The Compact City Fallacy

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The world has been urbanizing for centuries (United Nations 2001; United Nations Centre for Human Settlements [1996] 2000). While some scholars note a decline in the significance of space and distance as the result of telecommunications advancements and globalization (Cairncross 2001), other thinkers point to the continuing, if not increasing, importance of proximity and multiple benefits of urban agglomeration economies (Sassen 2001; Scott 2001; Castells 1996, 2001; Mitchell 1999; Hall 1998). In between these two poles, what occurs is massive migration to metropolitan areas and decentralization within metropolises. Concentrating people and activities in urban areas confers advantages, yet given the choice and resources to exercise it, many locate in the sprawling metropolitan periphery instead of the denser urban core. This paradox between urban desirability and suburban livability is one theme of this essay.

Despite many great efforts over the generations, this paradox has yet to be adequately resolved. Recent attempts to halt sprawl and improve urban livability have been made by compact city, smart growth, healthy community, and new urbanist advocates. To the extent that these advocates have been successful, it is because they have tapped into widespread dissatisfaction in American community building in the last several decades and have provided alternatives. However, how effective are these options in attaining a deep-seated shift in community building toward truly sustainable communities?

Another promising approach, sustainable urban development, runs counter to the principles of the compact city in one fundamental respect: the primacy of process over form. This article assesses available empirical evidence as to whether compact cities represent a form of sustainable development. It also analyzes the theoretical underpinnings of sustainability. By examining factual evidence and intellectual foundations regarding sustainability, we place ourselves in a better position to accurately judge whether compact cities are more sustainable than noncompact cities.

This article is organized into six sections. The first section, titled The Compact City, reviews empirical evidence surrounding the question of whether contemporary compact cities are sustainable. While there is ample literature on compact cities, it is deficient in two ways. First, there is no accepted definition for the compact city, despite its common usage. Second, the little evidence that does exist regarding the sustainability of compact cities is equivocal. This first section remedies the first deficiency with a preliminary characterization of the compact city and goes on to weigh the factual evidence on its sustainability.

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Abstract

The problems of urban sprawl have long been recognized. The classic response to sprawl has been compact settlements of one form or another. Yet the profession's modern origins stem from responses to overcrowding. Relieving crowding by letting in more light and air led to less compact urban form. This paradox remains unresolved despite recent compact city, smart growth, healthy community, and new urbanist efforts. This article reviews empirical data of whether compact cities are sustainable. Then, after reviewing current debates on sprawl and the compact city, it outlines the intellectual origins of sustainability and analyzes whether its theory supports the compact city hypothesis: compact is more sustainable than sprawl. It concludes that conceiving the city in terms of form is neither necessary nor sufficient to achieve the goals ascribed to the compact city. Instead, conceiving the city in terms of process holds more promise in attaining the elusive goal of a sustainable city.

Keywords: *sustainability theory; urban planning; urban form; compact city; urban sprawl*

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The second section, titled Urban Sprawl, reviews the literature on sprawl and its associated costs. It also presents Burchell's widely quoted list of the characteristics of sprawl. The third section, titled The Compact City Paradox, compares the compact city with urban sprawl with a view toward resolving the urban desirability versus suburban livability paradox. The overall aim of the first three sections is to raise the following question: Is the compact city sustainable? The planning profession and academy take as axiomatic that the compact city is more sustainable than sprawl. As we will discover, the evidence is equivocal and does not necessarily support that claim.

With a shift from empirical to theoretical terrain, the fourth section, titled Intellectual Traditions of Sustainability, presents the five intellectual traditions that undergird current notions of what it means to be sustainable. In the fifth section, titled Common Themes of Sustainability, I abstract common principles among these five intellectual traditions. In the sixth section, the common principles are compared with the compact city to evaluate current practices in planning and building cities and to test whether practice follows the common principles. The conclusion posits that the main principle of sustainability, process, is more critical than form—compact or otherwise—in attaining a more sustainable city. The overall purpose of the final three sections is to raise the question whether urban form, compact or otherwise, is the best planning strategy to attain a more sustainable city. Or is process a better way?

▶ The Compact City

The term *compact city* conveys the opposite of urban sprawl. The compact city, we are told, is more energy efficient and less polluting because compact city dwellers can live closer to shops and work and can walk, bike, or take transit. Proponents claim it promotes more community-oriented social patterns (Katz 1994). After all, the work of Leon Krier, Andres Duany, and Elizabeth Plater-Zyberk—progenitors of the current American compact city movement—originated in social critiques of zoning and suburbia (Krier 1998; Duany, Plater-Zyberk, and Speck 2001). In the United States, compact cities are also called transit-oriented developments and neotraditional towns and are promoted through the smart growth movement. The word *city* in this article is not restricted to the central municipality of a metropolis but applies to the entire metropolitan area.

Preliminary evidence testing the compact city vis-à-vis sustainability suggests that the relation between compactness and sustainability can be negatively correlated, weakly related, or correlated in limited ways. In this section, I review the empirical evidence. In her study of twenty-five English cities, Burton found that social equity, as measured by forty-four social equity indicators, was more often than not negatively affected by urban compactness (measured by fourteen indicators). "When looked at in its entirety—that is, as a combination of all the different indicators—social equity has a limited relation with compactness" (Burton 2000, 1987).

Empirical studies by Breheny (1992) and Williams, Burton, and Jenks (2000) are not conclusive about the link between higher densities and reduced automobile trips. The type of auto trip influences the impact of land use intensification. While short trips to local activities may decrease, travel distances for those seeking specialized employment, unique shopping, or singular leisure pursuit can be independent of urban density. Growth in car ownership, weekend air travel, and business travel, as well as increasingly dispersed life patterns, have led to the inability of physical design alone to reduce travel demands of energy-rich transport modes (Williams, Burton, and Jenks 2000).

Bouwman, using national data for the Netherlands, found that average personal energy use for transportation in different spatial settings ranged only 5 percent. "It is clear that supposed positive energy related effects of the compact city with regard to its mobility pattern cannot be observed within the Dutch situation" (Bouwman 2000, 235). This is in a country with compact cities and high levels of nonautomobile travel (for more on personal energy use, see Table 1).

In a careful and revealing review of empirical studies on the effect of urban form on transportation, Peter Hall (2001) found that "the research results are not consistent; indeed they are confusing" (p. 102). He referred to widely cited studies whose findings, when compared to each other, are equivocal. Many of these studies have examined one parameter of travel (distance, time, frequency) instead of more complete assessments. For example, a study based on British National Travel Surveys concluded that highest trip frequency is in areas where population density is low, and lowest trip frequency is where density is high (DOE/DOT 1993). On the other hand, another study found no significant statistical link between trip frequency and population density (Ewing 1996, in Hall 2001). Breheny, Gordon, and Archer found a weak link between densities and transportation energy use (Breheny et al. 1998). According to Hall (2001), internationally, "Travel is much more strongly linked to fuel prices and income" than population density (p. 103). Breheny and his colleagues sum it up: "This [research] project casts doubt on the orthodoxy that increasing building densities will necessarily reduce travel in towns and cities" (Breheny et al. 1998, 4).

While energy used by the transport sector is significant, other sectors are more important. In the United States in the year 2000, the transport sector used 27 percent of all energy, a 3

Table 1.
Average personal energy use for transportation in different spatial settings.

Urban Density	*Average Personal Transport Energy Use (MJ/day)*
Very strongly urbanized	50.9
Strongly urbanized	54.5
Urbanized	54.5
Weakly urbanized	48.4
Rural	51.0

Source: Bouwman (2000, 235).

percent increase from 1950. Buildings consumed 38 percent, up from 29 percent in 1950 (Energy Information Agency 2002). Notably, the year 1950 precedes interstate highways, when urban transit use was common, and rail freight exceeded long-distance trucking by a wide margin. It is also prior to widespread air travel, the most energy inefficient form of travel. If we want sustainable cities, then personal, household, and business consumption patterns must fall, as they have a greater effect on overall energy consumption and air quality than car travel. Even in environmentally conscious Holland, Van der Wal found that total household energy use rose thirteenfold between 1950 and 1992 (Van der Wal 1995), while population rose only 50 percent in this same period (Netherlands Interdisciplinary Demographic Institute 2002).

Garcia and Riera's (2003) results found that less compact growth is welfare increasing in aggregate terms. Their study method differs from most researchers—according to them, most "test statistically the relationship between certain indicators of urban form and selected environmental variables. Instead [Garcia and Riera's emphasis] is on how urban residents perceive the environmental effects of urban growth. [Their] study focuses on the changes in welfare [measured using an Alonso-Fujita bid-rent model as a basis for their contingent valuation method] caused by variations in available open space, and rural land around cities, and by different urban densities - always from the perspective of the residents" (p. 1926). They tested their model empirically on the metro region of Barcelona and found that lower densities and more open space in the urban fringe increased an individual's perceived welfare.

Crane's (2000) review of research on the connection between urban form and travel behavior found mixed and possibly contradictory findings, which he attributed to methodological divergence among researchers. Galster et al. (2001) created an eight-dimensional sprawl index in their analysis of American cities. Using a detailed model, they calculated an aggregate measure of sprawl for their study cities, creating and analyzing measures of density, concentration, clustering, centrality, nuclearity, proximity, continuity, and mixed uses. Their work yielded interesting yet counterintuitive and seemingly contradictory results. For example, Boston and Atlanta yielded substantially similar results on a number of dimensions, despite significant differences in their urban forms.

Song and Knaap (2004), in an expert analysis that could prove to be useful for future researchers and policy makers alike, offered a sophisticated method to measure urban form, combining numerous statistical parameters with the spatial analysis and visualization afforded by geographic information systems. Their case study of Portland, Oregon, revealed mixed results: compact form within a context of metropolitan growth management improved some measures of livability, while other measures, such as external transportation connectivity, declined, and still others experienced marginal or limited improvements, such as mixing land uses. They did not directly link their analysis to improvements in urban sustainability, although some might assert that.

Sustainability in urban settings also involves health and well-being. Empirical tests based on social theory belie received wisdom about the influence of population density on social attitudes and behaviors, which bear on sustainability. Simmel ([1903] 1950) and Wirth (1938) suggested that high density causes emotional stress and other negative psychological conditions. Yet Verbrugge and Taylor (1980) found in a carefully controlled study of 237 Baltimore households that population density was a relatively weak predictor. "Wirth (1938) believed that population size, density, and heterogeneity have strong influences on urban dwellers. The Baltimore study confirms this. . . . But density has much weaker effects than size and population composition; population size especially overshadows density as a predictor. This suggests that researchers who focus solely on density are 'wide of the mark'" (Verbrugge and Taylor 1980, 155).

Investigators have opened a new line of research into the effects of the built environment on physical activity. These studies test how different urban forms are correlated with personal health. The hypothesis driving them is that compact form and mixed uses enable people to walk and bike more, thus being more fit. An excellent review describes this link between form and behavior (Handy et al. 2002). As intuitive as the connection between urban form and exercise seems, there are confounding factors—diet, genetics, non-form-related behaviors, quality of and access to health care, and so on—to control for to isolate a causal relationship determining an individual's health. Empirical studies will need to be carefully designed to obtain conclusive findings on whether compact cities cause greater health.

This brief report on empirical evidence suggests that the data are still inconclusive. That the titles of the articles and

books of much of the sprawl research reviewed here ended in a question mark is revealing of this inconclusiveness. Yet, when most people try to define a compact city, the first characteristic that comes to mind is population density. Others include mixed land uses and public transportation. Despite extensive literature on compact cities, surprisingly, a definition of one does not exist. Researchers tend to use density alone as the independent variable (Burton 2000; Hall 2001). Planners and designers tend to use physical characteristics such as density, street widths, setbacks, lot size, sidewalks, porches, and so on (Duany, Plater-Zyberk, and Speck 2001). Surprisingly, researchers and practitioners have only recently begun to rigorously define the compact city apart from density (Galster et al. 2001; Song and Knaap 2004).

Table 2 presents a first-cut list of characteristics of the compact city that can be used to guide future research. This preliminary and not exhaustive list suggests variables that can be tested in future research. The characteristics in Table 2 are based on reviews of practice, research, literature (especially Burton 2000; Galster et al. 2001; Song and Knaap 2004), and observation. Note that the listing in this table is intentionally comparable to Table 3.

Table 2.
Compact city characteristics.

1. High residential and employment densities
2. Mixture of land uses
3. Fine grain of land uses (proximity of varied uses and small relative size of land parcels)
4. Increased social and economic interactions
5. Contiguous development (some parcels or structures may be vacant or abandoned or surface parking)
6. Contained urban development, demarcated by legible limits
7. Urban infrastructure, especially sewerage and water mains
8. Multimodal transportation
9. High degrees of accessibility: local/regional
10. High degrees of street connectivity (internal/external), including sidewalks and bicycle lanes
11. High degree of impervious surface coverage
12. Low open-space ratio
13. Unitary control of planning of land development, or closely coordinated control
14. Sufficient government fiscal capacity to finance urban facilities and infrastructure

Many of the characteristics in Table 2 could describe nearly any city. They can also be used to guide the physical design and planning criteria for a new town. These criteria, if applied to a new compact city, will endow it a degree of functionality. Yet they do not in and of themselves make the compact city sustainable across a full range of parameters, as evidenced by the research represented above. Furthermore, discussions of compactness elide scale. Many of the features that compact city proponents find desirable, such as increased choice and opportunity, are more dependent on size and scale rather than on density or compactness. Why then is the compact city promoted as a sustainable city? Is not the compact city a default model? Have not planners relied on the compact city, a model inspired mainly by old European and North American cities and towns, because there is no clear alternative? One reason why there is no alternative is that many do not know what to do to be sustainable. Yet we assume it is different, perhaps radically different, from the way we live now. In Kuhnian terms, we are in the throes of a paradigm shift.

If this is true, then why do urban planners favor the centuries-old model of the compact city? Why do they use old strategies to accomplish a fundamentally new task? The world has changed since the middle ages, not to mention since World War II. Metropolises and megacities and exurbs and edge cities differ from the villages and towns of Joan of Arc. So why do new urbanists revert to old urbs?

Critical observers question the compact city movement. Heidi Landecker (1996) asks why we copy old suburbs from the turn of the century, when conditions were markedly different. She questions the core premise of new urbanism, that design can create a sense of community. “Like the Modernists before them, New Urbanists believe they can change human behavior through design” (p. 68). Mike Pyatok (2002) expresses reservations about the social homogeneity of new urbanist towns.

Others have begun to note problems. “The New Urbanist Village is by necessity a fully planned and regulated environment, fiercely resistant to change and any deviation from the rigid rules that govern its form and function. But it is precisely this inflexibility, which is so important in its struggle for completion as a development enterprise, that is sowing the seeds of the village’s ultimate demise” (Durack 2001, 64). Durack argues, following David Leatherbarrow, for open, indeterminate planning, which confers four advantages. First, it supports cultural diversity. Second, it tolerates and values topographic, social, and economic discontinuities. Third, this type of planning invites ongoing citizen participation. Finally, it responds to the state of continuous adaptation, common to all living organisms and systems, including human settlements (Durack 2001, 67-68).

I have found that new urbanists and other compact city proponents maintain their beliefs for at least three reasons. First, it is the opposite of sprawl. Living in sprawl is generally seen to be a less than sustainable way of life, so the compact city is an antidote. Second, it is a seductive alternative embodied in beautiful images that harkens back to an ideal that continues to hold our imagination. Yet these two reasons do not penetrate to a deeper, more fundamental problematic, which is the basis for

the third reason. It is problematic because it presents itself as a paradox, which is deeply seated in our professional planning ethos. This paradox, which Wiersinga (1997) calls the "compact city paradox," poses serious challenges because it has remained unresolved for a long time. The paradox has been scarcely raised, much less debated openly and frankly—that is, until now.

► Urban Sprawl

The problems associated with urban sprawl have long been recognized (Mumford 1938, 1961; McHarg 1969; Real Estate Research Corporation 1974; Jackson 1985; Downs 1994; Bank of America 1995; Fulton et al. 2002). Urban sprawl results from the confluence of several factors: the lure of cheap open land outside the city, advances in transportation, easily available capital to buy property, the rise of the real estate developer, mass production of housing, and the always-present image of the single family home as the American dream. The professions have played enabling and supporting roles, contributing tools, processes, institutions, and knowledge.

The spread of cities across the countryside was propelled by the impetus of depopulating large, congested, polluted, and crime-ridden industrial cities since the nineteenth century. Metropolitan growth was further increased by the worldwide rural to urban migration. In 1900, 14 percent of the world's population lived in cities. In 1900, there were 12 cities with one million inhabitants or more. Today, half the world's population lives in cities. There were 411 cities with one million inhabitants or more in 2000 (World Resources Institute et al. 2000; United Nations 2001). As an outcome of the population growth and geographic expansion of cities, urban sprawl has given rise to two new sets of terms, one for new types of outlying places (e.g., satellite town, edge city, and exurb) and another for an entirely new scale of the city (megalopolis, megacity, urban agglomeration, and standard consolidated statistical area).

Various spatial modifiers for the term sprawl exist: urban, suburban, exurban. For lexical simplicity, I call all of these phenomena urban sprawl. This is because suburbs and exurbs are rapidly urbanizing into edge cities or taking on urban features. Also, cities are annexing their outskirts and bringing suburban, exurban, and rural lands under their jurisdiction. Finally, the adjective *urban* acknowledges dense economic and social networks in metropolitan areas. It is increasingly limiting to conceive of the city and just consider the central municipality. Most metropolises are several times the size of their core city.

The most comprehensive review of urban sprawl literature analyzed 475 studies (Burchell et al. 1998). Despite the wide range in data quality, research design, methods, and rigor, most of these studies concluded that sprawl has both positive and negative effects. The most complete and rigorous North American studies concluded that overall, sprawl is more costly than compact development for both operating and capital costs (Burchell and Adelaja 1992; Burchell et al. 2002). The greatest savings gained from growth controls were in land consumed and infrastructure built, especially water, sewer, and road facilities. Burchell defined sprawl in the United States as a form of urban development that contains most of the following ten elements listed in Table 3 (Burchell et al. 1998).

Table 3.
Urban sprawl characteristics.

1. Low residential density
2. Unlimited outward extension of new development
3. Spatial segregation of different types of land uses through zoning
4. Leapfrog development
5. No centralized ownership of land or planning of land development
6. All transportation dominated by privately owned motor vehicles
7. Fragmentation of governance authority of land uses among many local governments
8. Great variances in the fiscal capacity of local governments
9. Widespread commercial strip development along major roadways
10. Major reliance on a filtering process to provide housing for low-income households

Source: Burchell et al. 1998.

An international specification of urban sprawl, while potentially valuable, would need to consider the variability of settlement patterns on the outskirts of cities around the world. For example, the first element, low residential density, does not necessarily reflect international realities. Some fringe residential growth in other continents has occurred in high densities because of high-rise housing blocks that are close to each other. A comprehensive global survey of urban sprawl ought to examine the variability of definitional elements.

There is a continuing flow of sprawl research (Squires 2002; Wiewel and Persky 2002). In addition to the attributes contained in this extensive set of analytical works, other dimensions of urban sprawl could be added. One is the lack of street connectivity in many post–World War II North American suburbs occasioned by extensive use of cul-de-sacs and other dead-end streets. Another is the lack of alleys and sidewalks.

► The Compact City Paradox

The paradox of the compact city refers to the inverse relation of the sustainability of cities and their livability (Wiersinga

1997). For a city to be sustainable, the argument goes, functions and population must be concentrated at higher densities. Yet for a city to be livable, functions and population must be dispersed at lower densities.

To be sure, many people want the greenery, sense of safety, good schools, quiet streets, and so forth, provided by low-density residential suburbs. Yet these same qualities exist in abundance in the densest cities, notably Barcelona, Prague, Amsterdam, San Francisco, and others. In fact, these qualities exist in many cities and are not exclusive to low-density suburbs. So we must be cautious in accepting claims that livability is greater in one form of human settlement over another. Livability is not only a matter of urban form, it is also a matter of personal preference.

However, in the United States since the great depression, real estate and urban development marketplaces have been structured and manipulated to support a particular preference, low-density development (Jackson 1985). Housing consumers, limited by a supply-driven housing market that has placed a premium on single-family homes in suburbs, have only recently had real choices regarding what was a monotonous monopoly (Neuman 1991). Two choices growing in popularity are moderate density, mixed-use neighborhoods and the positive revaluation of downtowns (Birch 2002).

Nonetheless, most observers claim that a compact city is more sustainable (Echenique and Saint 2001; Jenks and Burgess 2000; Newman and Kenworthy 1999). Most professional and political institutions agree with this diagnosis (Urban Land Institute 1998; American Planning Association 1999; President's Council on Sustainable Development 1996; European Environment Agency 1998; United Nations 1992; National Research Council 1999). For example, Beatley claims that "sustainable communities are places that exhibit a compact urban form" (Beatley 1995, 384).

Yet the policy desire for compact urban form belies two categories of facts. One is that people who have the means to do so have long been voting with their feet and moving from the central city to the outskirts. The residential marketplace has deemed lower-density places outside of cities more desirable. A wide array of government subsidies at all levels has helped to underwrite this exodus (Jackson 1985).

The second category of fact has been the accumulated evidence that the intensity and proximity of certain uses have made cities, or parts of them, toxic flashpoints detrimental to human and ecosystem health. The principle of applying the police power through land use zoning, which separates incompatible uses from one another, arose from the recognition that the old urban pattern of intermingled activities and structures was no longer viable in dense, overcrowded industrial settlements. However, single-use zoning is antithetical to the original idea and crowning achievement of cities, that of bringing persons and activities into proximity. Moreover, single-use zoning has contributed to urban sprawl.

In the past, large-scale pollution from point sources such as factories had a significant environmental impact. Today, steady, incremental, and accumulated pollution and resource depletion from nonpoint sources that emanate from the daily and routine actions of all have significant repercussions. These activities include commuting and fertilizing, flushing and cleaning, cooking and washing, paving and clearing. When there are six billion consumers, waste producers, and polluters, gradual and incremental accumulations add up quickly. As a result, production, consumption, and other processes have begun to be rethought and retooled to cope with this change of scale and location of the polluter. New fields and disciplines such as risk assessment, environmental conflict resolution, hazards management, toxicology, environmental medicine, and the "new" public health have emerged to address this.

As a compound outcome of these factors, two contradictory tendencies—compact urban form and sprawling urban form—result in contradictory policies and investments. Yet both sprawl and compact development continue. Dispersal and segregation of population and activities continue as inhabitants and business owners seek a higher quality of life and higher profits outside the city. However, relocation to and reinvestment in the central city, especially its core, continues as well, as residents, visitors, and businesses seek city benefits.

One might relegate this to a simple matter of personal preference—some prefer suburbs, others prefer cities—except that the rush to make all places compact raises the questions of how compact and whether they can be livable. For example, many cities such as Philadelphia, Baltimore, Cleveland, and Detroit have square miles of compact residential neighborhoods, once livable and vital, that have been vacant for years, if not decades. This has occurred even as their metro areas have grown in population and surface area.

This fundamental and deeply seated paradox has not been solved by urban planners and policy makers, by the markets, or by multisectoral partnerships. It is the argument of this essay that this paradox cannot be solved by existing modes of thinking about, acting on, and living in the city.

One way to examine this paradox is to see if the compact city is sustainable. Absent a large-scale, quantitative, and comparative analysis (which ought to be undertaken), here, I compare principles and premises of the compact city against those of sustainability. Sustainability has emerged as a common ground for global and local discourses and politics. It is a category of thinking that is replacing or redefining old categories, such as growth, development, progress, and limits (Sachs 1993; Daly 1996). As a new category, it is especially important to

unpack the traditions of thought that stand behind it. The very existence of the contemporary meaning of the term stands as stark recognition that our societies are not sustainable. We have begun to rethink our ways and have started to mend them. Are we on the right track?

► Intellectual Traditions of Sustainability

Sustainability and compactness have fostered spirited debates. One strand of the debate is between compactness and sprawl, and another is between free markets and government intervention (Ewing 1997; Gordon and Richardson 1989, 1997; Newman and Kenworthy 1989). For protagonists, the compact city represents a quintessential physical response to many urban problems, such as land consumption in fringe areas, energy and resource waste, air pollution, accessibility, and social segregation. It is practically their synonym for the sustainable city.

When we try to visualize sustainable development in our mind's eye, we may think of high-tech fixes such as solar or wind energy or fuel cells. Or we may see images of age-old traditions. Prior ways of life and the scale and pace of historic societies usually fit their surroundings. While old traditions may inspire, their practices usually are not directly transferable to Western cities, although some of their principles may be (Norberg-Hodge 1991). In the face of the checkered history of technology, in terms of one solution often begetting unintended and unforeseen negative consequences and in the face of limited transferability, examining traditions of thought rather than far-fetched technologies or far-flung practices may be more useful.

Let's begin by asking two questions. They are questions of meaning. What is sustainability? How have we come to think about it in this way? Sustainability is a debate about how to live. It suggests we rethink our relationship to the cultural construct we call "nature," to the earth, and to each other (Schama 1995). Sustainability refers to the way things ought to be and how we ought to live. As such, it is the start of a complex dialogue. As a dialogue about how we ought to live, it is a moral dialogue (Cronon 1995). As with all moral arguments, there is a danger, for it is but a small step from dialogue to dogma. This essay examines one dogma of the controversy surrounding sustainability, the compact city.

Sustainability is a broad, vague term that has many meanings. Sustainability is a Platonic idea, a category of the good. As a new idea, there is not yet a clear, single image of what sustainability is. Its fuzziness and many facets contribute to its appeal. It is appropriated without fear of challenge because there is no single accepted image of how to specify it exactly and put it to work, despite one accepted general meaning of a balance among equity, economic, and environmental concerns. Sustainability is not yet branded. There is no patent, trademark, or copyright.

Sustainability as we think of it today draws from at least five intellectual traditions. They are capacity, fitness, resilience, diversity, and balance. The goal in examining them is not to conduct an exhaustive analysis. Instead, it is to tease out broad yet critical underlying premises to see if common ones exist. This article does this and then applies the results to the compact city to assess how the compact model compares.

Capacity

Capacity refers to carrying capacity of a place to support populations of living beings. It is perhaps the oldest notion of sustainability with a pedigree going at least as far back as the *Essay on Population* by Malthus, whose clear exposition led to its acceptance as a definitive work. His argument summarized is that food, and by inference, other biological imperatives such as water and territory determine population levels and survival. Ecologist Charles Elton specified carrying capacity as a limit at which populations can be maintained by their habitat without being restricted by food, water, land, disease, or predation and without compromising their habitat's capacity to support that population (Elton 1927). Borrowing from their premises are such landmark treatises as Donella Meadows et al.'s (1972) *The Limits to Growth* (Club of Rome Report), and Ian McHarg's (1969) *Design with Nature*. They were benchmark methods of carrying capacity analysis and planning with respect to nature. The methods and principles behind carrying capacity are similar to those of land uses analyses known as suitability or capability analyses (Griffin 1977; Anderson 1987). The World Conservation Union, for example, defines sustainable development as "improving the quality of human life while living within the carrying capacity of supportive ecosystems" (World Conservation Union 1991). Carrying capacity has been carried into a range of economic and scientific arguments (Ledec and Goodland 1985; Arrow et al. 1995). Carrying capacity persists as a mainstream definition of environmental planning for sustainability (Rees 1996; Beatley 1995).

Carrying capacity became popular because it used factors that are easily measured and assessed. It is both place and time specific. If we view sustainability as a process of a people adapting to, while simultaneously changing, a place over time—as William Cronon did in his brilliant account of colonial New England—then we can fathom sustainability as a coevolutionary process. Cronon's ecological and social history traced the ways American Indians and Pilgrim settlers changed

their relations to place and to each other as they learned about, and often subjugated, the land and each other (Cronon 1983). Measuring capacity at a single point in time thus goes against the notion of sustainability as process. Moreover, determining the carrying capacity of a specific place does not square with any earthly place being an open, living system.

Fitness

Fitness, the second perspective, has a long tradition in biology and conservation. No discussion could begin without citing the monumental influence of Charles Darwin's masterpiece *On the Origins of the Species* (1859). Among other things, fitness implies an evolutionary process marked by the mutual interaction between species and environment. It involves adaptation over time—a fit between organism and habitat. Fitness is a local trait stemming from adaptations that respond to immediate context. The biological concept of fitness today trades in other realms under such names as appropriateness and adaptability. E. F. Schumacher (1973) popularized this thinking in the economic sphere in *Small is Beautiful*. Schumacher, an economist, criticized economic development models exported by industrial nations and international organizations like the World Bank to "less-developed" countries. He contended that they did not fit the recipient cultures well because they relied on knowledge, capital, technology, and materials foreign to them.

His colleague George McRobie (1981) extended his moral plea into the practical plane in *Small is Possible*. McRobie, also an economist, presented empirical cases and best practices in settings throughout the developing world. His goal was to fit the proper technology to the stage of development of a specific place. Together they launched the appropriate technology movement, which had effects in many fields including urban and environmental planning.

The notion of fitness continues to be developed in numerous fields. Planners and designers maintain community character by fitting development harmoniously with the existing urban fabric. Fitness is at the root of most "not-in-my-backyard" (NIMBY) controversies, where a land use such as a landfill or energy plant is considered undesirable or not fitting local circumstances by potential neighbors. Any condition that is considered undesirable by a local population can generate a NIMBY controversy. Landscape architects and environmental planners endeavor to fit built structures and developments into natural and rural landscapes without disrupting ecological systems irreparably (McHarg 1969; Ashby 1978).

Fitness has generated sophisticated treatments by a range of thinkers. Architect Christopher Alexander's (2002) treatise *The Nature of Order* treats sustainability in an original way. His theory encourages planners, architects, and builders to produce life in their creations by fitting their structures into the whole (city, environment) in a slow, unfolding natural process. His theory of structural order values fitness of pieces that belong together in a whole. Theoretical biologist Stuart Kauffman makes a contribution to the theory of evolution by placing self-organization alongside natural selection in equal stature. He suggests fitness is the result of coevolution between self-organization and adaptation in complex and dynamic systems (Kauffman 1994). His theory of fitness brings structure into the equation and has consequences for planning and designing cities, which had been envisaged by Kevin Lynch (Lynch 1981). Lynch's career-crowning *Good City Form* carefully elucidates the connection between urban form and local culture using evidentiary analysis, while the philosopher Henri Lefebvre's books on urban topics in the 1960s and 1970s addressed numerous aspects of cities. *The Production of Space* ([1974] 1991) can be read, in part, as an exegesis of fitness as applied to the production of urban place and space.

Resilience

Resilience responds to some shortcomings and complexities of fitness theories. Alexander's and Kauffman's theories pose serious difficulties in measuring the degree of fitness. Resilience addresses these measurement problems by reframing the question. Instead of asking how well does an organism or activity fit into a given ecosystem or social community, resilience asks how well does a place absorb the presence of an organism or activity. How does a place respond to the effects? Is there a range in which an ecosystem or social community can absorb shocks and still retain its health and functional integrity?

Resilience borrows from notions of health—namely, immunity and recovery. Resilience, whether for individuals or communities, is based on accommodation between the organism/community and some agent foreign to it. Resilience thus shares some characteristics with fitness and capacity. All three concern accommodation over time. Carrying capacity, resilience, and fitness are based on the interaction among elements in an interdependent system. As with fitness, Resilience is a process of adjustment through interaction (Ashby 1978; Dubos 1978; Waldon 1994).

The modern city planning movement partly derives from the idea of resilience. In the latter nineteenth part of the nineteenth century, the urban expansion, tenement improvement, and civic hygiene movements in Spain, Germany, Britain, and the United States all diagnosed large cities as ill and not fit to live in. Professionals proposed solutions to let in more light

and air and to better treat wastes—that is, to make cities more resilient to the effects of crowding (Cerdà 1867; Unwin 1912; Hall 1988). Today, cities with vacant lots, abandoned structures, and deteriorating neighborhoods have a more costly and slower recovery in response to stresses. Likewise, altered or damaged ecosystems have greater difficulty bouncing back after natural events such as hurricanes and floods.

Diversity

Diversity is a powerful idea that has redefined the debate on sustainability. The idea was widely disseminated by Edward Wilson (1988) in his classic *Biodiversity*. Diversity has entered discourse in a multitude of ways. It has entered such arenas as politics and education in debates surrounding cultural diversity (Bowen and Bok 2000). Diversity also refers to preserving biological diversity via environmental protection. In urban planning, it may take the form of multiple and mixed land uses instead of a single use. Likewise, inclusionary zoning that accommodates a range of incomes is construed as promoting social diversity. It also appears in process design by including a wide range of participants, or stakeholders.

Diversity is an indicator of health, whether for an ecosystem, urban community, or organization (Wilson 1988; Schulze and Mooney 1993). Diversity refers both to the variety of members in a community and the positive disposition of members in relation to one another. It implies interaction and adaptation insofar as for a diverse group of beings to occupy the same space simultaneously, those beings must learn to coexist. This entails mutual adjustment. Adjustment requires reciprocal learning and consent in cultural systems. In biological systems, it entails natural selection, a form of reciprocal learning through competition and cooperation. Diversity has become a pervasive and persistent feature of sustainability debates (National Research Council 1999; Taylor 1986).

Balance

Finally, *balance* refers to balancing the "natural" environment with "human" development. This strand of thinking stems from criticisms of neoclassical economics (Schumacher 1973; Daly 1980). Neoclassical economics held the environment separate from humans and their economic activities. The environment was reduced to natural resources exploited for human consumption. Natural resources were inputs and throughputs to economic processes, on par with labor and capital. This separation led to the concept of externalities, activities that fell outside of and could not be explained by formal models that mathematicians were deriving for economic theory. These models placed a premium on elegance, which externalities marred. Moreover, externalities ignored free riding and the tragedy of the commons.

To correct this limitation and better represent the real world, critics of mainstream economics put forth a new paradigm to balance the economy with the environment. Before it was environment versus development. Now it is environment and development in balance. The debate entails trade-offs between environment and development and the integration of the economy and the environment. Under the balance rubric, environmental justice, economic equity, and other manifestations of redistributive justice draw their basis (Sen 1973; Rawls 1971).

As balance entails bargaining and compromise, it is no wonder that this viewpoint is subscribed to by politicians and policy makers. There are contradictions inherent in the orthodox view of balancing economy with ecology, however, despite the fact that the two words stem from the same root (Redclift 1987). To see how far this view has penetrated mainstream institutions, consider the subtitle of the United Nations report *Our Common Future: Report of the World Commission on Environment and Development* (United Nations World Commission on Environment and Development 1987). This report urged a balance between development and environment and between present and future generations. The Brundtland Report had much to do with popularizing the word sustainability and the balance view of it.

Balance implies equilibrium. However, in open and dynamic systems like the city, subject to human will and caprice as well as the furies and salves of nature, can a city ever be in equilibrium? Instead, history records the flows of unending change. The human struggle to cope with these changes is the urban process.

The inherent limits to a synopsis of five powerful, influential, and complex intellectual traditions are apparent. Several pages are not enough to convey the nuances of rich, sometimes centuries-old lines of thought. Each of these traditions has its critiques. Nonetheless, they continue to resound and form the basis of much scholarly and professional activity. Another criticism that can be anticipated is that they are Euro- and America-centric to the extent that they have been passed down through Western books and institutions. Many of these traditions have counterparts in non-Western philosophies and cultures. To analyze them is beyond the scope of this present article. It may prove fruitful, nevertheless, to learn how widespread these ideas are and how they vary. Finally, these five traditions are more linked than the categorization suggests. The next section explores some of these links.

▶ Common Themes of Sustainability

As with many classifications, these five categories overlap and are not mutually exclusive. The Brundtland Report is an example that contains pieces of all five perspectives, even in its focus on two (United Nations World Commission on Environment and Development 1987). An earlier essay that reflects multiple viewpoints is Garrett Hardin's (1968) "The Tragedy of the Commons." I highlight commonalities to see how they may impinge on the praxes of compact cities and sustainable development.

The first common thread among the five traditions stems from the notion of sustainability itself and is derived from the word's root, *sustain*. Its most common meaning is to keep something going over the long run. This resonates with the second part of the thesis of the Brundtland Report, which states "Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future" (United Nations World Commission on Environment and Development 1987, 40). In human and biological terms, sustainability refers to an ongoing process of how to live and perpetuate the species. Process, then, is the first common feature of sustainability. Process is most apparent in the fitness and resilience points of view, as well as diversity and balance.

A second commonality is health, appearing in all five categories. To sustain an ecosystem or city over the long run assumes that it will be healthy. Biologists, in studying the health of biological communities, devised an approach incorporating quantitative and ecosystem-wide health measures. Functional integrity of an ecosystem is a surrogate for overall health. Functional integrity has been applied to ecological analyses of the city (Boyden et al. 1981).

A third common characteristic refers to place-specific conditions. They measure the relationship of a species or a process to a specific locale. For example, carrying capacity is the ability of a particular area of land or water to support a certain level of life. Fitness deals with the appropriateness of species and activities to a specific habitat. Resilience suggests the adaptability of a certain place to absorb impacts. Biodiversity refers to the number of different species in a particular habitat. Balance means the interaction of production and place in a specific locale. I distinguish the place-specific facet of sustainability because so often references are made to global processes, whether natural (global warming, ozone layer depletion), human (globalization of the economy), or institutional (international treaties and political bodies such as the World Trade Organization and United Nations) and because global or universal approaches adopted by multinational corporations and national governments are being revealed to be nonsustainable (Schmidheiny 1992; Vitousek et al. 1997; Chapin et al. 1997; Matson et al. 1997; Botsford, Castilla, and Peterson 1997; Dobson, Bradshaw, and Baker 1997; Daily and Ellison 2002).

Relationships attendant to place, including fitness, adaptation, and evolution, become more problematic as we consider multiple and overlapping scales of space and time. This is especially true in human affairs. Consider nonplace fitness in multiple cultures and subcultures, which, among other things, has put terrorism on the sustainability agenda. Further, as space and time are diminished by advances in communication and transportation, the space of places is supplemented by the space of flows (Castells 1989). Under these circumstances nonplace fitness takes on added dimensions and significance. The mutual interdependencies of multiple scale fitness and the very notion of nonplace fitness are only beginning to be appreciated and understood. They should appear on future research agendas.

Lastly, interrelationships among system components, borrowing from systems theory and ecology, are a defining feature of sustainability and are common to all the intellectual traditions under scrutiny here. It is this attribute of interrelationships that closely connects sustainability with the classic and ideal view of city planning, especially comprehensive planning (Nolen 1916; Unwin 1911). In fact, all four common themes—long-term process, health, place specificity, and interrelationships—are closely connected to comprehensive city planning. For this reason, sustainability inherently encompasses the planning of cities and provides a solid foundation for professions concerned with cities (Berke 2000; Campbell 1996).

▶ Sustainability and the Compact City

How do these composite conceptions of sustainability stack up against theories and practices of sustainable urban development, particularly as put forth in the compact city? Rather than analyzing the compact city movement systematically, which merits a carefully designed multidisciplinary research agenda, let us ask a question. Does the compact city respond to the four common themes we have found for sustainability? This is a question of action.

Is the compact city a place-specific solution? It should be, as all good design is context specific. Yet, as practiced by its leading contemporary proponents, one concludes it is not. Generic "cookie cutter" designs are widely reproduced (Southworth 1997) and are often insensitive to context, whether social, environmental, economic, or political (Lehrer and Milgrom 1996). Some new town designs, according to the designers themselves, are taken from those of itinerant

planners around the turn of the past century (Duany, Plater-Zyberk, and Speck 2001). Here, we refer to plans by Nolen, Burnham, Bartholomew, Olmsted Senior and Junior, and others in the United States. Leading British counterparts include Unwin, Parker, Abercrombie, and Adams. Most European nations and their colonies had their equivalents (Hall 1988).

This listing belies the diversity of approaches and contrasting visions of these practitioners. This difference was partly due to differences in professional education. To pick the Americans, Nolan and Olmsted were landscape architects, Bartholomew a traffic engineer, and Burnham an architect. Each applied the tools and ethos of his trade (Thomas 1999; Boyer 1983; Mumford 1938).

The standards and criteria that these pioneering planners imposed were based on a technology that professional elites applied via institutional apparati (Boyer 1983; Rabinow 1989). The term *professional elites* refers to architects, landscape architects, engineers, planners, and lawyers who developed the city planning profession. By *technology*, I mean the tools (means) professionals used to attain ends in classic Weberian instrumental rationality: survey, analysis, plan, zoning, and so on. These professionals were able to apply these tools effectively precisely because the planners and their tools were embedded in existing institutions: governments, commercial clubs, chambers of commerce, universities, professional associations, and so forth. Institutional embedding endowed at least three advantages: power/resources, legitimacy/legal standing, and reproducibility resulting from the standardization of practice. Tools were replicated using the standard means of professionalization. Collectively, these tools, organizational networks, and modes of knowledge constitute the institutional apparatus.

Similar physical planning technologies are applied today by both those who produce urban sprawl and those who produce compact cities. These technologies assume physical design will generate social relationships even though the planning and design principles have more to do with standardized technologies than with local culture. This is why we find new urbanist simulacra of classic New England villages and towns scattered around Canadian prairies, Florida swamps, Low Country marshes, and Gulf Coast beaches.

Pre-twentieth-century models for the compact city include settlements in Europe and elsewhere. Those cities and towns may have been sustainable, but if they were, it was for reasons beside compactness or density. Their builders used local materials, local labor, and local and appropriately scaled technology. They were more artisanal and built settlements gradually over time. Because they applied local knowledge and resources as craftsmen, these settlements fit their surroundings (Lefebvre [1974] 1991). Town builders of prior eras used technology in the sense of the Greek terms *technología*—systematic treatment—and *téchne*—art, craft. This earlier meaning of technology as the art of fabrication encompassed proportion, order, beauty, and quality in a way that contemporary meanings, which value efficiency, uniformity, and reproducibility, do not. The places that earlier city builders built grew in a sustainable way that had nothing to do with the rapid growth (five- to ten-year build-out, or less) of the compact developments built today by one developer, using petroleum-based production methods, with imported technology, materials, capital, energy, and labor. Notably, the latter also can be said about most post–World War II subdivisions and planned developments, the compact city's putative opposite.

Another problematic aspect of the compact city analyses is that they have placed a premium on a single operational measure: population density (Dantzig and Saaty 1973; Breheny 1992; Beatley 1995; Jenks, Williams, and Burton 1996; Burton 2000). While these analysts' discussions of the city are complex and not limited to density, I stress their operational measures of the compact city. This tendency to reduce a complex entity—the city—to one criterion—density—constrains research and biases action. As a representation of urban form, average density does not address variations in density within aggregated areas. It does not address differences in land use patterns, physical design, social characteristics, and ecological conditions among places with the same overall density. It does not reflect variations in linkages among land uses in urban settings (Handy and Niemeier 1997). A rich and more complex set of factors, as indicated in Table 2, provides more complete and accurate indicators. New researchers are adding other urban form factors and getting more robust findings that are more usable for untangling the compact city debate (Zhang 2001; Krizek 2003; Shin 2002).

Compact forms do impart advantages. These include lower land consumption, cheaper infrastructure and utility costs, and resource protection (Burchell et al. 2002; Beatley 2000; Daniels 1999). Yet many compact developments are still mostly residential, still distant from a city or town. This necessitates daily travel for shopping, work, and entertainment. Thus, they contribute to sprawl. In this, they resemble in their (dis)functionality their planned unit development and residential subdivision predecessors, except that now they are more compact.

Is the compact city the result of a long-term, evolutionary process? The new urbanist development is based on a "master designer" approach, by which a single design team drafts plans. In addition, designers along with legal experts draft municipal codes—legally binding standards to be followed to ensure that the building process proceeds according to the designer's plan. To this standard, compact city design process one can add focus groups, public meetings, and other citizen

participation methods, which provide information and ideas. Yet the final designs and codes are produced only by professionals in a brief time span.

Like those a century ago, today's new urbanist and compact city architects prepare a design for a place to be built according to plan. It is not evolutionary. The town does not grow bit by bit over time, accumulating uses, meaning, size, and so on. It is all built nearly all at once, according to the linear principles of a hierarchy or "tree," laid out in Christopher Alexander's critique of traditional master planning methods (Alexander 1965). The new urbanist's town is a static product of a developer's marketing campaign rather than an evolving process of human development.

Is the compact city a healthy city? The health of a city is determined by many factors. Only some factors are affected by density or compactness. Most often, dense cities are unhealthy. The origins of modern urban planning is derived from devastating criticisms of city crowding in the nineteenth century (Hall 1988; Riis 1890; Mearns 1883). Industrial cities became less healthy as they became denser. Today, the tables have been turned. Sprawling metropolises are unhealthy. It would seem logical to conclude that sprawl's opposite, compact, should be more healthy. Indeed, some studies claim they are (Newman and Kenworthy 1989; see Gomez-Ibañez 1991 for a critique). Newman and Kenworthy's findings suggest that gasoline consumption is lower in European cities compared to American and Australian counterparts. Yet gasoline is significantly cheaper in the United States. Furthermore, dense urban centers have diseconomies of scale (pollution and illness) and inefficiencies (increased energy and material costs per square foot in skyscrapers) that ought to be factored into more holistic assessments. Compact settlements with an emphasis on density, pedestrians, and public transportation only address a few of the ills attending modern metropolises.

Does the compact city deal with interrelationships? Partly. Neotraditional planning did emerge from critiques of segregated land uses. New urbanism seeks to bring uses into proximity and mix uses in town centers, thus enhancing choice and livability. Yet close inspection of most neotraditional plans reveals that segregation of uses still occurs. Commercial and civic uses dominate the center, and housing remains on the periphery. A stiff pattern of single-family homes on the edges and multifamily dwellings near the center mimics traditional suburban development, just more compact. People who live in them still must commute, often long distances, as only a few are connected to job centers by transit. Moreover, the principle of police power, the legal basis of segregating land uses by zoning, still underlies neotraditional codes. Economic and class segregation still occurs. Most new urbanist towns are enclaves of the middle and higher classes and are predominately populated by whites.

Beyond the dogma on either side, critical analysts find that the data and methods of analysis are equivocal. Breheny (1992) and Jenks, Williams, and Burton (1996) concluded that the data regarding the sustainability of compact cities are not conclusive. Their analyses, however, were limited to the question of compactness and, more specifically, to urban form. Because cities are not just physical forms and because even their material aspects are manifest in dimensions other than density and compactness, we have to look beyond the compact city for answers to the sustainability question. Moreover, the debate itself needs to be reframed, which I undertake in the following conclusion.

▶ Sustainability as a Process: Raising the Level of the Game

In *Levels of the Game*, John McPhee (1969) wrote about tennis in the era of Arthur Ashe and Billie Jean King. He observed that champion athletes were able to improve their performance—raise the level of their game—to whatever level necessary to win. The term *level of the game* has entered the language to denote an occasion in which a practitioner rises above and beyond the current level of practice to an entirely new level.

As this essay explored representations and meanings of sustainability and compact cities, the way the compact city is represented takes on added import, precisely because it has been taken for granted. Compact city is a pleonasm, two words commonly used together that are redundant—free gift, ice cold, compact city. The fact that we say compact city seems to be occasioned by the existence of sprawl. Yet by countering sprawl with compact cities, proponents remain on the same playing field with their counterparts. They have not raised the level of the game. Instead, they have reverted back to an old game.

By asking if compact urban form is sustainable as Jenks, Williams, and Burton (1996) did in their influential book *The Compact City: A Sustainable Urban Form?*, they are asking the wrong question. Hildebrand Frey (1999) also pursues the sustainable city debate via urban structure in *Designing the City: Towards a More Sustainable Urban Form* (see also Hall 1994). One cannot overlook the fact that form is both the structure that shapes process and the structure that emerges from a process. Yet the question that should be asked is whether the processes of building cities and the processes of living, consuming, and producing in cities are sustainable. Asking this question raises the level of the game. It may even change the game.

In the past, leading scholars have advocated "organic" models of cities and city building. These authors, each in their own manner, analyzed pathologies and wellness of the urban condition. Each has sought prescriptions to remedy bad urban form or principles and criteria for creating and assessing such remedies (Mumford 1938; Jacobs 1961; Ardalan 1973; Benevolo 1980; Lynch 1981; Alexander 1987; Lefebvre 1991; Correa 2000). Recognizing disparities among them, we nonetheless can detect the seeds of a new type of planning. Most preceded the sustainability debate, yet each contributed valuable perspectives that can inform a new type of planning and city building that is not obsessed with urban form.

The purpose of this article has been to identify the compact city fallacy. The compact city fallacy holds that the compact city is neither a necessary or sufficient condition for a city to be sustainable and that the attempt to make cities more sustainable only by using urban form strategies is counterproductive. Instead, conceiving urban form as a processual outcome of urbanization opens the door to a new and dynamic conception of urban planning that is based on a reversal of the last century's (not exclusive) focus on urban form governed by the static tools of the plan and zoning.

Form, as biologists and geologists understand it, is an outcome of evolution. Form is a snapshot of process. It is a fixed condition at any point in time. Form, in and of itself, is not measurable in terms of sustainability. Asking whether a compact city, or any other form of the city, is sustainable is like asking whether the body is sustainable. The proper question is not if the body is sustainable, but rather, does the being that inhabits the body live sustainably? "If the city is to survive, process must have the final word. In the end the urban truth is in the flow" (Kostof 1992, 305).

We must take care not to extend this analogy and criticism too far. There is no such thing as a sustainable city. Cities have always been dependent on their hinterlands and distant counterparts for food and trade. Cities historically have relied on pillaging and tithes and, in recent times, on subsidies from external sources. Has the city, standing alone, ever been sustainable? The sustainable city is a motivating metaphor for something that does not and perhaps cannot exist. The attempt to attain sustainability via physical means alone is nonsensical. Instead, we ought to envision the city as the manifestation of many coevolutionary processes: between the city and its inhabitants and between the city and its environs are two prominent ones. Without taking the organismic analogy literally, the city can be envisioned as a composite of metabolic processes (Decker et al. 2000; Ravetz 2000). Following this, measures of sustainability—indicators—can be applied to a host of factors in addition to the built environment: ecological, social, economic, civic, fiscal, and infrastructural. If emergent and convergent views of sustainability suggest that the city is a coevolutionary process, then the idea and ideal of a sustainable city is a viable one that we can strive to reach.

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