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The Greening of the Blue Collars

Tough-minded, hard-working American men, the kind who know how to strap a twelve-gauge shotgun onto the back of a pickup, could always count on a few magazines—*Sport Truck, Car and Driver,* and *Motor Trend,* for example—to stand up against doom-saying environmental and bureaucratic wimps. But in the same magazines that have long defended the oil and automotive industries against the likes of Ralph Nader and the Sierra Club, we now find a turn toward environmentalism.

The November 1989 issue of *Sport Truck,* for example, called on Detroit to provide technology that is friendly to the environment. "Even if performance has to be compromised by clean air legislation," an editorial conceded, "we're just going to have to bite the bullet. Because when our enthusiasm butts heads with our health, something has to give."

Car and Driver showed glimmerings of environmentalism even earlier than *Sport Truck.* For two decades the magazine railed against "safety twits," the Clean Air Act, "Eco-Fascists," endangered species programs, seat belts and air bags, speed limits, welfare cheats, and government regulations in general. In the November 1989 issue, however, columnist Brock Yates came out in favor of corporate average fuel-economy (CAFE) standards. "Like it or not," Yates wrote, "our beloved car is an irksome source of pollution, urban congestion, and excessive fossil-fuel consumption. Calls for an end to the CAFE standards—recently heard from no less an eminence than General Motors president Robert Stempel—seem selfish and simple-minded. I am no Greenpeacer, but I believe we face larger problems on this globe than the search for more horsepower-per-cubic-inch or the financial welfare of the auto industry."

In the August 1989 *Car and Driver,* William Jeannes, a columnist who historically echoed Yates's diatribes against environmental regulations, jumped on the bandwagon. "If you are concerned about planet Earth

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In This Issue

and the cars you drive on it,'' he wrote, ''you understand that an efficient automobile is one that...contributes as little carbon dioxide as possible to fuel the greenhouse effect.''

Of course, in supporting CAFE standards, *Car and Driver* did not lose all the old-time religion. It still fulminates volcanically against speed limits, air-bag and seatbelt requirements, and other government efforts to improve safety of any kind, especially highway safety. In the February 1989 issue, for example, Yates praised those Americans who will pick up a rifle before letting Big Brother tell them how fast they can drive their cars.

Why are environmental restrictions okay when all other regulations—especially safety regulations—remain anathema? How can anyone extol risk-taking and at the same time speak for the trees?

The obvious answer is that CAFE standards don't limit people's personal freedom to drive as they like. Rather, these standards seek to protect nature from pollution and, perhaps, to make America less dependent on the OPEC cartel. Accordingly, *Car and Driver*, in calling for tougher CAFE standards, does not necessarily endorse safety regulations, but supports Mother Nature, nationalism, patriotism, and so on.

About the time *Car and Driver* announced for the global environment, the London *Economist* cited a speech by Margaret Thatcher ''that marked her conversion from Iron Lady to Green Goddess.'' Thatcher, the magazine added, was scarcely alone: ''Hard on her heels trod Mikhail Gorbachev, who made the environment a theme of an address to the United Nations; George Bush, who built part of his election campaign on a promise to clean up America; and the EEC Commission, trying to outdo its member governments in greenery. Never have so many politicians seized so quickly on one idea.''

The Shift in Public Opinion

Politicians, according to the *Economist*, are responding to an extraordinary shift in public opinion, apparent all over the world. Public opinion polls amply document this trend in the United States. A *New York Times*-CBS poll in June 1989 found 80 percent of those polled agreed while only 14 percent disagreed with the statement: ''Protecting the environment is so important that requirements and standards cannot be too high, and continuing environmental improvements must be made at all costs.'' These results show a dramatic increase since 1981, when yeas and nays were nearly equal. Gallup polls and Roper and Cambridge Research Studies all show the same shift in public opinion.

What may strike us as surprising about the rush of politicians to the environment is that they need not (and often do not) change their other political colors when they paint themselves green. A conservative, for example, may defend the environment without becoming more liberal with respect to, say, the death penalty, abortion rights, or the drug problem. The environmental bandwagon—unlike gun control or abortion rights—apparently has room for everybody. Environmentalism plays as well in Peoria as on Martha's Vineyard.

Where, then, does environmentalism fit in the political spectrum? A good deal may depend on how one characterizes or measures the concept of environmental concern. Scholars have long observed a tension, even an antagonism, between a prudential ''conservation ethic,'' or ''gospel of efficiency,'' which endorses long-run cost-benefit accounting, and a moral ''environmental ethic,'' which rebels against utilitarian thinking, and which might be associated historically with Aldo Leopold and John Muir. This distinction can be drawn politically today between *prudential* and *ethical* environmentalism or, roughly, between those who seek to protect nature for the sake of exploiting resources efficiently and those who wish to protect nature for its own sake.

Why are environmental restrictions okay when all other regulations—especially safety regulations—remain anathema? How can anyone extol risk-taking and at the same time speak for the trees?

The distinction between prudential and ethical environmentalism may help to explain an anomaly that has long puzzled social scientists. Environmentalism has become an overwhelming political force even though traditional American values and beliefs present obstacles to the development of any strong pro-environment orientation.

According to this analysis, as Americans squared off against the apparently limitless natural frontier, they formed a ''dominant social paradigm'' (to use Dennis Pirages' term) around values like materialism, unfettered progress, and personal liberty. Researchers have established that in many aspects, this dominant social paradigm—e.g., support for laissez-faire government, insistence on individual liberty, faith in science and technology, and commitment to economic growth—relates strongly, but negatively, to environmental concerns. Environmentalists themselves have called for a paradigm shift away from the basic values that built our society and that lie at the root of the ecological crisis.

Even today, social scientists and analysts reason that since lower-middle-class Americans firmly endorse the dominant social paradigm, and since this paradigm conflicts so deeply and thoroughly with a protective approach to nature, the lower-middle class has to oppose laws protecting the environment. Only upper-middle-class suburban professionals, who prefer the welfare state over the dominant paradigm, could favor environmental protection.

As early as the 1970s, however, several social scientists tested whether environmental concern was indeed rooted in the upper-middle-class intelligentsia. These writers quickly dismissed the idea that environmentalism is simply a crotchet of the upper-middle class. As Paul Mohai points out, "The link between the upper-middle class and environmental activisim is a link between socioeconomic status and factors of political activism, rather than a link between the upper-middle class and environmental concern." Indeed, the most vocal, coordinated opposition to environmentalism comes from the top levels of corporate management; so one might argue, as Denton Morrison and Riley Dunlap do, that "the opponents of environmentalism come closer to being an elite than do core environmentalists."

Recent studies and public opinion polls point unambiguously to the conclusion that support for environmentalism is spread throughout the U.S. population as a whole. Environmental concern is surprisingly broad-based, cutting across nearly all socioeconomic categories.

A question arises, then, as to *why* environmentalism plays as well in Peoria as on Martha's Vineyard. Are the issues the same? Are lower-middle-class workers, farmers and small businessman in Birmingham and Baton Rouge defending the same environment as well-to-do liberals in Brookline and Bethesda? Are environmentalists motivated primarily by prudential concerns about safety, health, and the coming ecological crisis? Or have long-standing religious and ethical beliefs, which may be consistent with the dominant social paradigm, brought the lower-middle class into the environmental consensus?

It is reasonable to conjecture that if Americans in the dominant paradigm are optimistic, freedom-loving, risk-taking, wealth-seeking individualists, then they would tend to scoff at warnings about the so-called ecological crises. Faced with persistent ecological and environmental degradation in their own immediate communities, however, Americans may not so quickly dismiss concerns about the global environment. Love of community belongs to the dominant social paradigm, and people within that paradigm may regard the continuity of nature as necessary for the maintenance and the identity of the communities to which they belong. Security of a moral and visceral sort requires that nature—in a romantic and religious sense, not merely as a collection of resources—remain intact. It should be no surprise, therefore, that the environment has become a populist issue throughout the world.

Populism Affects Environmental Law

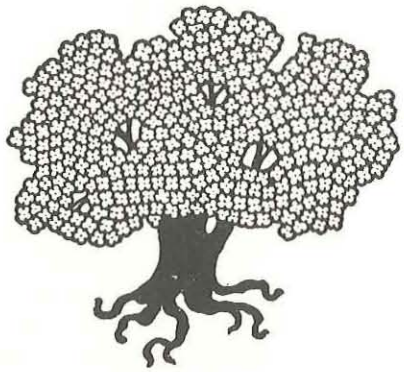
The National Wildlife Federation learned years ago that environmentalism extends well beyond the upper-middle class. Roughly two-thirds of the Federation's members are hunters and fishermen who live in the American heartland. These mainstream Americans generally voted for Ronald Reagan and presumably agreed with his conservative agenda. The other third of the membership, concentrated on the coasts, joined the Federation to support environmental protection. These urban professionals were horrified by the appointment of Anne Gorsuch at the Environmental Protection Agency and James Watt at Interior in 1981.

The Federation leadership wished to mount a political campaign against these appointments, but they were

"I think we agree, gentlemen, that one can respect Mother Nature without coddling her."

afraid of alienating their hook-and-bullet constituency. How could the Federation unseat Gorsuch and Watt, who epitomized the anti-regulatory views of a very popular president who had just been swept into office?

The Federation commissioned a survey to determine where their membership stood on the environment. The results were astounding: the hunters and fishermen stood with the urban membership in favoring strong environmental regulation. On the strength of these surveys the National Wildlife Federation threw itself behind the political effort that forced Gorsuch (then Burford) and Watt to resign and the Reagan Administration to appoint Ruckelshaus at EPA and deal more respectfully with the political might of environmentalism.



Congress, too, felt the winds of change. During the 1970s, it responded to the technocratic thinking that characterized urban professional elites by producing technocratic legislation. Congress wrote "command-and-control" statutes which told industry what sorts of pollution-control technology it had to install. These statutes raised up a phalanx of experts in everything from risk communication to mobile-source monitoring.

In the 1980s, responding to the more moralistic and engaged environmentalism of the lower-middle class—public resentment spurred by Love Canal, Times Beach, the dumping of Kepone in the James River, and so on—Congress restructured environmental legislation from prospective command-and-control strategies to laws based on retroactive liability and criminal penalties. Industries were put on notice not to contaminate or pollute except in permissible ways—or face severe legal penalties after the fact. In previous legislation, industry was permitted to do anything it was not expressly prohibited from doing. More recent laws reverse the approach, making industry strictly liable for any environmental problem it was not expressly permitted to create. Responsible parties are held liable for environmental contamination regardless of individual degrees of fault and regardless of the extent of the risk or hazard the contamination creates.

"The effect of these laws," according to environmental lawyer Adam Babich, "is to shift much of the responsibility for planning for a dangerous and uncertain environmental future to that segment of society most capable of finding innovative and efficient solutions—the private sector. Regardless of its perceived fairness, if carried through, this approach will result in a quantum leap in the effectiveness of environmental laws."

Environmental laws that are enacted today—the Clean Air Act is an example—"cap" the amount of pollution to be tolerated and make industry responsible for determining how to lower aggregate emissions to respect those caps. The moral onus, backed by severe threats and penalties, lies on polluters to clean up; this outcome results from the moral crusade that began in the early 1980s, not from any expert judgment about benefits and costs.

Now that the moral crusade based on lower-middle-class attitudes has gained the day, what should industry do? How should polluters respond to an alliance between professionals and populists?

The Industrial Response

The old command-and-control laws had the advantage, for industry, that they did not work; they were far too cumbersome to implement or enforce. Their unenforceability, however, led to the even greater disadvantage that the public demanded something tougher. And so we have liability-based laws that are tougher—they may hurt industry far more—but they, too, may fail to promote a cleaner, more healthful, more "natural" environment.

It seems plausible to suppose that industrial associations such as the Chemical Manufacturers Association and the American Petroleum Institute should use their considerable power and expertise to support laws that work to clean up the environment in cost-effective ways. Laws of this kind may require industry to pollute only with a permit; they may also have to empower citizens' groups to enforce compliance with those statutes through the courts. At the same time, these laws would allow industry, e.g., through the use of permit-trading schemes and other market incentives, to ratchet down pollution to lower levels by the most efficient and least costly methods. Industry, bureaucracy, environmental activists, and the general public, *including* blue collars, are ready to support laws that get results rather than laws that simply appeal to particular ideologies.

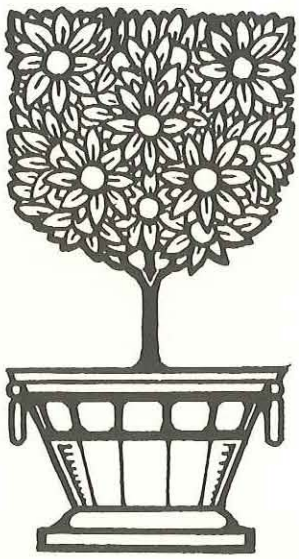
Love of community belongs to the dominant social paradigm, and people within that paradigm may regard the continuity of nature as necessary for the maintenance and the identity of the communities to which they belong.

Representatives from industrial and from environmentalist associations now have many interests in common. The primary goal must be to find a legislative and regulatory framework that will actually work to

control and eventually decrease emissions. Industry must support laws that make this kind of progress in cost-effective ways, or face further toughening of liability-based and criminal sanctions which, in the continued absence of progress, could become vindictive. Environmentalists, now weary of making the best the enemy of the good, no longer insist on statutes that promise the moon but, as a result, are so unrealistic that they defeat all prospects of actual progress. Environmentalists, therefore, must support a legislative and regulatory framework that gives us efficient improvement, even if is does not, say, solve the ozone problem in Los Angeles in five years.

The old command-and-control laws had the advantage, for industry, that they did not work. Their unenforceability, however, led to the even greater disadvantage that the public demanded something tougher.

If environmentalists and corporate executives have these strong interests in common, why, then, don't they work together? Part of the reason is cultural: these groups have a long history of mutual suspicion and antagonism. Another problem, however, arises from the growth of industries that live off this antagonism. Public relations firms, for example, must describe environmentalists as fire-breathing dragons in order to get large retainers from industry to slay or tame them. If environmentalists and executives worked together for common legislative purposes, they would overcome the distrust that makes business for public relations firms. There would be no dragon to slay.



If environmentalists and corporate executives cut a political deal, for example, to pursue workable statutes, they would eliminate much of the work not only of public relations experts but also of experts in risk assessment, risk analysis, risk management, risk communication, and so on. The idea behind workable laws is to make the environment safer, cleaner, and more "natural" in enforceable but cost-effective ways. We can do this without supporting an establishment of theorists to answer questions—like "How safe is safe enough?"—that no one will ever answer because they always require more research.

It is time, then, for business leaders and environmental leaders to deal directly with one another, without the benefit of academic and public relations experts who have made a niche for themselves by forcing these two sides farther apart. We have the necessary experience with environmental law—we have learned enough by trial and error, which is the only way—to write statutes that work. This kind of experience, if we rely on it, can turn opposition to cooperation between industry leaders and environmental groups in restructuring environmental law.

— Mark Sagoff

Sources used in preparing this article include: "The Politics of Posterity," *The Economist* (September 2, 1989); *The Rising Tide: Public Opinion, Policy and Politics* (1989), section 5; Holmes Rolston, *Environmental Ethics* (Philadelphia: Temple University Press, 1988); Eugene Hargrove, *Foundations of Environmental Ethics* (Englewood Cliffs, N.J.: Prentice Hall, 1989); Dennis C. Pirages, "Introduction: A Social Design for Sustainable Growth," in D.C. Pirages, ed., *The Sustainable Society* (New York: Praeger, 1977); Diane M. Samdahl and Robert Robertson, "Social Determinants of Environmental Concern," *Environment and Behavior* 21 (1)(1988); Denton E. Morrison and Riley Dunlap, "Environmentalism and Elitism: A Conceptual and Empirical Analysis," *Environmental Management* 10 (5)(1986); Paul Mohai, "Public Concern and Elite Involvement in Environmental-Conservation Issues," *Social Science Quarterly* 66 (14)(1985); and Adam Babich, "Restructuring Environmental Law," *Environmental Law Reporter* 19 (February 1989).

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Sharing the Burden of Global Warming

When representatives from governments around the world sit down to negotiate a global-warming treaty, debate will center on how the burden of adjustment can be shared fairly. By "burden" we mean a combination of costs and risks. Since a decision to limit greenhouse-gas emissions would mean reducing reliance on fossil fuels and investing in alternative technologies, the costs could be substantial. On the other hand, the longer emissions go uncontrolled, the greater the risk of economic and ecological dislocations from flooding, changing weather patterns, and the loss of species.

The burden of costs and risks must plainly be distributed in some manner, and any realistic policy will probably combine elements of both. What, then, do we mean by a *fair* distribution of the burden?

The fact that the atmosphere is currently treated as a global commons, whose use is largely unregulated, does not imply that nations, firms, or individuals have the right to continued free access to it.

This highly sensitive questions cuts along a political fault line that separates nations in many other respects: North versus South, industrial versus agricultural, rich versus poor. The developing world naturally blames the greenhouse-gas buildup on developed countries, which have been spewing industrial effluents into the atmosphere gratis for well over a century now. The industrialized countries, in turn, blame some of the poorer nations for pursuing development policies that accelerate a dangerous trend. An international agreement on global warming would have to find some way to balance the disparate claims of these two groups.

In this article we shall use the theory of fair allocation to explore various solutions to the burden-sharing problem. In the process, we must leave aside other important issues, such as the magnitude of the economic dislocations that might occur, how they would be distributed geographically, and how much it would cost to avert or mitigate them. Great uncertainty surrounds such projections, mainly because scientists still know very little about the long-run effect of greenhouse-gas emissions on the biosphere. This very uncertainty leads some to conclude that no action should be taken. We, however, maintain the contrary: the level of uncertainty serves to increase, rather than reduce, the degree of concern.

The risk of catastrophic dislocations, improbable though they may be, creates a powerful incentive for taking action to reduce risk. It may be improbable, for example, that methane released from the melting permafrost would cause a significant rise in ocean levels by the middle of the next century. Nevertheless, the costs of such a catastrophe would be so immense that it would make sense to try to forestall it. Even if we can't be sure that the benefits of such a policy outweigh the costs (measured in strictly economic terms), the policy might still be advisable. Stabilizing global climate is a form of insurance. And just as we buy life insurance policies out of concern for our children, so we pursue environmental policies at least partly out of concern for future generations.

What Counts as Fair?

Though standards of fairness vary from one situation to another, they play a critical role in coordinating people's expections and legitimating the solution they reach. Suppose, for example, that two municipalities contribute different amounts to build a road connecting them. If the project costs more than expected, the two parties will almost certainly split the additional costs in proportion to their original contributions; for this is how cost overruns have usually been allocated in similar cases.

It doesn't matter if a standard is peculiar to a specific negotiating environment, just so long as everyone involved understands and abides by it. Even if there are no exactly parallel precedents, negotiators may reason by analogy from related cases. The precedents that have been established in analogous cases therefore become crucial in determining what the bargainers regard as a fair and appropriate outcome in the present case. Unfortunately, this means that negotiators find it harder to agree when they come from different cultures and are discussing an issue with few precedents. These are features of international negotiations in general and of global-warming negotiations in particular.

In asserting that there is no universally accepted rule for sharing a burden, we do not mean to suggest that

there is no moral obligation to share the burden in some manner. It seems clear that people who cause the global environment to deteriorate do have an obligation to those who are harmed. The fact that the atmosphere is currently treated as a global commons, whose use is largely unregulated, does not imply that nations, firms, or individuals have the right to continued free access to it. As with other types of commons—e.g., fishing grounds, grazing lands, and communications bandwidths—when unregulated use begins to crowd out some members of the community or deplete the resource, the community has every right to enforce limitations. These usually take the form of carefully defined entitlements to use the resource. Precisely how these entitlements should be defined, and how distributed, are key issues in negotiating a global-warming treaty.

Components of the Distributive Problem

Like every distributive problem, global warming raises three questions: What is to be distributed? Among whom? According to what principle? Simple as this structure may appear, it is often far from simple to pin down the three components in a concrete case.

To begin with, what would a global-warming treaty allocate? The most widely discussed option is to limit the quantity of greenhouse gases—carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons (CFCs)—that each nation can release into the atmosphere. In this case, the ''thing'' being allocated is a reduction in the total flow of gas—a cutback, say, of so many tons per year of carbon dioxide. The problem is therefore framed as one of sacrifice, of giving up something relative to the status quo.

Alternatively, one could focus on how much is permitted, rather than on how much is cut back. According to this second way of thinking, the thing being allocated is an entitlement to release a certain amount of gas annually into the atmosphere. If the total number of permits distributed is less than the emissions rate, this second approach will involve cutbacks, just as the first does. Nevertheless, the two approaches differ: one is framed negatively, as a sacrifice; the other is framed positively, as a right. One focuses on the loss, the other on the gain.

Both approaches have recent precedents. For example, the Montreal Protocol—an agreement signed by fifty-seven countries in 1987—requires that production of CFCs and other ozone-damaging chemicals be reduced by certain fixed percentages. By contrast, the U.S. Clean Air Act proposes to reduce sulfur dioxide emissions by granting emissions permits to electric utilities, who may trade the permits among themselves. Both of these solutions conceive of the atmosphere as a common-property resource that must be rationed by creating entitlements to its use.

Suppose the distributive problem is indeed framed in terms of emissions entitlements or permits. We still need to consider who the claimants are, how many permits should be distributed, and how many permits each claimant should receive.

First, who are the claimants? Most discussions of greenhouse-gas reductions assume that nations are the claimants: the United States would be entitled to x permits, China to y permits, and Uganda to z permits, depending on the theory under discussion. Of course, it is true that national governments will negotiate a treaty, just as they will be responsible for carrying out its terms. So it's natural to think of nations as the *repositories* of emissions permits. But this does not mean that nations must also be the primary *claimants*. It is individuals who would suffer the dislocations that global warming threatens, and it is individuals who stand to benefit from a reduction in that risk. Furthermore, it is individuals who benefit from the activities

Drawing by Scott Willis, *San Jose Mercury News*

and products that currently increase global warming. Thus it makes sense to regard individuals as the primary claimants to emissions entitlements.

But even if we agree that individuals are the natural claimants, we must still decide how many permits each person should receive. Is everyone entitled to the same number of them? If not, according to what principle should they be distributed? And what about those yet unborn, who will bear the consequences of greenhouse gases released now?

Three Ways of Determining a Fair Share

Let's consider three competing theories, each of which provides an answer to the questions just raised. The *egalitarian doctrine* holds that everyone is entitled to exactly the same number of rights. Thus, if n is the number of people alive on the day the treaty is signed, and $q(t)$ is the total quantity of emissions allowed in each year t, then every individual would be allocated $q(t)/n$ emission permits in year t.

The *cumulative liability doctrine* holds that individuals and their forebears are responsible for their total contribution to the greenhouse-gas buildup. In theory, one would estimate each nation's cumulative past emissions of (say) carbon dioxide, and then amortize them by the appropriate biotic absorption rate. These past emissions would be treated as an accumulated debt. The total debt would then be divided by the current population to obtain an average per capita rate, and the net debtors (those who exceeded the average rate) would have to pay off the net creditors according to some repayment schedule.

However fair this solution might seem, it carries with it the enormous practical problem of estimating past contributions with any degree of accuracy. There's a theoretical difficulty as well: not only did producers benefit from unregulated past emissions, so did consumers and investors—including consumers and investors in the nonindustrialized world. For example, the rents to oil-producing countries over the past half-century would surely have been less if CO_2 emissions had been taxed or restricted during the period. Indeed, the entire economic order has been based on a regime of free CO_2 disposal. The accumulated benefits and blame are both so widely diffused that past emissions are not a reliable measure of cumulative liability. In fact, the true extent of each country's liability is probably impossible to estimate.

The *status quo doctrine* represents an altogether different approach to distributing entitlements. This theory not only denies that past emitters should be held liable, it also asserts that their current rate of emissions constitutes a sort of property right established by long usage and custom. In other words, industrial countries are entitled to their higher emissions rates according to the common law doctrine of adverse possession.

A strict interpretation of the status quo doctrine treats current emissions as sacrosanct and allows only for limitations on their expansion. A more moderate interpretation holds that, if cuts must be made, then all parties must sacrifice equally relative to their status quo positions. According to this *equal sacrifice* variant of the status quo doctrine, the status quo is legitimate, but everyone acknowledges that sacrifices must be made for the common good. So, for example, each country's current rate of emissions might be reduced by an equal amount per capita, or by a fixed percentage per capita, or perhaps according to a progressive schedule, with the greatest percentage cuts imposed on those with the highest emissions rates.

Practical Implications

Now let's consider how these three doctrines would actually parcel out emissions permits. Table 1 shows the shares of population, gross national product, and CO_2 emissions in the industrialized countries, as compared with the rest of the world. The industrialized nations are responsible for roughly 60 percent of current CO_2 emissions and 70 percent of cumulative emissions, though they account for less than 25 percent of the world's population. Under an egalitarian regime, the industrialized nations would accordingly be granted only one-third of the permits that they need to continue business as usual. (If cumulative liabilities are counted, they would receive even fewer.) The less developed countries, on the other hand, would hold nearly twice as many entitlements per capita as they currently need.

Table 1

Shares of CO_2 Emissions, Population, and GNP

	CO_2 Emissions			
	Cumulative	Current	Population	GNP
Industrial	70%	60%	23%	84%
Less Developed	30	40	77	16

Cumulative emissions 1860-1986; current emissions total is mean of 1980-86; 132 countries covered. Industrial countries are those with 1986 per capita GNP above $4,000. Population and GNP data (125 countries covered) do not correspond precisely with emissions data. Sources: Suback, 1990; World Bank, 1988; *Information Please Almanac*, 1990.

In theory, the less developed countries would be willing to sell the industrialized world a large portion of their current entitlements (though not necessarily their future ones) at a price reflecting the cost of reducing CO_2 emissions at the source. This could involve the transfer of many billions of dollars from the industrialized to the nonindustrialized countries. Moreover, the latter might form a cartel and use their permits to gain political and economic leverage. The industrialized countries would then be forced to choose between paying the price demanded, making drastic production cuts, or reneging on the agreement. Considering its potential to cause significant hardship, the strictly egalitarian approach seems unattractive, even though it may be justifiable in theory.

The status quo doctrine, which says that the industrialized world is entitled to its current per capita emissions rate, carries a different kind of risk. Even if the rate were frozen as of some date and the less developed nations permitted to rise to that level, and even if the populations of those countries were fixed, or the per capita emissions level adjusted downward to compensate for population increases, the developing world's CO_2 emissions would still expand over sixfold. As a result, global emissions would expand over threefold. So large an increase could pose a serious threat to the environment.

A Proposed Compromise

The status quo doctrine allows too little flexibility for capping greenhouse-gas emissions while still meeting goals of equity, whereas the egalitarian and cumulative liability doctrines take too little account of the hardships attending adjustment, and therefore also fail to be fair. These considerations suggest that we need to find a compromise between the three methods of distributing entitlements.

One approach would be to move, in a series of steps, from a status quo to an egalitarian regime. Say, for example, that a particular year is chosen as the baseline from which adjustments are to be made, and the goal is to keep total emissions of each type of gas below some established ceiling. This would require setting a target rate of emissions per capita for each gas. The entitlements would then be allotted as follows: Countries above the target rate would have their entitlements reduced by a specified amount per capita (or by a specified percentage per capita) over a series of years. Countries below the per capita target rate would be allowed to rise until reaching it.

Emissions entitlements would be allotted to each nation en bloc, with the internal distribution of entitlements to be determined by the country's own policies. The end result would be a regime where emissions per capita are equal, but the phased transition would rest on the idea that everyone should sacrifice equally in moving toward this regime, except for those who are already disadvantaged.

Note that emissions would be limited absolutely, and not merely on a per capita basis. Since world population ranks among the most important factors driving the current increase in greenhouse-gas emissions, entitlements would have to be granted, once and for all, on the basis of each country's current population. Future generations would "inherit" these entitlements as they would other forms of property. The larger the number of descendants, the fewer the shares that each, on average, would inherit. Additional entitlements would not be granted as the number of claimants grows.

Table 2 shows how such a scheme would work if it were to begin now. From 1990 until 2000, developing-country emissions are allowed to grow at 4 percent, while industrialized-country emissions are reduced so that total worldwide emissions remain at the base-year level. Industrial countries reduce their emissions 3.3 percent annually from 1990 to1995, and 5 percent annually from 1995 to 2000. During the ten-year period, total industrial-country emissions decline 35 percent, while developing-country emissions rise 48 percent. In terms of emissions per capita, the industrial countries cut back 40 percent, and the developing countries expand 21 percent.

The proposed solution represents a compromise between radical insistence on absolute equality and conservative commitment to the status quo. Yet it still ig-

Table 2

Phased Transition from the Status Quo in CO_2 Emissions to an Egalitarian Regime, 1990-2000

	1990		1995		2000	
	Total (10^9 tons)	Per Capita (tons)	Total (10^9 tons)	Per Capita (tons)	Total (10^9 tons)	Per Capita (tons)
Industrial	3.88	3.37	3.27	2.72	2.52	2.02
Less Developed	2.86	0.71	3.47	0.78	4.22	0.86

Annual emissions totals based on 1986 estimates (Suback, 1990). Industrial countries are those with per capita GNP above $4,000. Per capita calculations based on World Bank population data (1988).

nores the most troubling aspect of the case—namely, the historical contributions of the industrialized world to the present buildup of greenhouse gas.

As we have already argued, any attempt to assess past contributions to the problem must factor in the benefits that resulted from the laissez-faire regime. But since those benefits are so widely diffused and difficult to quantify, the quest for a reliable measure of cumulative liability seems hopeless. A better solution, suggested by the Montreal accord, would be for industrialized countries to establish a joint fund that would invest in research and technology transfer and financial aid to help developing countries adjust to the new regime.

Even relatively modest levels of investment could produce substantial benefits. For example, the fund could support the development of improved world climate models, as well as basic research into the chemical and biological processes related to the greenhouse effect. The fund might also award prizes for inventions and discoveries that could help to remedy global warming. At a more ambitious level, the fund could provide credits to developing countries that adopt technologies expected to reduce greenhouse-gas emissions.

A reasonable basis for sharing the costs of such a fund would be a commonly accepted measure of ability to pay—such as gross domestic product or the United Nations contributions scale. By any such formula, the burden of costs would fall squarely on the developed countries. Not only would this be widely regarded as fair, it could prove of strategic value in generating an agreement. The developed world must make a serious commitment, not only to cutting back its own emissions, but also to helping less developed countries deal with a problem that industrialized countries are largely responsible for creating.

— H.P. Young

H.P. Young is an economist at the University of Maryland's School of Public Affairs and a specialist in issues of distributive justice. His forthcoming book *Equity* examines the ways that public agencies allocate scarce resources and necessary burdens. The sources cited in this article are United Nations Environment Program, *Montreal Protocol on Substances that Deplete the Ozone Layer* (1987); Susan Suback, *Accountablity for Climate Change* (Boston: Stockholm Environmental Research Institute, 1990); World Bank, *World Development Report* (Washington, D.C.: World Bank, 1986, 1988); *Information Please Almanac* (Boston: Houghton Mifflin, 1990). The data was compiled by Amanda Wolf.

Greenhouse Economics: Think Before You Count

Most people agree that the greenhouse gases produced by modern society are changing the make-up of the earth's atmosphere. Most people also agree that these changes will cause a rise in average temperatures near the planet's surface. Granted, there continue to be uncertainties about the size and speed of the temperature increase, its implications for human activities, and its ecological effects, all of which have been stumbling blocks to forging an agreement on global warming. But an equally important stumbling block has attracted comparatively little attention: the fact that different decision-making frameworks have been brought to bear on the discussion of what our policies should be.

One of these—the utilitarian market framework (UMF)—attempts to use the conceptual apparatus of welfare economics to assess environmental policy options. A good example of this approach can be found in the writings of William Nordhaus, John Musser Professor of Economics at Yale. In "How Fast Should We Graze the Global Commons?" Nordhaus recommends that alternative strategies for controlling greenhouse-gas emissions "be weighed by examining their implications for consumption (or real income) of different generations." On this view, how much we would be willing to pay to control emissions "must equate discounted costs and benefits of. . . abatement in terms of consumption." Costs and benefits are discounted back to their present value so that they may be compared with one another. We then choose the strategy that maximizes the benefits over the costs.

The UMF's key assumption is stated explicitly in "To Slow or Not To Slow: The Economics of the Greenhouse Effect." "We assume," Nordhaus writes, "that it is desirable to maximize a social welfare function that is the discounted sum of the utilities of per capita consumption." According to the UMF, we should maximize the benefits of actions taken over the costs of

The articles by H.P. Young and Peter G. Brown grow out of a working group on Equity and the Greenhouse Effect supported by the Ethics and Value Studies Program of the National Science Foundation.

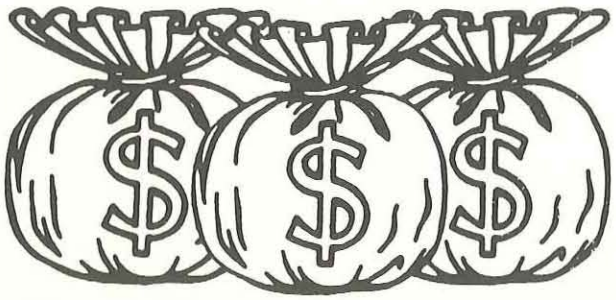
those actions *as measured by the ability to consume.* So if slowing global warming diverts resources that could otherwise be spent on consumer goods, then the resources have been ill spent. On the other hand, if global warming itself will reduce consumption opportunities—for example, by causing problems for agriculture that result in higher food prices—then we should spend money to avert it up to the point where the extra costs equal the benefits derived from them.

The UMF decrees that all costs and benefits be discounted back to the present; that is, the value of future costs and benefits should be weighted to take into account their occurrence in the future. Discounting simply formalizes the common-sense notion that people would rather have a dollar today than a year from now. Accordingly, they will pay less for a dollar a year from now than for the dollar now.

Environmental Values and Inequities

If the UMF isn't *the* standard economic approach, it is at any rate *a* standard economic approach. Yet serious difficulties arise when applying this framework to global warming.

Perhaps the most obvious problem is the assumption that we know what people want, including and especially their trade-offs between environmental values and other goods. Nordhaus cites no data whatsoever about what people actually want with respect to global warming. Of course, one could argue that collecting data is unnecessary because what people want has already been revealed in the market through their purchases. But to make this argument persuasive one would have to show how present markets reveal not only our own preferences about global warming and its effects, but also the preferences of persons yet unborn—a demonstration no one is likely to offer.



As the UMF pays little attention to goods that aren't efficiently priced by the market system, so it pays little attention to distributive issues such as the unequal ability of countries to adapt to climate change. As a rule, technologically advanced countries will be better able to avoid, or at least mitigate, the negative aspects of global warming. The UMF has nothing to say about such inequalities, except indirectly through interdependent utility functions—an avenue Nordhaus does not explore.

It seems inappropriate in the extreme to assess policy options without considering the potential impact of what we do, or fail to do, on those already at the margins of subsistence. In "Greenhouse Economics: Count Before You Leap," Nordhaus himself notes that "small and poor countries with large agricultural sectors are particularly vulnerable." But a bit later in the same article he suggests that "the best investment today may be learning about climate change rather than preventing it." Should the poor literally sink or swim as the oceans rise?

Discounting the Future

Advocates of the UMF assume that everything should be discounted. In making this assumption they move uncritically from using a tool that is helpful in business decisions, such as trying to estimate the net returns on different investments, to using the same tool for issues of planetary management. There are three serious problems here.

There are some things that are not, and should not be, discounted. No one asks, "What is the optimal rate of shredding for the U.S. Constitution?"

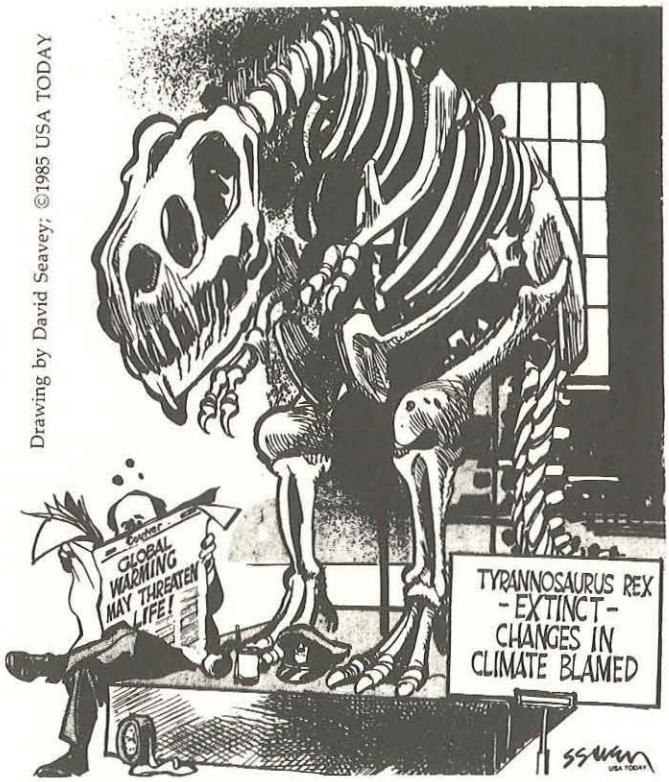
First, there are some things that are not, and should not be, discounted. No one asks, "What is the optimal rate of shredding for the U.S. Constitution?" On the contrary, we assume that we should preserve the historic document for posterity. This is precisely analogous to what many people think we should do with respect to the earth's ecosystems. Of course, economists might reply that these two examples simply show us to have a negative discount rate with respect to these issues; but all this response demonstrates is that the UMF doesn't tell us what the discount rate should be, or even whether there should be one.

Second, even if we assume that there should be *a* discount rate, appeals to "*the* discount rate" cover up a number of factors. One of these is opportunity costs, another is uncertainty. Merging the two under one discount rate simply obscures what is at issue. We would reveal what is at stake much more clearly by talking about opportunity costs and uncertainty separately.

Third, in any situation where there is a long-term asymmetry between costs and benefits, as is the case with global warming, discounting imperils the future by undervaluing it. Although the costs of averting the greenhouse effect are paid in the present, the benefits accrue in the distant future. The discounted value of harms that occur a century from now are insignificant when compared with the present costs of avoiding them. As D'Arge, Schulze, and Brookshire argue in "Carbon Dioxide and Intergenerational Choice," "a complete loss of the world's GNP a hundred years from now would be worth about one million dollars today if discounted by the present prime rate."

Fungibility and Rationality

Proponents of the UMF assume that all goods are of the same kind; so we shouldn't bat an eye if we trade off two hundred species for a 1 percent rise in GNP unless somebody manages to show that the species are worth more than the 1 percent in dollar terms. An important purpose of legislation such as the Endangered Species Act is to limit trade-offs of this kind. Many environmental laws such as the U.S. Clean Air Act and workplace safety rules also limit cost-benefit comparisons as the basis of policy. Are all such regulations irrational?



Maybe they are, at least according to Nordhaus. In "To Slow or Not To Slow" he declares that a model like his "must underpin any rational decision." This claim, however, rests on a confusion about what rationality is. Any definition of instrumental rationality must have two parts: an *end* of some kind, and *means* that are to be conserved in reaching that end. Though maximizing utility is certainly one end, there are many others, such as maximizing liberty, maximizing justice, doing what one's role requires, and so on. In the context of climate change, responsible stewardship of the earth and its ecosystems would seem to be a reasonable end to have in view.

A Perilous Pedigree

The UMF, as presented by Nordhaus, has embraced a doctrine that finds its classical formulation in John Stuart Mill's *Utilitarianism*. According to Mill, utilitarianism "holds that actions are right in proportion as they tend to promote happiness, wrong as they tend to produce the reverse of happiness." From this it follows that we should seek the greatest happiness for the greatest number.

Although there have been many criticisms of this doctrine in the philosophical literature that has grown up since World War II, the UMF proceeds as if utilitarianism had never been challenged. In addition to the objection about rationalitiy already raised, there are three significant problems with the doctrine:

Because persons, especially in a deeply pluralistic society like our own, have disparate, incommensurable ends, the model of individual decision making cannot simply be recycled for use in collective decision making.

1. Utilitarianism conflates the problem of collective choice with the problem of individual choice. On the utilitarian model of decision making, individuals act to maximize their own happiness. Each of us has a rough, though perhaps only implicit, set of priorities to which we appeal in deciding how our limited resources of time, money, energy, and so on, should be spent so that they'll most increase our happiness. But when we move to the level of social choice, utilitarianism encounters a serious obstacle. Because persons, especially in a deeply pluralistic society like our own, have disparate, incommensurable *ends*, the model of individual decision making cannot simply be recycled for use in collective decision making.

2. Utilitarianism is indifferent to the distribution of utility between parties, just as long as the greatest total utility is attained. Thus utilitarianism has little to say on questions of public policy where the distribution of benefits and burdens is a central issue.

3. Utilitarianism is at once too altruistic and too indifferent to human rights. At least in principle, the doctrine is compatible with severe human rights violations. (We might, for example, return to the institution of slavery if we could thereby achieve a net increase in utility.) On the other hand, utilitarianism requires that we weigh the utilities of others as equal to our own—which means that our personal projects and plans can always be called into question if there is something else we could be doing to increase net utility. In both respects utilitarianism places our personal integrity at risk.

Economists who *are* aware of these problems sometimes try to deal with them by dropping words like "happiness" and "utility" and speaking only about "preferences." In this way they try to discard the baggage of utilitarianism. One variant of this strategy is to assert that there is a prima facie case for

giving people what they want—for satisfying their preferences—which means that we should arrange the world so that there can be as much preference satisfaction as possible by allowing all exchanges desired by both parties. But no one really believes this. There are plenty of cases where such exchanges are prohibited, ranging all the way from public offices like the Presidency to the purchase of new cars without seatbelts.

Everything else being equal, it may be better to give people what they want; but until we have said what we mean by "everything else being equal," we are nowhere.

— Peter G. Brown

Peter G. Brown, director of environmental programs at the University Maryland's School of Public Affairs, is currently working on a book critical of market-oriented approaches to public policy. This article was condensed and adapted from his paper, "Fiduciary Responsibilities and the Greenhouse Effect." **The sources cited are: William D. Nordhaus, "How Fast Should We Graze the Global Commons?" *American Economic Review: Papers and Proceedings,* vol. 72, no. 2 (May 1982); "To Slow or Not To Slow: The Economics of the Greenhouse Effect," a paper presented to the February 1990 meeting of the American Association for the Advancement of Science; "Greenhouse Economics: Count Before You Leap," *The Economist* (July 7, 1990); Ralph C. D'Arge, William D. Schulze, and David S. Brookshire, "Carbon Dioxide and Intergenerational Choice," *AEA Papers and Proceedings* (May 1982); and J.S. Mill, *Utilitarianism,* ed. G. Sher (Indianapolis: Hackett, 1979).**

Post-Modernism and the Environmental Crisis

The globalization of the environmental crisis coincides with the crossing of what many consider to be a historic watershed in philosophy. On one side we find the dominant tradition of Western thought, with all its efforts to place human knowledge on a solid, unchanging foundation. On the other side we find certain skeptical, or anti-foundationalist, modes of thinking variously labeled "post-modern," "post-structuralist," or "deconstructionist." Whether or not the emergence of these viewpoints truly constitutes a watershed, and whether or not they actually represent a common tendency of thought, the fact is that many intellectuals have recently adopted an attitude of radical skepticism toward the basic premises of scientific rationalism. Perhaps the most important of these premises has been that human beings can gain access to a stable, context-free foundation for knowledge, and so arrive at a univocal, objective truth.

This widespread skepticism about the foundations of knowledge leads naturally to a rejection of "essentialism"—that is, the belief that our language provides access to immutable essences, or meanings, located in a reality beyond, and hence independent of, the language itself. Defenders of essences are now rare indeed. We find instead a pervasive historicism, acutely sensitive to the unstable, contingent nature of language, and convinced of the historical and societal genesis of all our ideas and practices, including the language or discourses by which they are defined.

Terms such as "nature," "technology," "science," and "environment"—which might be thought to represent constituent properties of an independently existing reality—are seen from a post-modernist perspective as contingent products of historical processes. Like all our words and concepts, they are taken to be "socially constructed." So, far from having a univocal meaning, the import of each term is thought to vary according to historical, social, and cultural cir-

cumstances and, more particularly, according to the speaker's assumptions about race, ethnicity, gender, and class.

Whatever its weaknesses, post-modernism is a feature of our intellectual world too important to be ignored; and it may even provide valuable critical analyses of certain cloudy regions of environmentalist thinking. Because its adherents do not offer their own "positive" alternative to the conventional theories of knowledge they dismiss, most versions of post-modernism, like most versions of philosophic skepticism, are valuable chiefly for the critical, anti-metaphysical insights they afford. Indeed, it is difficult to imagine what form such a positive alternative, compatible with the spirit of post-modernist skepticism, might take. We nonetheless believe that the post-modernist critique of traditional assumptions could be useful in rethinking certain theoretical and cognitive presuppositions of environmentalism.

There may be more than coincidence involved in the simultaneous discovery of the global and social nature of environmental degradation and the skeptical, anti-foundationalist drift of contemporary philosophy and critical theory.

The Hegemony of "Hard" Science

This current tendency, with its bias towards contextualism, may help to break down some long-standing conceptual and practical barriers to collaboration between the "hard" biophysical sciences and the "soft" social or human sciences. To begin with, it calls into question the hegemony of "hard" scientific knowledge and its tacit corollary, a virtually exclusive commitment to reductionist methods of inquiry. That hegemony has created many difficulties for the management of environmental research. It has often meant, for example, that complex problems involving the reciprocal relations between human and natural systems are defined in narrowly technocentric terms.

Because of the perceived "weakness," or "softness," of the social sciences and humanities, the hegemony of the biophysical sciences has also impeded the effective integration of scientific findings about environmental degradation with findings about its behavorial, societal origins. According to *Humankind in the Biosphere*, Martin F. Price's recent survey of international interdisciplinary research on environmental problems, the "research objectives" of many purportedly interdisciplinary projects "tend to be set primarily by natural scientists." Of course, this is hardly a recent development. Price notes that the 1981 international conference aimed at assessing ten years' work by UNESCO's "Man and the Biosphere" program, whose goals were "to develop the basis within the natural and social sciences" for improving the global relationship between man and the environment, found that "less than five percent of projects through mid-1979 integrated the work of natural and social scientists."

These findings compel us to reaffirm our primary assumption, namely, that although the work of scientists and engineers is indispensable for coping with the most urgent environmental problem, the problems themselves are invariably the result of social practices. They are quintessentially *social* problems whose roots lie deep in a long-standing matrix of cultural proclivities. Hence, they are bound to remain intractable until we find ways to integrate (1) scientific analyses of their nature; (2) an adequate understanding of their social, cultural or behavorial genesis; and (3) a plan to change the behavior, or institutional structures, necessary to resolve them. One of the main impediments to coping with urgent environmental problems, in our view, is the deeply ingrained habit of defining them chiefly in terms derived from their biophysical manifestations. Indeed, a fact that scientists and engineers seem reluctant to acknowledge is that many, perhaps even most, environmental problems will have to be resolved in the arena of national and international politics.

All of this suggests that there may be more than coincidence involved in the simultaneous discovery of the global and social nature of environmental degradation

and the skeptical, anti-foundationalist drift of contemporary philosophy and critical theory. These current philosophic tendencies direct attention away from the centrality of "hard" scientific knowledge as the key to coping with the problems of the environment. They emphasize the decisive role not of some context-free body of truth, but of the common understandings, or "background" knowledge, shared by a people. On this view, the ultimate determinant of many of the practices causing the deterioration of the environment, as well as of the practices required to cope with it, is the cultural context. Unlike traditional scientific rationalism, this contextualist concept of knowledge might help to foster a collaborative, multidisciplinary approach to environmental problems.

— Leo Marx

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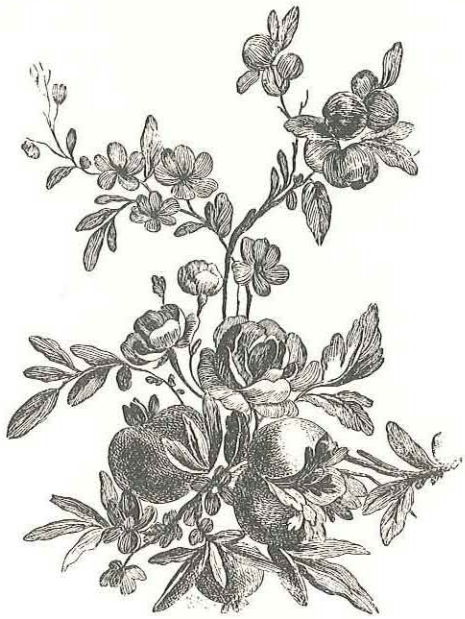

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