

**INTERROGATING THE TREADMILL OF PRODUCTION:
EVERYTHING YOU WANTED TO KNOW ABOUT THE TREADMILL,
BUT WERE AFRAID TO ASK**

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Abstract

We have structured this paper to answer a number of questions that have been raised over the years about the origins, structure, and application of the treadmill of production theory. The following questions have been addressed:

I. ORIGINS OF THE TREADMILL THEORY

- why does the theory focus on production rather than consumption?
- what was the theoretical significance of the "treadmill" metaphor?
- was the treadmill a dialectical or a linear change theory?

II. EVOLUTION AND APPLICATION OF THE THEORY

- how has the treadmill theory changed under the growing globalization of production since 1980?
- has the treadmill been evaluated empirically?
- what forces have limited the diffusion of the treadmill in environmental sociology?

III. THE FUTURE ROLE OF THE TREADMILL THEORY

- is the treadmill more/still useful today for ecological analyses? for social analyses?

I. ORIGINS OF THE TREADMILL THEORY

WHY DOES THE THEORY FOCUS ON PRODUCTION RATHER THAN CONSUMPTION?

Schnaiberg (1980) initially outlined the substantial change in technologies in the third quarter of the 20th century. The newer technologies were inevitably more energy-intensive and chemical-intensive on the one hand, and less labor-intensive, on the other. Capital mobilization for these changes in production technology arose from a substantial postwar economic boom, which led to increased production and profits. Next, these profits were disproportionately used to develop and introduce new physical technologies. However, to amortize the fixed and operating costs of the new technology, production generally had to be substantially increased. In turn, this increased the demand for natural resources, both energy and other. Once in place, the expanded production of the new technologies substantially increased both the volume of production waste, and the toxicity of wastes (due to increased use of chemicals).

From the outset, then, the treadmill of *production* focused on decision-making in the realm of *production*. Its model of socio-environmental dynamics emphasizes production rather than consumption. While consumers may be the ultimate purchasers of *some* of the products of the new technologies, decisions about the allocation of technologies is in the realm of production managers and owners. Decisions about types of technologies, the use of labor, and volumes of production are made outside the realm of consumer decision-making. Individuals, communities, states and corporations can only consume the outputs of a given production technology. The majority of what social systems consume must either be extracted from nature (extraction being the lead edge of

any production process), and then further processed to generate a final product. While consumers can accept or reject these products, they have no influence over the allocation of capital to productive technologies. Thus, it is within the production process where the initial interaction of social systems with ecosystems occurs.

Many popular economic theories postulate the responsiveness of supply to demand. Yet it is in the decision to *provide* supply, and the means by which that supply is provided, where social systems and ecosystems first collide. Production decisions may or may not be influenced by anticipated consumption decisions. But the relationship between production and ecosystems, which provide the total stock of potential materials for production, is a direct one. In contrast, the relationship between consumption and ecosystems is at best indirect. Consumption decisions must be made in the context of previous production decisions, as well as prior social distribution decisions.

By recognizing the relationships between economic structure and political power, the treadmill model contextualizes the role of consumer decisions within the material parameters of their political-economic contexts. Consumer choice devolves from: (1) the constraints of specific prior production decisions, (2) specific prior economic distribution decisions, and (3) a specific distribution of policy and decision-making power. To place consumption decisions first in our analyses would obscure the power relations embedded in the political economy. Henry Ford's famous "consumer choice" comes to mind: he told the public they could purchase any color Model T they wish, "as long as it's black!" "Consumer behavior" studies contain few theories about power underlying them. Obscuring the distribution of economic and political power serves the discipline of neo-classical economics quite well in its status quo reinforcement functions. It violates the

critical analytical and empirical requirements of sociology, however. A key dimension of the exercise of power is the ability to influence, if not dictate, the choices of those less powerful (Lukes 1974). Individual choices to not consume products generated by powerful actors involve a underlying power struggle between highly unequal contenders.

The mechanisms through which human need and human desire are formed are largely determined by preexisting conditions of production, beyond the basic biophysical needs of humans as living organisms (food, warmth, shelter, social interaction). Desire is socially constructed, and material desires are largely constructed by material producers (Schiller 1996). The transformation of socially constructed material desire into human need is a result of social processes, which are heavily influenced by those who control production decisions. Contrary to classical and neo-classical economic theories that posit that consumer preferences determine the contour of markets, this consumer behavior was consciously being shaped by industry. The “gospel of mass consumption” was the successful construction of consumer desires not by consumers themselves but by the captains of industry and their collaborators in the advertising sector. Thus the extraordinary rise in productive output after World War II was complemented by a rise in personal consumption among U.S. citizens.

It may be argued that individual, community, state and/or corporate consumers may alter or terminate specific forms of production by consumer boycotts. However, these collective victories still do not empower consumers to determine the *means* by which alternatives will be produced, or even what alternatives will be produced. Indeed, it is possible that no alternative will be produced, thus freeing consumer capital to be funneled into the consumption of yet other items already made available by producers. In

theory, the decision not to consume may terminate the production of specific products. In rarer cases, they may even terminate specific forms of production. Yet there are few if any examples of either of these terminations occurring directly through consumer choice, and only a handful have even been implemented through political pressures exerted by social movement organizations (which are politically-organized interest groups of consumers). Even the famous grape boycott succeeded mainly in raising social consciousness about working conditions among farm laborers, but was an economic and political failure.

Again, however, the decision of what alternative forms of production will be offered for consumers to choose from is not in the hands of consumers. It remains with a small minority of powerful individuals (treadmill elites), who are empowered through their access to production capital. Decisions that determine producers' access to natural resource inputs, and to ecosystem waste sinks arise from a stratified and politicized society:

- producers' access to capital
- producers' access to labor
- producers' assessment of potential liability
- producers' assessment of marketability
- producers' assessment of profitability

Such producer decisions are influenced by the regulations imposed by the state, and by negotiations with their labor forces. This is why the treadmill of production model emphasizes the role of non-elite individuals as **citizens** (polity) and **workers** (labor),

rather than as consumers (Gould, Schnaiberg and Weinberg 1996). It is also why the model emphasizes collective actions (such as those of NGOs or social movements) over individual choices/actions. Non-elite treadmill participants alter the nature of social system-ecosystem interactions through pressuring private capital and/or state decision-makers to make more pro-environmental decisions in production processes. Much of the limited success in achieving treadmill alteration in the post-WW II era was achieved through social movement pressures. For example, most if not all environmental legislation passed during this time was the result of progressive forces seeking to slow the excesses of treadmill institutions. Similarly, as labor, treadmill non-elites may use their role in physical production to directly induce capital actors to alter their production processes. Organized labor has done so sometimes for environmental concerns – or more frequently, because of occupational safety and health concerns associated with ecologically-disruptive technologies (Schnaiberg 1986).

Thus the treadmill model implies that more democratic ownership and control over production could ameliorate social and ecological problems more than attempts to control rates of consumption or consumer choice of certain products. Consumers can choose Pepsi or Coke or some low-calorie, “green” alternative soft drink. Yet this is largely irrelevant if the ownership and control over all these products is in the hands of producers who are simultaneously displacing workers, taxing the state’s resources, and placing great burdens on the ecosystem. Clothing is another “consumption” example. Unless consumers in the North produce their own clothes, they leave producers the appealing option of producing virtually all clothing in sweatshops that exploit laborers, and typically produce various ecological disruptions (in both agriculture and

transportation). So long as owners are free to invest in low-wage countries (or engage low-wage immigrants in industrial countries), consumers exercise little control over these production processes.

Unfortunately, consumerist approaches to the problem of the treadmill almost never consider the goal of treadmill deceleration. The question of how much we are consuming (i.e. growth), is rarely challenged. The focus is only on changing what goods we are consuming. This is perhaps not surprising, as consumerist approaches are fundamentally about protecting the right to consume as much as they are about corporate and social responsibility. For example, the major recycling campaigns spearheaded by many national environmental groups in the 1980s and 1990s emphasized recycling, itself an environmentally problematic industrial process (Weinberg et al 2000) Yet they largely eschewed more socially- and ecologically-effective practices of re-use and reduction of production. In earlier analyses, we demonstrated that, as long as companies harvest timber at increasing rates (i.e. increases in production), it matters very little whether or not environmentally-conscious residents are recycling their waste (i.e. consumers), because any potential gains from residential recycling are offset by production. This type of analysis preceded and informed research on ‘commodity chains’, by noting the multiple points at which social, political, and economic forces impact each other and environmental protection efforts.

The treadmill model argues that the collective bases of historical success in altering aspects of the political economy arises only through direct or indirect political conflict with state and capital elites. Treadmill non-elites’ roles as individual consumers are the “tail end” of the system, not the leading factor. In contrast, their collective roles as

citizens and workers offer the potential to alter the production decisions of elites, who essentially control social system-ecosystem interactions. The treadmill model at least suggests the need for a more radical restructuring of the political economy. Citizen-workers need to achieve more control over production decisions. In this perspective, prolonged engagement in enduring conflicts with powerful treadmill decision-makers may be effective (Schnaiberg and Gould 2000).

Production is the locus at which we can observe and measure the degree of ecological withdrawals and additions, as well as potential solutions. Yet it is also where industry leaders will fight the most to keep their autonomy from the state, environmentalists, and labor. Control over production is the critical battleground for industrialists generally, and where the waste industry, in particular, drew the line in the struggle over the Resource Conservation and Recovery Act of 1976 (Szasz 1993). Industry successfully fought to shift federal mandates for recycling outside the production process onto consumers and states, in an effort to protect profitability and control over production. Globally, industry leaders engage in a range of actions to ensure this control, from relocation to avoid unionization, to the use of private and state armies to intimidate, torture, and execute opponents (Gedicks 2001). For them, production is legitimately the exclusive province only of the owner/management/shareholder class, with virtually no input from other impacted parties.

The treadmill is organized under the premise that producers, not consumers, are the major driving factor in the political economy. Consumers, for example, would prefer to be able to purchase environmentally responsible products, but this decision is ultimately up to producers. However, we should never ignore consumer behaviors.¹

Growth in urban pollution has been rising, in part, due to increased vehicle ownership and mileages. These have offset a large portion of the emission reductions gained from motor vehicle controls. This is a classic illustration of the treadmill of production at work. In view of the unforeseen growth in automobile emissions in urban areas combined with the serious air pollution problems in many urban areas, Congress has made significant changes to the motor vehicle provisions on the 1977 Clean Air Act, but the core problem of growth in consumption and production of automobiles is left unchallenged²

A policy focus on consumption is almost always the easy path: it generally absolves industry and the state of responsibility for a host of problems.

- it leaves production largely undisturbed;
- it fails to challenge the fundamental structure of the industry in question; and
- it often blames poor populations for not engaging in “enlightened,” “responsible,” and “conscious” consumer practices.

Although the treadmill model’s emphasis remains on production, it could also be said that it also addresses the way that producers and other stakeholders literally *consume* the ecosystem and *become* consumed by the (il)logic and seductions of the treadmill. As such, it could be said that we have redefined or broadened our notions of what “consumption” is (industrial and collective versus personal/individual). The study of the social, economic, and environmental impacts of personal consumption is gaining greater visibility (see Clapp 2001, Park 2003; Schorr and Holt 2000) and we welcome this development. However, scholars emphasizing this phase of the product lifecycle would do well to remember that it is just that—a *cycle*, that begins with production.

WHAT WAS THE THEORETICAL SIGNIFICANCE OF THE "TREADMILL" METAPHOR?

The core logic the treadmill represented was one of running in place, without moving forward. It represented a decrease in the efficiency of the productive system. The economic system represented by post-World War II America was one in which each unit of ecosystem involved in production generated less support for US workers and their families. This system was quite favorable for investors, since it permitted a fairly rapid growth of profits and returns on investments.

What this decreased social efficiency of natural resource utilization produced was a shift towards vastly increased rates of ecosystem depletion (resource extraction) and ecosystem pollution (using ecosystems as dump sites). Two quite different types of social forces generated this shift. First, investors and managers realized that by voluntarily investing in efficient (labor-saving) technologies, they could generate substantially increased rates of return on investment (as well as large earnings for managers). Second, workers and their families were involuntarily caught up in politically supporting the expansion of this new capital-intensive form of production. As workers were cast off by the growing treadmill, one of the major perspectives they were coerced to accept was that accelerating this new form of investment was their only option -- this was part of social progress. Thus, each round of socially dislocating growth generated increased, rather than decreased, social support for this process.

Politicians were induced to provide direct and indirect support for such expansion: they received strong support for doing this from investor-managerial groups. And they received public support from workers and their unions, for virtually any and all kinds of economic development. While some workers and their unions attempted to

resist these processes, they were under growing economic, social and political pressure to accept this as the only path to social progress, even if only reluctantly. Any resistance to this change was labeled as antediluvian, Luddite, old-fashioned, reactionary, and doomed to failure (see below) by a variety of economic and political representatives. Ironically, this rapid growth in support occurred despite considerable doubt about the future of the US peacetime economy after the end of World War II (with fear of a return to the economic depression of the 1930s). Within five years, though, the accumulated savings from the wartime period were mobilized to create vast new infrastructural and manufacturing investments to stimulate production expansion.

Through this period of about 1945-60, the promises of unlimited energy (especially atomic energy) and newly-accessible mineral and other extractive resources (especially petroleum) led to disattention to ecological limits and in favor of support for unlimited economic expansion. Early 20th century attention to “sustained yield” (Hays 1969) utilitarian approaches to land and water were largely dismissed, and emerging pollution problems were not well researched or managed. Waste disposal was mostly into the commons, spilling into water systems, spiraling into air resources, and dumped in land systems at some distance to cities. These presaged the “limits to growth” (Meadows 1974) perspective, which emerged in the later 1960s and 1970s. They were largely ignored, in favor of attending to economic expansion.

Part of this disattention was facilitated by the economic segregation of the population. Middle class workers, who benefited from the expansion of the treadmill, largely moved to emerging bedroom suburbs. Blue collar workers, and many craftspeople, lived in cities or small or company towns, where they struggled with rising

pollution and health problems, and the need to preserve their jobs. While pollution was a negative externality for both groups, it was geographically and socially removed from many members of the rising educated middle class, yet fully confronted much of the working class. The former lived upwind and upstream of polluting enterprises, while the latter were induced and/or coerced to live downwind and downstream or next to, by virtue of lowered property values there, and their limited wages. This class-based distribution of residential location insulated production decision-makers from the health/environmental consequences of their decisions (Gould 2003).

Ironically, one of the precursors of the treadmill model was any early argument of Barry Commoner, a socially progressive biologist (and later a Green Party candidate), who helped expand ecological consciousness in the U.S. His ecological analysis of declining capital productivity (1977) paralleled our own work. This was in stark contrast to the standard economic and managerial focus on worker productivity. Both in the 1970s when Commoner wrote, and especially in the current political-economic climate, the obsession with increasing worker productivity has dominated many policies. From the standpoint of the treadmill theory, increasing worker productivity is often associated with accelerating the treadmill – producing still fewer worker benefits from a given rate of natural resource extraction. Indeed, raising worker productivity was the central dynamic of corporate decision-making in the initial theorizing about the treadmill of production. The treadmill process aimed to displace many workers – through an increase in physical capital per worker (and hence potential environmental impact per worker), using profits to raise production technology. The goal was to enhance profitability, or return on investment. Inherent in this process was a substantial increase in energy needs and

chemical waste discharge, as well as elimination of habitats for flora and fauna. Over the period since 1945, habitat destruction has probably been the best marker for expansion of the treadmill (either through resource extraction or waste disposal).

Two outcomes of this emerged for workers. For most, this eventually led to a decline in wages and job opportunities, what Harrison has termed the “low road to development” (Harrison 1994). Part of this was accomplished by crushing worker unionization through job blackmail (Kazis and Grossman 1982) – and an ever-growing part of this was created by closing US plants and moving to locations in the Global South, where labor was substantially cheaper, workers non-unionized, and workers and politicians were desperate for new employment possibilities for their young populations. From maquiladoras in Mexico to sweatshops and intense factory work elsewhere, the rate of return on investment was substantially increased. Workers in the US became more desperate for new investment, as noted above, and workers abroad accepted new employment, which appeared to raise their living standards somewhat. Both phenomena increase the potential for higher environmental damage, often by eliminating existing environmental protection because both also produce greater economic volatility.

Yet there was a smaller class of workers who experienced this process as a “high road to development” (Harrison 1994) – their wages, skills, and careers were enhanced by their incorporation into the new physical (and electronic) technological systems. This included both workers directly involved in the new production, but also a wide range of workers involved in marketing, financial analysis, and customer service functions. In recent years, though, this high road has become increasingly susceptible to the core logic of the treadmill. For middle-level managers, and educated professionals of all types,

there are strong pressures to increase “worker productivity” in order to sustain corporate profitability by reducing expenses.

This has extended even more sharply to the state sector, which has been attacked as “big government,” using private sector taxes in part to regulate both the social and ecological displacement of large enterprises. While the current Bush administration exemplifies this, let us not forget that it was Bush’s predecessor Clinton who cut the federal labor force by 25%, and introduced controls over social expenditures by placing significant limitations on the welfare budget. There have been similar moves to reduce health costs for businesses and governments, either by reducing services and/or by reducing payments to physicians and hospitals (now feeling some of the heat of the treadmill’s quest for enhanced profits). Once more, this reduces the protection for workers and the environment, sacrificing both expenses for the needs to be “competitive” in the global market. Ironically, the movement of US capital abroad has increased over this period, even while tightening controls over employment, wages, and taxes. It is true that, to some extent, this has reduced ecological withdrawals and additions **within the US** – which has been more than offset by huge increases in environmental disruption in countries where this capital has been applied.

Beyond the core logic of the treadmill, this model generally encourages analysts to take into account a range of factors that produce environmental insults as well as understanding how these factors make environmental policy making so complex. The treadmill model underscores the importance of paying attention to dialectics and contradictions in the behaviors of individuals, groups, the state, and industry. When we develop a sociological understanding of the constraints and choices within which

individuals and institutions exist, environmental conflicts and solutions become clearer and yet more complex. Although the majority of U.S. workers would like to live and work in safer, cleaner environments, they are either unable and/or unwilling to take direct action to achieve these realities. Although most Americans indicate that quality-time is an important goal in their lives, they tend to spend more time working every year. Elected officials must maintain their legitimacy with the voting public and secure the “monopoly” powers of the state (Tilly 1978). But they routinely make decisions that erode state power and public legitimacy. Ratifying free trade agreements, which undermine the ability of nation-states (and subsidiary forms of government) to exercise social control starkly illustrates this contradiction. Industry needs to secure and maintain the obedience of its workers, but managers engage in practices that violate the social contract, and mitigate against worker trust.

The treadmill model also underscored the importance of social inequality, power, and conflict as underlying environmental behavior. Given the focus by many scholars on environmental attitudes and concern, the treadmill offered not simply an analysis of what people thought about the environment, but what was actually occurring with respect to how institutions were impacting the natural world.

Using the treadmill as our tool, we have often taken positions that are unpopular or that run counter to the prevailing consensus on a number of topics. For example, there is a scholarly tendency to celebrate (and overstate) the influence of the environmental, anti-toxics, and environmental justice movements (Dunlap and Mertig 1992, Szasz 1994, Bullard 1993). In contrast, we have used the treadmill model to squarely face the reality that these social forces were (and remain) at a major power disadvantage vis-à-vis

political and economic elites. Indeed, we believe that environmental sustainability/protection around the globe has declined substantially, despite the work of these movements. This sort of “bad news” reporting in scholarly circles is generally unappealing and often frustrating for those of us who would like to believe that both the environment and our societies are moving toward a state of sustainability. The same dynamic applies to the debate between treadmill theorists and proponents of ecological modernization, with the latter adopting a fundamentally upbeat outlook on industrial practices (Garcia Johnson 2000), despite continued and intensified ecological destruction around the globe. This approach has, at times, met with both acceptance and resistance from activists as well, who have an investment in reports that the global ecological crisis is serious, but also seek affirmation that their actions are having a positive impact on the state of the world.

Another key theoretical contribution is the link between the treadmill model and more recent developments in environmental sociology. For example, the ToP predated the now well-established field of environmental justice studies and advanced the argument that environmental problems and solutions are not shared equally across or within populations. It laid a foundation for more recent research that has focused on how other forms of inequality (such as race and gender) intersect with environmental policy. Schnaiberg’s 1980 work is prominently cited in many environmental justice studies and texts, including Robert Bullard’s landmark book, *Dumping in Dixie* (also see Hurley 1995; Pellow 2002; Pellow and Park 2002; Walsh, Warland, and Smith 1997).

As environmental justice scholars reflect on the impact of two decades of activism, critical questions are emerging. In a forthcoming study, Pellow and Brulle

discuss the *race versus class* divide in both the EJ movement and in scholarly circles. The question partly arises from the recognition that many EJ scholars have yet to integrate the treadmill into their own research frameworks. The “race versus class” debate in the environmental justice literature (whether the strongest predictor of toxic facility location is the race or class composition of the host community) has raged since the release of the United Church of Christ report, *Toxic Wastes and Race in the U.S.* (1987). Recent research has produced interesting methodological advances in the study of environmental racism/inequality, but often misses the structural framework the treadmill offers. Researchers argue over whether zip codes or census tracts are the most appropriate level of analysis for EJ studies, while communities continue to be inundated with pollution. Environmental injustice has always been about both race and class, yet most scholars have missed this point (Faber and Krieg 2001). The EJ movement had to work hard to claim ownership over the discourse and politics of environmental inequity, centered in minority communities where environmental injustices are evident. Thus the EJ discourse, ideology and framing of the problem focused heavily on environmental racism, without examining class bases of environmental inequality (Gould 2003). Many environmental justice conflicts simply cannot be explained by racism.³ Thus the treadmill’s significance is clear across a range of subfields.

WAS THE TREADMILL A DIALECTICAL OR A LINEAR CHANGE THEORY?

One of the critiques of the treadmill is that it appears to be a theory of linear change. There are two quite distinct aspects of our research around the treadmill. First, we note that the initial **theory** of the treadmill was a historical model of changes that

seemed to have appeared in the US and other industrial societies. Alongside this historical pattern, Schnaiberg initially proposed that there were many political-economic alternatives to the social and ecological impacts of an accelerating treadmill. As workers confronted new social and economic restrictions, they would act politically to favor policies offsetting the treadmill tendencies. Likewise, as environmental degradation began to have more pronounced effects on communities and families, citizen-workers would act to reduce relatively unrestricted economic control over ecosystems. In both cases, Schnaiberg predicted that social and political actions would serve to reduce the growing influence of treadmill institutions and ideologies. Among other strategies, he listed the following possibilities (1980: 228-229):

- small-scale entrepreneurialism in lieu of large corporate employment
- direct state provision of essential public services (e.g., transportation, education)
- profit-seeking could decrease, in favor of other goals of corporate entities
- rising labor costs could reduce capital available for technological innovation
- state subsidies for provision of employment by the private sector
- expansion of state agencies to absorb displaced workers
- unsold production may raise inventories and reduce capital accumulation and investment
- firms could absorb more profits rather than investing them (e.g., in salaries or bonuses)
- support for increased public sector consumption, to offset reduced consumer demand
- wider acceptance of high unemployment levels

- increased taxation to reduce capital investment and enhance social services

We leave it to the reader to make their own assessment of how many of these options have emerged, and the degree to which they have actually slowed the rate of treadmill expansion/acceleration since 1980. Indeed, as part of his initial (1980) work, Schnaiberg described the **dialectical** dimensions of economic growth and environmental impacts. He outlined three syntheses – an economic, a managed (planned) scarcity, and an ecological synthesis. Each of these would leave treadmill forces in a different level of dominance of the political-economic system. The treadmill was quintessentially an economic synthesis. By 1975-1980, though, there were significant policies of environmental protection, which Schnaiberg labeled as planned scarcity. Here the state would limit the degree to which treadmill institutions had access to ecosystems. At the other extreme, the ecological synthesis would entail the state's substantial control over ecosystems, without regard to issues of profitability and of wages/employment. Treadmill institutions would, **theoretically** have to restructure their activities to deliver employment and wages, and to protect crucial aspects of ecosystem functioning. It was not then (or now) clear how this would occur, given the recent history of treadmill expansion and the growing cultural commitment to this as their major social option. Interestingly, the ecological synthesis bears surprising similarity to sustainable development, the successor to Schumacher's (1973) intermediate technology development trajectory. Equally important, though, is the fact that in the last 25 years, there appears to be very limited movement towards sustainable development nationally or globally. Even the proposals of the Kyoto conference, which quite modestly proposed to limit production of

greenhouse gases to reduce global warming, failed to find support in the US (and a complex mixture of support and opposition elsewhere).

So the theory of the treadmill inherently entailed a dialectical system, in which social forces benefiting from its expansion would engage in political contests with those diminished by such expansion. And in the last 25 years, there have indeed been local, national, and multinational contests challenging the treadmill. Yet it is our assessment that the **empirical history** of the 1976-2003 period is one in which the treadmill has only occasionally been slowed. It is more accurate to suggest that its rate of growth has sometimes been slowed by political opposition. One of Schnaiberg's (1980) naive expectations was that the publication of the treadmill model would lead to substantial mobilization of **opposition** to the treadmill.

Yet history has given the lie to his expectations. It is hard to argue empirically that, despite the plethora of state regulations, the empowering of global conferences, and the emergent networks of social movements (non-governmental organizations), that the treadmill has been shrunk. There have been a few modest victories, such as the increased energy efficiency of many productive enterprises, and the reduction of air, water, and land pollution in a variety of locales, especially in the US and some other industrial societies. There has been a rise of education in business schools about "environmental management", and new social theories about ecological modernization as a form of reflective modernity (Beck 1992, Mol 1995). And yes, there has been an enormous increase in post-consumer recycling in industrial societies (Weinberg et al 2000)

Yet treadmill structures have adapted quite well to these new challenges. We could state boldly that **increasing the return on investment has displaced every other**

social and environmental goal in this period. Moreover, this principle has become dominant in more societies through the forms of globalization that have been dominated by investors from the previously-industrial societies. Indeed, this principle is increasingly dominating all forms of globalization, despite the resistance by socially and environmentally progressive forces in northern and western Europe, as well as indigenous peoples everywhere (Collinson 1996, Goldman 1998). We could go even further than this: it seems apparent that **more of human activities all throughout the world fall under the influence of the treadmill institutions and logic** than was true in 1980. In one sense, this growing monoculture of the production system is expressly antithetical to the goal of sustainable development, or to the even more modest goal of a seriously managed scarcity model (Stretton 1976). From the perspective of the treadmill, the media representation of economic change is profoundly misleading. When "productivity" increases, especially through increased technology per worker, this is actually an acceleration of the treadmill -- producing higher production and profits with fewer workers. In effect, this increases the demands for more treadmill investment by increased levels of displaced workers. As we write this, more reporters are noting that job woes persist even as the economy begins recovery, in what is now becoming infamously known as a "jobless recovery" (Krugman 2003: 73-75). This is a concept that raises troubling questions about what exactly a "recovery" is, if it excludes employment security for workers. Paradoxically, consumer debt is at an all-time high, but this is a scenario we documented and envisioned long ago (Schnaiberg & Gould 1994: ch 6).

So we can argue that the treadmill theory was dialectical, but that the empirical history of the US and global political economy since 1980 has been only weakly so.

Indeed, rather than the treadmill expanding linearly over this period, it has expanded exponentially. As we will note below, this causes serious re-evaluation of various proposals for environmental protection, including the recent arguments of ecological modernization theorists (Mol 1995).

II. EVOLUTION AND APPLICATION OF THE THEORY

HOW HAS THE TREADMILL THEORY CHANGED UNDER GROWING GLOBALIZATION OF PRODUCTION SINCE 1980?

There has been little systematic application of the treadmill logic to analyses of globalization, other than our own work. However, there were some preliminary treatments of global change even in Schnaiberg's initial work (1980). In many ways, even his earliest primitive analysis presaged the effects of NAFTA and WTO changes: a rise in investment in less-developed countries would eventually lead to reduced consumer spending, and hence to a reduction of US-based production for the US market. This in turn should have reduced the environmental impact of US production, and hence afforded more potential for ecosystems to recover from past disruption (if the state intervened to pressure the treadmill institutions to do this).

To trace the role of the treadmill under conditions of globalization, however, requires some careful distinctions. One of our recent puzzles was the fact that the rising US imbalance of trade payments has left the US as the world's largest creditor nation! Yet there has been little political attention to this situation, which could, according to

macroeconomic theories of trade, lead to a total collapse of the US treadmill structure. Why has this aberration caused such little political ripple?

A partial answer seems to require us to distinguish between states and global interest groups. When the “US” experiences a vast array of imports for a much lower array of exports, what does this mean, actually? To whom is “the US in debt”? Ultimately, the answer seems to be, in part, to US-based investors and managers, who have shifted production abroad, and imported the results of this “foreign production”. Because the treadmill’s major goal is increasing return on investment, after all, US investors and managers desire to reduce US investment in favor of greater investment abroad, precisely because of the attraction of lower overseas wages (and often lower environmental protection, as in the NAFTA debates). In addition to offering this direct benefit to US investors and managers, this system has the added effect of pacifying more US environmentalists (through reductions of local production and pollution). And finally, in an era of downsizing and wage reductions, the importation of more-cheaply produced “foreign” goods has permitted less affluent US workers to buffer themselves somewhat against their wage losses or wage stagnation. Interestingly, still a third benefit of this for US-based investors and managers is that it strengthens their claims that they need labor and environmental protection concessions from workers and the state, in order to remain “competitive” (often with their own overseas production organizations!).

All of this should caution analysts (including ourselves) to be exceedingly careful in conceptualizing the treadmill influences within “globalization”. Indeed, even the term of globalization is misleading, because it implies inter-state relationships as constituent of the new economic order. Yet it is much more accurate to examine the competing

interests involved in the process, and to understand how each has succeeded or failed to offset some of the social and environmental pressures of treadmill organizations and culture. Such interests include US workers, US environmentalists, US political representatives, foreign workers, foreign environmentalists, and foreign political representatives, among others. We will not trace all the connections, but note a simple environmental impact principle, which underlies globalization.

In general, capital seems to have shifted more towards environmental degradation through production abroad, than it has to environmental protection within the US or in US investment-countries overseas. Moreover, there appears to be a shadow “pricing” of environmental disruption by globalizing treadmill interests. They are grudgingly willing to reduce or ameliorate pollution from their production facilities. But in return they absolutely refuse to accept any limits to production (actually, profit limits). Thus, we in the US have cleaner streams and rivers and some reductions of air pollution. But in return, ecological damage due to logging, mining, and agriculture has increased dramatically since 1980, both in the US and in US-investor locales overseas (at least as measured by ecological indicators of habitat destruction and species extinction). The export of hazardous chemical wastes and the transfer of toxic technologies has followed the same pattern, producing extreme occupational health problems and ecological disruptions in the global South as the USEPA celebrates improvements within certain environmental indicators as if they were primarily the result of developing cleaner production domestically (Clapp 2001, Daykin and Doyal 1999).

Indeed, in an age where there have been increasing calls for sustainable development and sustainable biodiversity, the loss of habitat and associated species in

countries of the global South has rapidly accelerated since the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. While some of this may be due to increases in population (Rudel 1993), the majority of habitat loss appears to have come through increased investment in extractive activities (agricultural, mining, and especially forestry – Rudel 1993, Sonnenfeld 2000). This is the major cause of habitat destruction, despite recent and visible declarations and policy mobilization by organizations whose main mission is environmental sustainability through population reduction and control (see, for example, the Population Institute, Federation for American Immigration Reform, Sierra Club). Loss of species diversity is further accelerated by the pollution associated with the increased processing and manufacturing activity (e.g., refineries and petroleum distribution, etc). Many of the rates of natural resource extraction (e.g., oil mining) and pollution (e.g., power plant emissions) have been decreased in the US and other industrial societies. But the globalizing capital flowing from investors from industrial countries (now increasingly capital “service countries”) has been guided by “cheap natural resources” and weak environmental regulation in the global South, along with cheap labor.

Once again, this suggests we be extremely cautious in accepting arguments about “hypermateralism” (super-efficient technologies) as predicted by ecological modernization theorists (Mol, etc). It is true that, for example, there has been some decoupling between energy consumption and GNP increases within the US in the past two decades. Yet it is not true that all of this “US GNP” arises from US production. Much of the service revenues of US corporations arise from coordinating investment and production abroad. When we examine the ecological impact of such non-US production,

we find increased materialism, with few limitations imposed by states or corporate entities on natural resource consumption (Goldman 1998, Sonnenfeld 2000). Returns on investment abroad add to the US GNP, but ecological losses and natural resource consumption are not factored into the US production record (York & Rosa 2003).

In its initial presentation (Schnaiberg, 1980), the treadmill was largely conceptualized as an analysis of the relationship of the U.S. political economy to the natural environment. Implications for other northern industrial economies were implicit, and the relationship of those economies to those of the global South were also alluded to. Nevertheless, it is clear that the treadmill itself already operated on a global scale, and had significant global implications. *The Environment* was published just as:

- the non-aligned movement of Southern nations was collapsing,
- the Washington Consensus on neo-liberal global integration was gaining steam,
- transnational electronic networks were still under construction,
- the Southern debt crises were appearing on the horizon, and
- transnational trade liberalization agreements were yet to be fully negotiated.

As those changes to the global political economy emerged, the need for a more consciously transnational articulation of the treadmill model became clear.

The South Commission and the United Nations Conference on Environment and Development (the Earth Summit of 1992, in Rio de Janeiro) both served to focus greater social attention on the global dimensions of environmental problems, and the specific ways environmental problems were manifested in the global South. The relationship between transnational economic production and growing global inequality and accelerating ecological degradation were highlighted. As a result, in *Environment and*

Society, the treadmill was more deeply contextualized in global history and the transnational economy. The South was seen as moving from scarcity to even *greater* scarcity. Historic and increasing reliance of the Northern industrial treadmill on access to Southern natural resource pools, labor pools, markets and waste sinks were given greater primacy in this later iteration of treadmill theory. So were the implications of those transnational connections for domestic and international environmental *politics*. Here the emphasis was placed on the transnational distribution of economic benefits and ecological costs, and the acceleration of withdrawals and additions. Resulting diminution of social returns to increased productive capacity, and the structural dependency of labor were also more clearly articulated. The focus was on economic actors with growing ease of transnational operation.⁴ Although this was not welcomed as good news, our transnationalization of the treadmill model was well timed to meet the era of “globalization.”

Environment and Society still predated important transnational events: the completion of the Uruguay Round of GATT negotiations, the establishment of the World Trade Organization, the ratification and implementation of NAFTA, and the resulting Zapatista rebellion in Chiapas, Mexico. It was also written before the full impacts of the collapse of the East Bloc Socialist economies could be assessed. Linkages between the transnational economy, the domestic treadmill, and local conflicts were more fully addressed in *Local Environmental Struggles*. **It** overtly focused on transnational trade liberalization in the early post-NAFTA, and post-WTO period. We noted the constraints these transnational institutions and processes placed on the trajectory of local conflicts as mediated through the national treadmill. The local scale at which most humans

experience global dynamics were seen as increasingly shaped by changes imposed by globalization on national political economies. Problematizing the then-popular slogan of “Think globally, act locally,” we argued that, due to the greater capacity of private capital actors to operate on a global scale, each locality was forced to compete with others, since all were in an increasingly vulnerable competitive position. As a result, the effectiveness of local political action to protect the environment would be diminished, and environmental protection conflicts would need to match the scale of operation of capital. The local action valorized in much of the environmental sociology literature would thus be insufficient to alter the political economy in ways that would lead to a more sustainable development trajectory if that action was not networked and unified regionally, nationally and transnationally.⁵

The growing hegemony of treadmill values and political economic forms manifest in corporate-led neo-liberal globalization was further addressed in the new foreword to *Environment and Society* (2000: foreword). That brief introduction to the earlier work identified the treadmill model as set of *global* processes, relations and forces, decreasingly tied to the U.S. state. We noted that the treadmill had become more entrenched and less available to deceleration or dismantlement. Marking the 20th anniversary of the publication of *The Environment*, this forward articulated the extent to which the earliest national-level model had transnationalized and largely defeated competing alternative models for renegotiating socioenvironmental dynamics.

However, it also notes the emergence of new and/or renewed national and transnational political coalitions in opposition to a transnationalized treadmill. Most notably, by undermining the security of labor, treadmill transnationalization to some

extent broke the alliance among workers, private capital, and the state that had been the primary engine of treadmill support (Rubin [1996] and others have called this the breaking of the “social contract” in U.S. labor relations). By simultaneously disempowering labor and accelerating ecological disruption, the transnational treadmill made it possible (or even necessary) for labor to lend support to the opponents of treadmill expansion at the *transnational* level. Labor-environmental coalitions urged in earlier iterations of treadmill theory emerged more at the turn of the century than they had in the 1980s (Gould, Roberts and Lewis 2003). Transnationally organized “extralocal action” to confront the treadmill called for in *Local Environmental Struggles* emerged, especially in the anti-corporate globalization movement (Buttel and Gould 2003).

In short, as the scale of treadmill actors operation increased through processes now termed “globalization,” the treadmill model scaled up to address the move from primarily national to primarily transnational political economic arrangements. It did so without losing the analytical focus on and the centrality of national level politics where transnational arrangements must be ratified or derailed. Nor did it lose sight of the implications of national and transnational forces for the local level, the level ultimately at which material social system-ecosystem interactions occur. History may not always affirm the theory, but the history of the past 20 years has provided ample empirical validation of treadmill theory. A deepening commitment to treadmill expansion, and less critical acceptance of treadmill values characterize this period. In addition, it entailed growing socioeconomic inequality, acceleration of the rate of ecosystem disorganization, and failure of non-structural regulatory efforts to reverse overall ecological decline as the state ceded more power to corporate interests.

HAS THE TREADMILL BEEN EVALUATED EMPIRICALLY?

When the initial treadmill theory was presented in 1980 by Schnaiberg, it had no formal empirical evaluation. Indeed, the theory itself had been grounded by analytic induction (Glaser and Strauss 1967). In formal terms, this means that the theory “fit” the data from which it was actually abstracted. So the 1980 volume represented a grounded but untested theory. What has happened in the 1980-2003 period? Most directly, we have individually and collectively tested how well the treadmill fits social production trends in the intervening decades. This includes work on Great Lakes water pollution (Gould 1991, 1992, 1994), on local mobilization for toxic waste control (Weinberg 1997, on local wetland protection efforts (Gould et al 1996) on global environmental treaties (Gould et al 1996) on the rise of post-consumer recycling in the US (Weinberg, Pellow, and Schnaiberg 2000), on eco-tourism (Gould 1999), on local alternative technology initiatives in the global South (Schnaiberg and Gould 2000) and on environmental injustice in the waste treatment and electronics industries (Pellow 2002, Pellow & Park 2002).

Each of these studies had a different set of specific questions, but all are subsumed under a general quest to see whether recent social reforms have led to more socially progressive and ecologically sustainable production. While the details of each study differ, they all fail to find a substantial weakening or deceleration of the treadmill structures and processes. Indeed, as noted earlier, these studies were a painful lesson for us on how resilient the treadmill has become. To some extent, this has been exacerbated by the rise of profitability for US corporations, and the use of some of this windfall to

capture political support through campaign contributions (Weinberg & Schnaiberg 2001). Paradoxically, the acceleration and globalizing of the treadmill, as noted above, has also led to increasingly desperate efforts by state and local political officials seeking new investment to increase tax bases and employment opportunities. The result is a supply of treadmill-accelerating policies by the state and its corporate supporters, and a demand for accelerating the treadmill by displaced workers and their representatives.

It appears that there is more empirical (or political) support for the major contending theory – ecological modernization – which has emerged in the last decade or so (Beck 1992, Mol 1995). Central to ecological modernization theory is an assumption that the design, performance and evaluation of production processes have been increasingly based on ecological as well as economic criteria (Mol 1995, 1996; Mol and Sonnenfeld 2000; Spaargaren, 1997; Spaargaren and Mol, 1992). As a theory of industrial change, ecological modernization suggests that we have entered a new industrial revolution, one of restructuring of production processes along ecological lines (Mol 1995). Yet recent summary and empirical critiques of EMT (Schnaiberg, Pellow and Weinberg 2002, York & Rosa 2003) have indicated the methodological and theoretical limitations of such supporting studies. It is certainly true that the treadmill theory is insufficient to explain *all* patterns of economic and environmental change since 1980, but we believe the evidence indicates stronger support for the treadmill model in comparison to the ecological modernization framework.

Especially in the absence of other major competing theories, the treadmill seems more congruent with recent history than any other theory at hand. And the treadmill theory is highly grounded in the political-economic change processes in the US, other

industrial societies, and the South under globalization. Our argument is that the greater entrenchment of treadmill political-economic ideology and practices – that is, **deeper** institutionalization of it in the global North and more **diffusion** of it across global trading systems – appears to be a continuing and indeed, a growing influence over actual environmental protection policies. And the best indicators seem to support this position. Generally speaking, despite its numerous successes, the environmental and environmental justice movements must confront the harsh reality that the political economic structures on which this society operates have not been significantly altered with regard to ecological protection and social justice concerns.

In their evaluation of ecological modernization theory (EMT), York and Rosa (2003) compare the strength of EMT with political economic approaches to global environmental problems, including the treadmill of production model. Drawing on a range of examples (the Thai pulp industry, global environmental treaty ratification, the coal industry, the Dutch chemical industry, etc.) York and Rosa conclude that there is stronger evidence supporting the treadmill model than there is for the EMT. This is largely because the treadmill model actually evaluates more than the simple adoption of environmentally responsible policies. They examine whether this produces positive or negative ecological impacts locally and extra-locally. EMT scholars have, on the whole, not pursued this line of analysis.

WHAT FORCES HAVE LIMITED THE DIFFUSION OF THE TREADMILL IN ENVIRONMENTAL SOCIOLOGY?

Just a few months after the publication of *The Environment: From Surplus to Scarcity*, Ronald Reagan was elected President of the United States. He ushered in a neo-

conservative agenda, emphasizing state deregulation and transnational neoliberalism. This new political *zeitgeist* of the 1980's was clearly antithetical to the treadmill theory's articulation of the need for "politics over markets" (Lindblom 1977). Its anti-environmental, treadmill-accelerating agenda simultaneously validated the Treadmill model while making resistance to the Treadmill more difficult. By increasing the power and liberty of transnational corporations and Treadmill elites, rolling back the initial gains of environmentalists, and launching an attack on the countervailing forces that sought to constrain corporate power (Derber 1998), the Reagan administration dimmed the prospects for slowing or dismantling the Treadmill just as the theoretical framework was making its intellectual debut.

The declining power of organized labor, which had been a powerful force promoting both progressive distribution and environmental health, had some impact as well. Civil society resistance of the 1960s and 1970s (Shuman 1998, etc), offering countervailing forces to the treadmill of production, also waned. Environmental and other social movements, which were often insurgent prior to the publication of *The Environment* became more conservative. They became more cooperative with private capital and the state. Adoption of "Third Wave" environmentalism strategies supplanted earlier insurgence (Dowie 1995). An increasingly-professionalized mainstream environmental movement now emphasized cooperative approaches, voluntary action on the part of treadmill actors, and "flexible," market-based approaches to source reduction and ecosystem protection. This stance resonated well with the Reagan Administration's neo-liberal political-economic agenda (and continued into the Clinton era), but withdrew from any serious challenges to the treadmill.

Transnationally, the Southern debt crises of the 1980s disabled many alternative development strategies adopted by developing nations. This crushed most treadmill-alternative pilot projects. The weight of international debt payments and the International Financial Institutions' Structural Adjustment policies suppressed efforts to build alternative structures for production and distribution. Ideological support for such efforts from "mixed-economies" and social welfare states of Europe was diminished as well. The combined influence of Reagan in the U.S. and Thatcher in the U.K. shifted the global political climate and also led to an upsurge in U.S. military interventions and muscle flexing around the globe (Blum 1995). Transnational insurgence against the Washington Consensus model of global economic integration was displaced by new corporate libertarian deregulatory regimes (Derber 1998, Korten 2001). Dismantlement of the state socialist economies of the Eastern Bloc at the start of the 1990s, and their replacement with "shock therapy" policies of western "free-markets" removed the last global social support for opposition to the treadmill. The treadmill emerged as the only path for social and economic change, regardless of its ecological consequences. ⁶

All of those changes to domestic and transnational political economies, and the resultant acceleration of ecological disorganization, poverty and inequality served to empirically validate the predictions of the treadmill model. Yet, even as treadmill theory proved correct in assessing the causes, consequences, and necessary alternatives to ecological degradation, it became less politically viable.

Those seeking to further their careers in the study of socioenvironmental dynamics were thus deterred from adopting a theoretical framework that lay in direct opposition to state, private capital and international financial institution policy directions.

A better option was to search for models that might be more amenable to the political and economic *zeitgeist*. Mainstream environmental *movements* had chosen to move toward “Third Wave” environmentalism, and the influence of the mainstream environmental movement on the *field* of environmental sociology should not be underestimated. With radical structural pro-environmental change off of the political agenda, some environmental scholars retreated into intellectual abstraction.

They sought insights and careers in constructionist models. These posed no threat or challenge to power holders, who controlled the gates for grant funding and for policy-maker access. Others chose to focus on areas of apparent environmentalist success in an era of major environmentalist failure. They chose to reify grass-roots struggles as national and transnational struggles waned. Others chose to adapt “Third Wave” environmentalism into sociological theory. In this view, the treadmill would simply self-correct for environmental limits through market mechanisms. This supported rather than opposed the emerging neo-liberal agenda.⁷

Additionally, some of the resistance to the treadmill model stems from its power to nullify commonly proposed and often popular non-structural solutions to environmental problems (i.e. efficiency, recycling, appropriate technology, ecological modernization, ecotourism, population control, attitude adjustment, voluntary simplicity, etc.). Many of these solutions had become sacred cows of the environmental movement at the time that *The Environment* was published, thus providing a political opening for treadmill theory to be simultaneously cast as anti-capitalist and anti-environmentalist. By presenting structurally based critiques of the solutions offered by both treadmill elites and their environmentalist opponents, the theoretical framework was left with few potential political

and intellectual allies. Even within the academy, the treadmill model is more often critiqued as “depressing” than inaccurate, reflecting the model’s utility in debunking the environmental myths surrounding non-structural paths to socioecologically sustainable development trajectories. *Environment and Society: The Enduring Conflict* included critical analyses of recycling and “appropriate technology,” and more overtly called for political conflict as a means to achieve sustainability. This position served to deepen the alienation of both treadmill elites and mainstream environmentalists from treadmill theory.

The treadmill model does imply the need for major structural changes – indeed, some would argue revolutionary changes to create socioecological sustainability in the transnational system. It locates solutions largely in macro-structural domains that are not as clearly and overtly “environmental” as those that attracted many environmental sociologists (as well as many environmental activists) to the field. It implies that much of the research of environmental sociologist may be irrelevant, or only tangentially useful, to resolving environmental crises.

This limitation helps explain the scholarly hiatus between a professional American Sociological Association section, often intent on establishing a new professional domain, and the societal need to integrate ecological factors in political and economic world systems, labor, race and ethnicity and other interest areas within the discipline. Economic elite-State relations, information control, and control of science and technology research and development already had pre-established professional social scientific stakeholders. Those stakeholders already had macrostructural concerns motivating their research, and environmental issues could only be *added* to these agendas rather than *displace* them. From a treadmill perspective, there may be less intellectual justification for

environmental sociologists to examine economic policy, in which **environmental policy** is intrinsically embedded. Likewise, *environmental* sociologists have less claim to study all anti-systemic movements, whose support is required by **environmental** movements to effect change, or to study technology policy generally as opposed to **green technology** initiatives.

Most "reasonable" scholars have taken revolutionary or even macrostructural change to the political economy off the agenda, as either unrealistic or impossible. They may be correct. In that context, the treadmill implies that the dream of solving environmental crises and achieving "sustainable development" is unlikely or impossible (and is thus an *Enduring Conflict*).⁸ However, as non-structural solutions fail, the value of treadmill theory, with all of its unpleasant implications and difficult challenges, may slowly emerge as compelling. Deepening ecological disorganization, declining social returns on treadmill-dominated development, and disillusion with alternative theoretical frameworks may lead to a resurgence of interest in treadmill theory. A generation of younger U.S. scholars may be willing to accept conflict and difficulty borne of earlier political and intellectual failures (partly stemming from politically naïve and overly idealistic expectations of environmentalists of the 1960s and 1970s). Emergence of transnational resistance to the transnational treadmill at various levels and in various forms throughout the globe may further fuel such a shift in orientation.⁹

III. THE FUTURE ROLE OF THE TREADMILL THEORY

IS THE TREADMILL MORE/STILL USEFUL TODAY FOR ECOLOGICAL ANALYSES? FOR SOCIAL ANALYSES?

More younger scholars are drawing on the treadmill, perhaps because national and global environmental politics support and reflect the treadmill model more than they do other theoretical frameworks. Battles over environmental protection have recently become more contentious, more transnational, and more multifaceted. The “Battle in Seattle” at the World Trade Organization’s Millennium round of talks, and the recent shutdown of talks at the WTO meeting in Cancun attest to this. Environmental protection is no longer restricted to the domain of policy “experts,” academics, and scientists. People are starving, while land and watersheds, forests, and ways of life are being destroyed (Gedicks 2001, Goldman 1998).

Scholars need frameworks and models that reflect stakeholders’ reality. The treadmill has always offered this, particularly for academics who are willing to accept the possibility that the trajectory of national and global environmental protection has been limited at best. Abstract, detached modeling techniques and opaque theoretical constructions are not as accessible, useful, or appealing to scholars, students, and publics who seek to understand the contentious and ecologically-disorganized world. After more than three decades of institutionalized environmental protection at the U.S. federal level, why is the U.S. more ecologically compromised than ever before? ¹⁰

Moreover, the treadmill offers a much more credible and useful theoretical link between environmental sociology and other subfields within the sociological discipline. While environmental sociology claims to be *interdisciplinary* (Dunlap and Michelson 2002), its weaknesses include its failure to build lasting bridges to *sociology* itself. The treadmill of production bridges environmental sociology with the sociology of work,

Marxist sociology, political sociology, urban sociology, the sociology of the world system, and the sociology of race, gender, and class.

Equally important is the capacity of the treadmill to speak to all sociologists. This affords them a broader scope to incorporate environmental factors into their epistemological, methodological, and theoretical work. Non-environmental sociologists might deepen and broaden their approaches to sociological phenomena by adopting what Buttel and Humphrey term the “double determination”—that approach to the study of society incorporates both *social* theory and a focus on the *natural* world. Treadmill scholars have always understood that environmental politics are driven by both social/human and ecological/natural factors and limitations. Environmental sociology’s founders intended to challenge the dominant Durkheimian paradigm, which restricted sociologists to explaining social phenomena only through other social phenomena. A broadening of this approach is intrinsic in treadmill analyses.

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NOTES

¹ As environmentalists and treadmill scholars now know, a combination of production and consumption of automobiles and trucks has maintained high levels of air pollution in our urban areas. Specifically, while motor vehicles built today emit fewer pollutants (60% to 80% less, depending on the pollutant) than those built in the 1960s, cars and trucks still account for almost half the emissions of the ozone precursors VOCs and NOx, and up to 90% of the CO emissions in urban areas.

² The Clean Air Act of 1990 establishes tighter pollution standards for emissions from automobiles and trucks. But, like the original legislation, none of these will address the problem of production and consumption, so the fundamental problem remains. Despite the significant role of consumption in this scenario, the treadmill model would likely focus on the broader political economic arrangements among the state, industry, developers, and labor in their collaboration to produce (sub)urban sprawl and

metropolitan regions geared toward auto-addiction and away from public transportation (Bullard et al 2000). Thus, it would make less sense to blame the consumers for this problem when other stakeholders are in fact much more responsible.

³ We note some examples of this. Each of these cases is reflective of the ways in which treadmill institutions engage in both environmental racism and environmental classism/inequality. Thus the treadmill model has profound theoretical importance for environmental justice studies.

- Operation Silver Shovel was a scandal in the City of Chicago during the mid-1990s, wherein tons of construction waste was illegally dumped in Latino and African American neighborhoods. The culprits: white-owned construction companies, waste dumpers, and the Latino and African American politicians who accepted bribes to look the other (Pellow 2002).

- On numerous Native American reservations, tribal leaders have accepted payment to allow nuclear waste and other locally unwanted land uses (LULUs) to be sited, over objections of tribal members (LaDuke 1999).

- In the home-based high-tech toxic sweatshops of Silicon Valley, we find that Vietnamese immigrant entrepreneurs exploit members of their own ethnic group in the name of profit and the American Dream (Pellow and Park 2002).

⁴ Special attention was given to the impacts of treadmill penetration on more socially and ecologically sustainable development paths and initiatives throughout the global South, and the mechanisms by which the treadmill would force out alternative development strategies at local and regional levels were described.

⁵ The call for transnational, extralocal, political conflict with treadmill elites appeared just before the embryonic anti-corporate globalization movement would gain substantial social visibility (most notably three years later in November of 1999 in Seattle).

⁶ The political climate for adoption and diffusion of the treadmill model became quite hostile and difficult. Treadmill theory implies that deep structural changes in the direction of progressive distribution and growth deceleration are central to any viable solution to environmental problems. But the structural changes that were being implemented by transnational corporations, states and international financial institutions were in a diametrically opposed direction. This made the possibility of implementing treadmill prescriptions appear less viable than ever.

⁷ Each of those theoretical and intellectual tacks were less threatening to careers and promised better intellectual markets. Structural analysis and neo-Marxism became decreasingly fashionable, in response to the external political realities. This was

increasingly manifest in internal professional organizational pressures. In short, treadmill theory became politically and professionally inexpedient.

⁸ The treadmill is a theoretical framework with explanatory power, but offering a scholarly future filled with much political conflict. Its only long-term prospects for seriously addressing contemporary socio-environmental crises entail sustained conflict, and this is bound to limit the attraction of the treadmill to scholars.

⁹ This younger generation were exposed to the darker times following Reaganism. It had little viable alternative models operating in opposition. This generation has not seen the creation of broad environmental regulatory policies and agencies. Instead, it witnessed the dismantlement of those policies and agencies. It is this generation that may be more intellectually and emotionally prepared to engage the political conflicts and intellectual challenges of the treadmill's socio-environmental dynamic.

¹⁰ Studying levels of environmental concern or the public declarations by state and industry elites about their devotion to sustainability can be useful for analyzing how individuals and organizations produce discourses around and interpret environmental problems. But these approaches do not allow one to examine the root causes of the environmental crisis or even the actual outcomes of state and corporate environmental policies. If scholars wish to follow this line of analysis, the treadmill is a far more useful framework.