

***Sustainable Development and the Treadmill of Production\****

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## *Sustainable Development and the Treadmill of Production\**

### **A. FROM THE TREADMILL TO SUSTAINABLE DEVELOPMENT: WHAT IS THE ACTUAL DRIVING FORCE FOR CHANGE?**

The *treadmill of production* (Schnaiberg 1980; Schnaiberg & Gould 1994) is a social system that has institutionalized economic growth as a national and transnational goal. It has elsewhere been characterized as "Fordist" (Lipietz 1987), or "economic nationalism" (Reich 1991), or "rationalization" (Murphy 1994). The *economic* component of this political-economic system has the publicly-stated goal of expanding industrial production and economic development, as well as concomitantly increasing consumption. The *political* component of this system has a public confluence of interests among private capital, labor, and governments in promoting this expansion. An increasingly widespread social belief has been that advances in public welfare are achieved primarily through economic growth. Treadmill interests are manifest in private investments in fixed capital, in public institutions developed by the state to facilitate economic growth, and the orientation of organized (and non-organized) labor toward these investments and institutions (Barnet & Cavanagh 1994; Schnaiberg & Gould 1994). Treadmill production uses fiscal capital to substitute more controllable physical technologies for more refractory human labor. In turn, such technologies have required the increased use of ecosystems as reliable feedstocks for production and as available sinks for industrial wastes.

Environmentalists see the treadmill is seen as an **unsustainable** political-economic system (Schnaiberg & Gould 1994). It threatens rural biodiversity, as well as other ecosystems within urban and suburban environments of industrial and industrializing societies. Moreover, by increasingly using the "low road" of development in the modern era of transnational competition, it has displaced and impoverished many

stable working classes and subsistence agricultural groups as Harrison (1994: 213) argues:

"managers try to beat out the competition by cheapening labor costs. They move whatever operations they can to low-wage rural areas or to Third World countries. They scrimp on training. They routinely outsource work to independent contractors who will not...pay decent wages, let alone provide basic benefits..[They] try to squeeze the last ounce out of older capital equipment... At the last extreme, a company that once made its own products, using domestic workers and paying them a living wage, now hollows itself out...to become...an importer of things made by foreign companies -- or by their overseas subsidiaries."

Many treadmill actors are likely to offer substantial resistance to social policies that will actually promote genuinely-sustainable development. The latter must perforce restrict some forms of contemporary technological and labor organization (Redclift 1984, 1986, 1987) -- in order to preserve natural resources for future generations.

I evaluate the history of responses to two earlier proposals for changes in the treadmill, to see whether the optimism of sustainable development proponents is justified. Fritz Schumacher (1973) proposed new forms of economic and social "reengineering" for both Northern and Southern societies, built upon principles he termed "Buddhist economics". Some of Schumacher's proposals were actually implemented in selected Southern localities, through his Institutes for Intermediate Technology in some localities and for some purposes (Schnaiberg & Gould 1994: chs. 7-8). But in no society was a major share of production altered towards his proposal.

A second set of similar theorizing is focused on corporate restructuring -- ecological modernization or industrial ecology (Graedel & Allenby 1995; Socolow 1994; Tibbs 1993a,b). It attempts to project from modest recent changes in actual corporate practices within industrial societies towards a major restructuring of production (cf.

Schnaiberg 1993b). Once again, we can point to some examples of ecological modernization that have some promise for reducing ecological degradation, without seeing major restructuring of treadmill goals and means (Schnaiberg 1993b).

In doing these evaluations, I follow the outline of Hugh Stretton (1976). He outlined some socially and politically realistic scenarios about how a material "levelling down" might take place under different political and social conditions. His mixture of social coercions and seductions traced difficult policy choices between national growth, environmental protection and social equity in industrial societies of the European Union. In contrast, many contemporary EU proponents of sustainable development envisage attaining all three goals. In the final part of the chapter, I offer a brief historical account of post-consumer waste recycling programs, since they appear to represent this integrated effort of the state, industry and labor (European Community 1993: ch. 8). Recycling appears to capture many of the elements of sustainability and subsidiarity in the EU -- working at the lowest level of government operation possible. Yet recycling has also been strongly influenced by treadmill institutions (Schnaiberg 1992a,b, 1993a).

## **B. INTERMEDIATE TECHNOLOGY: A HISTORICAL PRECURSOR OF SUSTAINABLE DEVELOPMENT?**

E.F. ("Fritz")Schumacher was a unique role model: a Northern manager of the European Coal Community, he had also worked in the South, on development projects. His concept of "appropriate" technology (1973) was built on Buddhist economic principles ["achieve the most social gain with the least material input"]. What makes AT or its institutionalized form of intermediate technology [IT] so valuable as a comparison to sustainable development is that drew favorable attention in both North and South, among citizens, politicians, and even some private sector agents of the treadmill. Interestingly, like sustainable development, appropriate technology generated little overt political resistance (Dickson 1975; Gould 1987; Schnaiberg 1982, 1983a,b).

When we look at the achievements of AT some twenty years later, there are some AT projects . But there are few sustained AT programs of change, in either the North or the South (Reddy 1979). "Appropriateness" of technology, as projects were created in the South through Institutes for Intermediate Technology, gradually became disconnected from the Buddhist economics. In practice, AT became translated into being intermediate between existing traditional labor-intensive production and highly capital-intensive treadmill-type production (UNIDO 1979). The term "intermediate" provided useful ambiguity for operationalizing Schumacher's goals. For the continuum between traditional labor-intensity and the pinnacle of capital- and energy-intensity is a large and elastic one, with few clear criteria to measure success. Likewise, IT moved from Schumacher's social emphasis on relations of production, and an ecological emphasis on "peace and permanence". As applied, it became transformed into a much narrower technical concept of the "right" technology for the local mix of labor, natural resources, and the local or extralocal sources of capital (Gould 1987; Leonard et al. 1989).

Why did AT not develop into broader *programs* ? Mostly the projects had one of the following trajectories (Schnaiberg & Gould 1994: ch. 8):

- if successful in expanding their markets beyond marginal clientele, they were incorporated into treadmill firms,
- if dealing only with marginal workers, they have uncertain funding, local ambivalence and mistrust, and erratic performances ,
- political support, necessary to ensure local mobilization and protection from treadmill interventions (including sabotage and rapacious competition), was erratic, because of the lack of an established party and sustained political constituency for it [e.g. Higgins & Lutzenhiser 1993]
- where projects were sustained, they seem to fit one of two conditions:
  - they had been incorporated as a technology in a larger treadmill entity
  - they met some local basic needs that other treadmill firms found too costly

or inefficient to meet

Thus, AT/IT moved quickly from very positive "words" about an alternative to the treadmill as a means of solving "the problem of production". Instead, it created a proliferation of small scale "deeds" to achieve this lofty goal (Frahm & Buttel 1992). These projects never seriously challenged the treadmill for any length of time. They were either incorporated (and thereby transformed into treadmill principles, using other technologies), crushed through competition, or allowed to operate as a supplement to the treadmill, serving low-income and low-skill citizen-workers. In none of these circumstances were they expanded to be a *competitor system challenging the treadmill*. Mostly, in Redclift's (1984) terms, they were often neither very "red" [having progressive relations of production] nor very "green" [having technologies with low ecological withdrawals and/or additions].

Equally important, during the periods of expanding, stagnating and declining AT/IT, there was rarely overt political opposition by treadmill agents (corporate and state). Most of their actions were "backstage" political ones (including scientific and technological arguments -- e.g. Schnaiberg 1977), or quiet market transactions (incorporating or crushing e.g., Schnaiberg 1975). So AT/IT had a historical trajectory of "noisily positive words" and "quietly negative deeds" (Gould et al., 1993; Schnaiberg & Gould 1994: chs. 8-9).

### **C. INDUSTRIAL ECOLOGY & ECOLOGICAL MODERNIZATION: CURRENT PRACTICES & FUTURE PROJECTIONS**

Tibbs (1993a) outlined, following some of the earlier work of Ayres (1989), a model of *industrial ecology* (Graedel & Allenby 1995; Socolow et al. 1994), also called "ecological modernization". Industrial ecology is a form of re-engineering to reduce the environmental disruption generated by treadmill production. Before a sociological audience, Tibbs articulated a broader "hierarchy" of social needs, including social functioning" and "personal actualization". Yet he also suggested that (1993b:13):

"Designs that meet, say, only basic technical criteria may well be effective over the short run. It is only when such partial solutions are deployed extensively for long periods that their environmental and other shortcomings threaten 'unsustainability'."

This poses two immediate problems. First, treadmill organizations have increasingly been operating in the short run, even while becoming more spatially dispersed (Barnet & Cavanagh 1994). Second, treadmill agents have exerted considerable effort to diminish public sensitivity to the negative environmental and social externalities of treadmill production (Murphy 1994; Schnaiberg 1994). Tibbs (1993a) offered a number of examples of the recent greening of particular corporations, as testimony of the potential for a future widespread industrial ecology and the immanence of a socioenvironmental decision hierarchy (1993b: 13ff). His premise is that these examples were either

- (1) evidence of a widespread historical turnabout, representing a new corporate interest in longer-term ecological protection, and/or
- (2) evidence that, under certain favorable conditions, corporations can and will adopt a "green" perspective.

The "greening" of corporations such as those cited by Tibbs, appears to be more a social construction put upon disparate corporate activities and motives. Most of the effects of environmentalism were mediated through standard treadmill parameters, which always influence decision-making about "technical operations" for managers (Schnaiberg & Gould 1994: ch. 3). Exceptions exist in some European Union societies with stronger communal values, and in smaller, privately-held businesses. Private owners may be resident in their communities of operation, rather than absentee; they may thus value their local environments, and they may have enduring relationships to their community of operations (Schnaiberg & Gould 1994: chs.3-4; ). Overall, there is little evidence of universal internalization of negative externalities, through "getting the prices right" (EC 1993). Managers have increasingly had to confront the realities of increasing transnational competitiveness, which has in turn pressured them to externalize as many waste processes as possible (Murphy 1994).

Ironically, one widely-used case study offered by Tibbs, of Asnaes in Denmark, is precisely a deviant corporate case, since it worked through "*geographically close participants*" [1993a:11], and it is built around issues of *local* water conservation. The complex Tibbs (1993a) describes was an impressive illustration of what is possible under such conditions (and in a particular **kind** of society). Another case of Tibbs was that of General Motors, whose "industrial ecosystem" recycled platinum. This too fits the more dominant treadmill and technical operation decisional model, since "the high value of platinum was obviously an important factor" [1993a: 12].

In contrast, his report of "dematerialization" by electrical utilities [1993a: 18] through conservation programs obscures the fact that these programs were primarily reactions to environmental movements. Political movements prevented the expansion of nuclear generating facilities in the 1970s and 1980s, through raising their political and economic costs. Citizen and scientific coalitions arose because of health fears (exacerbated by the Three Mile Island shutdown in 1979, and the Chernobyl disaster in 1986). The actual history of the 1965-93 period was one of intense political conflict between the Edison Electric Institute and its members, on the one hand, and environmental movements, on the other.

One final illustration in Tibbs was that of Minnesota Mining and Manufacturing [1993b:20]. Alone among the examples Tibbs offered, this is a rather hopeful scenario for moving from the treadmill into industrial ecology and eventually, into sustainable development. 3M has been an industry leader in energy consumption control, introducing van pools well before the small number of other corporate adopters. Perhaps the concentration of a highly-skilled labor force, a relatively "clean" and homogenous community (Minneapolis), and a long tradition of *local* (as well as national) social investment helped drive their anti-pollution drive. But even here, their corporate slogan was that "Pollution Prevention Pays", another treadmill bottom line. Moreover, during the period in which the 3M program was introduced, both the Toxic Substances Control Act (TSCA) and the Resource Conservation and Recovery Act (RCRA) were created, to control many of the kinds of effluents that 3M generated (Landy et al. 1990; Szasz 1994). Therefore, 3M can be seen at least equally as *reactive* to government regulations, as well as *asproactive* with regard to citizen inputs. Optimists see such examples as a new "greening" of corporations, but other corporate analysts remain more cautious:

"Questioning today's win-win rhetoric is akin to arguing against motherhood and apple pie. After all, the idea that environmental initiatives will systematically increase profitability has tremendous appeal. Unfortunately, this popular idea is also unrealistic. Responding to environmental challenges has always been a costly and complicated proposition for managers." [Walley & Whitehead 1994:46]

"For all environmental issues, shareholder value, rather than compliance, emissions, or costs, is the critical unifying metric. That approach is environmentally sound, but it's also hardheaded, informed by business experience, and as a result, is much more likely to be *truly* sustainable over the long run." [Walley & Whitehead 1994: 52; emphasis in the original]

To offer a more dynamic view of sustainable development paths, I outline next the arena of **waste recycling**. My collegus and I have studied this in the United States over nearly a decade (Gould et al. 1996; Pellow et al. 1996; Schnaiberg 1992a,b, 1993b; Weinberg et al. 1995; Weinberg et al. 1996) tracing both the social and environmental outcomes of recycling.

#### **D. RECYCLING REFORMS AND RESISTANCES: HARBINGER OF SUSTAINABLE DEVELOPMENT?**

Recycling is a recent local "environmental" response to national problems of solid waste treatment. Post-consumer waste recycling has become widely diffused in U.S. cities and suburbs, and increasingly, in the European Union, especially in Germany (The Economist 1991; Swanson 1991a; McCarthy 1991; Fishbein 1992). For some U.S. analysts, it represents a sociopolitical ideal for solving "environmental problems", through "thinking globally and acting locally". They see local government agencies, environmental movement organizations, and large-scale capital owners as negotiating a mutually acceptable alternative to solid waste disposal through burial in landfills, or through incineration (cf. Moberg 1991). In the context of this volume, it seems valuable to examine such recycling approaches as potentially exemplifying some early stages of

sustainable development. Among other values of the recycling example, I would note its unusually neo-corporatist character within the United States. While the U.S. is generally viewed as a non-corporatist society, with little coordination between the state, major capital actors, and other social institutions, recycling offers an apparent counter-example.

One set of U.S. opinions envisage recycling as an environmental policy, preserving resources for future generations, as **reforms of the treadmill**. Their arguments suggest that use-value concerns, supported by citizen-activists and the state through recycling policy, are coming to have relatively more influence than current exchange-value interests have over the forces of production. We could thus argue that these can be seen as empirical instances of Stretton's (1976) social scenario of "second chances", whereby the health of communities is maintained despite ecological contractions.

A second set of statements suggest more tensions within recycling programs. These ideologies and interests represent the interaction among environmental movements. We might see these as **reforms within the treadmill**, which Stretton's (1976) social scenarios labelled as "business as usual", or "the rich rob the poor", under stringent regulation over ecosystem access. These statements offer us a **dynamic** view of recycling processes during the past decade. During this period, curbside recycling has expanded to over 4000 communities in the U.S., as well as to institutional recycling programs, yet exchange-value interests have reasserted more influence over recycling programs. Recycling thus affords us an opportunity for testing the validity of the several social models for SD attainment. This is because it has been around long enough in some industrial societies for us to trace its trajectory. Most of the literature on American and European recycling has been largely dealing with the forces of production -- recycling technologies for converting wastes into remanufactured products. In addition, it has emphasized the economic dimensions of such technologies, and the political role that the state can play in regulating some of these processes. For me, these ongoing technical and political debates are especially noteworthy. We can examine the

underlying social relationships and market transactions in this example that may lead us to understand more about possible social trajectories towards sustainable development. Indeed, we can trace the changes from the initiation of recycling in the mid-1980s, to the sustaining relationships and transactions in the period since then.

### **E. RECYCLING: TREADMILL OR SUSTAINABLE DEVELOPMENT PRACTICES?**

#### **1. "Getting The Price Right" vs. "Getting The Right Materials"**

In the EC document on sustainability, "**getting the price right**" is the key policy instrument, as it was in the corresponding U.S. National Commission on the Environment (1993). However, such a process of internalization of negative environmental and social externalities has almost never been evident in the deeds or practices around recycling policies in the U.S. Indeed, as I note below, the majority of U.S. discussions around recycling tends to keep this approach off the policy agenda (Bachrach & Baratz 1973). Instead, they reinforce the view that recycling programs need to focus on "**getting the right materials**". This is best characterized by Stretton's (1976) scenario of "business as usual". My assessment is based on analyses we have done on U.S. post-consumer waste recycling programs (Schnaiberg 1992a,b, 1993b; Pellow et al. 1996; Weinberg et al. 1995, 1996). There, we found that the actual deeds of recycling-remanufacturing offer very little internalization of negative environmental and social externalities.

Since the inception of local curbside recycling programs in the mid and late 1980s, public and private agencies have been gathering more and more post-consumer wastes. These have been separated in a variety of ways -- ranging from the consumers separating them, to local and regional Materials Recovery Facilities (MRFs). MRFs use a combination of newer physical technologies, as well as hand sorting, to separate components of the gathered waste stocks. The latter are sorted into two primary categories: the recyclables, and the non-recyclables. Recent estimates suggest that, overall, some 20% at least of the waste gathered by public agencies are non-recyclable.

Such rejected materials are either incinerated, or placed in landfills, rather than "closing the loop" between consumption of and production from waste materials. For many community-based programs, moreover, an even larger proportion of the materials gathered are never transformed into remanufactured products. This is because there are no organizations that can "economically" recycle these wastes.

"Recycling is manufacturing, and manufacturing is business, not disposal....Some practitioners think of market development simply as local business promotion. Others see it as the progressive restructuring of the world economy to fully accommodate recycling. It is, of course, both....The ultimate goal in market development is to increase investment in industry's capacity to recycle. Goals such as getting municipal suppliers together with reliable consumers end up becoming secondary to questions like 'did companies financially commit to building new plants?'" (Kacandes 1991: 53)

Finally, when there was insufficient demand for products remanufactured from waste materials, markets become glutted and materials are not sellable by municipalities, or were sold for a small fraction of the costs of gathering and separating them. When markets have improved recently (Bishop 1991; Morris & Dickey 1991; Holusha 1994), moreover, they have done so because of new corporate remanufacturing investments and anticipated returns, rather than because of new corporate environmental goals.

Paradoxically, much "green marketing" encouraged consumers to recycle their packaging, quite independently of the MRF selection processes. This created a collection glut, because of rising citizen "recycling participation levels", on the one hand, and higher MRF selectivity due to declining market prices for many recyclable materials (Bishop 1991). In either case, municipalities and other private sector actors increasingly became focussed on **getting the right materials**, in contrast with the EC principle of **getting the prices right**.

## 2. "Closing the Loop": Economic Transactions vs. Sociopolitical Relations

State agencies in the U.S. and Europe have become involved in operating increasingly-costly recycling programs. Their legislative arms have also come under increasing pressures from environmental movements, who have been monitoring the rather limited remanufacturing from waste materials. New attempts have been made to "**get the right regulations**", in order to control at least the quantities, and occasionally the prices of recyclable materials that are reutilized in remanufacturing operations (Morris & Dickey 1991; Beck & Grogan 1991; McCarthy 1991). In the United States, these regulations have been limited to specifying several criteria of minimal incorporation of both producer and post-consumer wastes in production (Beck & Grogan 1991). Conversely, in the European Union, especially in Germany, these mandates have been more extensive and intensive -- requiring both the maintenance of **reusable containers** and a timetable for absorbing all containers into some form of remanufacturing (Fishbein 1991; McCarthy 1991).

Interestingly, I note the relative absence of shadow pricing in recycling, which the EC (1993) notes is part of "getting the price right". Instead, the U.S. has relied on market pricing as a criterion for recycling-remanufacturing. Such reliance on market prices is rather unusual historically, in arenas of both social expenses and public works. Shadow prices have been used historically to embed citizen concerns (such as health, safety, or pollution) into a form of legitimizing public sector intervention into private sector markets. They "tilt" private **transactions** into greater conformity to the **relations** of citizens to these market agents and actions. Without such shadow price enforcement, therefore, the "sustainable development" policy of recycling is more influenced by treadmill institutions.

Within the U.S., the state role has often focussed on subsidies for remanufacturing. Local curbside programs, especially when they operate at a loss and

are underwritten by citizen taxation, are one such subsidy (Rabasca 1993). Others include tax credits or tax writeoffs for MRFs and remanufacturing plants, which have become more popular in less affluent U.S. communities, as one way of attracting high-tech remanufacturing facilities to supply jobs and taxes. Another way for communities to act is to commit local publics to gather a sufficient supply of wastes through community-subsidized programs. A final way is to also subsidize some local consumption of the remanufactured goods (Beck & Grogan 1991). Interestingly, within the U.S., such "minimum recycled content" laws have been increasing at the regional (but not the national) level. In contrast, there have been bolder EU interventions in the form of prohibitions, such as exclusions of materials, taxes on virgin products (Fishbein 1991; McCarthy 1991).

The primary agents supporting "getting the laws right" currently appear to be *moral and economic entrepreneurial* organizations. They seek to modify standard market operations, using the EC concept of subsidiarity to minimize substitution of extralocal regulation to replace local forces. In other work, we have explored the sharp limits of local enforcement of water pollution and toxic wastes, under similar principles of subsidiarity in North America (Gould et al. 1995, 1996; cf. Hawkins 1984). These attempts to change the current synthesis between citizen use-values and treadmill exchange-values, at an organizational level within local communities, need far more careful support than both the EC and U.S. policies of localism have offered to date .

Absent such relational forces, I note that the critical role in modern U.S. recycling relates to the physical technologies in remanufacturing and waste sorting. Conversely, there is little attention to the social relations of citizen-workers (and citizen-taxpayers) to both waste sorting and remanufacturing. Thus, little attention is currently paid to the quality of labor inputs to waste sorting and remanufacturing (including occupational hazards), other than to reduce transaction costs and increase profits by minimizing labor costs. Community development (a form of sustainable development) is rarely addressed

in most governmental recycling programs in the U.S. and the EU. This limits the social sustainability of recycling programs.

Moreover, there is much more complexity in the ecological impacts of recycling and remanufacturing. Remanufacturing involves some physical, chemical, and/or biological **manipulation** of recyclable materials. This produces both ecological additions or pollution, and energy and water inputs or withdrawals from ecosystems (Schnaiberg 1980, 1994). On the other hand, much of the existing remanufacturing processes and plants cannot operate with only recycled materials (Forman 1991). Physical, chemical and/or biological criteria for remanufacturing require some balancing of feedstock attributes. In all such instances, therefore, virgin materials must be added to the remanufacturing process. Such production requirements "opens the loop", requiring extraction of virgin materials to mix with recyclable material in remanufacturing. But such extraction of virgin materials has historically been associated with the destruction of habitat and/or species in the ecosystems (e.g., Rudel & Horowitz 1993).

Taken together, these two blind spots in current recycling programs make this contemporary innovation a rather limited exemplar for a *socioenvironmentally* - sustainable form of development (Weinberg et al. 1995, 1996). State agencies should be encouraged to include these aspects in their review of and regulation of remanufacturing. At the extreme, the strict model of closing the loop would also require each producer and citizen-consumer to both gather their wastes, and to purchase back the remanufactured products generated from their own wastes. At the opposite extreme, which is close to the operant current U.S. model, we have sets of actors motivated by exchange-value interests, who dominate the entire process, including the sociopolitical citizen inputs into legislation and gathering wastes. This tension is well articulated in Walley and Whitehead's cautions (1994: 47) about the "greening" of U.S. corporations:

"...Companies should seek to minimize the destruction of shareholder value that is likely to be caused by environmental costs rather than attempt to create value through environmental enhancements....In an area like the environment, which requires long-term commitment and cooperation, untempered idealism is a luxury. By focussing on the laudable but illusory goal of win-win solutions, corporations and policymakers are setting themselves up for a fall with shareholders and the public at large. Both constituencies will become cynical, disappointed, and uncooperative when the true costs of being green come to light. Companies are already beginning to question their public commitment to the environment, especially since such costly obligations often come at a time when many companies are undergoing dramatic expense restructuring and layoffs." [47]

Between these two extremes, we have the possibilities of creating a variety of new social and political situations:

"...the inquiry into the functioning of the market continued to be made in a manner which largely ignored the *social nature of the problem* ...New institutional economics looks at not only market coordination but also non-market coordination within and between enterprises, and also at the determinants of the scope of individual enterprises...Our theory of state intervention also suggests that there are *many possible types of state intervention* ...neither the market, nor the state, nor any other economic institution is perfect as a coordination mechanism...[T]his means that each country has to decide on the exact mix between the market, the state and other institutions...through a process of institutional learning and innovation." [Chang 1994: 131-136; emphasis mine]

David's (1988: 153) cautions about attaining and sustaining SD, first expressed around the time of the Brundtland report, still hold:

"The concept of sustainability can be interpreted in either a limited or a broad sense. From a narrow economic perspective, it is synonymous with wealth creation or economic growth... However, in a more holistic sense, sustainability is essentially linked to broader societal goals:..the requirements of sustainability and justice tend to coincide. This is related to the necessity of building durable social and economic structures, and of eliminating various forms of inequality."

## **REFERENCES**

Bachrach, P. & Baratz, M.

**1973** Power and Poverty: Theory and Practice. New York: Oxford University Press.

Barnet, Richard J. & Cavanagh, J.

**1994** Global Dreams: Imperial Corporations and the New World Order. New York: Simon & Schuster.

Beck, Patty and Pete Grogan

**1991** "Minimum content legislation: An effective market development tool." Resource Recycling, September: 90-99.

Bishop, Richard S.

**1991** "Defining the MRF..." Resource Recycling, October: 36-43.

Chang, Ha-Joon

**1994** The Political Economy of Industrial Policy. New York: St. Martin's Press.

David, Wilfred L.

**1988** Political Economy of Economic Policy: The Quest for Human Betterment. New York, Westport, CT, & London: Praeger Press.

Dickson, David

**1975** The Politics of Appropriate Technology. New York: Universe Books.

Economist, The

**1991** "Recycling: How to throw things away." The Economist, April 13: 17ff.

European Community

**1993** Toward Sustainability: A European Community Programme of Policy and Action

in Relation to the Environment and Sustainable Development. Luxembourg:  
Commission of the European Communities, D-G XI.

Fishbein, Bette K.

**1992** "European packaging initiatives leading the way on source reduction." Resource Recycling, March: 86-94.

Forman, Marty

**1991** "In my opinion...Plastics recycling: let's cut the bull." Resource Recycling  
May: 102-104.

Frahm, Annette M. & Fred S. Buttel

**1982** "Appropriate technology." Humboldt Journal of Social Relations 11: 11-37.

Gould, Kenneth A.

**1987** "The devolution of a concept: 'Appropriate' technology in a Third World context". Paper presented at the annual meetings of the Midwest Sociological Society, Chicago, March.

Gould, Kenneth A., Allan Schnaiberg, & Adam S. Weinberg

**1995** "Natural resource use in a transnational treadmill: International agreements, national citizenship practices, and sustainable development." Humboldt Journal of Social Relations 21 (1): 61-93.

**1996** Local Environmental Struggles: Citizen-Workers in the Treadmill of Production.

Forthcoming, Cambridge University Press.

Gould, Kenneth, Adam Weinberg, & Allan Schnaiberg

**1993** "Legitimizing impotence: Pyrrhic victories of the modern environmental movement." Qualitative Sociology, 16:207-246.

Graedel, T. E. and B.R. Allenby

**1995** Industrial Ecology. Englewood Cliffs, N.J. : Prentice Hall.

Harrison, Bennett

**1994** Lean and Mean: The Changing Landscape of Corporate Power in the Age of Flexibility. New York: BasicBooks.

Higgins, Lorie & Loren Lutzenhiser

**1995** "Ceremonial equity: Low-Income energy assistance and the failure of socio-environmental policy." Social Problems 42: 601-625

Holusha, John

**1994** "Rich market for business of recycling". New York Times, October 8: 1.

Kacandes, Tom

**1991** "Market development in New York: A report from the field". Resource Recycling, September: 53-60.

Landy, Marc K., M.J. Roberts, & S. R.Thomas

**1990** The Environmental Protection Agency: Asking the Wrong Questions. New York: Oxford University Press.

Leonard, H. Jeffrey et al.

**1989** Environment and the Poor: Development Strategies for a Common Agenda. New Brunswick: Transaction Books.

McCarthy, James E.

**1991** "Waste reduction and packaging in Europe." Resource Recycling, July: 56-63

Moberg, David

**1991** "Garbage: The city's blue-bag recycling program stinks." Chicago Reader, September 20: 1, 20-29.

Morris, Jeffrey and Lawrence W. Dickey

**1991** "Three 80s for the 90s will cut waste in half". Resource Recycling, March: 111-117.

Murphy, Raymond

**1994** Rationality and Nature: A Sociological Inquiry into a Changing Relationship.  
Boulder, San Francisco, & Oxford: Westview Press.

Pellow, David N., Allan Schnaiberg & Adam S. Weinberg

**1996** "Pragmatic corporate cultures: Insights from a recycling enterprise."  
Forthcoming, Green Management International.

Rabasca, Lisa

**1993** "Recycling in 1993 ebbs and flows." Waste Age's Recycling Times, December  
28: 1-12.

Redclift, Michael

**1984** Development and the Environmental Crisis: Red or Green Alternatives? New  
York: Methuen.

**1986** "Redefining the environmental 'crisis' in the South." Ch. 4 in Joe Weston,  
editor, Red and Green: The New Politics of the Environment. London: Pluto  
Press.

**1987** Sustainable Development: Exploring the Contradictions. New York: Methuen.

Reddy, Amulya Kumar N.

**1979** Technology, Development and the Environment: A Re-appraisal. New York:  
United Nations Environment Programme.

Reich, Robert

**1991** The Work of Nations: Preparing Ourselves for 21st Century Capitalism.  
New York: Alfred A. Knopf.

Rudel, Thomas K. & B Horowitz

**1993** Tropical Deforestation: Small Farmers and Land Clearing in the Ecuadorian  
Amazon. New York: Columbia University Press.

Schnaiberg, Allan

- 1980** The Environment: From Surplus to Scarcity. New York: Oxford University Press.
- 1982** "Did you ever meet a payroll?: Contradictions in the structure of the appropriate technology movement." Humboldt Journal of Social Relations 9 (2), (Spring/Summer): 38-62.
- 1983a** "Soft energy and hard labor?: Structural restraints on the transition to appropriate technology." in Technology and Social Change in Rural Areas, edited by Gene F. Summers. Boulder, CO: Westview Press.
- 1983b** "Redistributive goals versus distributive politics: Social equity limits in environmental and appropriate technology movements." Sociological Inquiry 53 (2/3), Spring: 200-219.
- 1992a** "Recycling vs. remanufacturing: Redistributive realities." Working paper WP-92-15, Center for Urban Affairs & Policy Research, Northwestern University, Spring.
- 1992b** "The recycling shell game: Multinational economic organization vs. local political ineffectuality." Working paper WP-92-16, Center for Urban Affairs & Policy Research, Northwestern University, Spring.
- 1993a** "Comments on Tibbs, *Industrial Ecology: An Environmental Agenda for Industry* and *The ethical management of global technology*." Paper prepared for the annual meetings of the American Sociological Association, Miami Beach, FL,
- 1993b** "Paradoxes and contradictions: A contextual framework for 'How I learned to reject recycling.'" Paper presented at the meetings of the American Sociological Association, Miami Beach, FL, August.

**1994** "The political economy of environmental problems: Consciousness, coordination,

and conflict." Advances in Human Ecology, edited by Lee Freese. Volume 3, pp. 23-64

Schnaiberg, Allan. & Kenneth A. Gould

**1994** Environment and Society: The Enduring Conflict. New York: St. Martin's Press.

Schumacher, E.F.

**1973** Small Is Beautiful: Economics as if People Mattered. New York: Harper & Row.

Socolow, Robert H. *et al.*, editors

**1994** Industrial Ecology and Global Change. Cambridge & New York : Cambridge University Press.

Stretton, Hugh

**1976** Capitalism, Socialism, and the Environment. Cambridge: Cambridge University Press.

Swanson, Stevenson

**1991** "Recycling grows into a way of life." Chicago Tribune, June 16: 1.1.

Szasz, Andrew

**1994** Ecopolitism: Toxic Waste and the Movement for Environmental Justice. Minneapolis & London: University of Minnesota Press.

Tibbs, Hardin

**1993a** Industrial Ecology: An Environmental Agenda for Industry. Emeryville, CA: Global Business Network.

**1993b** "The ethical management of global technology." Paper prepared for the annual meetings of the American Sociological Association, Miami Beach, FL, August.

U.N.I.D.O. [United Nations International Development Organization]

**1979** Monographs on Appropriate Industrial Technology. Nos. 3,4,6,8 and 9. New York: United Nations.

United States National Commission on the Environment

**1993** Choosing a Sustainable Future: A Report of the National Commission on the Environment. Washington DC & Covelo, CA: Island Press.

Walley, Noah & Bradley Whitehead

**1994** "It's not easy being green". Harvard Business Review May-June: 46-52.

Weinberg, Adam S., David N. Pellow & Allan Schnaiberg

**1996** "Sustainable development as a sociologically defensible concept: From foxes and rovers to citizen-workers." Forthcoming in Lee Freese, editor, Advances in Human Ecology. Volume 5.

Weinberg, Adam S., Allan Schnaiberg, & Kenneth A. Gould

**1995** "Recycling: Conserving resources or accelerating the treadmill of production?" Advances in Human Ecology, edited by Lee Freese. Volume 5: 173-205.

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