

*The Treadmill of Production and the
Environmental State*

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I. The Initial Logic of the Treadmill

The *treadmill of production* (TOP), a concept first introduced in 1980 by Schnaiberg (1980), arose from two observations. First, a major change appeared in the impact of production processes upon ecosystems in the last half of the 20th century. Second, social and political responses to these production processes were quite variable and volatile. While some people rebelled against this modern production system, others embraced these new technologies as their best hope for solving environmental problems.¹

Ironically, we have returned to this theoretical dual valence at the end of the twentieth century. Among environmental sociologists, proponents of ecological modernization (EM) have postulated that there is a growing independence or "emancipation" of the ecological sphere from the political and economic spheres in state and industry policy-making (Mol 1995; Mol and Spaargaren 2000; Spaargaren 1997; Hogenboom et al 2000; Sonnenfeld 2000; Frijns et al 2000). Within each of these spheres there are significant institutional transformations stimulated by leading firms, who have been driven by the pressures to reduce the environmental impacts of their past production processes. In sharp contrast, our own political-economic model argues that such firms tend to minimize, or even undermine, progress on ecological goals, as well as social ones. Proponents of political economy models urge increased mobilization and opposition to socially and ecologically oppressive actions by major private sector actors and the state, which often defers to these actors.

In this paper, we set out to frame these two special issues of *Organization & Environment* by outlining the model of the treadmill as a political-economic context for the so-called *environmental state*. Contrary to ecological modernization theory, we find that economic criteria remain the *foundation* of decision making about the design, performance and evaluation of production and consumption, dwarfing any ecological concerns. Further, the state also shares this orientation, despite its varied political interests, and often cedes a great deal of power to private sector actors. We view this as highly problematic for creating conditions for sustainability and ecological responsibility.

Schnaiberg (1980) argued that one major change in the U.S. production system during the post-1945 era was a rising status of workers, moving from a working to a middle class, albeit within a society still marked by considerable poverty (Rubin 1996; Reich 1992). Workers gained new income and occupational opportunities through the post-1945 expansion of production and trade, but at the expense of new ecological disruptions. In three books, Schnaiberg and his collaborators outlined the new production system that had changed its relation to the environment in two fundamental respects (see Schnaiberg 1980, Schnaiberg, Watts & Zimmermann 1986; Schnaiberg and Gould 1994):

¥ First, modern factories needed greater material inputs. The modern factory was capital-intensive, and hence, more energy was needed to run machinery. Likewise, the machinery was designed to vastly increase production levels, thus requiring far more raw materials. This feature of this new production system helped explain why ever-greater levels of *withdrawals* from ecosystems were required. These ecological withdrawals led to one set of environmental problems, natural resource depletion.

¥ Second, modern factories used many more chemicals in the new production processes. The modern factory used new "efficient" energy/chemical intensive technologies to transform raw materials into finished products. Thus, workers were increasingly engaged in managing energy and chemical flows, and directing their flows through the complex machinery, to create marketable products. This feature led to a second set of environmental problems, pollution -- which Schnaiberg termed *additions* to the ecosystem.

In a later series of empirically-grounded works (Gould, Schnaiberg, and Weinberg 1996; Schnaiberg 1994; Gould 1991, 1992, 1993; Weinberg 1997a, 1997b; Weinberg, Schnaiberg and Pellow 1996; Gould, Weinberg, and Schnaiberg 1995), this earlier concept of the treadmill was further elaborated, as Schnaiberg was joined by a succession of

students, including Gould, Weinberg and Pellow. Environmental impacts of production were viewed in these analyses as outcomes derived from changing relationships between capital owners, workers, and the state. The five axes of such changes outlined below differ markedly from ecological modernization principles:

1. Economic expansion. Economic expansion was generally viewed as the core of any viable social, economic, or environmental policy. Economic expansion was thought to increase the profits that corporate managers and their investors require for capital outlays. Workers were also believed to benefit from these outlays because investments lead to increased production, creating new local employment. Capital outlays also led to higher levels of productivity, a precondition for rising wages. Government agencies needed to ensure that national production generates sufficient profitability to: (a) induce investments by capital owners; (b) provide enough additional market values to maintain a level of wages adequate to sustain consumer demand; and (c) generate enough tax revenue to cover the state's social expenditures. Governments believed that tax revenues from the accelerating treadmill would rise more rapidly than citizen demands. Thus, government officials and agencies increasingly shared a stake in the economic expansion with the private sector.

2. Increased consumption. If economic growth were to come about through increased production of the amount of goods, consumers needed to have the disposable income to purchase the goods. Therefore the state, along with private capital, worked to make low-interest loans available to consumers for the purchase of homes and other items. This would ensure a continued cycle of production and consumption.

3. Solving social and ecological problems by speeding up the treadmill. Social and ecological problems were thought to be best solved "through the market." Thus, there arose an untenable, almost magical, sense that any type of economic expansion will reduce social and ecological problems. Poverty would be reduced by a growing economy because there was an expanded job base and increased wages at the bottom. A growing economy also supported government social expenditures (for education, housing, and other needs of the poor), and provided the source of funding for technological development that could address environmental ills.

4. Economic expansion via large firms. Economic expansion was seen as fostered primarily through the growth of large firms, "core firms." Large firms were thought to be the driving engine of the economy. Their growth created the most demand for jobs and secondary demand for supplies, which fueled the growth of smaller entrepreneurial firms. The wages paid to the large labor pools provided consumption capacity among consumers, who kept mainstreet American merchants in business. The earlier popular slogan "What's good for General Motors is Good for America" captured this thinking.

5. Alliances among capital, labor, and governments. The post-1945 political economy was largely held together by an implicit contract. Private capital's need for a reliable labor force permitted the development of strong trade unions, which could also collectively bargain for wage increases and safer working conditions. Workers' need for jobs and their general satisfaction with unprecedented material gains led to a "no strike" pledge with management. The state played its part by expanding public education in order to produce a higher quality labor force, while also expanding consumer credit to make sure that domestic demand for goods kept pace with the increase in production.

Within these papers, we had noted that as early as the 1960s in the United States, the treadmill had already begun to undergo significant changes (Gordon 1996; Reich 1992; Rubin 1996). With increasing international competition, investors and managers became concerned about the existing pact between management and labor, which had ensured a relatively high rate of return to workers, as workers' price of accommodating to the treadmill. A higher allocation of profits to labor had occurred because of rising rates of unionization, and the growing agreements between unions and investors/managers. However, beginning in the mid-to-late 1960s, and increasingly in the 1980s and 1990s, managers began to undermine unions. Their tactics ranged from union-busting, to mobility from unionized to non-unionized areas within the United States (e.g., from north to south), and then increasingly to off-shore production facilities. The state did nothing to prevent these shifts, and indeed accepted the argument that higher corporate profits would lead to further national economic expansion.

With the growth of global investment and production patterns in recent decades, these anti-labor trends have accelerated sharply. Among other indicators, there has been well over a 50% decline in union membership in the United States, frequently and inaccurately attributed merely to changes in the composition of the workforce, from blue collar to white collar. Yet most de-unionization has in fact been the result of union busting campaigns (Bluestone and Bluestone 1994). To some extent, the earlier form of the treadmill had followed the "high road" to development (Harrison 1994), allowing workers a greater share of material gains. But after the 1960s, the treadmill began to shift to the "low road", in which labor costs were to be reduced to ensure higher profits. Arising from this shift, negative ecological and social outcomes emerged. We argue that this shift can be attributed to a convergence of technological and political changes that made it possible for firms to act on their recurrent desire to minimize labor costs.

First, ever more of the production process shifted to energy- and chemical-intensive forms, replacing these elements for human labor and simpler machinery. Second, a smaller share of the work force was involved in the production process, much as had happened in earlier decades within agricultural production. For example, in Chicago's Ford Motor Company Plant, production workers were downsized from over 5000 to under 2500 in a decade. In Dearborn, Michigan's River Rouge Ford plant, the reductions were even more dramatic. Third, those workers remaining in the plants were increasingly deskilled, relying on automation for the execution of many tasks previously done by human beings (Edwards 1979). Again, the state was passive with regard to these changes, in part because of the rising involvement by firms in financing political campaigns (Beeghley 1995). Moreover, the corporate-framed ideology of modernization, "growing world competitiveness", and "free trade" further rationalized these shifts.

Yet the state became caught in a double bind. With increasing displacement of the labor force from production, there were growing demands for social safety nets to cushion displaced workers and their families. Under these pressures, the U.S. state moved in an uncritical fashion to further support the expansion of the treadmill, now under the rubric of "free trade". Implicit in this statement was the hope that the new accelerated treadmill would resolve the very community problems that the previous state of the treadmill had created.

But the old communities implied safety and stability that the new corporate communities cannot offer. They provided continuity and relationships across the generations, rules that didn't change no matter how often we broke them, and leaders, trusted men and women, who had the interests of the community at heart. The continuity is gone, the rules keep changing, and somehow the downsizing captains of today's corporations are one's idea of trusted community elders (Longworth 1998: 112).

II. Social vs. Ecological Elements of the Treadmill

Two forms of a "treadmill" emerged in this new system. As firms made more products using more efficient technologies, they also garnered rising profits, which could be invested in still more productive technologies. This suggested a kind of *ecological treadmill*. This expansion required greater inputs (raw materials and energy) and hence greater withdrawals of natural resources. It also led to greater additions (toxic chemical pollution and other forms of liquid and solid waste). The implications of this model were that ecosystems were increasingly becoming used as sources of raw materials and as "sinks" for toxic wastes, degrading ecosystems while enhancing profit levels.

A second form of the treadmill was *social*. After each cycle of production, a growing share of profits was allocated to upgrading the technological "efficiencies" of the firm. Analogously to ecosystems, workers were helping to sow the seeds of their own degradation. By generating profits in one cycle, they would help set in motion a new level of investment in labor-saving technology, ultimately leading to their removal from the production process (Rifkin 1995).² Despite these trends, some workers did indeed gain opportunities in this process as skilled technological workers (Wellin 1997), while others lost such opportunities.

Moreover, as this treadmill expanded, it created new sources of revenue for governments. Some of this revenue was used to give displaced workers social and economic compensation (e.g., income supplements and alternate employment). There were thus losses and some gains as the treadmill expanded, replacing earlier forms of production, natural resource utilization, and employment.

In its initial formulation, therefore, the treadmill was more than a model for ecological impacts of production. Inherent in its logic was a necessary and simultaneous shift in social relations within production, and social relations between producers and other institutions. From its inception, then, the treadmill's dual focus has been *within the firm* and *within the society in which the firm is embedded*. This is a primary distinction between the

theory of the treadmill of production and the theory of ecological modernization. **Social distributional** features have always been a core component of the treadmill's dynamic and metric. In addition to ecological indicators, the treadmill notes the changing nature of the workforce, the relationship between social inequality and environmental quality, the growing autonomy of firms from control by local and national governments, and the growing dependency of governments on treadmill organizations for fiscal and political support. Because we believe ecological outcomes are by-products of economic (and political) reorganization, these features of treadmill change offer a better base from which to predict environmental actions of firms and states.

In recent decades, the rising tide of global investments and geographic shifting of production has intensified competitive pressures on ever more workers in industrial societies (Longworth 1998), leading to down-sizing and increasing bifurcation of global labor forces, outsourcing of production, and a decline in real wages for more workers (Rifkin 1995). Furthermore, ecological risks within communities and workplaces have increased markedly (Erikson 1994), while nation-states have ceded significant policy-making authority to corporate-run global trade organizations.

Recently, we have used empirical data on recycling (Weinberg, Pellow and Schnaiberg 2000; Pellow, Schnaiberg and Weinberg 2000; Schnaiberg, Weinberg and Pellow 1998), on green businesses (Weinberg 1998; Pellow 1998; Gould 1999), and on social movements (Pellow 2000; Weinberg 1997) to make sense of treadmill changes and their ecological outcomes. For recycling programs in the U.S., it became clear how the practice of substituting larger forms of physical capital for human labor had permeated every aspect of this industry. From billing and accounting, to collection, processing, labeling and shipping, the recycling industry has wholeheartedly adopted labor-saving technologies, robotics, and expert systems. The commodification of recycling also fundamentally represented a displacement of the environmental movement, which had earlier emphasized recycling's use-value potential. Additionally, the much-anticipated employment and revenue

gains for communities and governments never materialized, either when communities did recycling directly, or when they contracted out with private industry. Furthermore, despite recycling's local image, markets for post-consumer waste were much more volatile and global in scope than previously expected. To understand why this outcome occurred, we believe a more general dynamic of the treadmill needs to be studied, as outlined in the next section.

III. Government Environmental Policies & The Constraints of the Treadmill

>From a conceptual perspective, we might characterize an "environmental state" as encompassing the following feature: whenever it engaged in economic decision-making, considerations of ecological impacts would have equal weight with any considerations of private sector profits and state sector taxes. Put this way, most industrialized nation-states fall far short of this standard. Indeed, it is increasingly true that any **environmental policy-making** is subject to more intensive **economic** scrutiny, while economic policies are subject to less and less environmental assessment (Daynes 1999; Soden and Steel 1999).³

One way of expanding our example of the government double-bind in recycling is to consider the broader limits to state environmental protection policies. As noted above, unlimited expansion of production is a goal of treadmill proponents. Therefore, it would appear that **any** state environmental protection is experienced as a form of **scarcity**, which limits treadmill producers from reaching their desired state of indefinite expansions of production or profits. In like manner, at first blush all **firms** embodying ecological modernization appear as countercases for the diffusion of the treadmill logic, as such firms hypothetically are equally concerned with environmental and economic goals.

Two features of the American political-economic landscape affirm the tensions inherent in state environmental policy-making. First, treadmill organizations generally resist environmental regulation with all the substantial means at their disposal. For example, prior to the advent of recycling regulations and programs, container firms fought all forms of "bottle bills", spending perhaps US\$50 million opposing such bills, and succeeding in about 2/3 of the states. Yet even these bottle bills were only indirectly constraining firms. Legislation did not directly mandate a refillable container, but only the imposition of a deposit on all containers. Even in this limited regulation, the refunding mechanisms for the deposit put some cost burdens on non-refillable container manufacturers and/or users. Thus, in recent years in New York state, bottlers have refused to repurchase stockpiled refunded containers. They have let these accumulate at brokers and large retailers, seeking

thereby to mobilize opposition to the bottle bill system. For the remaining 2/3 of states, container manufacturers and bottlers have simply encouraged recycling, and have kept feedstock prices low, and avoided paying labor costs for refilling containers.

Second, where direct resistance against any environmental legislation becomes infeasible, under pressures from environmental NGOs, firms first dilute the legislation to minimize its impacts on their operations. Then they wait for opportunities to further lighten their regulatory load, whenever the political climate shifts and/or NGOs are elsewhere engaged. In the recycling arena, this has been commonplace. Affected industries have continuously shifted their campaigns to avoid mandatory direct controls on their production and distribution activities. All U.S. government regulations have avoided mandating firms with a "life cycle" responsibility for their own generation of post-consumer wastes, as has occurred in some European states. Instead, governments had introduced fairly weak mandates for firms, requiring higher "recycled content" of their production. Firms have responded by including post-production waste recycling (a standard economic practice for decades) as part of post-consumption recycling.

On a broader level, the major types of state environmental policies have been largely restricted to regulating ecological additions (pollutions of various types). They have largely avoided regulating ecological withdrawals (depletions of various ecosystems). There is some confusion over this, because American environmental legislation has also included some protection of specific ecosystems -- e.g., regulating logging in national parks, in old-growth areas, for example. But even in these cases, which represent a rather small share of national and state environmental legislation, there is no prohibition of the general treadmill expansion into a variety of **other** ecosystems. The maximum effort of the state has been the restriction of this expansion in a small set of publicly-owned lands, to protect a limited range of ecosystems.

The same is true for other legislation such as the Endangered Species Acts, which has put somewhat ineffective controls over specific habitats of a small number of particular

species. Yet it leaves unprotected all manner of national and transnational habitats to resource extraction -- and even to certain "protective" extractions from delicate ecological reserves, such as oil fields in the Alaskan Reserves. Thus, in general, the state has allowed private firms to extract a great deal of ecological withdrawals on publicly-owned lands.

After many years of our analysis of the political and social conflicts around environmental policies, we are nonetheless startled to realize how very limited a role the state has played in protecting natural habitats in the United States and throughout the world, especially the developing world. It sometimes appears to us that treadmill organizations and their states have accepted a tradeoff. They permit firms relatively unlimited access to the world's biotic and mineral reserves. In return, the states are politically permitted to tinker with "end-of-pipe" controls over a limited range of pollutants, to maintain their political legitimacy with non-treadmill constituents.

Treadmill organizations seem to be arguing: "do not attempt to control national and global expansion of production, through limiting economic access to ecosystems, or we will undermine your agencies." Perhaps the most interesting case is in global warming, where states **appear** to be moving into the atmospheric "habitat" and restricting expansion of the treadmill. Neither the Rio UNCED (ÒEarth SummitÓ) nor the Kyoto (ÒClimate ChangeÓ) conferences have actually undermined the expansionism of the treadmill within the United States, or even within Europe. This is because, for the first time, national governments, under the auspices of transnational organizations such as the United Nations, have begun to consider regulations that still **indirectly** restrain treadmill expansion. While overt expressions of accommodation and good-will appear, in fact treadmill organizations are nonetheless balking at these national and transnational efforts.

A more recent U.S. example is the President's Council on Sustainable Development (PCSD).⁴ The PCSD was an effort by U.S. Vice President Al Gore to bring private sector, federal government, and NGO leaders together to move forward on an ecological modernization agenda. From 1993-1999, the PCSD was a hub of environmental activity

within the Clinton Administration. Two major reports were issued (PCSD 1993, 1999) which outlined a vision and an action plan. This culminated in a May 1999 National Town Meeting in Detroit, where private sector and federal officials committed to implement parts of the action plan.

The following observations about the PCSD are most relevant to the treadmill model:

1. Whereas the early efforts had fairly impressive participation by the private sector, this was short-lived. For example, by 1999 the Metropolitan and Rural Strategies Task Force had no active private sector participation. Despite being the task force charged with deal with urban and rural forms of sustainable economic development. Numerous participants commented to us that private sector representatives were initially active because they feared that the Vice President would push for a series of ecologically-motivated policies, as articulated in his book (Gore 1992). When it became clear the PCSD would not have broad support within the administration to make sweeping changes, the private sector saw no need to continue its participation. In other words, when the threat disappeared, so did the private sector. The other side of this observation is our conclusion that the environmental movement's hope for meaningful reform from the PCSD was dependent upon the private sector's involvement. Ultimately, movement participants had no power to ensure that either the private sector or the state would participate in good faith and implement any final recommendations.

2. The PCSD was part of Vice President Gore's *reinventing government* initiative. One early idea was to re-focus major federal policy around ecologically-sound production. There was some discussion of the possibility that the USDA's Extension Service would become a sustainable development entity. Those early efforts to emancipate the environment within federal agencies met with fierce and

consistent opposition. Their efforts were stymied and many of the key players moved on to other jobs.

3. Two types of actions *have* been carried out. First, some of the action items have been implemented. However, they are primarily federal programs that required no private sector support. They are also issues that have broad political appeal. For example, "smart growth" has become a popular initiative. Following the logic of the treadmill, we note that smart growth is a weak environmental project. It has broad support from urban mayors who want reinvestment, suburban communities that want to contain congestion, and private sector actors that want the federal government to pay for their urban infrastructure needs. It is basically a gift from the federal government to powerful urban actors, who are concerned about economic and political needs.

Second, there is an coalition of federal extensions working together in a Sustainable Development Extension Service (SDEN). They are currently working on a series of innovative projects in Burlington, Vermont. However, the initial goal of revised SDEN has been reduced to a minuscule effort that exists along-side the more traditional massive extension service. Thus, even where there are innovative efforts they usually exist along-side identical programs pushing non-sustainable forms of production. One participant from a major federal agency involved in natural resource protection commented at a meeting:

ÓYou take for granted that there is support for sustainable development. I have to go back and be able to make a strong case for these ideas. There is tremendous opposition. People are not going to just act because it seems like a good idea to protect the environment. There are a lot of other constituencies out there.Ó

4. Finally, we note that the term Ósustainable developmentÓ has been dropped by the Vice President in the campaign in favor of the concept of *livability*. A group of

major foundations had agreed in the summer of 1999 to help move forward some the actions proposed in the last PCSD report. The initiative is called the *Livability Campaign*. The proposed Rural Sustainable Development Network is now called the *Rural Livability Project*. Our informants within the federal agencies commented that, the Administration felt that there was considerable hostility towards anything environmental (from the Republican congress especially), while there was insufficient support from any constituency powerful enough to get legislation passed or to get the Vice President elected. Hence a strong environmental agenda would most likely become an election obstacle, but was not likely to become a source of campaign strength. Thus, projects were reframed around "quality of life" issues, in hopes of attracting suburban constituencies, who are perceived to be substantially more powerful than environmentalists.

We believe that cases like the PCSD and U.S. recycling practices challenge two of the major tenets of ecological modernization theory: (1) that the environment has been emancipated from the economic sphere, and (2) that the environmental movement is a major political force. Neither of these claims holds up in the current U.S. administration, as environmental policy-making has continued to be written within an economic framework, and participation of environmental organizations continues to be open to constant political challenge. In a recent empirical assessment, Daynes states, "Even though it was clear that Bill Clinton was quite serious about the environment and quite unafraid to confront the most controversial issues, the 'politics of the moment' frequently interfered with the administration's environmental focus" (1999:265). Daynes goes on to argue that the political opposition to anything that disrupts private sectors actors and their agendas has been too great for the administration to combat, especially in the aftermath of 1994 mid-term elections. He concludes that "the roles most commonly used (by the President to

push for environmental reforms) were the roles that are traditionally the weakest (1999:300).

We find that the treadmill model has much more explanatory power with regard to the above dynamics. Specifically, the treadmill is premised on the argument that the major motives behind environmental policy-making are economic. The environmental movement -- similarly to other use-value oriented social movements -- is instead competing in a fierce struggle against powerful actors, whose biased political and social agendas exclude most ecological and social goals.

IV. The "Only" Perspective of the Treadmill, versus the "Fully" Perspective of Ecological Modernization

In a 1994 book (Schnaiberg & Gould), we outlined an evaluation problem that is inherently political, and one that will perhaps help us understand the differences between the treadmill and ecological modernization theories in viewing the modern "environmental state". Briefly put, our argument was that there are two ways of evaluating any change in state (or firm) actions. One uses the *past* as a guide, and sees any positive change as "fully" moving from a negative past to a more-positive present. The other sees "only" a limited amount of change, comparing the present status to a *future* goal to be desired.

From the latter perspective, the state has actively or passively permitted the treadmill to achieve its current practices, which are inherently unsustainable on both ecological and social dimensions. Unsustainability is an outcome of this current economic and political arrangement (Schnaiberg 1980, 1982, 1986a 1994; Schnaiberg & Gould 1994; Gould, Weinberg & Schnaiberg 1993; Weinberg 1995; Weinberg & Gould 1993; Gould, Schnaiberg & Weinberg 1996; Pellow 1994). In terms of the criterion for "the environmental state" outlined above, it is clear that we have "only" moved in very small increments towards this goal, of making economic considerations on a parity with ecological protection.

Conversely, from the standpoint of some ecological modernization theorists, firms (under pressures or encouragements from their states and NGOs) have moved "fully" beyond their earlier dismissal of ecological costs of their profitable activities. The firms now take **some** ecological factors into some account in **some** of their planning and activities. Moreover, since the state has, over the past 25 years, incorporated **some** consideration of ecological outcomes for **some** economic policies, there has been "fully" some movement away from a strictly *economic synthesis* of the societal-environmental dialectic (Schnaiberg 1980, Schnaiberg & Gould 1994).

Tacitly or explicitly, some of these arguments by ecological modernization theorists seem to suggest that, **if** this ecological modernization is permitted to continue, we will achieve some ideal sustainable end-state. But, they argue, this will occur through processes of supra-industrialization, not through processes of de-industrialization (as some environmental movements share with treadmill analysts such as us). Ecological modernist theorists argue that states should encourage these forms of super-industrialization, to delink natural resources from economic development. We think this is an unlikely trajectory, as we argue in the closing section.

V. Assessing Ecological Change from within the Economic State

Our analysis of the role of the state within the treadmill stresses the typical practices of economic organizations, their autonomy relative to the state, and their regulation by the state. Governments have (until the recent growth spurt) been increasingly restricted by policies promulgated by coalitions driven by reproducing the treadmill. As a result, ever more profitable corporations are now "generously" endowing local governments, schools and universities, and public broadcasting with "public support" ranging from motor vehicles to environmental curriculum. And also as a result, government regulation is increasingly curtailed around many environmental policies.

For example, Weinberg (1994) presented findings about how weakly the Illinois government supported citizen access to toxic substance data that the state collected under the Community Right to Know provisions of the Superfund Amendments and Reauthorization Act of 1986. Attending the session was a sociologist who worked for the Illinois Environmental Protection Agency -- who affirmed Weinberg's findings. Moreover, he noted that, although the agency was mandated to receive these corporate toxic waste inventory statements, there were no personnel assigned to do anything to help communities get access to and understand these technical documents. Since firms understood this *de facto* unregulated situation, they were under few constraints in preparing these documents, and relatively few constraints in handling their toxic waste by-products. Thus, Kirsch finds in his work in Massachusetts that "establishing the State Department of Environmental Quality Engineering had the opposite effect of its creators' intentions. Instead of providing an umbrella that could monitor industrial effects on the environment, the agency tied up complaints regarding potential hazards. There was no direct monitoring of the environment" (1998:108-9).

ALLAN START HERE: One critique of this type of analysis was voiced by a reviewer of this paper who noted:

"This kind of analysis needs greater sensitivity to the particular kinds of social relations and practices which constitute different societies. Just because the economy makes a systematic mess of the U.S. environment (supported by government) this does not mean that there is a law guaranteeing the same process and outcomes in all societies. It does not mean that the same will occur in all affluent societies. Germany and Holland are completely different cup of tea from the U.S. What Schnaiberg et al have detected is a general tendency (Marx's second contradiction) but the particular conjunctures of particular societies will determine how, and perhaps even whether, these work out in different societies."

Theoretically, we agree. The model of the treadmill is a model of social organization. Should societies come to be organized differently, we could imagine very different outcomes. Hugh Stretton's made this point very clear when outlined three different trajectories from the early 1970s political economy and the differing social and ecological outcomes (1976). In fact, the metaphor of the treadmill is meant to suggest that the problem

is neither capitalism, technology or large organizations, but rather the embedded logic of the current form of social organization.

The question is not could we change current forms of social organization. Hampden-Turner and Trompenaar outline seven different forms of capitalism (1993). Likewise, in our recent book, we articulate ways that this could occur (Weinberg et al 2000, chapter 7-8). Rather the question is what sorts of changes in social organization are likely to occur given current distributions of motives and means to act on motives. We believe that current data suggest that the United States is most likely to use global financial markets to force other countries to adopt treadmill forms of capitalism. The most clear statement came Bryan and Farrell (1996), two researchers for the consulting firm of McKinsey & Company. They state, “the ability of a single national government to control its own financial system is being undermined by the growing power of the global capital market” (1996:8). They go on to state that the implication for governments will be to forced to cut entitlement programs and other regulatory policies (1996, see chapters 1-2). A more recent piece comes from Richard Longworth, who outlines quite clearly the differences between American and our European forms of capitalism. Again, he documents how the trends suggest that American style capitalism (the treadmill) is forcing the Europeans to abandon social and ecological criteria (1998).

The same reviewer noted that our analysis has the danger of us talking past ecological modernization theorists. To prevent this, we frame the rest of this paper in direct dialogue with our colleagues.

Why do our treadmill analyses seem to differ so broadly from those of ecological modernists? Part of the answer is a methodological one -- the differences lie in (1) sampling approaches, and (2) projections for future change. We will touch on these next.

1. Sampling Differences

The tendency for EM theorists is to sample "best practice" industries. This makes sense given the research orientation, which is to look for change and try to theorize the processes and significance. However, it makes it hard to distinguish between an "epidemic of reports" and a "report of an epidemic" of EM transformations. We experienced a similar example of purported innovations in community energy policies while serving on a National Research Council panel (Stern & Aronson 1984). The panel was initially informed about "hundreds of communities" that had innovated to reduce energy use after the "oil crises" of the 1970s. Later, we discovered that there had only been two such communities -- Davis, California, and Seattle, Washington -- but that their "success" generated hundreds of media and scientific reports. Ironically, even for these two communities, there had been little evaluation of how these changes affected social distributional features of the cities.

This gives us further pause when we consider that EM may actually be a substitute for governmental attention to other dimensions of sustainable development -- e.g., corporate innovations may have been paid for by regressive taxes on employees and/or communities in which the companies are embedded. Numerous public sector and private sector conferences are organized and task forces convened to extol the increased "greening" of production. But such developments are more cost-effective than capital-intensive changes of production technologies, and still cheaper than maintaining both social equity and environmental protection, as sustainable development practices are intended to do. Our experiences with the President's Council for Sustainable Development affirm this. While the participants were actively engaged in seeking sustainable development, the Council itself was a political shadow play, "designed in part to boost the visibility of the Vice-President and presidential candidate Albert Gore -- and it is now defunct.

Furthermore, the units being sampled may be inappropriate for the broader inferences of ecological modernization. For example, the apparent "decoupling" of economic development from energy consumption and other natural resource inputs may be misleading. The relocation of ever more industrial production abroad under globalization,

while retaining profits in industrial countries, may separate ecological and economic outcomes of firms as **geographic networks** of production.

Moreover, firms may be increasingly outsourcing much of the negative aspects of production. Firms may have different roles within **commodity chains**, in which material transformations are tracked from initial ecological resources to final products and wastes. Thus, for example, recycling programs in cities are actually the outcomes of decisions made by container producers, consumer product manufacturers, and their trade associations.

2. Problems with Projections from "Best Cases"

In some ways, EM examines the "cutting edge" of changes in corporate structure. It assumes that these changes will **eventually** diffuse into other corporate entities and actions. But instead, EM cases may simply represent a "creaming" of a program of ecological incorporation into production practices. This concept arose in projecting early rates of success in public programs. Initially, many innovative public programs have a high and positive selection rate. But this means that the early period has "creamed" or culled from the potential population of adopters. The remainder of the population has been negatively selected, to eschew the program. Thus, the early adoption rates will not be sustained by later groups encountering the program. Indeed, it is not yet clear whether enough time has elapsed so that EM cases have had a time series of evaluations, to examine whether early changes in the same firms had been institutionalized, in changing market conditions. Our recycling study was carried out in that arena of change, precisely because at least a decade had elapsed since communities had been incorporating recycling practices. Thus we could see whether these changes, even if once **attained**, could be **sustained**. And indeed, we found that many were not sustained even for a decade (Weinberg, Pellow and Schnaiberg 2000).

3. The Conditional Nature of Projections of Future Changes

Even where we find change, we believe the treadmill to be a more persuasive model of the political economy of environmental problems and protection. Firms continue to push for higher profit margins to the neglect of both social equity and ecological concerns. Those firms that do make ecological improvements fall into one or more of the following categories: (1) firms were forced by regulation or social movement action to make improvements; (2) they made improvements only when their economic bottom line would be secure; or (3) they achieved the *appearance* of improvements through creative accounting or misreporting. Ecological modernization theorists tend to view such "improvements" as evidence that environmentalists are a powerful 'third force' in negotiating these changes (Mol 1999), and as part of a trajectory toward an end state of sustainability. We challenge both of these claims. We find that economic criteria remain at the *foundation* of decision making processes. Further, the state also shares this orientation, despite its own political interests, and often cedes a great deal of power to private sector actors. Thus, we believe that political economy models in general, and the Treadmill in particular, continue to have strong explanatory power with their starting assumptions conflict and politics, and the general dynamics of capitalism.

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¹ Schnaiberg's earliest work (1973) delved into the components of the "environmental movement". He identified four different forms of environmental groups: cosmetologists, meliorists, reformers, and radicals. Each of the groups perceived the causes of environmental problems in quite different ways. The groups also differed in their views of the severity of environmental problems. Thus, they offered quite different remedies for *environmental protection*.

² There is an emerging case study literature on this topic, as it played itself out in the United States in the 1970s and 1980s. Thus, Dudley (1994) documents how Chrysler closed its Kenosha plant, even when workers had the highest productivity rate of any facility, so that jobs could be transferred to higher technology facilities that required fewer workers. Wellin's (1997) study was a particularly informative ethnography of a food manufacturer undergoing automation. Workers shared their special knowledge of intricate production processes with management, with a promise that they would share in the increased profits associated with rising productivity. At the end of this cycle, a small share of workers did indeed gain new positions in the control of operations, but the bulk of workers found themselves in more deskilled positions, with a net loss of status (see also Besser 1996; Kirsch 1998).

³ This was clearly true under Reagan and Bush, who had a Council on Competitiveness to ensure that no policy would negatively impact economic opportunities (Daynes 1999). Under Clinton, many environmentalists assumed this would change. The Council was abolished by Executive Order. However, economic criteria have continued to dominate policy decisions. Even the Council on Environmental Quality (CEQ), which was supposed to be one of the main vehicles to roll back the Reagan assault has continued to decline and its role in policy making is minimal at best (Soden and Steel 1999:332).

⁴ Two of the authors (Weinberg and Pellow) were active in the PCSD, serving as Task Force members. Additionally, Weinberg helped prepare papers, meetings, and reports. The information in this paper derives from their experiences with the PCSD.

Treadmill of production theory offers a perspective for understanding the relationship between modern social institutions and environmental sustainability. We use this approach to analyze North Carolina's Coastal Resource Commission (CRC), a state agency charged with overseeing economic development and environmental concerns on the coast. Findings indicate that the CRC continually developed policies and fashioned regulatory decisions that favored economic growth over environmental protection. Importantly, the CRC failed to prepare for the long-term effects of climate change, such as sea-level rise. Our analysis extends the treadmill of production perspective through a deeper engagement with Marxian state theorists. "The Treadmill of Production: An Appreciation, Assessment and Agenda for Research." *Organization & Environment* 17:323-336. Gould, Kenneth A., Allan Schnaiberg David N. Pellow. 2004. "Interrogating the Treadmill of Production: Everything You Wanted to Know about the Treadmill but Were Afraid to Ask." *Organization Environment* 17:296-316. "Environmental Justice and the Political Process: Movements, Corporations, and the State." *The Sociological Quarterly* 42. Pellow, David N. 2002. Environmental Management reading practice test has 15 questions belongs to the Nature & Environment subject. In total 15 questions, 9 questions are Matching Headings form, 6 questions are Sentence Completion form. It shapes a third of the planet's land area, not counting Antarctica, and the proportion is rising. World food output per head has risen by 4 per cent between the 1970s and 1980s mainly as a result of increases in yields from land already in cultivation, but also because more land has been brought under the plough. Higher yields have been achieved by increased irrigation, better crop breeding, and a doubling in the use of pesticides and chemical fertilisers in the 1970s and 1980s. Section C. All these activities may have damaging environmental impacts. The treadmill of production framework organizes environmental destruction (or, ecological disorganization) into ecological withdrawals (i.e. the removal of resources from nature) and ecological additions (i.e. pollution). We review green criminological work in these two areas. We next provide an overview of research that links the traditional criminological perspective, social disorganization, to green crimes. We then turn to a discussion of how the treadmill of production impacts nonhuman species. We finish our review of political economic green criminology with some thoughts on the role of n