INTERROGATING THE TREADMILL OF PRODUCTION:

EVERYTHING YOU WANTED TO KNOW ABOUT THE TREADMILL,

BUT WERE AFRAID TO ASK

Kenneth A. Gould
Department of Sociology
St. Lawrence University
kgould@stlawu.edu

David N. Pellow
Department of Ethnic Studies
University of California, San Diego
dpellow@ucsd.edu

Allan Schnaiberg
Department of Sociology
Northwestern University
a-schnaiberg@northwestern.edu

October 17, 2003

Paper prepared for the Symposium on Environment and the Treadmill of Production, University of Wisconsin, Madison, October 31-November 1, 2003. The comments of our colleague Adam Weinberg are gratefully acknowledged. Do note cite or quote.

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

Kenneth A. Gould, David N. Pellow, and Allan Schnaiberg

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

·how did the treadmill differ from other contemporary theories about environmental degradation?

•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 growing globalization of production since 1980?

·has the treadmill been evaluated empirically?

•has the treadmill theory been adopted by environmental movements in the u.s. or elsewhere?

•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?

·what are the implications of the treadmill for the potential attainment of socially and ecologically sustainable development?

I. ORIGINS OF THE TREADMILL THEORY

HOW DID THE TREADMILL DIFFER FROM OTHER CONTEMPORARY THEORIES ABOUT ENVIRONMENTAL DEGRADATION?

When Schnaiberg first developed the theory of the treadmill of production in 1976, this was an exercise in empirical deduction. At that time, most public discussions of environmental degradation were conducted by natural scientists or engineers. They addressed both the causes of environmental decay, and the solutions. While both of these entailed social structural issues, none of these observers had any social science insights. Neither their radical nor their conservative analyses reflected any social science data, theories, or concepts. As a social scientist with a technical/scientific background, Schnaiberg tried to understand why U.S environmental conditions had declined so precipitously since World War II. He accepted the bioecological "facts" of the late 1960s and early 1970s: there was indeed an ecological problem, and it would ultimately have some social

consequences (the rationale for his commitment to this work).

No matter where he turned or what he read, the dominant narrative always seemed to start with changes in economic production as the major determinant of the trajectory of ecosystem impacts. From a logical perspective, it was production changes that were the efficient causes of environmental disruption. So his initial question was transformed into: why had the quantities and/or qualities of US production changed so drastically, from 1945-1975? Some analysts claimed that it was the increase in population that had required a production increase. As a sometime demographer, it was clear to Schnaiberg that, while there had been a baby boom during this period, the rise in energy and material use vastly outstripped the population increase. Others argued that the qualitative changes in production had been the result of "run away technology". But from the outset, as a former engineer, he knew that technology did not "run away"; rather, deliberation, time, and (especially) investment are required to change technology.

Of these two arguments, it was technological change theory that Schnaiberg began to trace through. What he soon realized was that there had indeed been substantial

technological change in the third quarter of the 20th century. On the one hand, this required huge amounts of capital – and where did this capital come from? He began to realize that this capital component arose from a combination of factors: a substantial postwar economic boom, which led to increased production and profits. These profits were disproportionately applied to new physical technologies. Two features of this change were apparent. First, the new technologies were inevitably more energy-intensive and chemical-intensive, on the one hand, and less labor-intensive, on the other hand. Second, to amortize the costs of the new technology, in general production had to be substantially increased, thereby further increasing the demand for natural resources, the expansion of waste streams, and an increase in the toxicity of wastes (due to increased use of chemicals).

In effect, the treadmill theory synthesized both changes in the forces of production, and the relations of production (using Marx's concepts). It further integrated these changes with the creation of ecosystem disruptions due to the changing scale and form of societal production. It was inductively uncovered, and not guided by any particular political-economy theory.

WHY DOES THE THEORY FOCUS ON PRODUCTION RATHER THAN CONSUMPTION?

The primary reason that the treadmill of production model of socio-environmental dynamics emphasizes production rather than consumption is that production is prior to consumption. Individuals, communities, states and corporations can only consume that which is first produced. The majority of what social systems consume must either be extracted from nature (extraction being the lead edge of any production process), or extracted and then further processed to produce a final product. 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 consumption cannot occur without the presence of products. The relationship between production and ecosystems, which provide the total stock of potential materials for production, is therefore direct. In contrast, the relationship between consumption and ecosystems is 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. "Consumer behavior" studies have few theories about power underlying them. Obscuring the distribution of 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.

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.

Consumers may opt not to consume specific produced items. But they are not empowered by market processes to determine how such items will and will not be produced. In this sense, they are not seriously empowered to alter the ecological impacts of production decisions. Even the degree to which individual, community, state and corporate consumers are free to choose or not choose not to consume available products is itself contested. 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.

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

Such producer decisions are influenced by the regulations imposed by the state, and by negotiations with their labor forces. This 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 would ameliorate social and ecological problems more than attempts to control rates of consumption or consumer choice of certain products. Consumer 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.

Only when activists have collectively organized citizens in consuming countries (and workers in producing countries) has there been a possibility of more political "choice" with regard to sweatshop labor. Consumers have only become relevant actors when these movements have organized them into consumer boycotts, and again, then largely serving only consciousness-raising functions.

Unfortunately, consumerist approaches to the problem of the treadmill almost never consider the goal of deceleration. The question of how much we are consuming (i.e. growth), is rarely challenged, only 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 many national environmental groups spearheaded in the 1980s and 1990s emphasized recycling (an environmentally problematic industrial process). Yet they largely eschewed emphasis on the more socially and ecologically effective practices of re-use and reduction. 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.

Some recycling campaigns have, however, contained a focus on production. For example, in 2003, a national coalition of environmental organizations (including the Grass Roots Recycling Network) successfully pressured a number of computer manufacturers to begin recycling their computers at the end of the consumer lifecycle (when consumers would normally throw them away). This appeared to be a major victory—in that recycling is probably better than dumping thousands of computers in landfills. But it failed to challenge the industrial growth imperative at computer firms, and *de facto* actually reinforced it. This recycling proposal was more progressive than most other forms of recycling, because it required producers to build recycling/reuse options into their design of new computers. The major limitation was its failure to address the problem of growth in both consumption and manufacturing.

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. For example, on a single day in 1992, Latino workers at Versatronex, a Silicon Valley computer firm, won the right to engage in collective bargaining with the company (by order of the National Labor Relations Board). The firm immediately announced that it was declaring bankruptcy and closing down the next month. Silicon Valley business leaders sought to remain union-free or firms would simply move elsewhere.

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 unchallenged [2]

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 19??) 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 the production system 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 the socially dislocating 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 support for unlimited economic expansion. Early 20th century attention to "sustained yield" 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" 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 2003b).

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. He wrote about declining capital productivity in the modern era. 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 selection. 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 enormous 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." Part of this was accomplished by crushing worker unionization through job blackmail (Kazis and Grossman 1981) – 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 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 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" – 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. 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 both 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 19??). 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 (Dunlap 19??, etc.), 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 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. 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 movement, based on 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 2003b). Many environmental justice conflicts simply cannot be explained by racism.[3]

WAS THE TREADMILL A DIALECTICAL OR A LINEAR CHANGE THEORY?

One of the critiques of treadmill theory 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 the intermediate technology development trajectory of Schumacher (1973, etc). Equally important, though, is the

fact that in the last 25 years, there appears to be very limited movement towards sustainable development. 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, Giddens 19??, Mol 1995, etc). 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 (Goldman, Collinson etc.) 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 seriously managed scarcity model (Stretton). 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 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, Yet this is a scenario we documented and envisioned long ago.

So we can argue that the treadmill theory was dialectical, but that the empirical history of the US and

global political economic 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, etc).

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 a reduced consumer spending, and hence led 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 <u>whom</u> 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.

ctlpar 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, habitat destruction 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 U.S.E.P.A. 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 Rio conference. While some of this may be due to increases in population (Rudel), the majority of habitat loss appears to have come through increased investment in extractive investment and profits (agricultural, mining, and especially forestry – Rudel, Sonnenfeld, etc). 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 "hypermaterialism" (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 (Sonnenfeld, Goldman, etc). 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. Relationships of transnational economic relations to the generation of both 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, nationality and transnationally. [5]

The growing hegemony of treadmill values and political economic forms manifest in corporate-lead neoliberal 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 between 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 19??). 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 19??), on local wetland protection efforts (Weinberg 19??), on global environmental treaties (Gould et al 1996) on the rise of post-consumer recycling in the US (Schnaiberg, Weinberg et al 19??), 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 1999, 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 19??). 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, Mol, etc). 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, **d e e p e r** institutionalization of it in the developed societies 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.

Hooks and Smith (2003) use the treadmill model to explain the relationship between Native American populations and hazardous munitions. They offer an innovative way of applying the treadmill model to the environmental justice literature. In addition, they envision the U.S. military-industrial complex as a treadmill institution, but driven primarily by *geopolitical* and *social/racial* motives, rather than industrial-capitalist influences (as treadmill scholars suggest). They argue that treadmill scholars have not focused enough on the phenomena of militarism, violence and coercion in U.S. environmental politics and history (although Gould [2003a] has done some recent work on this). This position offers a useful bridge between the class conflict emphasis of the treadmill state and the ethnocentric and racist politics of the military state. Hooks and Smith also argue that treadmill institutions operate with much greater autonomy than the treadmill model may allow for.

HAS THE TREADMILL THEORY BEEN ADOPTED BY ENVIRONMENTAL MOVEMENTS IN THE US OR ELSEWHERE?

It is unfortunate that the treadmill model has not been widely adopted by mainstream environmental social movements. Adoption would have led environmental social movement organizations to serve as a countervailing force. They would then be more likely to oppose the increasing power of corporate polluters and the ideology of reducing state intervention in economic markets. Much of U.S. mainstream environmentalism actually moved toward the adoption of *pro-treadmill* values in the 1980s and 1990s. This was a means by which to preserve their access to policy makers. It also permitted more cooperative relations with major polluters, as well as greater access to funding from foundations and wealthy private donors (Dowie 1995, Gonzalez 2001). Among the reasons for this movement position, we note the diffusion of the following political-economic ideologies:

- the growing hegemony of neo-liberal "free-market" ideology domestically ("Reaganomics"),
- similar ideologies in the western European mixed economies ("Thatcherism"),
- equivalent theories in Eastern Europe and the former Soviet Union ("Shock Therapy") and
- those in the global South ("Structural Adjustment")

All of these appeared to take any alternative model of development off of the table. A domestic and transnational political milieu was created, which produced institutionalized political resistance to treadmill-like ideas. Cooperation with those institutions was seen to gain whatever environmental protection might be acceptable to

economic and political leaders (Athanasiou 1996). Immediate gains (even if minor, ephemeral, and offset by more significant losses) are important to social movement organizations. They depend on expanding their "postal" memberships in order to demonstrate their effectiveness, thereby also enhancing external funding because of their constituency size.

Mainstream environmental organizations often share Board members with transnational corporations (Brulle 2000). They also share a class (and race and gender) status. The treadmill model's emphasis on structured class interests, distributional dimensions, and emergent conflicts thus lacked appeal. Leadership, membership and funding constituencies were thus firmly rooted in class and race privilege. As one environmental justice activist recently stated, "the leaders of the mainstream environmental movement are the sons and daughters of the industrialists producing much of the world's pollution."

Additionally, the core environmentalist constituency that emerged from the political turmoil of the 1960s and 1970s in the U.S. was not inclined toward political conflict and direct confrontation of power holders (Mitchell 1980). Other social movements in that era were much more explicitly conflictual. Environmentalism necessitated *some* opposition to elites but never encouraged a real structural critique of socioeconomic conditions. This contrasted with New Left, anti-imperialist, and even civil rights movements. Costs and benefits of environmental degradation and environmental destruction were largely viewed as a *shared* burden and benefit (especially when filtered through a *survivalist* frame, both in the late 1960s and in the later rise of *global* concerns). Environmental activists with more structural ideologies and approaches were

mostly drawn from **other** movements that had inattention with ecological problems as a key issue of theirs.

Initially, the presentation of the treadmill model did not overtly address racial inequality. Thus, when civil rights movements incorporated environmental factors as a significant part of racial inequality in their emerging *environmental justice* movement, they largely ignored the treadmill framework. Although the people-of-color environmental justice movement is firmly rooted in the distributional dimensions of environmental degradation, the American intellectual and political milieu which routinely presents race and class dimensions of inequality as oppositional rather than synergistic frames, made it difficult for that movement to immediately gravitate toward a model which places class based inequality centrally in the analysis. (see below)[6] .

In contrast, the emergence of the citizen-worker (white working class) *anti-toxics* movement came closer to adoption of the treadmill. This movement acknowledged both the diminishing returns to the working class produced by loyalty to the treadmill forces, and the growing awareness of the environmental health costs. They articulated a more class-based opposition to "business-as-usual" (Stretton 1976), grasping their growing environmental health risks, and the deceasing employment capacity and job security offered them by treadmill producers. Hence, they *implicitly* accepted many of the basic premises of treadmill theory, and coupled this with a working class tradition of union organizing and direct confrontation of power holders. Echoing community organizers such as Saul Alinsky, anti-toxics leader Lois Gibbs often declared, "there are two kinds of people: those with power and those without power who must take it back." While the civil rights movement had produced a similar legacy of political confrontation to

undergird the environmental justice movement, it lacked a direct link to treadmill theory (see below). The anti-toxics movement moved from local concerns toward a more universal ideology articulated in Lois Gibbs' famous "plugging up the toilets" strategy for forcing structural reform (Szasz 1994). At this juncture, the anti-toxics movement and treadmill theory became somewhat more convergent[7]

The four books that articulated treadmill theory have not been available in the languages of the global South (especially Spanish). However, the model appears to have resonance with the environmental livelihood struggles in peripheral nations of the global economy. *Environment and Society* offered a more transnational set of forces and processes applicable to the South, and thus found a positively disposed audience among academic activists and intellectuals. Scholar-activism is more the norm than the exception in the South (especially in Latin America), in contrast to its status as an aberration in the North. Hence, the dissemination of treadmill theory among environmental scholars in the South in the 1990s provided a route for transmission of the model to Southern environmental movements. Scholars in the South are more likely to view the practice of "speaking truth to power" in their writing, teaching, and service work as an obligation. This is so despite greater potential risks to their careers and personal security, as compared with scholars in the North. Macrostructural analysis, issues of distribution, and unequal power relations are central topics of popular as well as academic discourse in the much of the South. Thus the treadmill theory, with its resonance with dependency and world systems theory in its 1990s articulations, may have found a more receptive audience in the South than in the US (see Gould 2003b).

Southern environmentalism integrated ecological and social systems, viewing environmental and livelihood struggles as inseparable in a convergence of place, production and identity politics.[8] This fusion gave treadmill-based critiques more resonance. Rejected were northern mainstream environmental movements arguments rooted in population and culture.[9] Southern convergence of environmental, identity and production struggles may be widely shared in the transnational anti-corporate globalization movement. That social movement has most clearly adopted treadmill analytical frameworks in formulating an ideology of opposition to corporate power, market mechanisms, and international financial institutions (Buttel and Gould 2003). The anti-corporate globalization movement forms a complex coalition of coalitions. It incorporates a focus on macrostructural processes, corporate power, inequality and environment. Additionally, it believes in the necessity of politically confronting power holders (corporate, international financial institution, and state elites) in order to produce both better distribution of the benefits of production, and greater protection of the ecological bases of quality of life. And this resonates powerfully with the path toward treadmill deceleration and/ or dismantlement articulated in our works. This movement has produced a series of highly sophisticated structural critiques[10] with direct references to treadmill theory, which indicates that the treadmill model may have its greatest overt influence in anti-corporate globalization circles.

Anti-corporate globalization movements represent a convergence of organized labor, human rights, social justice and southern environmental movements (among others) (Gould et al 2003). Central in their programs are the search for distributional and environmental gains through macrostructural reorganization and a radical

democratization of power. This movement brings together disparate constituencies all of whom tend to be relatively positively disposed toward a Treadmill style analysis, including:

- •southern environmentalists
- •disenfranchised labor,
- •some northern environmentalists, and
  - southern and northern environmental justice advocates
  - advocates from multiple racial/ethnic populations

Due to the analytical orientations of its coalition components, the anti-corporate globalization movement is structurally inclined, politically confrontational, and environmentally and equity concerned (Buttel and Gould 2003).[11]

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 which and 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 19??). 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. [12]

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.[13]

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. 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 table, as either highly unlikely 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*).[14] 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. [15]

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 (Goldman 1998, Gedicks 2001).

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? [16]

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 19??), 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 (Schnaiberg et al 19??)

WHAT ARE THE IMPLICATIONS OF THE TREADMILL FOR THE POTENTIAL ATTAINMENT OF SOCIALLY AND ECOLOGICALLY SUSTAINABLE DEVELOPMENT TRAJECTORIES?

We each have evolved somewhat different political assessments[17] of "what is to be done?", in the face of the history of the treadmill. One position (mostly that of Schnaiberg), is that more structural reforms need to be implemented through the existing political system of the US and other major industrial societies. The major mechanism that will induce or coerce such change will be an increasing mobilization of those discontented with the impacts of the treadmill. In addition to traditional environmentalists, conservationists, and preservationist movement organizations, a second major component of a potential coalition is that of environmental justice and anti-environmental racism movement organizations (see above). Labor organizations, which have been both beneficiaries and casualties of the acceleration of the treadmill, have to become a coalition partner if a coalition is to be taken seriously by both political representatives and corporate elites. Organized labor's relations with many environmental organizations and social justice organizations have been episodic and conflicted (see above) (Gould et al 2003).

A few state policies have incorporated elements of all three interests: environmental, environmental justice, and labor. Clinton created an executive order to incorporate environmental justice evaluations of federal programs. But the actual implementation and force of these evaluations has been problematic. In much the same way, NEPA's (1969) requirements for environmental impact assessments have always been highly circumscribed (Schnaiberg 1980). Implementation of international Great Lakes water pollution were similarly undermined by corporate and community concerns (Gould 1991). Similarly, the stringent toxic waste reporting requirements of RCRA (1976) that incorporated the "community right-to-know" has been undermined from its early implementation (Weinberg 19??). Protection of workers from occupational hazards has also been undermined continuously by employers, both public and private (Pellow 1999).

For some time, we have observed the growing displacement of articulate, middle-class educated workers (Gould et al 1996; Krugman 2003). This stratum could offer some organizational capacity to merge some of the disparate concerns of a potential socio-environmental coalition. Perhaps the most limiting condition for the rise of any such coalescence has been the absence of an alternative

production system to the treadmill. Such a coalition ultimately lacks the capacity to mobilize private and public capital, to open up new organizations of work, natural resource utilization, and political representation of both labor and environmental concerns.

In contrast to the enduring conflictual aspects of the treadmill, there is an attraction to the comforting expectations of reflexive modernization, as argued in the ecological modernization theory (EMT). Yet these seem equally improbable to generate a successful production revolution in the near term. Whenever a more economically conservative US administration has taken control, for example, state environmental protection diminishes and political support for more rapid technological change is enhanced (especially noteworthy in the present Bush regime). This raises the need for a more enduring and mobilized coalition of opposition to the expansion of the treadmill as the major political-economic strategy of the society. Yet we note above the decreasing availability of these models in a post-USSR period.

Ultimately, the treadmill is simultaneously a disappointing and uplifting narrative. It dispels any belief that the state of global environmental protection is tolerable, and it makes clear what the driving forces

behind these remaining problems are. For those stakeholders who wish to move toward a socially-just and ecologically-sustainable future, the treadmill disabuses us of the notion that someone else is taking care of the problem or that it will be easy. One root of the problem noted by the treadmill theory is the power of elite institutions to construct reality and the definition of the environmental situation for mass publics, while exercising extraordinary material and structural power over both people and ecosystems (Beder 1997). Activists have, in recent years, become much more aware of the problematic alliance between corporations and the state, and how this has deeply negative implications for environmental protection in particular, and for democratic governance more generally (Mander and Goldsmith 1996; Pellow 1999). [18]

Another enduring hallmark of treadmill institutions is the willingness of elites within them to use violence, coercion, and repression to achieve their ends. Virtually every WTO meeting has witnessed peaceful demonstrations by activists being disrupted by violent state repression. In the face of such power and abuse, citizen-workers have to be prepared to respond to, diffuse, deflect, and challenge such elite tactics. One certainty is that both more radical action and a more radical vision are required to decelerate

the treadmill, in contrast to mainstream environmental movement perspectives. There is an overarching need to attain democratic forms of governance, and to rethink and transform our basic ideas about the *social* purpose of business, development, and work (Korten 2001)[19]

All social movements must combine theory with action, or diagnostic frames with tactics. The treadmill presents activists with a useful theory that gets at the core of critical questions, including: why environmental protection efforts have failed; why corporations have become so hegemonic; why workers and environmentalists will not be able to form productive alliances without a lot of effort; and why radical action is necessary to challenge these problems. The most important thing about changing the world is to know what is wrong with it in the first place (i.e. a diagnostic frame), and the treadmill makes this quite clear. As to where activists and others might take this analysis into the tactical frame arena, we leave that up to them.

At its most basic level, the treadmill model argues that traditionally-accepted and promoted mechanisms of achieving environmental protection will fall short, as they fail to account for the anti-ecological logic of capital. We have sought green technology, greater efficiency, cooperative agreements with private capital interests,

market mechanisms for pollution control, voluntary simplicity, and related policy tinkering. Yet all essentially fail to adequately account for the macrostructural constraints and incentives embedded in domestic and transnational political economies. They also ignore the central role played by *social inequality* in generating both treadmill support and ecological decline.

Most of the claims for the value of green technology fail to address power relations in the control of scientific and technological research and development (Schnaiberg 1977). In theory, green technologies could reduce the rate of increase in ecological disorganization. Such a radical redirection of technology is not likely to occur, however. Structured incentives of the large private capital interests that fund, organize and direct technological innovation will remain unchanged. Return on investment, not long-term protection of ecosystems, dominate as <u>the</u> decision criterion. Green technological trajectories can only emerge to produce greater ecological sustainability, when there is a radical restructuring of the funding, organization and directing of the innovation process. Such restructuring requires the deep structural changes to the political economy prescribed by treadmill theory[20].

Promoting greater efficiency in natural resource throughput as a means by which to sustain economic growth tend to ignore the structural nature of growth incentives and the constant expansion imperative of even nominally green firms (Gould & Schnaiberg 2000). These political and economic arrangements require constant expansion of productive capacity, so that efficiency gains (quality improvements) are bound to eventually be offset by output expansion (quantity increases). Reducing the levels of ecological withdrawals and additions per unit of production only attains environmental gains when levels of total output are kept steady. If total unit output is increased, as the logic of capital demands, greater efficiency of natural resource use only offers the potential for *more material consumption per level of ecological disorganization* [Gould & Schnaiberg 2000: 53-54]. In effect, efficiency will shift the trade-off between material benefits and ecological disorganization in favor of material benefits. More material gains are achieved through the same levels of ecological disruption. In that sense, efficiency is likely to yield *greater* support for treadmill expansion.

Co-operative agreements with treadmill firms were championed by state, industry and environmental movement

organization elites under "Third Wave" environmentalism (Dowie 1995, Athanasiou 1996). Again, this fails to address the structure of capitalist political economies and the incentives and disincentives that structure offers for private capital interests. Underlying the assumption of Third Wave environmentalism is the naïve assumption that negative environmental consequences are a result of a lack of understanding of, or concern for, the ecological consequences of production. Here the mantra is 'education is the key'. We disagree. Rather, this is a result of the constraints and incentives structured into the economic terrain of most firms (Schnaiberg & Gould 2000). Regardless of managerial or investor levels of concern or understanding of ecological consequences, the competitive pressures of capitalism offer only anti-ecological trajectories for the survival of firms (Korten 2001).

Firms making pro-environmental choices, left to compete with firms making anti-ecological choices are likely to fail in competitive systems. Anti-ecological choices of firms are, after all, based precisely on the competitive *advantages* that anti-ecological choices offer. Only changes to the array of incentives and disincentives in which firms compete can reduce the degree of competitive benefit bestowed on anti-ecological choices. Such changes

can only result from sociopolitical alteration of the larger macrostructural environment in which capital operates. State and broader public intervention in markets are a necessity for this to occur, and yet that is precisely the action that cooperative agreements are intended to circumvent. Co-operative agreements also tend to focus on green technologies and greater efficiencies, neither of which offers much potential for ecological sustainability within the rules of the current political economy of the treadmill.

It is understandable that, in an era of neo-liberal market ideological dominance, environmentalists would increasingly attempt to find means by which the environment can be protected *within* a market-driven system. All other options promise a future full of difficult political conflicts with powerful actors and institutions, in which success appears highly unlikely. The structure of markets itself, though, represents the primary threat to ecological sustainability. Hence, efforts to resolve "free" market systems and ecosystems are less likely to succeed. For the serious analyst or activist, the *difficulty* presented by the treadmill model's prescription of confronting political economic arrangements is offset by the *impossibility* of achieving environmental protection within those

arrangements. To the extent that markets (private capital) have increasingly gained ideological and policy edges over policy (states) in the last 20 years, the possibilities for achieving ecological sustainability have grown more dim. These observations are supported directly by statements made by free trade ministers and free trade agreement documents, including NAFTA and the WTO.

Similarly, voluntary simplicity efforts represent a retreat from environmental politics, which is the last thing we need at this historical moment. First, treadmill supporters and beneficiaries control the information environment in which individuals develop their needs, desires, choices, and views (Schiller 1996). Thus it is unlikely that those eschewing material consumption are going to win the ideological battle for the hearts and minds of a global population, plugged into an advertising-driven information system (now expanding into the electronic domain of the Internet). Voluntary simplicity in the North is thus unlikely to ever achieve more than minor "cult" status out of a wide range of lifestyle choices available for adoption. Since production leads consumption, only an overwhelming <u>mass</u> adoption of voluntary simplicity on a planetary scale offers much hope of altering the array of what is <u>produced</u>, much less the <u>way</u> in which material

goods are produced. Based on a notion of individual action rather than mass movement organization, voluntary simplicity fails to offer the ideological and tactics orientation necessary to make it even marginally viable.

Green consumerism, voluntary simplicity's meek and mild cousin, offers even less potential. The location of production decisions is with capital producers, and their logic of growth emphasizes only enough green production to meet green demand. Most citizens cannot afford to abandon their access to cheaper non-green consumption to meet their basic needs, because of the distributional logic of treadmill capital organizations. Adoption of individual consumer choice as a route toward sustainability is perhaps the most disheartening development, even more disheartening than the mainstream environmental movement's resistance to political conflict. The replacement of *collective* action and democratic governance with *individual* consumer choice represents a clear ideological victory for treadmill opponents. The neo-liberal economists' desire to replace voting with shopping as the mechanism through which social interests are expressed threatens to eliminate the possibility of both democratic governance and environmental sustainability.

Of all of the currently popular means to achieve environmental ends, policy tinkering actually offers the greatest potential for achieving *some* increased levels of environmental protection as a route toward a more managed scarcity synthesis. Precisely because of its greater, potential for constraining the negative ecological impacts imposed by the logic of markets, it is now on the wane. Policy intervention in the operation of markets is precisely the democratic constraint on capital that neo-liberalism was meant to disable. Third Wave environmentalism has been encouraged instead, by private capital interests. While mild policy interventions do nothing to alter the basic growth and distributional logics of capital, they do offer the potential to adjust the constraints and incentives within which competitive capital may operate. Such policy interventions can increase costs of anti-ecological choices for all firms, thus decreasing the competitive disadvantages associated with those choices.

Policy interventions can also generate incentives for *some* alteration of technological trajectories, and may preclude *some* forms of production. However, as capital becomes increasingly transnational in its scope of operation, policy intervention remains largely a national-

level phenomenon. Paradoxically, though, national policy intervention is likely primarily to increase incentives for firms to locate production in low-regulatory environments (Schnaiberg & Gould 2000). Yet, given the social consequences of such disincentives for **domestic** production, states are increasingly reticent to intervene in markets to protect the environment.

In a global economy, only global policy interventions can alter the competitive environment in which firms makes less or more ecologically protective decisions. No viable institutional structures currently exist for the imposition and enforcement of such global policy interventions. The realization of this is an important motivating factor behind the emergence of a transnational anti-corporate globalization movement.

Most of the generally accepted mechanisms above for achieving greater levels of environmental protection ignore the central role of social inequality in generating support for anti-ecological economic trajectories. So too do most mainstream environmental social movement organizations. Treadmill support is, in part, generated by the promise of alleviating the poverty-related impacts of capitalism through economic expansion, rather than through social redistribution. Without a redistributive option, the

current political economy offers either perpetual and deepening impoverishment of a growing segment of the human population, or a trickling-down of limited economic benefits through accelerating anti-ecological growth.

What makes the treadmill model so threatening to state, capital and movement elites is that it strongly advocates a move toward a steady state economy. There, most forms of economic *growth* are precluded, in order to achieve ecological sustainability. Under such conditions, the only route toward poverty alleviation domestically and transnationally is **redistribution** resulting from state intervention in or dismantlement of market systems. Redistribution thus becomes an essential component of any effort to achieve sustainability. Without the promise of redistribution, citizen-workers are unlikely to accept the low or no growth trajectories needed to protect ecosystems, except under conditions of extreme levels of repression (Stretton 1976). Repression is both economically and ecologically costly, though. Uultimately, it may prove socially and ecologically unsustainable (Gould 2003a). For all these reasons, then, redistribution is the key to achieving sustainable development and securing broad support for slowing or dismantling the treadmill.

The combined critique of the anti-ecological logic of capital and the necessity of more equitable distribution within a no or slow growth economy make the treadmill model threatening to capital elites in particular, and their client state elites as well. It is also threatening to the economically privileged groups that most commonly comprise the leadership and core funding membership of mainstream environmental social movement organizations. Steady state economies with equitable distribution as the model for social and ecological sustainability also threaten the naïve political claims of many Green Party organizations that champion slogans such as "neither left nor right, but forward".

The treadmill model denies the possibility of making an ecological end run around distributional (class) politics, even as it problematizes the structural role of workers within the political economy (Gould 2003b). Transnationalization of the economy and deepening global inequality makes the possibility of avoiding distributional politics in pursuit of green objectives decreasingly plausible. Inequality provides the basis for environmental injustices, insatiable material aspirations, anti-ecological survival strategies, and treadmill support even in the face of ever-diminishing social returns. The

treadmill model powerfully argues that any attempted solution to environmental problems that does not adequately address the distributional dimensions of socio-environmental dynamics is unworkable. In doing so, it indicates that political conflict with the ruling elite is inevitable, and must be successfully waged in order to achieve socio-environmental sustainability. This brings the entire repressive apparatus of economic elite dependent states to bear on treadmill and redistribution advocates.

In addition to the treadmill model's implications for capital actors, the theorizing of the state within the model also implies certain political opportunities and constraints. By focusing on treadmill elites and their interests, the model does indicate a greater orientation toward conceptualization of the role of and nature of the state in terms of capital elite dependence (Domhoff 1998, Gonzalez 2001). The model does allow for the emergence of greater state autonomy in specific historical periods and under certain socioeconomic and political conditions. However, the drift of states *away from* redistributive policies and market intervention since *The Environment* was first published in 1980 is an indication of a greater capture of the state by economic elites. This has led us in later iterations of our work to emphasize elite

convergence, rather than a state-autonomy conceptualization (Skocpol). Even under specific historical conditions that might produce capital-state elite schisms (paralleling the Great Depression), support of the treadmill from labor and consumers is likely to produce a more pluralist politics that would still support growth. This is so unless the extent of the environmental crises was accepted generally, **and** strong redistributive policies were put in place. A more autonomous state pursuing its own independent structured interests would be more open to citizen-worker appeals for environmental protection and public health. This treadmill deceleration mechanism is open to more political control. But that does not necessarily indicate that structural solutions would **automatically** be advocated.

Ecological consciousness-raising therefore has some power to decelerate the treadmill through policy tinkering. But this is diminished as firms operate on transnational rather than national structural terrains. Economic globalization has major impacts on the willingness and ability of states to effectively intervene in markets, with the threat of dramatic negative economic consequences. Therefore, ecological consciousness-raising must emerge in more transnational movement organizations, rather than primarily through participation in domestic political

processes. Various nations within the transnational economic stratification system are even less capable of operationalizing pro-environmental claims from a conscious and collectively-organized citizenry than the U.S. and other Northern states. Yet transnational mobilization is perhaps the only viable path toward social and ecological sustainability. That such efforts will succeed in the face of the powerful forces aligned against them is problematic at best.

REFERENCES

Athanasiou, T. (1996). *Divided planet: The ecology of rich and poor*. New York: Little, Brown & Co.

Beck, U., M. Ritter (Translator), U. Beck, S. Lash (Introduction), B. Wynne (Introduction). (1992). *Risk society: Towards a new modernity*. Thousand Oaks, CA: Sage Publications.

Beder, S. (1997). Global spin: The corporate assault on environmentalism. White River Junction, VT: Chelsea Green.

Blum

Brulle, R. (2000). *Agency, democracy, and nature: The U.S. environmental movement from a critical theory perspective*. MIT Press: Cambridge, MA.

Bullard, R.D. (1990). Dumping in Dixie: Race, class and environmental quality. San Francisco: Westview Press.

Bullard, R.D. Ed. (1993). *Confronting environmental racism: Voices from the grassroots*. Boston: South End Press.

Bullard et al (2000).

Bullard et al (2002).

Buttel, F. H. and K. A. Gould. (2003). "Global social movement(s) at the crossroads: Some observations on the trajectory of the anti-corporate globalization movement" In *Journal of World-Systems Research* . November, 9 (3).

Clapp (2001).

Chomsky, N. (1993).

Collinson, H. Ed. (1996). *Green guerrillas: Environmental conflicts and initiatives in Latin America and the Caribbean*. London: Latin America Bureau.

Daykin and Doyal (1999).

Derber , C. (1998). *Corporation nation: How corporations are taking over our lives and what we can do about it*. New York: St. Martin's Griffin.

Domhoff, G. W. (1998). *Who rules America?: Power and politics in the year 2000*. Mountain View, CA: Mayfield Publishing Company.

Dowie, M. (1995). *Losing ground: American environmentalism at the close of the twentieth century*. Cambridge, MA: MIT Press.

Dunlap

Dunlap, R. E. & A. G. Mertig. Ed. (1992). *American environmentalism: The U.S. environmental movement, 1970-1990.* Bristol, PA: Crane Russak.

Dunlap and Michelson

Faber and Krieg 2001

Garcia Johnson 2000

Gedicks, A. (2001). *Resource rebels: Native challenges to mining and oil corporations*. Cambridge, MA: South End Press.

Giddens

Glasser and Strauss

Goldman, M. Ed. (1998). *Privatizing nature: Political struggles for the global commons*. New Brunswick, NJ: Rutgers University Press and London: Pluto Press.

Gould, K. A. (1991). The sweet smell of money: Economic dependency and local environmental political mobilization. In *Society and Natural Resources: An International Journal*. 4 (2), 133-150.

Gould, K. A. (1992). "Putting the [W]R.A.P.s on public participation: Remedial action planning and working-class power in the Great Lakes." In. *Sociological Practice Review*. 3 (3) July.

Gould, K. A. (1994)."Legitimacy and growth in the balance: The role of the state in environmental remediation". In *Industrial and Environmental Crisis Quarterly*. 8, 237-256.

Gould, K. A. (1999). Tactical tourism: A comparative analysis of rainforest tourism in Ecuador and Belize. In *Organization and Environment*. 12 (3), 245-262.

Gould, K. A. (2003a). "The ecological costs of militarization" In *Environment, Technology and Society*. Number 108. Spring.

Gould, K. A. (2003b). "*Classe social, justiça ambiental e conflito politico*" in *Justiça Ambiental e Cidadania*, Edited by José A. Pádua, H. Acselrad and S. Herculano. FASE: Rio de Janeiro, (forthcoming).

Gould, K. A., Schnaiberg, A., & Weinberg, A. S. (1996). *Local environmental struggles: Citizen activism in the treadmill of production*. Cambridge: Cambridge University Press.

Gould, K. A., J. T. Roberts and T. Lewis. (2003). "Blue-green coalitions: constraints and possibilities in the post 9-11 political environment" In *Journal of World-Systems Research*. (November, 9 (3).

Gonzalez, G. (2001). Corporate power and the environment. New York: Rowman and Littlefield.

Hassfeld (forthcoming)

Hooks and Smith (2003)

Hurley, A. (1995). *Environmental inequalities: Race, class, and industrial pollution in Gary, Indiana, 1945-1980*. Chapel Hill: University of North Carolina Press.

Kazis, R. and R. Grossman. (1982). *Fear at work: Job blackmail, labor and the environment*. New York: Pilgrim Press.

Korten, D. (2001). *When corporations rule the world*. Bloomfield, CT: Kumarian Press.

Krugman, Paul. 2003. *The Great Unravelling:Losing Our Way in the New Century*. New York: Norton.

LaDuke, W. (1999).

Lindblom, C. E. (1977). *Politics and markets: The World's Political-Economic Systems*. New York: Basic Books.

Lukes, S. (1974). *Power: A radical view*. London: Macmillan

Mander and Goldsmith 1996

Mol, Arthur P.J. 1995. *The Refinement of Production: Ecological Modernization Theory and the Dutch Chemical Industry*. Ultrecht: Jan van Arkel/International Books.

Mol, Arthur P.J & Gert Spargaaren. 2000. "Ecological Modernization Theory in Debate: A Review."Pp. 17-49 in Arthur P.J Mol and David A. Sonnenfeld, editors. *Ecological Modernization Around the World*. London & Portland, OR: Frank Cass.

Park 2003

Pellow, D. N. (1999).

Pellow, D. N. (2002). *Garbage wars: The struggle for environmental justice in Chicago*. Cambridge, MA: MIT Press.

Pellow and Brulle (forthcoming)

Pellow, D. N. and L. Park (2002).

Rubin (1996).

Rudel, T. K. (1993). *Tropical deforestation: Small farmers and land clearing in the Ecuadorian Amazon*. New York: Colombia University Press.

Schiller , H. I. (1996). *Information inequality: The deepening social crisis in America*. New York: Routledge.

Schnaiberg, A. (1977).

Schnaiberg, A. (1980). *The environment: From surplus to scarcity*. New York: Oxford University Press.

Schnaiberg. A. (1986)."The role of experts and mediators in the channeling of distributional conflict". Pp. 363-379 in A. Schnaiberg, N. Watts, and K. Zimmermann, editors, *Distributional conflicts in environmental-resource policy*. Aldershot, England: Gower Press.

Schnaiberg, A. & K. A. Gould. (1994). *Environment and society: The enduring conflict*. New York: Cambridge University Press.

Schnaiberg, A., D. N. Pellow and A. Weinberg, (2002). "The treadmill of production and the environmental state." Pp. 15-32 in A .Mol & F. H.

Buttel. Eds. *The environmental state under pressure*. Amsterdam: Elsevier Science.

Schnaiberg, A., A. Weinberg, and D. N. Pellow

Schorr

Schumacher, E.F. (1973). *Small is beautiful: Economics as if people mattered*. New York: Harper & Row.

Shuman, M. (1998). *Going local: Creating self-reliant communities in a global age*. New York: The Free Press.

Skocpol

Sonnenfeld, D. A. (2000). "Contradictions in ecological modernization: Pulp and paper manufacturing in South-east Asia." Pp. 235-256 in A. Mol and D. A. Sonnenfeld, Eds. *Ecological modernization around the world*. London & Portland, OR: Frank Cass.

Spaargaren, G. (1997). *The ecological modernization of production and consumption*. Doctoral thesis, Landbouw University, The Netherlands.

Spaargaren, G. and A. P. J. Mol. (1992). "Sociology, environment, and modernity: Ecological modernisation as a theory of social change." *Society and Natural Resources* 5 (4), Oct.-Dec., pp. 323-344.

Stretton, H. (1976). *Capitalism, socialism and the environment*. New York: Cambridge University Press.

Szasz, A. (1994). *EcoPopulism: Toxic waste and the movement for environmental justice*. Minneapolis: University of Minnesota Press.

Tilly

United Church of Christ (1987).

Walsh, Walard and Smith (1997).

Weinberg, A., D. N. Pellow and A. Schnaiberg (2000). *Urban recycling and the search for sustainable community development*. Princeton, NJ: Princeton University Press.

Weinberg and Schnaiberg

York, R. and G. Rosa (2003). "Key challenges to ecological modernization theory: Institutional efficacy, case study evidence, units of analysis, and the pace of eco-efficiency". In *Organization and Environment*, volume 16, number 3.

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, 2002). 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 (Hossfeld forthcoming).

[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] . Although later iterations of treadmill theory more clearly integrated racial inequality in the model, those theoretical presentations emerged after the environmental justice movement had already developed a strong movement identity and after it had developed its own academic body of literature. It is only quite recently that environmental justice and treadmill theory have begun to more clearly converge (Pellow 2002), offering an important corrective to both intellectual traditions in moving environmental justice theory toward greater consideration of macrostructural analysis, and treadmill theory toward greater consideration of the role played by cultural and institutional racial discrimination. Thus, one of the principle weaknesses of the environmental justice movement has been the lack of integration between class and race analyses in its diagnostic (i.e. the source of the problem) and prescriptive (i.e. possible solutions) collective action frames (Pellow and Brulle forthcoming).

[7] . Nevertheless, the extent to which the movement can be said to have overtly and consciously adopted an academic theory remains limited. Localness of focus of much of the citizen-worker anti-toxics movement, and its failure to truly develop as a conscious national and transnational social movement restrained their analysis. Thus, they only addressed a limited macrostructural analytical framework, as outlined in *Local Environmental Struggles*.

[8] Southern audiences were more accustomed to seeing the necessity of structural analysis and political conflict. That cultural history, combined with the rapid acceleration of environmental degradation in the South was fostered by corporate transnationalization and Northern externalization of environmental costs. A history of structural analysis and political conflict induced environmental movements in the global South to overtly adopt treadmill theory in their political critiques.

[9] Greater access to treadmill theory through translation of theoretical works into Spanish, Portuguese, and other languages would have facilitated the adoption of treadmill theory by the movements that represented perhaps its best potential audience.

[10] This is represented in a large body of academic and movement literature. The treadmill model's emphasis on the necessity of political coalition formation, overt

political confrontation, and deep structural social change in order to produce both better distribution of the benefits of production, and greater protection of the ecological bases of quality of life makes it a perfect fit with the emerging ideology, existing political strategy, and long-range goals of the anti-corporate globalization movement.

[11] Hence the anti-corporate globalization movement may be creating the perfect audience for a transnationalized model of the treadmill of production. In that sense, it may be that the significant influence of treadmill theory on social movements is really just emerging.

[12] 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.

[13] 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.

[14] 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.

[15]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 c0hallenges of the treadmill's socio-environmental dynamic.

[16] 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.

[17] The three of us have evolved different political preferences and perspectives, while we all share the analytic principles of the treadmill. In a sense, this freedom is one of the attractions for scholars of beginning their studies with a framework like the treadmill.

[18] However, while this may appear to be a new development, Chomsky (1993) notes that the integration of state and corporate power and interests is a phenomenon that is hundreds of years old. The corporate-state alliance is what made European imperialism possible and one of the main characteristics of contemporary imperialistic practices by the U.S. and other nations. While the treadmill model developed out of the Post-WWII era to explain political economic dynamics around environmental policy, it is likely that the basic social forces associated with capitalism, imperialism, and militarism would allow us to extend treadmill analyses back several centuries.

[19]. During the early days of this nation's history, corporate charters were developed precisely for this purpose—to demand that private industry operate in a fashion that primarily benefits the citizenry (Mander and Goldsmith 1996). These laws are still on the books and have been invoked by human rights activists in efforts to reign in corporate abuse in a number of nations. These are efforts to redefine (or perhaps *remember*) the role of treadmill institutions in our society and to reclaim power over them.

[20] It is only by treating technological innovation as a process outside of the political economy that claims for a culturally driven shift in technological trajectory can be made. The failure to see technological innovation as an artifact and product of a specific set of political-economic arrangements is precisely the type of analytical weakness that the treadmill seeks to correct.