

“Models, Lists, and the Evolution of Sustainable Architecture,” in *The Green Braid*.

Rafael Longoria and Kim Tanzer, eds.  
(London and New York: Routledge, in press).

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The purpose of this first chapter is to challenge, at the outset, the abstract model that conceptualizes sustainability as a triangle of competing interests. This model proposes that sustainable development is achieved through the self-conscious balancing of three competing interests within society; those of economic development, environmental preservation and social equity--what are popularly referred to as the 3 Es. My argument is that this increasingly popular concept is historical (or political), rather than scientific, in significance. It is an idea that is socially constructed, not one that was discovered in our DNA. In this sense “sustainable architecture” reflects the structure of an ongoing human conversation that is struggling to envision a more life enhancing future, not a formula certain to deliver it.

In the 1960's--the period that catalyzed public concern over the degradation of “nature”--the environmental movement recognized only two diametrically opposed interests, those of ecological integrity and economic development. In this initial opposition activists pitted themselves against the interests of economic development so as to preserve ecological integrity. It took nearly twenty years of public conversation--until the mid-1980's--for most North Americans to recognize that it was not only the seemingly allergic interests of business and nature that were impacted by development. Rather, citizens came

to recognize that the relatively poor were being adversely impacted both by those who would consume natural resources and by those who would preserve them. Thus the 3<sup>rd</sup> E, equity, was given a seat--albeit a smaller one--at the table.

Through the international discourse that followed publication of *Our Common Future*, better known as the Brundtland Report in 1987, this triangulated concept has been generally accepted as the logic that informs the concept of sustainable development. As a result it has been adopted by many institutions as the *a priori* tool through which sustainable development is first conceptualized and then measured. My argument in what follows is not to hold that this logic is somehow wrong or misrepresents the social history of its construction. At the very least the green tripod, as some refer to it, has proven to be a valuable heuristic tool that helps us to understand one aspect of a very complex problem. I will argue, however, that such *a priori* or deductive logic can be less than helpful, even destructive, when employed by well-intended architects, planners, and policy makers as the template through which sustainability is imprinted upon real places.

The basis of my critique derives from my study of three city-regions that are associated in the literature with sustainable urban development: Austin, Texas; Curitiba, Brazil; and Frankfurt, Germany. This lengthy investigation was stimulated by a 1999 visit to Curitiba during which I discovered conditions that challenged my own assumptions, and those implicit within the Brundtland Report, about the relationship between democracy and sustainable development. Although I had previously argued that democracy was a necessary, if insufficient

condition for sustainability to show up in any city, Curitiba clearly presented evidence to the contrary. That city has made dramatic progress toward achieving sustainable development through technocratic means founded upon the authority of the military junta that seized power in Brazil in 1964 and that lasted until the late 1980s. The book that derives from this study is, then, chiefly focused upon the relationship between democratic processes, social equity and environmental preservation.<sup>1</sup> This chapter, however, focuses upon a sub theme of that book-- the relation between cities, stories and progress. In the end I find that it is human stories, not abstract models or lists of best practices that most dramatically influence ecological outcomes. But before considering how sustainability might better be understood as a progressive storyline rather than a fixed geometry of interests it will be helpful to trace the steps by which the tripod became the dominant model of sustainability.

### Triangles and tripods

I have already credited the authors of the Brundtland Report with the implicit suggestion that sustainable development at any scale can only be achieved through the balancing of the 3Es. That seminal text of 1987 did not, however, explicitly model the concept as a triangle nor did it stipulate specific action to be taken. By 1992, however, the United Nations Conference on Environment and Development (UNCED), held at Rio de Janeiro, articulated an action plan for sustainable development to be achieved in the 21<sup>st</sup> C that is now commonly

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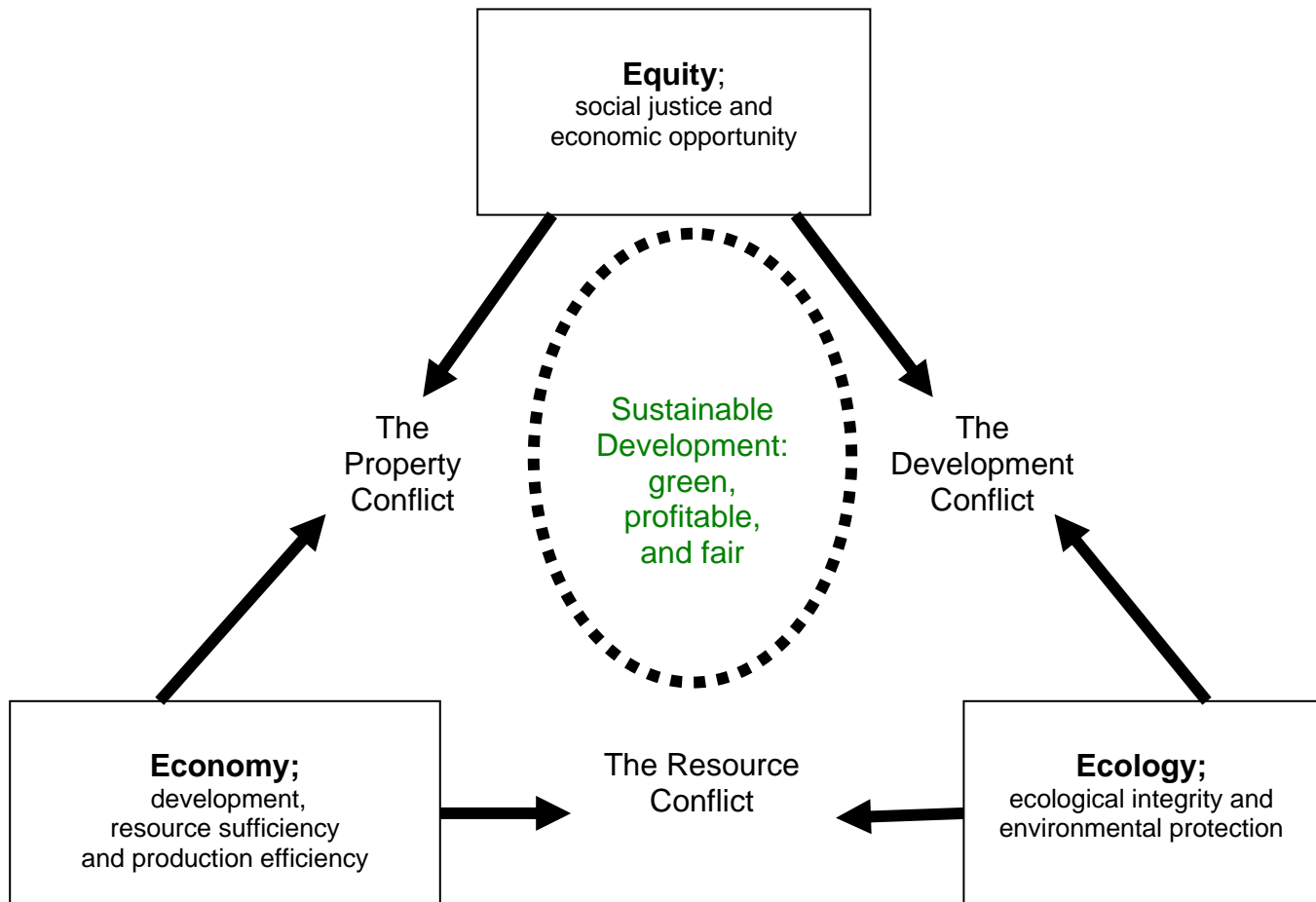
<sup>1</sup> Moore, *Alternative Routes to the Sustainable City* (in press, 2007). This chapter is partially excerpted and derived from the larger study to be published by Rowman & Littlefield.

referred to as *Agenda 21*. Under a UN mandate to implement *Agenda 21*, it was the International Council for Local Environmental Initiatives (ICLEI) that first conceptualized sustainability as a triangle of competing interests. In picturing sustainable development as a “three legged stool” these authors suggested that sustainability initiatives could not stand as a whole without equal support from the three constituent social networks that represent the interests of ecology, economy and equity.

Although the three-legged stool metaphor has been widely adopted, it has been most elegantly pictured by the planner Scott Campbell. In Campbell's diagram, illustrated in Figure 1, the three corners of an equilateral triangle represent the competing interests of the 3 Es and the sides represent a set of conflicts that occur naturally in any modern society. Campbell's argument is that the role of planners and architects in democratic societies is to mediate, and thus stabilize the conditions of conflict.

Others have adopted this vector-like logic, but have argued the need to include a fourth set of interests, thus transforming the triangle to a tetrahedron. This argument is based upon the historical precedent noted above. If environmental conflict of the 1960's began as a simple dichotomy between the 2Es--ecology and economy--and grew to 3Es by including the concept of equity as a legitimate variable in the conflict, why should we not have 4Es and thus democratize the conversation to include yet other related interests. David Godschalk, for example, has proposed that the three competing values of sustainability--economy, ecology and equity--must be expanded to include

“livable community values” if we are to construct a planning tool that will be helpful in negotiating and thus balancing the conflicts that emerge in real places.<sup>2</sup>



**The Concept of Sustainability** is inscribed within a triangle of competing interests. In this construction, the concept is discursive and reduces conflict.

**The Development Conflict** sets those with an interest in protecting the environment against those with an interest in distributing available resources.

**The Property Conflict** sets those who control the means of production against those with an interest in distributive justice.

**The Resource Conflict** sets those with an interest in economic development against those with an interest in resource conservation.

**The Sustainable City** is one that negotiates and balances each set of competing interests.

Figure 1: The 3Es of sustainability, after Scott Campbell, “Green Cities, Growing Cities, Just Cities? Urban Planning and the Contradictions of Sustainable Development,” in *APA Journal* (Summer 1996): 468.

<sup>2</sup> Godschalk, “Landuse Planning Challenges (2004:8).

In similar fashion I have myself attempted to expand the 3Es to include aesthetic interests as a necessary variable to be considered in the construction of sustainable places. By dropping the “a” from (a)esthetic, this strategy conveniently forms a tetrahedron of 4Es. My logic in constructing this figure was to argue that unless healthy environments are also beautiful and compelling they will not be sustained by the societies they claim to serve. Even worse, I feared that architecture might be reduced to a positivistic field of measurement.<sup>3</sup> In some texts I revised the tetrahedron to other geometries so as to reveal new possibilities for conflict resolution.<sup>4</sup>

Having made such abstract arguments I am now free to critique the logic behind it. Although each of these abstract models (my own included) may be helpful in suggesting the many conflicting variables legitimately related to sustainability, empirical evidence suggests that any model, no matter how complex, fails to represent the nuance or contingency of history, past or future. In my study of Austin, Curitiba and Frankfurt I found that all of these abstract models tended to obscure local discourses that thrived and/or languished in those places and thus distort the historical evidence. This is to say that although deductive models may help to explain some commonalities shared between cities that have already achieved some success in moving toward sustainability, such models only obscure the contingent process of *how* and *why* sustainability

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<sup>3</sup> Moore, *The Disciplinary Blinders that Enframe Sustainable Design* (2002). In this text and elsewhere I employed a tetrahedral geometry to model sustainable development.

<sup>4</sup> Moore, “Architecture, Aesthetics and the Public Health” (in press). In this text I employed a circular geometry to model sustainable development.

shows up in a particular city in the first place. And if this argument holds true, then my empirical findings suggest that extruding yet other cities through abstract models in an attempt to make progress toward sustainable development may do more harm than good.

What I did find in these exemplary cities, instead of the new and improved model of sustainable development I had hoped to find, is that each city has a very different story to tell.

### Sustainability as an urban storyline

Like triangles and tripods the notion that sustainability is best understood as a narrative is not a new one. David Nye (1997), Barbara Eckstein (2003), James Throgmorton (2003), and others have developed this idea over the past ten years. From their work we understand that all societies construct stories about themselves. We do so not only to distinguish our tribe from others, but to explain to ourselves how our ancestors came to live in a particular place in a particular way. But such stories are not fixed. They are edited over time by new ideas that first appear as marginal social practices and only later become codified as explanations for those practices. As conditions change, as they inevitably do, the “foundation narratives” of all societies are periodically rewritten.<sup>5</sup> So, one way to understand the emergence of sustainability is not as a historically unique situation brought about by a singular case of over-consumption, but as a periodic and necessary rewriting of the foundation narrative of Western society. Our

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<sup>5</sup> Nye, *Narratives and Spaces* (1997). Nye mentions sustainable development only in the closing passage of the book.

current era, as have others before it, requires a new storyline if we expect history to unfold in a trajectory we can accept on behalf of future generations and those who are now unable to speak for themselves.

Table 1.1 provides a simple analysis of six story lines that have shaped human understanding of the world at different times in history: the heroic, religious, scientific, C.I.A.M.<sup>6</sup>, economic and the sustainable.<sup>7</sup> Although these are roughly chronological in order of appearance, none of them has ever entirely disappeared from view, nor is my list comprehensive. When new story lines show up they simply share the available space with those that precede them and with others that are less prominent. The sustainability story is just one layer of history that best describes the dilemmas of our time and it must be understood within the context of the other storylines that compete for our allegiance. It is the overlapping nature of these competing storylines that keeps local stories about sustainability in touch with larger global phenomena.

Thinking about history as a succession of stories seems, at least at first, an outrageous notion. Is it possible that simply telling a new story will alter historical outcomes? To think so we would have to assert that the story to be told is a very powerful one indeed--so powerful that it will convince a majority of our fellow citizens that fundamental change of their ideals, behavior, heroes, modes of communication, time frames, and so on, is in their interest. But,

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<sup>6</sup> C.I.A.M., or the *Congres Internationaux d'Architecture Moderne*, was held annually from 1928 through 1956. The organization articulated, and constantly revised the collective vision of its members. The manifestoes issued under the CIAM are generally accepted to represent the orthodox views of modern architects toward the making of a truly modern world.

<sup>7</sup> The structure and some terms in this table are derived from those presented in a lecture by Betty Sue Flowers at the University of Texas 12 October 2000.

stories do not cause history. Rather, they reflect real capabilities for history-making as much as they catalyze action. If stories are received as utopian fantasies, unrelated to daily life, characteristic behaviors, and plausible outcomes they will be rejected by citizens. What proved to be of most interest in my empirical investigation of Austin, Curitiba and Frankfurt is how stories of sustainable development come to be told, how they conscript others to retell the story to their peers, how they motivate citizens to live differently, and thus influence our evolutionary prospects.

Table 1: Characteristics of alternative storylines

	premodern		modern			postmodern
storylines	Heroic	Religious	Scientific	C.I.A.M.	Economic	Sustainable
ideals	excellence	goodness	truth	functionalism	growth (quantitative)	development (qualitative)
behaviors	competition	obedience	experimentation	design	maximize	optimize
actors	heroes	saints and prophets	scientists and philosophers	architects and planners	consumers and business	citizens
modes of communication	legends	scripture and prayer	logic	drawings, models and manifestoes	images and numbers	feedback loops
attitude toward time	immortality	eternity	timelessness	<i>zeitgeist</i>	now	perpetual renewal

## The structure of urban storylines

My study of these three cities employed the methodological assumptions of *grounded theory* and ethnographic methods of data collection and interpretation borrowed from sociology and anthropology. In the process of interpreting the historical record and interviews conducted in each city I constructed terms that reflect the common structure, if not content, of the stories told in those cities.

Simply defining these terms is helpful:

First, I propose that we should not think of sustainability as a *concept* as is done in common usage, or as a *discourse* as Dryzek<sup>8</sup> and Fischer<sup>9</sup> propose, or even as a *narrative* as Eckstein and Throgmorton<sup>10</sup> propose, but as a *storyline*. I prefer this term because it emphasizes the plot or trajectory of action rather than the style of the narrative. By investigating the lines of stories we can better anticipate how competing accounts might converge or diverge. This is to say that competing storylines may be in conflict yet project forward a limited horizon of possibilities. Storylines are, then, a shared way of making sense of the past and speculating about what might become true in the future .

If competing storylines project a range of alternative futures, these are constructed, described and lived by citizens through different kinds of *public talk*. Every city has, of course, many different kinds of public talk, or conversations that take place over a long period of time. The citizens of Boston are, for example, the authors of many public conversations; some Irish, some Portuguese, some Catholic, some Puritan, some about the city's "big dig", and

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<sup>8</sup> Dryzek, *Politics of the Earth* (1997).

<sup>9</sup> Fischer, *Reframing Public Policy* (2003).

<sup>10</sup> Eckstein and Throgmorton, *Story and Sustainability* (2003).

some about baseball played under the unique conditions imposed by “the green monster.” Although each of these distinct public conversations include only some citizens, together they add up to public talk about the city’s past and future that includes all citizens whether they can talk baseball stats or not. Benjamin Barber defines “public talk” as that which “... always involves listening as well as speaking, feeling as well as thinking, and acting as well as reflecting.”<sup>11</sup> In the study I adopted this definition, but add to it the idea that public talk is comprised of many competing quasi-public conversations that vie for our attention, allegiance and participation.

In my analysis of these three cities that aspire to develop sustainably I found that of the many kinds of public talk in which citizens are engaged-- baseball talk, art talk, money talk, etc.--there are three that contribute most to sustainability: these are *political talk*, *environmental talk* and *technological talk*. This is not to argue that sustainability is comprised only of these variables, but that it turns up most frequently in these kinds of conversations. I’ll briefly characterize each in turn:

#### Political talk

Among architects it will not be controversial to characterize talk about sustainability as political. Given limited economic resources, how should we reasonably decide which of the many criteria put forward to define sustainability is correct or better--LEED, BREEAM, ISO 14400, Green Globe, etc. My point is that the disagreement between the expert authors of these various standards is

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<sup>11</sup> Barber, *Strong Democracy* (1984: 177).

not a scientific one, it is a political one. This is to say that choices about which criteria for sustainability is best are social choices about how we want to live, not scientific choices about what is true or more efficient. In my analysis of the three cities I concluded that each had developed distinct political dispositions in their historical development that reflect fundamentally different dispositions toward conflict resolution and what is socially valued.

The political philosopher, Benjamin Barber, has suggested a helpful taxonomy that categorizes three political dispositions within Western liberal democracies—these are defined in Table 2. Barber’s categories are teleological to the extent that they imply a progressive order of development but, in his view are not yet inadequate forms of democracy. My point in constructing the table is to point out that each of the three cities I have studied exemplifies one of Barber’s dispositions. I found that a majority of citizens in each city has very different political values and very different attitudes toward the conflicts inherent in assessing progress toward sustainable development. Where the real estate cowboys of Austin tend to deny the legitimacy of conflict in the marketplace, the technocrats of Curitiba tend to suppress conflict in the name of stability, and the cosmopolitan bankers of Frankfurt tolerate conflict in order to optimize cash flow. These attitudes tend to interpret global phenomena through very different kinds of stories.

Table 2: The three dispositions of liberal democracy

	<b>liberal-anarchism</b>	<b>liberal-realism</b>	<b>liberal-minimalism</b>
<b>Generic response to conflict</b>	denial-- Conflict emerges only because of the illegitimate authority of the state.	repression-- Conflict is dangerous because it disturbs the contract certainty upon which growth depends.	toleration-- Conflict is natural in a diverse society and stimulates individual creativity.
<b>What is valued</b>	rights-- Individuals are perceived as having asocial origins and rights.	wisdom-- A few very wise individuals are required to administer social order.	freedom-- Atomized individuals must be free to pursue happiness within market conditions.
<b>Selected city</b>	<b>Austin</b>	<b>Curitiba</b>	<b>Frankfurt</b>

### Environmental talk

As I argued above, the dominant kind of environmental talk, or talk about sustainability that is found in Western cities is the “three-legged stool” or “planners’ triangle” illustrated above in Figure 1. Here I’ll argue that Campbell’s discursive model is indeed a good fit for the political disposition of Frankfurt. The problem is that it less a fit for Austin, and largely unrelated to the political discourses and disposition of Curitiba. This is to say that one size, or one model, does not fit all. This discovery prompted me to adopt the broader description of competing environmental discourses developed by John Dryzek and illustrated in Figure 2. Dryzek developed these (and other) categories through the inductive methods of *discourse frame analysis*.<sup>12</sup> For the purposes of this short chapter I won’t attempt to describe the characteristics of each kind of environmental talk

<sup>12</sup> Dryzek, *Politics of the Earth* (1997).

encountered in my investigation, but simply note that all of the types that show up in Figure 2 also showed up in the cities studied.

	reformist	radical
prosaic	<p>problem solving:</p> <ul style="list-style-type: none"> <li>• by experts <ul style="list-style-type: none"> <li>○ technocracy</li> <li>○ administrative rationalism</li> </ul> </li> <li>• by citizens <ul style="list-style-type: none"> <li>○ pragmatism</li> <li>○ lifestyle greens</li> </ul> </li> <li>• by the market <ul style="list-style-type: none"> <li>○ economic rationalism</li> <li>○ eco-modernism</li> </ul> </li> </ul>	<p>neo-Malthusianism:</p> <ul style="list-style-type: none"> <li>• mutual coercion</li> <li>• survivalism</li> </ul>
imaginative	<p>The Brundtland vocabulary (three-legged stool or “planners’ triangle)</p>	<p>green radicalism:</p> <ul style="list-style-type: none"> <li>• romantic <ul style="list-style-type: none"> <li>○ deep ecology</li> <li>○ eco-feminism</li> <li>○ bio-regionalism</li> <li>○ eco-theology</li> <li>○ eco-communalism</li> </ul> </li> <li>• rational <ul style="list-style-type: none"> <li>○ social ecology</li> </ul> </li> </ul>

Figure 2: Categories of environmental talk

This more complex, fine-grained and inductive view of environmental talk suggests that there can be many more than three competing values—economy, ecology, and equity--in any particular place that must be satisfied in order to realize sustainable development.

Where the citizens of Austin are decisively split between discourses that are radical and imaginative and those that are reformist and prosaic, Curitiba

rely upon elite experts to solve their problems and Frankfurters tolerate every imaginable possibility. These differing dispositions make for very different stories about the state of ecological integrity.

### Technological talk

It is commonly argued that technology is the most distinctive feature of modern society. If we accept this characterization it suggests that human experience in the world is increasingly mediated by technologies of one kind or another. Talk about sustainable technology is, then, not only a matter of trading in one tool for another, it is talk about changing our living habits.

Choosing to understand un-sustainability as an unnecessary and destructive social habit, as I have in this study, suggests that the reverse may also be true—that the condition of sustainability might spring from the conscious reconstruction of social habits. The problem with this proposition is that instilling in our fellow citizens the desire to modify their habits is not enough in itself to alter the situation. This is because repetitious social behaviors do not exist in isolation from the built world. First, social habits co-evolve with the technological systems that enable them, and second, once technological systems like highways and automobiles are in place they limit our choices to live otherwise.<sup>13</sup> This is to say that the built world is the reification, or materialization of our social habits. If we are to consciously reconstruct malignant social habits, then we must also reconstruct our technologies and landscapes.

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<sup>13</sup> Hughes, "Edison and Electric Light" (1999).

Yet another way to argue this point is to say that technology is not a necessary progression of artifacts but a scene of struggle that determines how we will live together and in relation to natural processes.<sup>14</sup> This is to say that reconstructing cities to be sustainable will require what Pfaffenberg refers to as a “technological drama”--a series of technological acts and counter-acts in which technological systems are regularized, adjusted, and re-constituted by sets of interested actors.<sup>15</sup> The case studies which constitute the better part of the book excerpted here are urban technological dramas of just this sort.

In my examination of the selected cases I found that ordinary citizens in each city developed over time interpretive frames, or attitudes toward technology that tended toward the technophilic (meaning that technology is inherently good) or toward the technophobic (meaning that technology is inherently bad). Ordinary citizens also had split attitudes toward the relation of technology to society. Some were deterministic (meaning that they saw technologies as controlling society) and others were voluntaristic (meaning that they saw society as free to choose whatever technology was deemed desirable). These are what I will refer to as “naïve” interpretive frames and are related to each other in Figure 3.

More sophisticated observers--activists, STS scholars, and historians, for example--tend to have more critical views that are neither technophilic nor technophobic, and neither deterministic nor voluntaristic. These various critical positions lie in the central cell of the Figure.

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<sup>14</sup> Feenberg, *Questioning Technology* (1999).

<sup>15</sup> Pfaffenberg, “Technological Dramas” (1992).

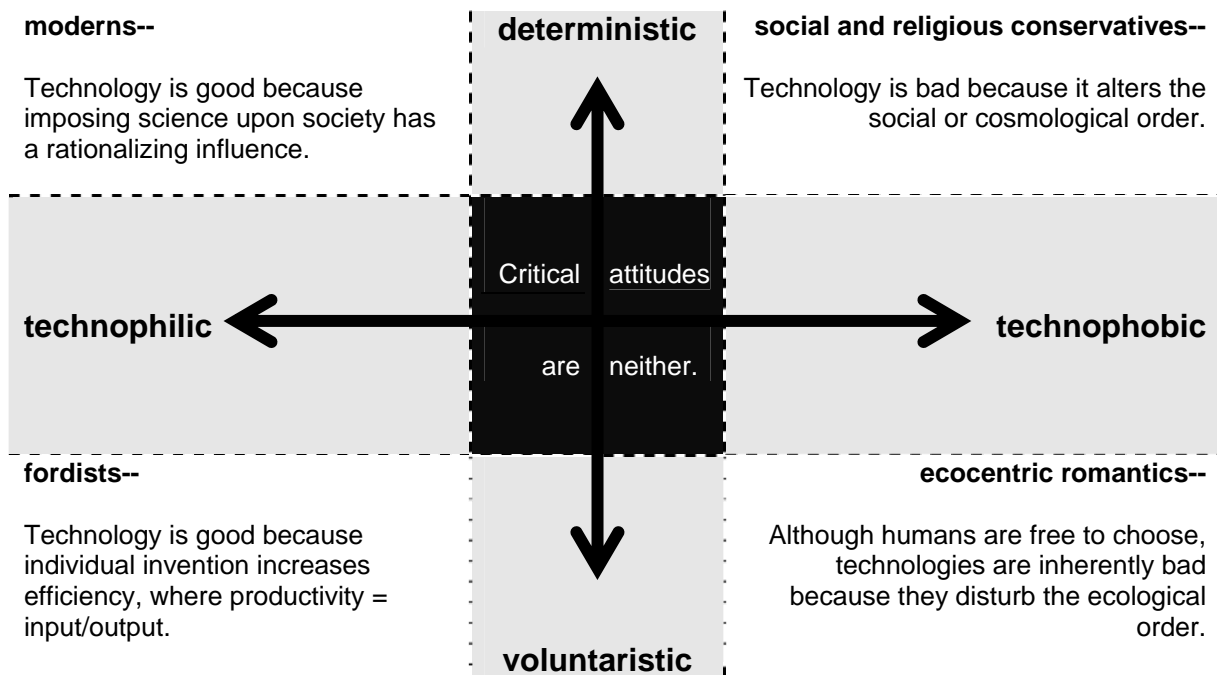


Figure 3: Naïve technological discursive frames

To summarize what was learned from the interpretation of political, environmental and technological talk in the three cities, I'll hold that it is not abstract models derived from deductive reasoning (IE. Campbell's illustration of the Brundland model), or universally applied lists of "best practices" derived from inductive reasoning (IE. the 'green' architectural checklist developed by LEED) that will catalyze successful action. These deductive and inductive proposals certainly have heuristic value--meaning that they can introduce naïve or skeptical citizens to the general concerns of sustainability. Rather, I found that abstract models and cumulative lists are in themselves distractions from the social project of constructing future-oriented storylines from the unique perspective of people

who live in a place. This kind of reasoning is what Charles Sander Pierce called “abductive logic”<sup>16</sup>, what Donna Haraway calls “situated knowledge”<sup>17</sup>, and what Richard Bernstein—following Aristotle--calls “phroenesis”<sup>18</sup>. Following these philosophers, my hypothesis is that *successful* storylines of sustainability-- meaning those that lead to satisfying action--are constituted of political, environmental and technological talk that is home-grown from particular cultural and environmental conditions. Turning this hypothesis inside out would be to argue that when citizens of a particular place compare their situation to abstract models of sustainable development or lists of best practices what they encounter are local obstacles to be overcome by universal principles. But when they begin with local patterns of public talk and historical storylines, what they encounter are opportunities. It is this latter possibility that leads most directly to satisfying action.

### Progress and evolution

Movement toward the ending or horizon of a storyline is commonly understood as “progress”. This term is, however, now received with skepticism and the criticism of those who have experienced or anticipated the dark side of Enlightenment rationality. In the view of postmodern philosophers, beginning with Heidegger, the very idea that science and technology will enable modern humans to predict and control nature is not our salvation but the very source of

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<sup>16</sup> Pierce, *On Arguments* (1902).

<sup>17</sup> Haraway, “Situated Knowledges” (1995).

<sup>18</sup> Bernstein, “Heidegger’s Silence” (1992).

modern environmental and social degradation.<sup>19</sup> For postmoderns, progress never makes the world better, only more complex. Some postmodern architectural theorists go so far as to argue that the sustainability story is only a thinly veiled attempt to perpetuate the hegemony of American corporate capitalism.<sup>20</sup> To embrace sustainability as the storyline of progress is, in the eyes of postmoderns, to stay firmly within the Enlightenment project of perfecting the world through the use of human rationality.

In response to these postmodern skeptics I must distinguish between the kind of human *rationality* that we associate with Enlightenment science and human *intelligence* itself. By the former I mean a particular way of reasoning, and by the latter I mean the ability to reason. Like many postmoderns<sup>21</sup> John Dewey was (occasionally) skeptical of traditional Western, or technological rationality, but unlike most postmoderns, he was generally optimistic about the potential of human intelligence to solve problems. He argued that "... if human problems are to be solved it will be human intelligence that will have to do the job."<sup>22</sup> The story that Dewey put forward was that human nature is changeable, or developmental rather than fixed. This is to say human reasoning might be improved. Contrary to the fears of some postmoderns, then, all forms of rationality do not lead to the same consequence.

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<sup>19</sup> Heidegger, *Age of the World Picture* (1977).

<sup>20</sup> Shephard, *Artificial Love* (2002). Shephard's critique of sustainability is hardly unique and derives from a generally Foucauldian aversion to the politics of modern institutions.

<sup>21</sup> In general I use the terms "modern" and "postmodern" to distinguish philosophical attitudes not architectural styles. Where moderns accept the Cartesian dualisms of mind and body, culture and nature, or subject and object, postmoderns reject them.

<sup>22</sup> Cited in Hickman, *Philosophical Tools for a Technological Society* (2001: 155).

The emerging discipline of *mimetics*, which derives most directly from the work of Richard Dawkins, proposes that human evolution is influenced not only by the laws of natural selection and genetic mutation but by the passing along of ideas from one generation to the next. Because ideas, or “memes”, affect not only human events but the physical environment, Dawkins argues that over time they also influence blind evolutionary choices.<sup>23</sup> For example, if we understand the idea of “rugged individualism” to be a “meme” of the American West that has been passed from generation to generation for the past century and a half it is perfectly reasonable to argue in Darwinian terms that a cultural landscape has been produced by rugged individuals that will in turn influence the possible choices of future generations. My point here is that the stories and “foundation narratives” we tell to each other have more than passing interest--they contain and/or suppress evolutionary possibilities. This is not to argue that human evolution takes place within such a short period of time as the era of rugged individualists but rather that the ecological impact of rugged individualists has been of geological proportion that in turn influences adaptive behavior and so on. An extension of this memetic logic would be to hold that it is not only the ideas which are passed between generations that have evolutionary impact, but also cultural habits or practices.

In Dewey’s assessment, thinking is biological in its origins. He held that,

“Of human organisms it is especially true that activities carried on for satisfying needs so change the environment that new needs arise which demand still further change in the activities of organisms by which they are satisfied; and so on in a potentially endless change.”<sup>24</sup>

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<sup>23</sup> Dawkins, *The Selfish Gene* (1976).

<sup>24</sup> Dewey, *Logic: The Theory of Inquiry* (1991: 35).

Dewey's position is not a form of environmental determinism, but a *relational* understanding of humans and nature that is entirely consistent with contemporary ecology. At its core is an understanding that humans interact with nature through technology. As human projects transform what we can call "first nature" into "second nature" not only are new technologies required, but humans too change in response to altered environmental conditions. In this scheme humans, nature, and technology are each granted shifting degrees of agency *ad infinitum*.

But here I must be careful not to leave the impression that human reasoning can direct evolution. Such logic would inevitably lead to the troubling proposal that Frankfurt is, for example, more evolved than Austin or Curitiba. Any such claim would require us to know the long trajectory of history from our position within it, which is not logically possible. To avoid such a simplistic view of either history or evolution we should distinguish between three models of evolution: those of Spencer, Lamarck, and Darwin:

Spencer's model proposes that greater complexity and progress are inevitable--his is a type of divine teleology first embraced by Enlightenment thinkers. In contrast, Lamarck's model proposes that human striving drives change but that progress per se is never guaranteed. Misguided striving might take us in a direction contrary to human interests. Darwin's model, however, proposes that evolution requires neither a historical force nor a direction of change.

I'll quickly dispense with Spencer's model of inevitable progress as wishful thinking, even if it is an attractive story still championed by many. Lamarck's model, however, seems closest to Dewey's position which is something of a problem because most contemporary evolutionary historians have discarded the idea that the striving of individuals can influence the long course of evolution. In spite of our ability to reason, skeptics argue, we can never predict the precise consequences of our actions. According to the more universally held Darwinian model, unconscious rather than planned selection is always at work in even the most carefully considered of human projects.

John Langrish, however, has proposed a neo-Darwinian model of evolution that does, I think, resolve the seeming conflict with Lamarck. Langrish's position combines Darwin's theory of natural selection with genetics, which appeared after Darwin, as a way of explaining what is carried from one generation to another. Langrish, like Dawkins whom I cited above, includes in the information carried between generations, not just the genetic code of DNA, but patterns of reasoning, or memes, which are transferred between generations and thus replicated through time and space. Langrish thus argues that "the idea that Darwinian change is just 'chance' is wrong..." rather, "... [human] striving has to be seen as a necessary but insufficient factor in Darwinian change."<sup>25</sup> This is to say that striving to make things better is an essential human characteristic, but it doesn't assure that change will happen in the direction we intend. Progress is not assured by striving, yet striving does influence not only history, but the

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<sup>25</sup> Langrish, "Darwinian Design", (2004: 11-12).

environment to which human biology adapts. A neo-Darwinian position would, then, accept not only the theory of *genetic* transfer, but *memetic* transfer as well.

This logic suggests that the social construction of storylines of sustainable development may in itself be an activity that foreshadows, if not determines, the appearance of the sustainable conditions we desire.

### Conclusion

My study of Austin, Curitiba and Frankfurt concludes that there is no single or privileged route to the sustainable city. Extruding local conditions through the two, three, or four Es will not necessarily create sustainable conditions. Rather, each city is always in-the-making and re-making of itself through the historical process of story-telling. It is highly unlikely that the technocrats of Curitiba, for example, will suddenly adopt the model of high tolerance for social conflict that exists in Frankfurt or that the rugged individualists of Austin will suddenly adopt the model of rigid technocratic codes that enabled the miracle of Curitiba. Rather, progress toward sustainable development, if it is to continue, will be constructed by citizens engaged in rationally redescribing their own future. Toward this end what is needed are tools that will open up new public conversations, not models and lists designed to shut down old ones.

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