ecology whose demands have acquired such operational mass that they are qualitatively more distinct and interesting.

Rykwert believes it is mistaken "to consider the city as an 'organic' or a 'quasi-natural' entity."[9] While this might be true, cities do have ecologies and the ecological impact of all global cities as a system of biopolitics is building up into this wholly new built and unbuilt environment. Sassen claims Global Cities should be regarded as "highly concentrated command points in the organization of the world economy."[10] Knox asserts Global Cities must be seen as sites that are "powerful centres of economic and cultural authority within the contemporary world-system."[11] Global Cities, then, brim with the people who are constantly engaged at "greasing the wheels of production, finance or commerce through face-to-face contact."[12] Of course, not all sections of any world city meet these descriptions of the Global City, as many areas in Los Angeles, New York, Mexico City or Sao Paolo all show. Global Cities, as this literature defines them, vary slightly in form and function, locations and links, centrality and peripherality but they are interesting as a group because this small select set of cities has such densely interlinked ties to each other managerially, fiscally, and culturally.[13]

To play off of Friedman's analysis of Global Cities, "global cities" demarcate the fullest forms of the world's new spatial division of labour.[14] Thus, global cities are major sites for the concentration and accumulation of global capital as well as global labour causing spatial, class and ecological polarization. The collective of global cities begins to constitute a "world of near complete internationalized urbanization."[15] Consequently, the larger ecology implied by the aggregate collectives of global cities is "an array of urban ecologies: 'environments' in the plural" that must address "global populations, globalized everyday practices, and internationally diversified gender relations, as well as images and uses of nature."[16]

Many discussions of Global Cities, then, typically approach them in "metageographical" terms,[17] trying to gauge how much they fully subsist in a space of flows, or still persist in the space of territories.[18] A cartography of states driven by Westphalian logic of territorialized sovereignty still occludes

the charts and maps that tracking flows would require, Storper and Sassen both focus upon big world cities in their Global Cities models. Storper argues, on one hand, that cities are key concentrations of "metacapacities" where a reflexive modernization requires large size to work well, while Sassen asserts, on the other hand, that global cities are marshalling centres for high-end producer services, particularly in the areas of financial and managerial value-adding.[19]

As the Loughborough University Globalization and World Cities (GaWC) group illustrates, many traditional efforts at Global Cities analysis map mostly these intercity linkages to see how Global Cities provide the high-level command, control, and communication services needed by global economy through intercity linkages among themselves.[20] Hence the GaWC group actually ranks world cities into arrays of magnitude and interconnection as "alpha," "beta" or "gamma" world cities to find which Global Cities dominate world service linkages and stand out as vital service centres.[21]

This work on Global Cities and their interconnected networks is interesting, but these static views of the links, magnitudes of interaction, and primacies in various industries among Global Cities is not the whole story. All of these links taken together now also constitute a vast megalogistical collective whose aggregate ecological effects are redirecting the world's built and unbuilt environments. The "global cities" approach must ask how this new "organizational architecture for cross-border flows" affects all local and global ecologies, fixed territorial sites, and streams of commodity circulation.[22]

Sassen speaks of this "organizational architecture" for "new global economic processes" as something which can override the dualities of global/national.[23] As it does, this collective thereby can "denationalize" particular elements of once strongly national states.[24] This allusion is interesting but, more importantly, it is critical to ask how the twin dynamics of globalization and denationalization also are "denaturing" the environment and "desocializing" the society they collectively influence. The ecologies between, beneath or behind the Global Cities' organizational architectures are increasingly public but subpolitical, largely artificial environments but rooted in many layered unbuilt ecologies, globally flow-based but locally frozen in particu-

lar territorialized material sites and spaces. Global Cities do make possible a new metageography, but this spatial frame has its own metaecological realities that become manifest in the logistics of the many global cities being infiltrated and influenced by the high-end command, control, and communication dictates of a few Global Cities.

Rather than focusing upon that handful of Global Cities which serve as the core nodes in networks for global capitalism, this study instead asks about the collective impact of all "global cities." As a planetary system of material production and consumption, these built environments constitute much of the worldwide webs of logistical flows which swamp over the conventional boundaries between the human and the natural with a new biopolitics of urbanism. Here, critical environmentalism must fuse the concerns of public health with the goals of sustainable ecology in public ecology. Decisions that are made and patterns that become fixed in a subpolitical fashion must be identified, addressed, and corrected in a more political register. Public ecology is a strategy for opening these discussions and effecting these changes.

Global Cities are the usual suspects in the line-up of world cities. They are, typically, presented in a fairly conventional manner. As Keil observes, they are seen as limited in number, tightly interconnected in function, located at the centre or semiperiphery of the global economy, and formed by abstract forces.[25] A global cities perspective tries instead to address how ecological sustainability, municipal politics, and global citification interconnect in "local social struggles that try to keep damaging consequences of globalization by bay."[26]

In this respect, Keil is quite right: "the world city is a place where the global ecological crisis manifests itself concretely."[27] Looking at "global cities" combines this insight with Friedmann's and Wolff's recognition that "world cities are the control centres of the global economy" by looking at world cities as control centres as well as controlled centred sites.[28] Moving from a perspective that counts and measures all Global Cities, like the work done by the GaWC project, to one that gauges the overall impact of the general citified formations marked by "global cities" is much more important. Here ecology does not stand outside of, and apart from, urbanism, which permits a critical analysis that emphasizes

"the social nature of nature and the natural basis of society," and leads to a point where "finding a strategy to solve ecological problems leads potentially to a democratization of society, economy, and the state."[29]

Focusing upon the "metageography" of Global Cities, and studying these urban forms as core nodes in commercial networks, is highly useful for understanding how they shape and steer the world's megalogistical systems as a "private ecology." Yet, the work of these five, ten or twenty Global Cities now has led to over a half of the world's human population living in urban settlements. Global Cities are small in number, but "global cities" are many in number. The impact of the carrying charges against the Earth's ecological carrying capacity for these hundreds of settlements should force everyone to see the privatized ecology of Global Cities as a highly public ecology which must be repoliticized, resocialized, and relocalized by environmental activists in many everyday struggles. The costs of allowing large corporate formations to privatize urban ecologies are unacceptable, and the metaeconomic questions about how humans should live with all other nonhuman beings and things must be addressed by public ecology.[30] Public ecology can, of course, be discussed apart from "global cities," but the environmental challenges posed by sustaining the logistical grids that Global Cities have propounded for "global cities," as well as global towns and countrysides, provide a critical point of departure for this discussion.

Urbanism as Logistics As the art of moving war materiale and quartering troops, logistics is about organizing and sustaining supply chains, but it also suggests the bigger issues of lodging, accommodation, and shelter for people as well as moving whatever materials are needed to sustain those activities. In many ways, cities are essentially concretions of logistics past, articulations for logistics present, and speculations about logistics future. And understanding these enduring elements in the creation of urban civilization is captured best by reconsidering the ecological links they create between, with, and after human beings and nonhuman things. From small changes in the daily traffic of materiale in human collectives, major ecological outcomes occur later, in succession to, and after such modifications in the movement of things and people.[31]

Immense logistical spaces, then, are always carved out beyond, beneath or behind the flows of urban existence. They help produce the permanent quarters of urban space, which fixes the conditions for quartering of city residents. These spaces also materially concretize all the arts and sciences of the broader civilization underpinning global cities. Here one sees the complex codes, collectives, and commodities of global commerce creating products and by-products out of global society's logistical exchanges, which are all dramatically recontouring the world's economies and environments around a highly privatized transnational, but still mostly transurban, trade. Cities remain pivotal sites at which the everyday exchanges between built and unbuilt environments occur, but they also are where much of what is regarded as international relations between different spatially divided economies, governments, and societies transpire.

Clearly, as Keil said in 1998, any single Global City is a particular site where larger forces burrow into a given place in specific but also varied ways, localizing the global in some determinate fashion. Yet, all of these determinate formations in the aggregate now also add up in the collective megalogistics of global cities which a handful of Global Cities has made much more possible. The logistics of contemporary American urbanization, for example, presume that 1,000 average homes need about one megawatt of electric generating capacity to meet their power needs. Everyone believes that "increasing demand" is "forcing" the USA to build more power plants to meet demand increases, but what increases demand, and how is this demand met? US Department of Energy Secretary Spencer Abraham asserts the nation will need 65 new power plants every year for the next twenty years to meet this rising demand.[32] Yet, other design arrangements could allow a megawatt of generating capacity to serve 3,000, 5,000 or 10,000 average homes by changing home design, lowering power requirements or curtailing use. Such "negawatts" would, in turn, create different metropolitan spaces and urban systems. These technically feasible options, however, are not valorized by the Global Cities' existing mix of codes, collectives, and commodities. So the reigning cultures of materiale use in advanced urbanism shape contemporary consumption in global cities to support that private ecology.

Consequently, a more wasteful logistics of energy production and pollution by-production is accepted in most urbanized areas, which simply must produce more power to meet higher demand. In turn, air quality declines, respiratory afflictions increase, forests die, and watercourses degrade as sulfur dioxide, nitrous oxide, and small particulates rise. Hence, the urban spaces of global cities occupied by human actors supposedly seeking liberty, equality, and fraternity are now crosscut by many other asymmetrically collectivized nonhuman structures of production that retard those struggles. The larger sense of the Earth's ecology must admit to these privatized global realities. "Certainly we continue to have," as Hardt and Negri argue, "crickets and thunderstorms...and we continue to understand our psyches as driven by natural instincts and passions; but we have no nature in the sense that these forces and phenomena are no longer understood as outside, that is, they are not seen as original and independent of the civil order."[33]

The grids of global cities simultaneously are works in the present for what is hoped to be greater future logistical efficiency as well as past products of what was once believed to be efficient logistical greatness. Citification has led to rich civilizations, but those cultural advancements typically were highly localized, rarely permanent, and still subject to decay and collapse. Only with the advent of global capitalism and industrial production over the past five hundred years have cities become much more than huge agricultural villages.

Medieval London held fewer than 60,000 people, and its core area was only about 700 acres.[34] By 1800, it had nearly one million people and a large network of roads, horse-drawn public transport, and latter railways were needed to move people and things within an urbanized region composed of many scores of square miles. Until 1800, the cities were by and large not unlike they were in 800 AD or 80 AD. Only about 2.5 percent of the world's population lived in cities in 1800, but this quadrupled to 10 percent in 1900, and then quintupled again to 50 percent by 2000. In 1800, only two cities in the world—London and Edo—held a million people; in 1900 ten cities did, but in 2000 almost 300 cities did.[35] The world's urban population, in turn, grew from around 225 million in 1900 to right at three billion in 2000.[36] While large

cities covered about 0.1 percent of the world's land in 1900, this figure grew ten-fold by 2000 to about 1.0 percent.[37]

To comprehend fully the destructive demands of today's transnational urbanism, one must accept how globalization is operating now in 2001. This acceptance is important if one hopes to understand how fully the reticulations of power and knowledge work in most locales through what Baudrillard has identified as "the system of objects" in culture, urbanism, and globalization on a local, national or global level.[38] All of these terms, however, are quite mutable in their meanings, and they are constantly evolving everyday in new objectifications of the systems at play in objects—capitalism, nationalism, technology, urbanization—within globalization.

Globalization: A Private and Public Ecology Globalization has become a powerful framework for analyzing social trends in the twenty-first century. Still, as one scans events from the twentieth, nineteenth, eighteenth, seventeenth, sixteenth, and fifteenth centuries it is clear that it is a long-running process as European capitalist states, enterprises, and cities have been building world markets around first, the Old World, and then the New World in pursuit of their goals of greater global power and profit. While recognizing the speed and scope at which today's networks of globalization work, one should be cautious about how powerful, innovative or unprecedented the effects of globalization per se are judged. They were equally, if not more, disruptive in the fifteenth or seventeenth centuries because most human settlements were still fairly unique and largely disconnected locales rather than more uniform modes in fast capitalism's worldwide networks of exchange.

Amidst today's globalization, it is "globalism" that seems to be what is most unique about the present moment, because this ascendant professional-technical-intellectual worldview holds:

> The world market eliminates or supplants political action—that is, the ideology of rule by the world market, the ideology of neoliberalism. It proceeds monocausally and economistically, reducing the multidimensionality of globalization to a single, economic dimension that is itself conceived in a linear fashion. If it

> mentions at all the other dimensions of globalization—ecology, culture, politics, civil society—it does so only by placing them under the sway of the world-market system.[39]

Consequently, globalism entails a set of beliefs and practices that suggest states, societies, and cultures can be run essentially like a corporate capitalist enterprise. Yet, "this involves a veritable imperialism of economics, where companies demand the basic conditions under which they can optimize their goals."[40] Without a world state to guide the world society, companies have, in turn, the best possible conditions for growth: "a globally disorganized capitalism in continually spreading out. For there is no hegemonic power and no international regime either economic or political."[41]

While there perhaps is no single hegemonic power today, the dilemmas posed by preserving the health of the world environment suggest this hegemonic form of globality is at work. Moreover, many globalists are willing to push certain conditions of consumption to advance globalization into where it does not yet exist, even though there are many resistances. Most political rulers and corporate managers are working quite openly to perfect this new private ecology. It is being built to bring many more global goods and services to consumers as a part of, first, their on-going programs to advance globalization; second, as an implicit sign of their globality, and, third, as a marker, complicitly of their shared submission if only for now, to globalism.

The privatization of collective ecological goods, as it is celebrated in the quest for greater performativity, is not advancing everyone's welfare. On the contrary, these practices are leading down paths that often are producing greater and greater malfare. Not only is the earth's "natural ecology" being degraded, but so too is the "social ecology" being neglected. Corporate visions of private ecology often discount healthy built environments, health care systems, and health-centred lifestyles to advance global growth; hence, these utilities are not being maintained or not being developed at all. Likewise, a provision of potable water, edible food, safe housing, efficient sewerage, reliable hospitals, and effective medical care as mandatory features of many built environments has never been done.

Even worse, if it has been attained then it is not sustained, as one sees in what was once the USSR. Indeed, the clearest example of disturbing health trends is the general demodernization, (and its consequent negative social impact) of the former Soviet Union. From 1917 through the early 1970s, public health advances raised human life expectancy to over 70. Yet, the general deterioration in environmental health, diffident approaches toward vaccination, poor nutrition, and increased alcoholism have all devastated the health of the former Soviet Union. By 1995, overall life expectance had fallen to less than 65, and to 58 for men.[42] Basically, the public ecology of an entire nation has imploded due to corruption, disinterest and underfunding.

A critical review of this private ecology suggests the everyday industrial metabolisms of urban life in global cities are denaturalizing the prehistoric equilibria of the Earth's ecologies. There is considerable debate about these points, but one can see innumerable markers for these transformations piling up rapidly in planetary alterations of incredible proportions. CFCs produced mainly as refrigerant, insulating, and packaging materials have measurably degraded the Earth's protective ozone layer, causing more animal and human skin cancers, lower crop yields, and massive die-offs of some amphibians. Tremendous increases in CO_6 levels from fossil fuel and biomass burning are changing atmospheric dynamics and raising surface temperatures on the Earth.[43] Nearly 450 million tons of hazardous wastes—ranging from heavy metals, chemical by-products, or nuclear materials to biomedical contaminants, harmful pesticides, or asbestos materials—are infiltrating soils, waters, and food chains.

About a decade after the arrival of Spain in the Americas, and a few decades after sea-borne commerce to Asia was begun by Portugal, the world's annual GDP stood in 1500 at about $240 billion (1990 US dollars), which was more than Pakistan but less than Taiwan today.[44] Over three centuries later in 1820, global levels of GDP were at $695 billion—or more than Canada but less than Brazil today.[45] The remarkable revolutionization of production in the nineteenth century boosted world GDP to $1.98 trillion by 1900, but this was less than Japan's stagnating economy in the 1990s.[46] War, depression, and more war crippled the growth of many

economies, but the world economy reached $5.37 trillion by 1950. This level of world GDP equaled the GDP of the United States in 1991, and in many ways this was the zenith of the highly statalized national economies created over the past 150 years of industrial development.[47]

Over the next fifty years, the intensification of production through globalization, high technology, and Cold War competition by loosely coupled transnational exchange truly changed the level and scope of world GDP. By the mid-1990s, it was nearly $30 trillion, or about six times greater than 1950.[48] While there were only 7,000 transnational firms at work in 1970, over 53,000 were in business in 1998. Over five billion tons of goods were shipped worldwide in 1998, which is up from less than 850,000 million. Two million people cross international borders everyday, and over 2.6 trillion air kilometers were flown in 1998 continuing the nine percent annual growth rate since 1950.[49] Once again, these apparently innocuous quantitative increases in human traffic between urban and rural areas are contributing to new qualitative transformations in the world's environments.

When the aggregate levels of world GDP for the year 1500 are indexed at 100, the mid-1990s level, expressed again in 1990 US dollars, they equal just at 12,000, while the per capita figures of world GDP are $565 in 1500 and over $5,100 in the mid-1990s. Ironically, the world's economy has increased 120 times from the years 1500 to 2000, but the average income has risen only about nine times.[50] Moreover, one finds nearly a billion people today living on a dollar a day or less, which is less than two-thirds the world's average per capita GDP in 1500.

Population, as Foucault would argue, is undoubtedly the motive force pushing economic growth upward. In the year 1500, global population stood at 400 or 500 million, but it had increased to that level quite slowly from the year 1 AD when it was around 200 or 300 million. By 1820, world population had doubled to about a billion, and then skyrocketed to 1.6 billion in 1900, 2.5 billion in 1950, and over five billion in 1990, and six billion in 2000.[51] These increases in economic output and population growth did not occur without unshackling sources of energy and matter that were largely underutilized or unavailable before the 1820s. Moving to agri-

culture from hunting and gathering in the Neolithic Revolution created new sites of energy utilization, information application, and material accumulation in cities and towns, but until the Industrial Revolution simple sources of animal, plant and human energy supplied 80 to 85 percent of all power sources.[52] The transition to fossil fuels in the nineteenth century created a new environment for energy production and use as well as energy by-products and abuse, because the capacity of human and animal muscle power coupled with primitive wind and waterpower was quite limited.

On the threshold of the Industrial Revolution, after decades of low-pressure steam engine development, world energy use was the equivalent of 400 million metric tons of coal a year. During the next two centuries, it rose to 1,900 million metric tons in 1900, and over 30,000 in 2000. Of course the bulk of these fossil fuel growth rates are largely confined to wealthy OECD nations, and billions of people today do not directly buy or burn fossil fuels. The average American uses up to 100 times more energy than the average Bangladeshi, and this comes after 30 years of slowing fossil fuel energy use.[53]

On one hand, the world's human population now exceeds six billion people and over half of them live in cities. On the other hand, it is estimated that there are 10 million different species of life on Earth; only 1.5 million have been named, less than a few hundred thousand are studied in any detail, and two-thirds of those unknown species live in tropical rain forests that have lost much of their area in the last fifty years. These two trends are closely connected: the proliferation of human beings living in cities is contributing to the decimation of nonhuman species on a scale that is starting to equal the five great prehistoric extinctions of life on the planet.

Such ways of living bring with them a cultural economy for both habitat-construction and construct-inhabitation that ties together new built urban and rural environments in thousands of human settlements, creating what Lewis Mumford decried as "the conurban," and what now are congealing into the globally general citification of "global cities."[54] Urbanization in the nineteenth and twentieth centuries around the North Atlantic basin upended old environmental balances that had prevailed since the first small cities were

built during the Neolithic Revolution. Until then, virulent epidemics, poor sanitation, and undernourishment typically killed off as many people in cities as were drawn to them from the countryside. From the 1820s to the 1920s, however, urban populations began to live longer than their rural counterparts, and by 2000, over 800 cities all over the world surpassed the 500,000 population mark, while just over 40 cities mostly in the North Atlantic nations held 500,000 people in 1900.[55]

These intensified levels of urbanization require new inputs of foodstuffs, metals, fibers, woods, chemicals and minerals supplied by the world's logistical grids to meet rising mass demand. Cities are where most of these resources are used and then accumulate in built environments, garbage, junk piles or pollution. In 1700, five cities in the world held 500,000 or more people (Beijing, Istanbul, London, Paris, and Edo), and by 1800 only Canton had joined the list. But two centuries later urbanization patterns have completely changed where people live and how economies function. Indeed, the world's entire population in 2000 was believed to be more "urban" than "rural," which then marked the Earth as a whole meeting the same sociodemographic saddle point once surpassed only in individual nations like Great Britain in 1850, the US in 1920, Japan in 1935, and Russia (USSR) in 1960.[56]

Such urbanization is significant inasmuch as all cities and towns now occupy only two percent of the Earth's land mass, but they house 50 percent of its population, consume 75 percent of all resources, and create 75 percent of its waste. In 2000, Tokyo holds over 26 million people, New York over 16 million, and Buenos Aires over 12 million, but by 2020 the ten largest cities will be in less developed countries—except for Tokyo—and over half of the urban population will be in poverty.[57] These global cities are too costly to sustain. The material inefficiencies of private ecologies in the natural environment are a major cause behind its degradation, but the sheer dysfunction of their built environments is a root source of ill health in contemporary's societies' ways of life. Humans and many nonhumans now live in entirely new built environments rooted in several complex layers of technological systems whose logistical layers are knit irrationally and

unusefully into other networks for the production, consumption, circulation, and accumulation of commodities.

Finding Public Ecology in Political Ecology Articulating all of the ambiguous interconnections between urbanization and the environment requires one first to come to terms with privatized ecologies. Only then can globalization and the nature of modern urbanism, the boundaries of the political and the subpolitical, the nature of personal and public health, and the social formations that link health and the environment be connected as a public ecology. The recurring motif that emerges from this reconsideration is inequality, so to cope with globalism's ambiguities this discussion speaks in favour of funding a new normative discourse, or a public ecology, to guide critical thinking and political activity to improve life in both the unbuilt and built environment for human beings as well as nonhuman life. While recognizing that the concept of "public" brings with it a great deal of baggage, this notion still provides a useful point of departure for rethinking our collective ecological future in terms of sustainability, equality and justice.

There are severe inequalities at work today in global affairs. Some are very old and well known. Some are quite old and only now being recognized. Some are new and just now being felt. Most of them, however, can be tied back to unequal levels of access, power, status, and wealth, which are becoming so quantitatively unbalanced on a global scale that they are turning into something qualitatively different. The analytical tools in both global studies and environmental studies are perhaps not adequate to the tasks of interpreting what is now unfolding. Instead, too many of these existing tools occlude what needs to be analyzed, who needs to be criticized, and what must be done to overcome these trends toward powerlessness and inequality. [58]

All too often, global studies is relegated to the realm of "Society" and its analysis is assigned to only the cultural and social sciences, while environmental studies are shuttled off to the domain of "Nature" and its consideration is given over exclusively to the biological and physical sciences. To really get at what is happening today, however, we need to focus on hybridities of Nature/Society at sites which intermix the nat-

ural and the social, like the "built environment," "natural history," or "political ecology" in privatized ecology. These amalgams of Nature/Society are what sustain and/or degrade overall levels of health and environmental quality for both human and nonhumans, and they materially manifest themselves in patterns of urban settlement, industrial ecology, and natural economy.

A public ecology must fuse the administrative concerns of civic public health with the activist engagements of a critical political ecology.[59] By pushing past exhausted conceptual divisions from the 1980s, which largely divided the more natural science-based "environmental sciences" from the more social science-focused "environmental studies," public ecology should mix the insights of life science, physical science, social science, applied humanities, and public policy into a cohesive conceptual whole. Public ecology should preserve, but also look beyond the "environmental problem" detection/monitoring/ regulation regime of policies like the National Environmental Protection Act (1970) in the USA. Instead it should work at local and global levels to develop "pre-pollutant" or "noncontaminant" approaches to environmental problems by using political pressures to work back up the commodity chain to lessen ecological damage by mobilizing solutions drawn from collaborative management, green engineering, industrial ecology or vernacular design. Public ecology must show how private ecology has turned the built and unbuilt environments into a formation that is one and of a piece, not two and wholly separable.

To anchor this claim, one can take Jameson's point about what he calls the postmodern condition as a critical point of departure. That is, it is what you have "when the modernization process is complete and nature is gone for good.[60] Nature's conquest by the economy/society/state over the past three centuries has created a second nature, a processed world, or a postmodern condition in which those who own and control the material and mental means of enforcing asymmetries in the production and consumption of wealth concretize new inequalities on an environmental scale. Far too many people and their things have been relegated to second, third, fourth, fifth or other developing worlds, while a few people and their things in a developed, or "first," world

are privileged to benefit from the costs incurred elsewhere by these world-proliferating powers.

To understand global affairs, we examine the division of humanity into nations, and then explain their conflict and cooperation as humans by looking at national-statal dynamics.[61] Yet, we also should explore how nonhumanity is divided into many different environments by privatized ecologies, and then account for environmental crises and contradictions as nonhuman forces and structures become entangled globally in many extranational dynamics.[62] Inequalities are no longer only global in scope; they are totally environmentalized in their sweep at the local, national, and global level.[63]

Conclusion: Resisting Inequality The twenty-first century must be the time in which these contradictions are overcome, and it is recognized how fully different collectives of human and nonhuman beings must now coevolve within global markets, common climate changes, or world trade, while coexisting in many different built environments that are a public ecology. What surrounds one in Dallas is not what surrounds one in Delhi, but those different surroundings have high economic, political, and social costs inside and outside of both environments. As Smith suggests, a persistent feature of all global societies today are toxic wastes, which arrive as "a by-product of energy development, agriculture, and most industrial activity," and now "are found throughout the environment, in our air, water, and soil."[64] Like weather, water, and wildlife, such waste is to be found everywhere in the planetary environment, making this by-product a new fixed characteristic of the Earth's ecology as it is being transformed by modern agricultural, industrial, and technological development.[65] Nonetheless, many mechanisms in the world's political economy permit Dallas (more than Delhi) to dump more toxic wastes outside specific locales, boost their concentrations beyond permissible thresholds, raise exposures so intensively as to threaten health, and disperse effects indiscriminately across space and time. These irrationalities in the private ecology of global cities come from a subpolitical realm, but they now are negatively affecting every political system on a global scale as transnational environmental problems. All of this, in turn,

exposes the key metaeconomic issues raised by the metageography of Global Cities.

In the realm of the subpolitical, ordinary processes of democratic legitimation fail because modern industrial revolutions, with all of their profitable products and toxic byproducts, are highly technified economic actions. Each always "remains shielded from the demands of democratic legitimation by its own character" inasmuch as "it is neither politics nor non-politics, but a third entity: economically guided action in pursuit of interests."[66] Because of property rights and expert prerogatives, most occupants of this planetary subpolis have yet to realize fully how "the structuring of the future takes place indirectly and unrecognizably in research laboratories and executive suites, not in parliament or in political parties. Everyone else—even the most responsible and best informed people in politics and science—more or less lives off the crumbs of information that falls from the tables of technological sub-politics."[67] This elaborate subpolis evolves in the reified dictates of industrial ecologies, whose machinic metabolism, in turn, entails the planned and unintended destruction of nonhuman and human lives in many different environments.

Beck worries about how to face this modernity as he recognizes how fully "the possibilities for social change from the collaboration of research, technology, and science accumulate" in new loci of social order and disorder when real power and knowledge "migrates from the domain of politics to that of subpolitics."[68] In the subpolis, activities that often may begin at an individual level as a rational plan combine at a collective level into the irrational, unintended, and unanticipated. It is difficult to resist these outcomes inasmuch as the workings of modern technics and markets are "institutionalized as 'progress,' but remain subject to the dictates of 'business, science, and technology, for whom democratic procedures are invalid.'"[69]

The acts and artifacts produced by Fukuyama's "accumulation without end" in globalization constitute the things that government must rightly dispose of and arrange to serve convenient ends, in the globalized civil society of the global economy.[70] The subpolis shapes, and then is itself shaped, in the global market's imbrication of the polis for

humans and the subpolis of things. Modernity becomes an inegalitarian mechanism whereby the few who know-how and own-how maintain domination over the many who do not know-how or own-how. The illusion of progress through greater education and broader opportunity, in fact, always belies grittier realities of exploitative avarice fostered by growing disinformation and greater dispossession. Consequently, the subpolitically structured inequalities in global cities need to be more closely policed in public policy and political practice to correct the inequalities of overall health and environmental quality behind today's economic crises and political contradictions. The notion of a public ecology offers a set of values and practices to push such decisions out of the subpolitical domain.

These ambiguities tie back to the contradictions that expertise and capital ownership bring into our public life. This occurs because those who "know-how," as well as those who "own-how," in the subpolis are permitted to prejudge everyone's actions in the privatized ecologies built up by Global Cities. Expert knowledge and private ownership give them, a small set of decision-makers, the capability to decide for all. Democracy, in turn, finds dictatorial administrative rationalities turned into collective ends in themselves without much, if any, ethical debate or political discussion. Environmentalism, urban studies, and public health are among some of the last remaining discourses available to provide some ethical consideration or political reflection about the effects of unequality and technique and property. Private ecology degrades the overall civic life of society as the privileged millions still benefit from the international misery of billions.[71] We cannot continue on this track if the Earth's ecologies are ever to be mended.

Such cultural transformations require recasting the metaeconomic and metapolitical assumptions underpinning the metageographies of flows and territories. Flows and territories both leave "footprints" upon the Earth's environments, but these footprints are now much more than the light transitory anatomical impressions of ambulation. They are more like permanently paved footpaths rather than lightly trod footprints, and their self-sustaining patterns of production and consumption have generated a path dependency that is

undercutting the carrying capacity of the planet. Here, one must not only talk about the iterated ecological links of the top ten Global Cities. Instead, we must consider the imposition of productive material extraction systems and material consummative discharge grids by all the settlements occupied by over half the world's human population. Ecology here becomes inescapably public, and thereby it becomes political.[72] It is so essentially public because many human and nonhuman ecologies are now embedded within municipal infrastructures, national markets, and global networks, even though the conditions of private production clad these public realities in the forms of private ownership. Ecological politics must change the metaeconomic agendas of endless growth, limitless appropriation, and worthless innovation which are embedded in so many of transnational capitalism's practices. A public ecology can begin to develop a more formalized discourse about the unecological conduct of conduct, and antienvironmental practice of the practice of living in global cities, which will help determine what must be done.

Notes

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1. For more discussion, see Edward Soja, Postmetropolis: Critical Studies of Cities and Regions (Oxford: Blackwell, 2000); J.R. McNeill, *Something New Under the Sun: An Environmental History of the Twentieth-Century World* (New York: Norton, 2000); and Clive Ponting, *A Green History of the World* (New York: St. Martin's, 1991).
2. Timothy W. Luke, "Placing Powers, Sitting Spaces: The Politics of Global and Local in the New World Order," *Environment and Planning A: Society and Space* 12 (1994), pp. G13-G28.
3. Roger Keil, "The Environmental Problematics in World Cities," *World Cities in a World-System* Paul L. Knox and Peter J. Taylor, (eds.), (Cambridge: Cambridge University Press, 1995), p. 293.
4. See Robert Pool, *Beyond Engineering: How Society Shapes Technology* (Oxford: Oxford University Press, 1997); Edward Soja, *Thirdspace: Journeys to Los Angeles and Other Real-and-Imagined Places* (Oxford: Blackwell, 1996); and Paul Virilio, *The Art of the Motor* (Minneapolis; University of Minnesota Press, 1995).
5. Saskia Sassen, *The Global City: New York, London, Tokyo* (Princeton: Princeton University Press, 1991).
6. See Mark Gottdiener, *The Theming of America* (Boulder, CO: Westview Press, 1997); Neil Smith, *Uneven Development* (Oxford;

Blackwell, 1984); and Lewis Mumford, *Technics and Civilization* (New York: Harcourt Brace Jovanovich, 1963).

7. See Timothy W. Luke, *Capitalism, Democracy, and Ecology: Departing from Marx* (Urbana: University of Illinois Press, 1999).
8. Dita Smith, "What on Earth? Draw of Cities," *Washington Post* (3 February 2001), p. A16.
9. Joseph Rykwert, *The Seduction of Place: The History and Future of the City* (New York: Vintage, 2001), p. 11.
10. Saskia Sassen, *The Global City: New York, London, Tokyo*, rev. ed. (Princeton: Princeton University Press, 2001), p. 3.
11. Paul L. Knox, "Introduction," *World Cities in a World-System*, p. 7.
12. D.A. Smith and M. Timberlake, "Cities in Global Matrices: Toward Mapping the World Systems' City System," *World Cities in a World-System*, p. 296.
13. See Erik Swyngedouw, "The Mammon Quest: 'Globalization,' Interspatial Competition, and the Monetary Order," *Cities and Regions in the New Europe* Mick Dunford and G. Kafkalas, (eds.), (London: Belhaven Press), pp. 39-67.
14. Jonathan Friedman, "The World City Hypothesis," *World Cities in a World-System*, pp. 317-331.
15. Roger Keil, "World City Formation, Local Politics, and Sustainability," *Local Places in the Age of the Global City*, eds. Roger Keil, Gerda R. Wekerle, and David V. J. Bell (Montreal: Black Rose Books, 1996), p. 42.
16. *Ibid.*
17. J.V. Beaverstock, R.G. Smith, and P.J. Taylor, "A Roster of World Cities," *Cities* 16/6 (1999), pp. 445-458.
18. J.V. Beaverstock, R.G. Smith, and P.J. Taylor, "World City Network: A New Global Geography," *Annals, American Association of Geographers* 90 (2000), pp. 123-134.
19. See Michael Storper, *The Regional World* (New York: Guilford, 1997); and Sassen, *The Global City: New York, London, Tokyo.*
20. See Peter J. Taylor, "Specification of the World City Network," *Geographical Analysis* 33 (2001), pp. 17-26; and J.V. Beaverstock, R.G. Smith, and P.J. Taylor, "Geographies of Globalization: U.S. Law Firms in Global Cities," *GaWC Research Bulletin* 4 http://www.lboro.ac.uk/departments/gy/gawc/rb/rb4.html.
21. P.J. Taylor, D.R. Walker and J.V. Beaverstock, "Global Cities and Global Service Networks," *Global Networks, Linked Cities* Saskia Sassen, (ed.), (London: Routledge, 2002), pp. 93-115.
22. Saskia Sassen, "Introduction," *Global Networks, Linked Cities* (London Routledge, 2002), p. 1.
23. *Ibid.*
24. See Saskia Sassen, *De-Nationalization* (Princeton: Princeton University Press, 2003).
25. See Roger Keil, *Los Angeles: Globalization, Urbanization, and Social Struggles* (Chichester: John Wiley & Sons, 1998).
26. Keil, "World City Formation," p. 38.
27. Keil, "The Environmental Problematic in World Cities," p. 282.
28. Jonathan Friedmann and Goetz Wolff, "World City Formation: An Agenda for Research and Action," *International Journal of Urban and Regional Research* 6 (1982), p. 319.
29. Keil, "The Environmental Problematic in World Cities," p. 285.
30. See David Harvey, *Spaces of Hope* (Berkeley: University of California Press, 2000).
31. See David Harvey, *The Condition of Postmodernity* (Oxford: Blackwell,

1989); and Lewis Mumford, *The Lewis Mumford Reader* Donald Muller, (ed.), (New York: Pantheon, 1986).
32. Michael Janofsky, "In the Race to Produce more Power, States are Faced with Environmental Tradeoffs," *New York Times* (26 March 2001), p. A17.
33. Michael Hardt and Tony Negri, *Empire* (Cambridge: MA, Harvard University Press, 2000), p. 187.
34. Ponting, *A Green History*, pp. 300-303.
35. *Ibid.*, pp. 301, 309; and McNeill, *Something New*, pp. 282-285.
36. McNeill, *Something New*, p. 287.
37. *Ibid.*, p. 289.
38. See Jean Baudrillard, *The System of Objects* (London: Verso, 1996); and Jean Baudrillard, *For A Critique of the Political Economy of the Sign* (St. Louis: Telos Press, 1981).
39. Ulrich Beck, *What is Globalization?* (Oxford: Blackwell, 2000), p. 9.
40. *Ibid.*
41. *Ibid.*, p. 13.
42. McNeill, *Something New*, p. 209.
43. Phillip P. Pan, "Scientists Issue Dire Prediction on Warming," *Washington Post* (23 January 2001), pp. A1, A14.
44. McNeill, *Something New*, p. 5.
45. *Ibid.*, p. 5.
46. *Ibid.*, p. 6.
47. *Ibid.*
48. *Ibid.*
49. Hilary F. French, *Vanishing Borders: Projecting the Planet in the Age of Globalization* (New York: Norton, 2000), pp. 5, 34.
50. McNeill, *Something New*, pp. 6-7.
51. *Ibid.*, p. 8.
52. See Carlo Cipolla, *The Economic History of World Population* (Harmondsworth: Penguin, 1978), p. 53; and Vaclav Smil, *Energy in World History* (Boulder, Co: Westview, 1994), p. 226.
53. McNeill, *Something New*, pp. 15, 16.
54. See Mumford, *Lewis Mumford Reader.*
55. McNeill, *Something New*, p. 282.
56. *Ibid.*, pp. 282-283.
57. Smith, "What On Earth? Draw of Cities," p. A16.
58. See Nicholas Onuf, *A World of Our Making: Rules and Rule in Social Theory and International Relations* (Columbia, SC: University of South Carolina Press, 1989).
59. See the Public Ecology Project at: http://www.cnr.vt.edu/publicecology.
60. Frederic Jameson, *Postmodernism, or the Cultural Logic of Late Capitalism* (Durham: Duke University Press, 1991), p. ix.
61. Paul Kennedy, *Preparing for the Twenty-First Century* (New York: Random House, 1992); and Joseph Nye, *Bound To Lead: The Changing Nature of American Power* (New York: Basic Books, 1990).
62. See Bruno Latour, *We Have Never Been Modern* (London: Harvester Wheatsleaf, 1993).
63. Timothy W. Luke, *Ecocritique: Contesting the Politics of Nature, Economy, and Culture* (Minneapolis: University of Minnesota Press, 1997).
64. Zachary A. Smith, *The Environmental Policy Paradox*, second edition (Englewood Cliffs, NJ: Prentice-Hall 1995), p. 170.
65. See National Academy of Engineering, *Technology and Environment*

(Washington, DC: Natural Research Council, 1989).

66. Ulrich Beck, *The Risk Society: Towards a New Modernity* (London: Sage, 1992), p. 222.
67. *Ibid.*, p. 223.
68. *Ibid.*
69. *Ibid.*, p. 14.
70. See Francis Fukuyama, *The End of History and the Last Man* (New York: Free Press, 1992).
71. See Hillary F. French, *Vanishing Borders*; and William Greider, *One World, Ready or Not: The Manic Logic of World Capitalism* (New York: Simon & Schuster, 1996).
72. Harvey, *Spaces of Hope*, Soja, *Postmetropolis*; and Luke, *Capitalism, Democracy, and Ecology*.