

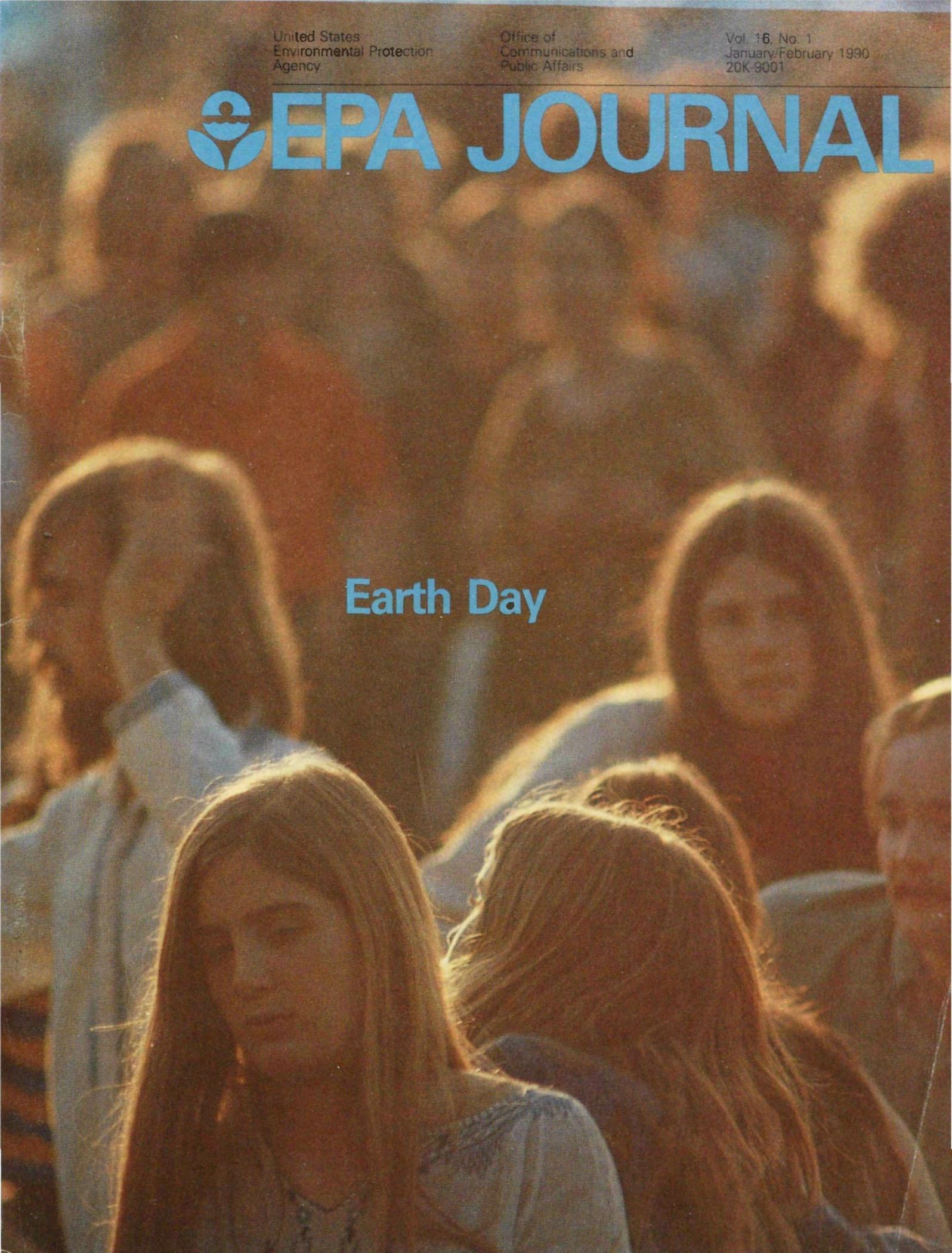
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EPA JOURNAL



Earth Day

Earth Day

Earth Day—special in its first incarnation in 1970; special now as we approach its 20th-anniversary observance on April 22, 1990. This issue of *EPA Journal* is dedicated to Earth Day and its meaning then and now.

President George Bush leads off the issue with an article that reflects his perspective on the environment at home and abroad. EPA Administrator William K. Reilly follows with a piece articulating a goal that he feels should become a key focus of the nation's environmental initiatives: pollution prevention.

An article by *EPA Journal* writer Jack Lewis describes the spirit and character of the first Earth Day, and an accompanying feature surveys a group of people who were key environmental players in 1970 and also

reports on what they are doing now. Former U.S. Senator Gaylord Nelson, the founder of Earth Day, outlines the legacy of Earth Day as he sees it.

Next is a series of articles looking back and looking ahead, occasioned by this 20th anniversary of the "year of the environment." For in addition to Earth Day, other environmental landmark events helped to make 1970 a special year: in particular, the birth of EPA; the establishment of the President's Council on Environmental Quality and an environmental impact review program (both mandated by the National Environmental Policy Act of 1970); and the passage of the Clean Air Act of that year. The authors are EPA's first Administrator, William D. Ruckelshaus; the first Chairman of the President's Council, Russell E. Train;

former Congressman Paul G. Rogers, who was involved in the deliberations leading to the 1970 Clean Air Act; and two activists who figured prominently in 1970 Earth Day events—Denis Hayes, who headed the national Environmental Teach-In office that coordinated Earth Day, and Edward W. Furia, who directed Philadelphia's Earth Week program.

Next, illustrating the burgeoning activity that may make 1990 another year of the environment, an article by *Journal* writer Roy Popkin reports on the growing commitment within the entertainment industry to promoting environmental awareness.

Two articles report on subjects that demonstrate how dramatically the environmental agenda has changed since 1970. First, John S. Hoffman and Robert Kwartin from EPA's Global

Change Division write about ongoing efforts to design refrigerators that are free of chemicals that damage the stratosphere and to make this new technology available in developing countries.

Second, Joel S. Hirschhorn, a Senior Associate at the Congressional Office of Technology Assessment, explains the steps needed if American industry is to adopt a preventive approach to industrial waste rather than the traditional effort to control waste at the "end-of-the-pipe."

Then Paul and Anne Ehrlich, a husband-and-wife team of environmentalists, describe the nature of the environmental crisis in their view and outline an approach for dealing with it. Next, providing an industry perspective, Jerald terHorst, Director of National Public Affairs for the Ford Motor Company, gives a rundown on efforts to clean up a major pollution source, the automobile.

The phenomenon of the "Greens" in West Germany and other European countries is explained in terms of its political dynamics by Konrad von Moltke, a senior fellow at The Conservation Foundation and former Director of the Institute for International Environmental Policy in Bonn. In a related article, Bowdoin College professor John Rensenbrink discusses the prospects for a Greens movement in the United States.

This issue of the magazine concludes with a report on the clean-up tasks confronting another industrialized society—the Soviet Union—authored by Alexei Yablokov, a key environmental official in that country. □



New York City's Fifth Avenue was closed to motor vehicles for Earth Day 1970.

The result was one of the biggest people jams in the city's history.

EPA JOURNAL

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What I Believe About the Environment

by President George Bush

Last summer, I took my 13-year-old grandson on a fishing trip to Jackson Lake, Wyoming. The memory of that day lingers—the two of us casting our lines, sinking long, flashy spinners deep into the crystalline water. After some effort, we caught a few Mackinaw trout and let them go. But the real catch was for our eyes.

From our small boat, we watched elk warily emerge from the forest at dusk to drink at the lake. And rising out of the forest in the distance were the Tetons—jagged, immense, snow-capped, invincible. No words, no photo, no painter could do them justice.

Of course, there was a time when all of North America was as primitive and pristine as Jackson Hole. But aside from protected areas like the Grand Tetons, the buffalo hunters and the settlers changed the face of the land, forever.

We no longer enjoy the luxury of leisurely action. Environmental protection must become a higher priority for us all.

The exploitation of natural resources was a natural way of life for the pioneers. In fact, it was the only way of life. So our ancestors did what they had to do to build a great nation, simply assuming that the land offered a limitless bounty.

Today, of course, we know better. And knowing better, we must act better.

President Teddy Roosevelt declared 80 years ago that nothing short of defending this country in wartime "compares in importance with the great central task of leaving this land even a better land for our descendants than it is for us." He was one of the first to perceive that nature is not an infinite resource. Environmental destruction in



National Park Service photo

one place on Earth can have serious consequences for other, sometimes remote, parts of our planet. In fact, some scientists compare the Earth to a single organism, a living system whose ability to survive depends on its overall well-being.

It is not possible to restore our environment to a perfectly natural state. Yet we've also learned that a growing economy can only be sustained with a healthy environment. This requires a balance—trade-offs, tough decisions, careful planning, exact studies, and creative proposals.

Seeking that balance, environmental leaders like Senators Ed Muskie, Howard Baker, the late Henry Jackson, and others put aside party differences in the late 1960s to craft landmark comprehensive environmental legislation. On January 1, 1970, President Nixon began the new decade by signing the National Environmental

Policy Act into law. All the historic environmental laws of the 70s followed this bold step: the Clean Air Act, the Clean Water Act, and the laws regulating pesticides, toxic substances, and hazardous wastes.

It was also roughly 20 years ago that EPA began its historic mission under the strong leadership of Bill Ruckelshaus. And in this same tradition Bill Reilly brings to EPA his own distinctive brand of leadership—leadership based on both environmental expertise and real commitment.

In the first year of this Administration, we've taken on many tough environmental problems. On June 12, I announced ways we can use the market to reduce emissions of acid rain, urban smog, and toxic air pollution—all included in the first major overhaul of

Grand Teton National Park,
Wyoming.

the Clean Air Act to be proposed in more than a decade.

Later in the year, we called for \$710 million for Clean Coal Technology; a ban on nearly all uses of asbestos by 1997; and a ban on the export of hazardous waste. In addition, we've accelerated our leadership on global change, proposing a 28-percent increase in global environmental research and offering to host an international conference next fall to negotiate a framework treaty on global change.

But the federal government is only part of the story. Twenty years ago, the environmental movement was gaining strength in the city halls and state capitols of our nation, as well as in Washington. And the new commitment to a cleaner, safer environment wasn't just confined to government. It grew from the bottom up—not just from school boards, city councils, and state legislatures—but from millions of homes.

Americans came together as environmental volunteers—spontaneously, almost instinctively—to save the Earth. And it was this movement that created the first Earth Day on April 22, 1970. Earth Day began as a spectacular movement of citizen leadership. It has become an American tradition, worthy of future generations.

A president quickly learns to see policy in the broadest terms possible. Urban and housing policy must be related to transportation, transportation policy to energy, energy policy to agriculture, and so on. Applying this same perspective, one cannot fail to see that deforestation, ozone depletion, ocean pollution, and the threat of global warming interconnect to challenge our future. We no longer enjoy the luxury of leisurely action. Environmental protection must become a higher priority for us all.

If our response is to be effective, then all the nations of the world must make common cause in defense of our environment. This is a message I took to



Sierra Club photo

the peoples of Europe in May. In Mainz, West Germany, I said that my generation remembers a world ravaged by war. And, of course, Europeans have rebuilt their proud cities and restored their majestic cathedrals. But I told them: "What a tragedy it would be if your continent were again spoiled, this time by a more subtle and insidious

If our response is to be effective, then all the nations of the world must make common cause in defense of our environment.

danger—that of poisoned rivers and acid rain." I told them of America's environmental tragedy in Alaska. I noted that countries from France to Finland suffered after Chernobyl, and that West Germany is struggling to save the Black Forest. The bottom line is this: Environmental destruction respects no borders.

When I suggested that the United States and Western Europe extend a hand to the East, the people of Europe on both sides of the Iron Curtain responded with enthusiasm. Since then, working with my counterparts in Western Europe, we have reached agreements to share our environmental technical and regulatory knowledge with Eastern Europe.

I hope these agreements become a model not just for Europe, but for the world. And I am determined that in the 1990s, the United States of America will continue to assume responsibility by

President Theodore Roosevelt, an early environmentalist, loved hiking and camping. In this 1903 photo, he is shown with John Muir, who founded the Sierra Club.

providing world environmental leadership.

At home, we've brought to my Administration outstanding environmental professionals, like Michael Deland, who chairs the important Council on Environmental Quality. We've broken new ground by declaring that pollution prevention is our ultimate goal. For too long, we've focused on clean-up campaigns and penalties after the damage is done. It's time to reorient our policies to technologies and processes that reduce or prevent pollution—to stop it before it starts. In the 1990s, pollution prevention must go to the source.

To save the Earth will require our best efforts. Everyone must volunteer to help. Business, labor, and consumers must cooperate. Environmentalists and industrialists must be partners, not adversaries. Local communities, large and small, must enlist. And so must families—we all can learn to generate less waste and to recycle the waste that we do produce. In fact, those families that do recycle have found it makes economic, as well as ecological, sense.

Finally, there is one simple thing that you can do on Earth Day, regardless of your age or ability. I ask you to join me in sowing a legacy of cleaner air and more beautiful horizons. I ask you to perform a simple act. I ask you to plant a tree.

You don't have to be a poet or a painter to appreciate a tree. Trees cool the Earth on a summer's day. They quiet the noise of a freeway. They provide a natural wind break in winter. And every tree makes America a little greener, a little more like the verdant nation the Pilgrims knew.

I hope that Earth Day will once again demonstrate that solutions to environmental problems are emerging from the good will, generosity, and vision of the American people. We have already given the world so much. Let's give the world an example of volunteerism and environmental leadership on April 22, 1990, and in the years to come. □

Pollution Prevention: An Environmental Goal for the 90s

by William K. Reilly

Despite their popularity, national celebrations of anniversaries often turn out to be what the eminent historian Daniel Boorstin has called "pseudo-events"—long on hype and nostalgia, short on substance.

Earth Day 1990 should be an exception to that rule. The 20th anniversary of Earth Day, like the first Earth Day on April 22, 1970, marks a turning point in the history of our relationship with planet Earth.

In 1970, as a result of mounting public concern over environmental deterioration—rivers on fire, cities clouded by soot, waterways choked by raw sewage, automobiles pumping out some 20 times the smog-producing emissions of today's cars—we began as a nation to address the most obvious, most acute environmental problems.

The National Environmental Policy Act was signed by President Nixon on New Year's Day 1970. In short order, the Clean Air Act of 1970 was passed. In December 1970 EPA was created. The Clean Water Act of 1972 soon followed. Because these readily identified environmental problems were so immediate, so obvious, it was relatively easy to see what had to be done and to summon the political will to do it.

As more environmental laws were enacted, they shared a common approach: They authorized EPA to develop rules and regulations that dictated, to a large extent, how our society would control its pollution and other wastes.

The regulations defined treatments for wastes, set discharge limits, mandated proper disposal methods, and provided enforcement authorities. For the most part, this command-and-control approach achieved dramatic successes in reducing discharges of pollutants from point sources. In other words, the substantial environmental investments



EPA photo.

made by the American people paid off handsomely.

Yet the achievements, as significant as they are, have been overtaken by new, growing environmental challenges and expectations. As the technology improved to detect ever-smaller levels of contamination, and as we learned more about the health and environmental problems associated with pollution, we found that deeper cuts in pollution were necessary. True to the theory of diminishing returns, reducing the remaining increments of pollution proved more difficult and more expensive than the initial ones.

New problems also surfaced. Few can forget the drama with which Love Canal entered the public consciousness. The tragic story of the Love Canal community, built above an abandoned hazardous waste dump, resulted in the Superfund program to clean up improperly disposed-of hazardous

An outfall. Despite progress in controlling such point-source discharges, we still face massive pollution problems.

wastes. This program added a huge new task to EPA's already ambitious mandate. From the inception of Superfund until now, EPA has devoted tremendous effort to the regulation and cleanup of hazardous wastes.

The big picture emerging from the first two decades of environmental protection is one of a nation investing considerable money and effort in a basic problem: how to cope with all the wastes generated by our modern industrial society.

(Reilly is Administrator of EPA.)

And now the entire world is confronted by alarming new discoveries of global environmental problems urgently requiring attention. Despite our best efforts at pollution control, this country still faces a massive accumulation of waste here at home—and accelerating devastation of nature abroad.

Global warming, stratospheric ozone depletion, acid rain, deforestation, soil erosion, species extinction, habitat destruction: This daunting array of new environmental challenges not only could overshadow environmental gains already recorded, it could destabilize

Garbage—one of the major challenges for pollution prevention. Here, barges bring solid waste from New York City to Fresh Kills, the world's largest landfill.

the very natural systems which sustain human life on Earth.

For all these reasons, I believe the dawning of the third environmental decade finds us at a historic turning point—a time when we must find a new approach to meeting our needs. If we don't, we may seriously compromise the ability of the poor to improve their standard of living and of future generations to meet their needs. We must find ways to continue economic growth and progress without irreversibly depleting the natural capital of the planet.

I am encouraged that today our institutions and our people seem ready to accept a new ethic, a new sense of stewardship on behalf of the environment. And right at the heart of this is a new approach to managing waste: pollution prevention.

Pollution prevention must become a fundamental part of all our activities, all our initiatives, and all our economic

growth. Increasingly, businesses are recognizing that pollution prevention can save them money. As the magazine *The Economist* recently suggested, good growth will be “green” growth.

Jim MacNeill, Secretary General to the World Commission on Environment and Development, recently laid out his vision of sustainable development. It's “not the type of growth that dominates today,” he wrote, “but growth based on forms and processes of development that do not undermine the integrity of

Pollution prevention must become a fundamental part of all our activities, all our initiatives, and all our economic growth.

the environment on which they depend.”

As MacNeill points out, an essential condition for sustainable development is that a nation's basic stock of ecological capital not decrease over time; in other words, developed and developing countries alike must learn to live on the interest of the earth's stock of renewable resources, without encroaching further on the principal. Doing so, MacNeill believes, will require a significant reduction in the energy and raw-material content of every unit of production. And to accomplish this, the nations of the world will have to adopt far-reaching strategies aimed at abating and, more importantly, preventing pollution.

Finding creative approaches to pollution prevention is a priority for EPA; it's also the theme of EPA's Earth Day 1990 celebration. My intent is that as time goes by, the pollution prevention ethic will work its way into



William C. Franz photo

Environmental regulation first dealt with pollution that was all too visible to everyone, then moved on to control less obvious pollutants. The next step is to prevent pollution before it is released into the environment.

the fabric of our society, becoming an integral part of our way of life.

How can pollution prevention contribute to sustainable development? An obvious example, and one that is close to home for all of us, is municipal solid waste—garbage.

As the magazine The Economist recently suggested, good growth will be "green" growth.

By now, most Americans are well aware of the growing burden the garbage glut is placing on the nation's landfills and other disposal facilities. But along with the disposal problem, we must also pay attention to the supply side of the equation—the insupportable drain on natural resources represented by the millions of tons of trash that we throw away every day. Much of that waste could be saved through pollution prevention and recycling—preserving resources at the front end and returning expended resources to productive use at the back end.

EPA has set a goal of achieving a 25-percent reduction in the nation's waste by 1992. This is a realistic national goal if everyone contributes—government, business, and, especially, consumers.

Thus, in designing products, business executives need to design for waste reduction: to think not just about how a product will be used, but also about how long it can last and what will happen to it when its useful life is over.

Manufacturers and distributors need to eliminate unnecessary packaging.

And we all need to rethink the wisdom of disposable, "use-once-and-throw-away" products, however convenient they may seem.

On the household level, we need to start composting our kitchen garbage and yard waste, if possible. At the very least, each of us should begin to separate our garbage according to local recycling programs. The transition to recycled materials is an important part of limiting encroachment on natural capital. It's no coincidence that countries that have already made considerable progress in recycling aluminum, steel, paper, and glass are at the top of the list of international economic performers.

At EPA, we're doing our part by looking for ways to encourage markets for recycled and recyclable materials. For example, we've issued federal procurement guidelines that require the federal government, as well as state and local governments using federal funds, to purchase recycled paper and building materials, used oil, and retreaded tires. We're also trying to set an example for others by instituting our own Agency-wide waste-minimization and paper-recycling program.

But more is needed. The nation may need new legislation to foster markets and incentives for recycled materials. We also may need new disincentives to unnecessary waste generation, such as excessive packaging of consumer products. Several bills that would address pollution prevention and waste minimization are now pending in Congress; and the Bush Administration is drafting its own "Pollution Prevention and Recycling Act," which will offer a comprehensive approach to prevention.

In placing such strong emphasis on pollution prevention, I am not calling

for a retreat from environmental regulation or from vigorous enforcement. Pollution prevention complements and reinforces the continuing efforts to ensure proper waste treatment, disposal, and cleanup.

What I am saying is that until now, our nation's laws and regulations have concentrated almost exclusively on waste treatment and waste cleanup. As vital as these efforts are, they can achieve only a limited amount of environmental protection. In fact, the biggest environmental gains we have made have been in the handful of cases when industry has phased out or found substitutes for problem substances. The banning of DDT in the early 1970s is probably the best-known example. Another is the drastic reduction of lead in gasoline; since EPA began its efforts to remove lead from gasoline, lead levels in the ambient environment, as well as in people's blood, have dropped dramatically.

Borrowing from the late René Dubos, EPA's slogan for Earth Day 1990 is, "Think globally; act locally. You can make a difference." The Agency is thinking globally and acting locally by applying the concept of pollution prevention to its existing programs in a number of very down-to-earth ways. For example, the water program is emphasizing pollution prevention and conservation as it develops guidelines for controlling industrial wastewater pollution. EPA is also identifying and incorporating pollution prevention techniques in its permitting activities.

We have put together a state grant program to support state and local pollution-prevention programs. We're changing our enforcement policies to encourage defendants to make fundamental alterations in products and processes, in addition to coming into compliance with end-of-pipe standards.

EPA is also establishing a Pollution Prevention and Recycling Awards program to honor the best national



the use and release of CFCs, agricultural and urban run-off, indoor air pollution, the use and disposal of consumer products containing toxic substances—all are examples of big pollution problems generated by millions of small sources.

In a speech last fall in Spokane, Washington, President Bush said that

The biggest environmental gains we have made have been when industry has phased out or found substitutes for problem substances.

“through millions of individual decisions—simple, everyday, personal choices—we are determining the fate of the Earth.” We are all responsible for the environment, the President said, and “it’s surprisingly easy to move from being part of the problem to being part of the solution.”

Over time, the best way to help people become part of the solution is through education and information that increases their understanding of the environment and helps encourage a national ethic of individual responsibility. I recently created an Agency-wide Environmental Education Task Force to work closely with the states to develop an environmental education program. The task force is charged with developing a strategic plan, sponsoring an Environmental Youth Forum, and participating in the development of national environmental education legislation. Environmental education, when combined with legislatively created market incentives,

could have a powerful influence on millions of individual choices and prevent a great deal of pollution.

EPA is also sponsoring the first National Minority Environmental Career Conference on April 9, 1990, at Howard University in Washington, DC. The conference is the lead activity in EPA’s Earth Day celebration and will offer expanded opportunities to minorities for education and employment in environmental fields.

Through education, consumer demand, and improved technological innovation, I am convinced that we can find ways to manufacture products and provide services while using less energy and raw materials, and while reducing, if not eliminating completely, the generation of waste. This will bring us closer to attaining a sustainable economy for future generations to enjoy.

My wish for Earth Day 1990, therefore, is that this celebration will help to bring about a national commitment to pollution prevention—through the actions of millions of individuals finding ways to prevent, recycle, or reduce waste.

The national goal for the 1990s and beyond should be to push technology to its limits, with the ultimate objective of creating an efficient, sustainable society—a society that will preserve the environmental legacy and productivity of our nation and our planet for generations to come. □

prevention and recycling efforts. And the Agency has set up a Pollution Prevention Information Clearinghouse to help ensure that successful prevention practices are shared as widely as possible.

Finally, we’re dramatically increasing our support for environmental education. Some of the most intractable pollution problems confronting us are from decentralized sources—pollution that does not come out of a smokestack or a pipe, but results from the activities of millions of Americans going about their daily lives. Car tailpipe emissions,

The Spirit of the First Earth Day

by Jack Lewis

April 22, 1970, a Wednesday, was a glorious spring day in most parts of the country.

In the waning months of the 1960s, environmental problems were proliferating like a many-headed hydra, a monster no one could understand let alone tame or slay. Rampant air pollution was linked to disease and death in New York, Los Angeles, and elsewhere as noxious fumes, spewed out by cars and factories, made city life less and less bearable. In the wake of Rachel Carson's 1962 best-seller, *Silent Spring*, there was widespread concern over large-scale use of pesticides, often near densely populated communities. In addition, huge fish kills were reported on the Great Lakes, and the media carried the news that Lake Erie, one of America's largest bodies of fresh water, was in its death throes. Ohio had another jolt when Cleveland's Cuyahoga River, an artery inundated with oil and toxic chemicals, burst into flames by spontaneous combustion.

In a response commensurate with the problem, an estimated 20 million Americans gathered together on April 22, 1970, to participate in a spectacularly well-publicized environmental demonstration known as "Earth Day." The rallies, teach-ins, speeches, and publicity gambits almost all went smoothly, amid a heady and triumphant atmosphere that was further enhanced by perfect spring weather. But the months leading up to Earth Day had been frantic, and the success of the event had been unpredictable up to the very last moment.

Such uncertainty is endemic when volunteer effort is the driving force behind any activity, let alone one as ambitious as Earth Day 1970. Some of the grassroots activists who coordinated the work of thousands of Earth Day volunteers had come to the environmental cause rather late, after

cutting their teeth on other political issues of the 1960s, such as civil rights and the anti-war movement. Others, however, had been intensely involved in environmental causes for many years. Whatever their background, these activists were the driving force not only behind Earth Day, but also behind many smaller and less publicized environmental reforms during the closing months of the 1960s.

The term "Breathers' Lobby" was coined by the *Wall Street Journal* in the late 1960s to denote one of the most prominent components of the grassroots movement: the congeries of anti-air pollution groups that had sprung up over the previous decade in urban areas across the country. GASP in Los Angeles and Pittsburgh, the Metropolitan Washington Coalition on Clean Air, the Delaware Clean Air Coalition, and other similar groups started with sweat equity, then qualified for grants and technical assistance from the federal government. Groups focusing on water-quality issues were also making dramatic inroads: most notably, the Lake Michigan Federation, and Get Oil Out in Santa Barbara, California.

The anti-pollution stance of these groups, after changing the climate of political opinion at the state and local level, quickly permeated editorials and editorial cartoons featured in the nation's leading newspapers. Even Broadway picked up the environmental theme when the smash-hit musical *Hair* lampooned air pollution with a hilarious song called "The Air," which ended in a choking chorus of coughs. Readers were sampling a range of provocative books on the environment: *The Whole Earth Catalogue*, John Sax's *The Environmental Bill of Rights*, Paul Ehrlich's *The Population Bomb*, and Charles Reich's *The Greening of America*. Students tuned into the counterculture were picking up environmental messages from rock lyrics.

(Lewis is an Assistant Editor of EPA Journal.)



Students at Cerritos Junior College in Norwalk, California, near Los Angeles, gave Earth Day a sendoff in 1970.

Media coverage of the massive youth rallies of 1969—as well as the ghetto riots of 1965 to 1968—helped to impress on the American public that the United States had become an urban country with complex problems compounded by huge numbers of people. Early in the 1960s, most rhetoric about the state of America's air, water, and other resources had revolved around the word "conservation," with heavy emphasis on

To countless participants, Earth Day was a turning point in their lives which they remember to this day with awe and reverence.

the preservation of parks and recreational areas. The word "environment" came into widespread use only at the end of the decade. By then, committed activists understood that urban environments would be the battlefield for years to come, but they wanted the American public and American political leaders to understand that as well.

One prominent politician, Gaylord Nelson, then Senator from Wisconsin, had been frustrated throughout the 1960s by the fact that only a "handful" of his Congressional colleagues had any interest in environmental issues. On the other hand, during his travels across the United States, he had been greatly impressed by the dedication and the expertise of the many student and citizen volunteers who were trying to solve pollution problems in their communities.

It was on one such trip, in August 1969, that Nelson came up with a strategy for bridging the gap separating grassroots activists from Congress and the general public. While en route to an environmental speech in Berkeley, California, the Senator was leafing

Julian Wasser/TIME Magazine

through a copy of Ramparts magazine when an article about anti-war teach-ins caught his eye. It occurred to him that the teach-in concept might work equally well in raising public awareness of environmental issues.

In September, in a ground-breaking speech in Seattle, Senator Nelson announced the concept of the teach-in and received coverage in *Time* and *Newsweek* and on the front page of the *New York Times*. Several weeks later, at his office on Capitol Hill, he incorporated a non-profit, non-partisan organization called Environmental Teach-In, Inc. He announced that it was to be headed by a steering committee consisting of himself, Pete McCloskey, a Congressman from California, and Sidney Howe, then the President of The Conservation Foundation.

The main purpose of the new organization, he declared, was to lay the groundwork for a major nationwide series of teach-ins on the environment early in 1970. The purpose of the teach-ins was, in Nelson's words, to "force the issue [of the environment] into the political dialogue of the country." Very quickly, Environmental Teach-In received pledges from the Senator himself (\$15,000), from the United Auto Workers and the AFL-CIO (\$2,000 each), as well as from The Conservation Foundation (\$25,000) and other organizations.

Early in December, Senator Nelson selected a 25-year-old named Denis Hayes, the dynamic former President of the Stanford student body, as national coordinator. Hayes, postponing plans to enter Harvard Law School, immediately set to work making plans for the inaugural Earth Day.

Hampered from the start by an extremely limited budget (approximately \$190,000), he rented an office in Washington and gathered around him an enthusiastic cadre of volunteers, most of them students. The most promising and the most dedicated of these were named coordinators for various regions of the country. Working in an atmosphere Midwest Coordinator Barbara Reid Alexander recalls as "mass confusion," they were inundated each

day by torrents of phone calls and overflowing mailbags.

Senator Nelson's Senate staff lent its full support and guidance to the work of Hayes and his assistants, only a few of whom were salaried and those only at meager levels. Nelson and Hayes had already agreed that the teach-ins should, wherever possible, be located not on college campuses, but in public spaces within the community, and furthermore, that active participation should be sought from labor unions, the League of

Women Voters, and other organizations. The latter goal was realized, but not the former, at least not to the extent originally intended.

One masterstroke was the purchase of a full-page ad that appeared in the *New York Times* early in February 1970. The advertisement announced that on April 22, 1970, at locations throughout the United States, citizens would demonstrate for a cleaner environment. Immediately contributions started to roll in, and better yet, the curiosity of

The Legacy of Earth Day

by Gaylord Nelson

We can get a rough measure of the impact of Earth Day 1970 on the nation by asking some key questions:

- What changes on the political scene did it bring?
- What has been achieved?
- How did it affect public attitudes on environmental issues?
- Can we see some sprouting seeds that might flower into a national conservation ethic?

These questions can be answered fairly briefly.

My major objective in planning Earth Day 1970 was to organize a nationwide public demonstration so large it would, finally, get the attention of the politicians and force the environmental issue into the political dialogue of the nation. It worked. By the sheer force of collective action on that one day, the American public forever changed the political landscape regarding environmental issues.

(Nelson, founder of Earth Day 1970, is Counselor to The Wilderness Society.)

By the sheer force of collective action on that one day, the American public forever changed the political landscape regarding environmental issues.

The politicians got the message. They responded with a series of major legislative initiatives that have begun to move us in the right direction. There are even glimmers of hope that we, as a society, may be starting to develop a conservation ethic and that the next generation may turn out to be the conservation generation so vital to our future.

Another important change has occurred in the past decade or so—a change that now makes it likely that Congress, regulatory agencies, industry, environmentalists, and the public can cooperate to make environmental controls more effective and less costly. For years every major legislative initiative to control pollution was opposed by the affected industries on the grounds that the proposals were unnecessary, too expensive, or



Magnolia blossoms encountered through a gas mask. On Earth Day 1970, this Pace College student in New York City used this symbolic gesture to warn of pollution dangers.

unworkable. The result was constant confrontation. Endless amounts of time and energy were wasted on political maneuvering, delay, and debates over whether it was necessary to do anything. Witness the 10 years of debate over acid rain.

That kind of deadlock has passed. The business community now generally acknowledges that there are serious environmental problems that need to be addressed. A recent statement by Chrysler Corporation President Robert A. Lutz reflects the change: "The party's over. We are making a mess out of our environment, and the sooner we clean it up, the better."

Most confrontations in the future will not be over the need to do something but rather over how much needs to be done, how fast, and how to use market forces to help achieve the goal. Many environmentalists will have to re-examine their attitude toward the use of market forces. It is a tool too valuable to overlook.

There remains, still, an important question. Where does all of this leave us?

I think the answer to that question is that we, as a society, finally understand that human activities—many of them careless, irresponsible, or unnecessary—have created a global environmental crisis that urgently demands our attention. This is a giant leap forward.

We have come to recognize that right now, and into the next century and the centuries thereafter, no other issue is more relevant to the condition of human life than the status of our resources: air, water, minerals, soil, scenic beauty, wildlife habitat, forests, rivers, lakes, oceans.

If we agree that this an issue of fundamental consequence to us all, we must very soon respond to some important, pragmatic questions:

- How rapidly can we make the necessary conversion from a throw-away society to a preserve-and-recycle society?
- How do we launch a global movement that will begin to work changes in the way we treat the planet Earth and its resources?

Global cooperation is the key. The most important objective of this 20th anniversary celebration of Earth Day is a worldwide demonstration of concern so overwhelming that it galvanizes the political leadership of the world into a monumental cooperative effort to stop the deterioration of the planet and begin its restoration.

The time has come to stop the arms race and begin the race to preserve the planet. □

network broadcasting giants was piqued.

April 22, 1970, a Wednesday, was a glorious spring day in most parts of the country. Newspapers such as the *New York Times* and the *Washington Post* had given front-page coverage the day before to the roster of scheduled events, and the television networks also had provided enough coverage to give the impending day something of the aura of a national holiday.

Perhaps the most impressive observance was in New York City, whose mayor, John V. Lindsay, had thrown the full weight of his influence behind Earth Day. For two hours, Fifth Avenue was closed to traffic between 14th Street and 59th Street, bringing midtown Manhattan to a virtual standstill. One innovative group of demonstrators grabbed attention by dragging a net filled with dead fish down the thoroughfare, shouting to passersby, "This could be you!" Later in the day, a rally filled Union Square to overflowing as Mayor Lindsay, assisted by celebrities Paul Newman and Ali McGraw, spoke from a raised platform looking out over a sea of smiling faces. In New York, as elsewhere, self-policing demonstrators left surprisingly little litter in their wake.

In Washington, the focus of events was the Washington Monument and its adjacent Sylvan Theatre, where thousands of Earth Day demonstrators congregated to hear speeches as well as songs by Pete Seeger and other performers. One of the most noteworthy statements, by Denis Hayes, made it clear that Earth Day was a beginning, not an end in itself: "If the environment is a fad, it's going to be our last fad . . . We are building a movement, a movement with a broad base, a movement which transcends traditional political boundaries. It is a movement that values people more than technology, people more than political boundaries, people more than profit."

There was no point in marching to Capitol Hill, for Congress—at the behest of Gaylord Nelson and others—had recessed so that members could return



Paul M. Schmick photo. Copyright Washington Post, reprinted by permission of the DC Public Library

1970 Earth Day participants were so alarmed about the environment that some thought the world couldn't survive another 20 years. But we did. What happens in the next 20 years?

the environmental movement. A lot of people were saying this was a flash in the pan. History has proven them wrong."

With the founding of EPA in December 1970, the history of the environmental movement entered a new phase. The Agency was fused together from 44 organizations scattered in nine departments, and it gave a much stronger profile to the federal effort to curb environmental decay across the nation. Also during the 1970s, in keeping with the stepped-up pace of environmental reform, conservation organizations began to take more active stances on urban environmental issues. These private lobbying groups soon found that they needed lawyers, scientists, and economists to make their voices heard. The whole tenor of environmental activism increasingly took on an aura of "professionalism" that was a far cry from the bold and sometimes simplistic generalities debated on Earth Day 1970.

Yet today—despite the rise of specialists and experts—grassroots emotions still boil over in the face of clearcut local issues, such as defective landfills or hazardous medical waste, which can quickly galvanize a community of homeowners.

The signs are promising that Earth Day 1990 will suffer from no dearth of volunteers or money. Its budget of \$3 million is 15 times greater than the budget of the 1970 event, and its scope will be worldwide, rather than strictly confined to the United States and Canada. In fact, there is every reason to expect that Earth Day 1990 will be an appropriate legacy of that April day 20 years ago when, even if only for 24 hours, people really did seem to matter more than profit and more than technology. □

to their constituencies and address Earth Day rallies. Interestingly, many of these politicians had to borrow prepared texts from Nelson and Environmental Teach-In, Inc. Philadelphia, Chicago, Los Angeles, and most other major American cities were also scenes of Earth Day rallies; in fact, 80 percent of all observances were urban affairs.

To countless participants, Earth Day was a turning point in their lives which they remember to this day with awe and reverence. "It was something magical and catalytical," remarked Denis Hayes, "touching a huge cross-section of Americans." Byron Kennard, then a grassroots coordinator with The Conservation Foundation, was also impressed by "one of the largest peaceful demonstrations in human history, [an event] sacred in my memory." "A charmed event," "a joyous occasion," "a public-relations masterpiece," "foundation of a national environmental consciousness" were words of praise conjured by other participants.

Earth Day was also the foundation of many environmental careers. Denis Hayes and Ed Furia, who are heading the 20th anniversary celebration of Earth Day, are typical of many individuals who built environmental careers on the momentum generated that day. One former participant, Tom Jorling, is today the Commissioner of New York's Department of Environmental Conservation; another, John Turner, is Director of the U.S. Fish and Wildlife Service. The list goes on.

Public opinion polls indicate that a permanent change in national priorities followed Earth Day 1970. When polled in May 1971, 25 percent of the U.S. public declared protecting the environment to be an important goal—a 2500 percent increase over 1969. That percentage has continued to grow, albeit more slowly, so it is fair to say that the ideals espoused on April 22, 1970, however naive and simplistic they were in many ways, have left an enduring legacy. They are, in the words of Barry Commoner, "permanently imbedded in our culture." Sam Love, who was Southern Coordinator for Environmental Teach-In, fully agrees: "What has surprised me, is the staying power of

Earth Day 1990 Viewpoints

What are some of the most important issues Earth Day 1990 should emphasize? EPA Journal asked seven people who were leaders in the 1970 Earth Day observances to respond to this question; each was also asked what he or she is doing 20 years after the first Earth Day. Here are their answers:



Ruth Clusen: Former national environmental chair for the League of Women Voters, she sees Earth Day 1990 as a time for reflection on how far we've come and how far we've got to go. Although her primary interest today is serving on the Board of Regents of the University of Wisconsin, she is still active with the Lake Michigan-oriented Clean Water Coalition and local Green Bay area environmental groups. Ruth Clusen says, "Solid waste is the major public concern at this time," but even more than that, Earth Day 1990 "is a time to look at how far we have come and whether we have met the promise of the first Earth Day. We need to look backward and forward at the same time."



Barbara Reid Alexander: Lifestyle changes and environmental education are the most important issues facing us on Earth Day 1990, says Barbara Reid Alexander, who 20 years ago was Midwest coordinator at national Earth Day headquarters. Now associated with the Maine Public Utilities Commission, she urges 1990 Earth Day observers to focus on "educating a new generation to be environmentally concerned and active. Having taken the first steps over the past two decades, we must move on to the next level of hard issues—creating a new lifestyle that frees us from dependence on toxic materials, plastics, and the like, and promoting conservation. Earth Day should help each individual learn what he or she can do to make a difference."



Sam Love: The onetime southern regional coordinator of Environmental Teach-In, Inc., Love is now a Washington film-maker with the Public Production Group, which produces films, public service announcements, and television releases for environmental groups. Like Alexander, Love stresses lifestyle changes: "The most important issue for 1990 is encouraging lifestyle changes, including conservationism. We have to move beyond the 1970s' general concern about the Earth to more specific targets, and we need to be more informed to do that."



Lee Botts: Pollution prevention is the key issue today, says Lee Botts, a 1970 founder of the Lake Michigan Federation (and still a Board member) and currently a consultant to the Chicago Department of Streets and Sanitation, where she is grappling with the problem of how Chicago can recycle plastic wastes. "In 1990, we need to concentrate on pollution prevention," she says. "We need to take advantage of a major change in the attitude of industry. In 1970, industry was the enemy; now many industries are working with environmentalists, as in our Chicago project. In 1990, we need to concentrate on pollution prevention. We are still hung up on the contamination that's already there. Instead, we need to focus on giving up sources of pollution, and on prevention. We need a new law like the National Environmental Policy Act to provide a pollution-prevention incentive."



Jack Sheehan: World-wide environmental issues should be the focus of Earth Day 1990, believes this labor-union environmentalist. Twenty years ago, he was involved in environmental programs for the United

Steel Workers of America, on the Board of the American Lung Association, and Chairman of the Clean Air Coalition. Now legislative director for the Steel Workers, he is still active in both groups and is leading the union's efforts in relation to pending Clean Air Act legislation. "Earth Day 1970 was directed at our piece of the earth—the United States," Sheehan says. "We didn't even know what we meant by our own problems; we weren't ready to look beyond them. In the intervening years, we have seen that we have to deal with environmental problems on an international level. In 1990, we need to use the word 'Earth' in a broader sense."



Michelle Madoff: She sees dealing with solid waste and protecting the water supply as key issues for 1990. In 1970, she was President of Pittsburgh's Group Against Smog and Pollution (GASP). Today, as a Pittsburgh City Council member, her main concern "is and will be solid waste and recycling it. With landfills filling up and waste from outside of Pennsylvania coming into the state, the city government is faced with being mandated to have a plan for the city by next September. By Earth Day, we have to be well along the way to a solution, so that's our Earth Day priority. The second most important issue—here and throughout the nation—is protecting our water supply against pollution."



Jack Winder: Individual action in environmental matters should be Earth Day 1990's focus, says attorney Jack Winder, 20 years ago executive director of the Metropolitan Washington Coalition for Clean Air and today an enforcement attorney for the EPA. "The 1990 focus should be on individual participation ... on the simple concept that everyone can make a difference, whether it be by recycling household waste or by filing a lawsuit against a polluter. The second major priority is water pollution and related issues, particularly protection of the water supply."

Retrospectively dubbed the year of the Environment, 1970 saw not only the first Earth Day, but also a number of other environmental landmarks: the birth of EPA, the enactment of the National Environmental Policy Act, the creation of the President's Council on Environmental Quality, and the passage of a new Clean Air Act establishing national air quality standards for the first time.

In the following five articles, these landmark events are respectively considered from the vantage point of their 20-year anniversaries; the authors all played prominent roles in the year of the environment and continue to be actively involved in environmental issues.

EPA

by William D. Ruckelshaus

As we observe the 20th anniversary of Earth Day, it may be constructive to look back to the origins of EPA 20 years ago in order to gain perspective on the nature of the environmental issue today and to explore what the future may hold for EPA and the country.

Born in the wake of the first Earth Day, EPA opened its doors in downtown Washington, DC, on December 2, 1970. For the first time, concern about environmental pollution was elevated to a national issue. The causes of this sudden escalation of the environment to the national scene were many and varied.

For one thing, color television saturated American living rooms, and the visible effect of a yellow outfall flowing into a blue river, or brown smog against a bright blue sky was far more impressive than those same images in black and white. On our newly colored TV screens, we saw spaceships heading for the moon, and the subsequent photographs of our planet—looking so small and vulnerable in the firmament—gave us a sense of our limits and a concern about exceeding them.

It was no accident that our heightened environmental concerns coincided with an unpopular war in Southeast Asia. The impact of the Vietnam War on America was dramatic and tore at our spirit and our sense of ourselves. Many became persuaded that a country that seemed to care so little for life in a far-off land might also ignore the environmental underpinning of life here at home. Modern environmentalism in America has always had a certain spiritual quality about it. I believe the coincidence of its rise with the Vietnam War both defined and contributed to that quality.

Certainly in the 1960s, America had environmental problems. Gross pollution problems abounded. Raw sewage and industrial discharges spoiling our rivers were more the rule than the exception. Air pollution from

mobile and stationary sources was far more intense on a per-capita basis than today. The toxic waste issues that have dominated the headlines in the last decade were there in the 60s, but we were focused on the problems we could smell, touch, and feel: the problems that television loved and our senses attested to on the way to work every morning.

In the late 60s, the public reacted to these problems by organizing and putting pressure on the political system, and as always, the politicians responded. What ensued was the creation of the Council on Environmental Quality and EPA at the national level. Similar agencies were created in states all over America. A cascade of environmental laws and regulations followed.

The turmoil of the early 80s left some deep and abiding scars on the Agency.

Like few other public issues in our history, the environment has drawn a high level of public awareness and commitment from the day EPA began to the present. Public opinion polls over the years have shown the consistency of the public's concern for a safe and clean environment. Events in the latter half of the 1980s have served to raise that concern to even higher levels. And today, once again, we are experiencing a strong, predictable political response.

The resurgence of public concern for the environment resulted from the emergence of new environmental issues during the 1988 presidential election. Publicity about global warming in the summer of 1988, coupled with intense heat and drought, followed by the television-recorded images of medical waste closing beaches from coast to coast was more than the public or the politicians could bear. For the first time in the history of this country, the environment became a key issue in a presidential campaign. In 1988, the environmental records of the two major candidates were debated throughout the country—from a heaving ship in Boston

(Ruckelshaus, EPA's first Administrator, is currently Chairman and Chief Executive Officer of Browning-Ferris Industries, Inc.)



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Harbor to an abandoned Superfund site in New Jersey. Both candidates made major speeches about the environment and featured one another's environmental past in their television ads.

Nor is the environment strictly an American phenomenon. Green politics have emerged from minority status and become a political movement to be reckoned with in countries throughout Europe. (See article on p. 46.) Such events as the massive destruction that resulted from a chemical spill on the Rhine River and the nuclear disaster at Chernobyl only served to bolster the emergence of the Greens. Even in the Soviet Union and the rest of newly enfranchised Eastern Europe, the public has demanded more environmental protection, and the leaders are beginning to respond.

EPA sits in the middle of this new awareness and increased demand for action. Like it or not, EPA is the repository for this nation's hope, concerns, and frustrations about the environment. How can and should EPA respond to the new forces that buffet it on all sides reflecting the ever-changing concerns of the public, the Congress, or the special interest groups? What are its responsibilities in the decade to come? What are the responsibilities of the other institutions in our society that affect environmental policy? The

answers will determine how effectively our country and the rest of the world respond to the increased demand for action on the new environmental agenda.

Without question, today's EPA is far different than it was in 1970. It is more mature. It is more focused on public health than it was 20 years ago. EPA is more seasoned, more bureaucratic, but in my view, no less committed than it was in the heady days of the early 70s.

Despite that commitment, I have concerns about the future of EPA. The turmoil of the early 80s left some deep and abiding scars on the Agency. It affected EPA's ability to interact effectively with Congress in defining its mission and goals. The scandals broke the fragile ties of trust that must exist between an entity like EPA and the public if the Agency's judgments are to be trusted and the Agency itself is to remain self-confident. Both public trust and a self-confident EPA are necessary ingredients for true environmental progress.

In addition, the turmoil—and the high degree of politicization attendant to it—has resulted in a stridency and bitterness in the environmental debate that was unheard of in the 70s. Too often the focal point of public and political rancor is EPA. Congress, environmental groups, and industry, pursuing their own agendas, have

engaged in "EPA bashing" on a wide scale. That has contributed to the further erosion of trust in the Agency, and in recent times has led to highly dedicated civil servants leaving government service.

As the Agency became an inviting and vulnerable public target, it attracted the inevitable legislative response. The history of environmental legislation in the 80s is characterized by a singular lack of trust in EPA by Congress. That is manifested in increasingly prescriptive legislation that strips away administrative discretion from EPA managers and often sets impossible goals for the Agency. These goals may gain political mileage, but their extreme nature ensures practical failure. The result has been missed deadlines, unfulfilled promises of purity, failure to achieve goals, another round of EPA bashing, followed by even more stringent goals; and the spiral of mistrust continues.

What is so remarkable about all this is that EPA, when given well-defined, realistic goals and adequate resources, performs as well as, if not better than, other institutions of government. If you look back over the 20 years of EPA's existence, the progress made in cleaning up the gross pollution problems of the past and addressing the more difficult

issues of toxic pollution of today is quite impressive. Of course, there have been missteps; certainly not every reasonable goal has been achieved, but overall the record on the environment in America is as good as, and probably better, than anywhere in the world.

Just imagine the condition of our harbors and rivers had we not embarked on the sewage treatment program of the 70s and the vigorous enforcement of the Clean Water Act in the 80s. Imagine the skies over our major cities had we not aggressively implemented the Clean Air Act, controlling both smokestack emissions and severely restricting automobile pollution. One of the major health threats to our society—airborne lead—has now been virtually

Like it or not, EPA is the repository for this nation's hope, concerns, and frustrations about the environment.

eliminated. We should take pride in the fact that we have been able to achieve these gains. These precedents should give us confidence that the new issues that confront us—toxics and acid rain, and the planetary problems of ozone depletion and global warming—can be effectively addressed by our government, given proper direction and incentives.

Any doubt concerning America's progress on the environmental front may quickly be erased with the purchase of a few plane tickets. My travels as a member of the United Nation's World Commission on Environment and Development during the 80s took me to any number of Third World countries where the environmental problems make ours pale into insignificance. In Latin America, Africa, and Asia, the pollution problems are so fundamental, so massive, and so pervasive in every aspect of human life as almost to defy description. While that should not deter us from addressing our continuing environmental problems in this country, it should show us how much we have achieved and provide us with the confidence to allocate more wisely our resources for environmental improvement in the future.

To achieve that wise allocation, and consider what to do next, we need to lower the decibel level of environmental rhetoric in this country. The bitterness and anger that have characterized the debate in recent years represent

something new, something we didn't have in the late 60s and early 70s, and it ought to end. There must be room in the America of the 90s to debate these issues and disagree about solutions to problems without the participants being dismissed as "tree-huggers" or "industry stooges."

We need to address the increasing inability of our political processes to make final decisions about needed facilities for the disposal of waste in our society. Regardless of the merits of public participation in environmental decisions, the "not-in-my-backyard" (NIMBY) syndrome is here to stay. We need to institute processes that come to an end, that provide closure, that ensure the finality of decision-making without sacrificing the quality of decisions. To maintain the status quo is to ensure gridlock.

EPA must re-enter the fray; EPA must re-assert itself and help define the environmental agenda for the future and set realistic goals. This alone could lead to a far more efficient allocation of what necessarily will be inadequate resources, and ultimately a re-establishment of trust in EPA by the public.

The process of setting these goals needs to be based on a solid scientific understanding of the problems we face, a thorough and objective review of the solutions that are available, and a realistic assessment of the costs of each of those solutions. A very open goal-setting process will lead to a greater public understanding and acceptance of the goals that are set and the solutions chosen.

Right now the Agency, according to its own analysis, is spending an enormous amount of its precious resources to control environmental hazards that pose relatively small risks to our society. At the same time, many known environmental hazards are barely being addressed because of the low priority for them dictated by Congress. Some would say the answer is to give EPA more money. The Agency may need increased resources, but the fact is there will always be problems waiting when those of higher priority are brought under social control.

As with all problems facing our society, today's reality in Washington is one of limited resources, and choices must be made by EPA, like everyone else. Congress, working with the EPA comparative risk analysis already available, must thoroughly re-examine the existing allocation of resources in terms of real health and environmental

priorities. Surely the current disconnect between Congressionally allocated resources and priorities to be addressed can be remedied. It is in the best interest of EPA, the environment, and the country to do so.

As environmental demands increase in breadth and depth, allocating resources will become an increasingly larger challenge for all our elected leaders. Let me give you an example. A major chemical company, as a result of its SARA Title III chemical emissions report, has decided to reduce those emissions by more than 90 percent by 1992. That decision will cost the company almost \$200 million. The company has estimated that if all industrial concerns in this country undertook the same control program, the total cost would approach \$20 billion.

Recently, when I asked the senior scientists and engineers of the firm whether they honestly believed that a significant public health improvement would result from that action, they answered no. Their action stemmed from a combination of public spiritedness, enlightened self-interest, and a desire to be out of the line of fire. The point was not whether reducing those emissions of chemicals is a good or bad thing. In a world of limitless resources, it is probably something worth doing. But in a society faced with real and hard choices about resource allocations, is this the best way to spend \$200 million or \$20 billion to serve public health? I doubt it.

These kinds of choices are being made by institutions and individuals in our society every day. The choices often involve the commitment of resources against one devil at the expense of a more formidable one. The dynamics of the choices made are driven by a combination of public opinion, Congressional legislative reaction, and EPA implementation—the process that generates public policy. EPA cannot escape responsibility for the human health or environmental implications of the policies or the choices made as a result of that process. The failure to help society understand where its best interests lie is no less because "Congress made me do it."

This is where EPA's role as educator is important. More knowledge about public health or environmental risks exists within EPA than anywhere else. That knowledge must be shared. It

should be shouted from every podium or forum available in the hopes that wiser policy will result.

People need to know what their Agency is doing and why, and what the intended or expected result will be. That shared knowledge builds trust and leads to real environmental improvement. One of the most useful Agency initiatives in recent years took place in Tacoma, Washington, in the mid-1980s. EPA undertook a massive educational effort to make sure that the community understood the risks associated with the continued operation of a local copper smelter, how those

The question for us really isn't whether humanity will survive our environmental assaults. I think we will. The question is whether free institutions will survive.

risks would be reduced by various control options, and what the true impact of those various options would be on the continued operation of the smelter—and thus on the community itself. That exercise proved, very dramatically, that when fully armed with all the facts of a situation, the public can and will make rational, intelligent decisions about the

environment and the future course of human lives.

At the end of the educational process, people from all sides of the debate—environmentalists, smelter workers, community leaders—were all sporting buttons that read "BOTH." The buttons meant that the environmental risks inherent in the operation of the smelter could be controlled to acceptable levels, and the community would still have the economic benefit of that smelter. In other words, they could have "BOTH."

We must constantly strive to make our process of dealing with environmental risks more realistic, efficient, and effective. If for no other reason, let's do it to celebrate the 20th anniversary of Earth Day. Our nation and the world are faced with major environmental challenges for the future. There is broad and intensified interest in the environment. There is increased demand to achieve greater levels of cleanup of the problems we know about. At the same time, there is scientific evidence of new and potentially serious environmental problems yet unaddressed.

Increased public pressure is not restricted to the industrialized world. Certainly, it is very intense and immediate here in the United States, but in the future, the greatest pressure on the developed world and on the environment is going to come from the

four-fifths of the world's population in the underdeveloped and developing countries yearning to approximate the standard of living now enjoyed by us. Unchanneled and uncontrolled, that inexorable push to economic development will create an assault on our environment the likes of which we have never seen.

How the developed nations, and how we as a leader of those nations, respond to our own challenges—and the path we set for the rest of the world—will say much about what kind of world will be left to coming generations. Ultimately, what is at stake in free societies and those now throwing off the shackles of 40 years, is the ability of free institutions to solve these difficult, complex, and emotionally wrenching problems. The emerging democracies are watching us, as are the vast populations in the underdeveloped world. They want to see if we can cope with our own complexities and do it within the context of freedom. If we can, our dedication to freedom will seem increasingly attractive to them as they struggle for an enhanced standard of living.

The question for us really isn't whether humanity will survive our environmental assaults. I think we will. The question is whether free institutions will survive.

When confronted with a choice between authoritarianism and chaos, people will always choose the former. Whether we can address our environmental problems within a system of political and economic freedom is an open question in the last decade of this century. Is freedom indeed the banner to which all should repair? Certainly that is the world's question and our challenge. At the next observance of Earth Day, perhaps in 20 years, I hope we can celebrate the success of attaining a livable environment, enhanced development, and expanded freedom. □



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The Council on Environmental Quality

by Russell E. Train

The environmental movement came of age in the 1970s. Fittingly, President Nixon's first official act of the decade was to sign into law the National Environmental Policy Act (NEPA), one of the most far-reaching and innovative pieces of environmental legislation in our history.

A key element of NEPA was the creation of the Council on Environmental Quality (CEQ) in the Executive Office of the President to serve as a focal point for environmental policy development. I became the first Chairman of the Council shortly after President Nixon signed NEPA, but my involvement with the legislation goes back to my tenure as president of The Conservation Foundation.

In the late 1960s, The Conservation Foundation began to focus on building ecological principles into development activities. The Senate Interior Committee, then chaired by Senator "Scoop" Jackson, had similar concerns, and with the help of The Conservation Foundation hired Dr. Keith Caldwell, a professor of political science at the University of Indiana, as a consultant. Caldwell originated and developed the concept of environmental impact analysis, which became an integral part of NEPA. Together with the creation of CEQ, environmental impact analysis requirements—obliging federal agencies to consider environmental factors in their decision-making processes—were really the heart of NEPA.

In 1968, President Nixon asked me to chair a task force on the environment to advise him on environmental issues. Our principal recommendation was to create a mechanism for developing environmental policy within the White House—a forerunner of the CEQ concept. In 1969, the administration acted on that proposal by setting up, by executive order, an interagency Committee on Environmental Quality, chaired by the president's science advisor. In short, the committee worked imperfectly and took little leadership on environmental matters.

Once NEPA was signed, the Council replaced this interagency committee and was vastly more effective. The Council had the enormous task of developing and promulgating guidelines for federal agency compliance with the environmental impact statement requirement of the act. The environmental impact statement was a revolutionary concept in government. It brought about a radical change in the way government decisions were made because it required bureaucrats to look at alternatives to proposed actions—including the alternative of doing nothing—if a planned course of action would damage the environment.

We had many interagency struggles and controversies because some agencies were extremely reluctant to go along with the process. But in fact the environmental impact statement opened up the process of decision-making for input by other agencies and the public in an unprecedented way.

Early on, the Council made the decision that each individual agency had to act as its own implementing authority for NEPA requirements. That was important because there had been some suggestion that CEQ would oversee all government actions and make its own determinations concerning environmental impacts, alternatives, and so on. First of all, this suggestion was impractical from a workload standpoint and secondly, it would have meant that individual agencies would not have felt responsible for addressing environmental considerations in their programs. They would have perceived it as someone else's job, namely CEQ's. So from the beginning, the Council tried to delegate authority to the agencies themselves, focusing the Council's own role on developing guidelines, overseeing NEPA implementation, and reacting when a poor job was being done. The Council stressed that the agencies themselves must keep full responsibility for their own environmental performance.

The Council had some dramatic successes. For example, in 1970, we recommended that the President halt work on a barge canal across northern

Today, CEQ clearly needs more staff and an augmented budget to go with it.

(Train, the first Chairman of the Council on Environmental Quality and a former Administrator of EPA, is currently Chairman of the Board of World Wildlife Fund and The Conservation Foundation.)

Reviews of the potential environmental impacts of federally aided highways were one of the innovations of the National Environmental Policy Act. This aerial view shows construction of an interstate highway in Wisconsin.



Mike Brisson photo.

Florida, although one-third of the work had been completed. I sent the President a memorandum stating that the environmental costs of the canal far outweighed the benefits because it threatened to destroy a unique scenic area, a major wildlife habitat, and a large sport fish population. Other adverse effects, such as pest infestation and water pollution, also were feared.

The President ordered work stopped on the canal, despite strong protests from the shipping industry and local developers. This controversial decision dramatically demonstrated the new force the environmental ethic had in government decision-making.

Within a few years, the staff of CEQ numbered about 54, the same size as the Council of Economic Advisors. It was a superb staff. The environment was a hot issue at the time, and since young people graduating from college and law school were anxious to get into the

environmental area, we had the pick of the crop. Bill Reilly came in as a young attorney and played a major role in developing the National Land Use Policy Act that President Nixon submitted to Congress.

But that legislation was too far ahead of its time and never seriously considered by Congress. It would have required states, as a condition for obtaining federal financial assistance, to assume responsibility for land-use decisions that have impacts beyond the local jurisdiction where the decision is made. The bill would also have required states, for the first time, to: protect areas of critical environmental value such as coastal wetlands and historic districts; control land use around public facilities such as airports, highway interchanges, and major recreation areas; and assure

that regionally needed development, such as water-treatment plants or low- and moderate-income housing was not excluded by local governments. Though many of these principles were incorporated into other laws, many others—such as wetland protection—were long neglected and are only now being given their full due.

The Council quickly adopted the role of developing an annual environmental message for the President to send to Congress. This message became the repository for a wide range of legislative initiatives as well as executive actions in the environmental area. The Council had a great deal of clout through having responsibility for putting together this message. Under CEQ staff direction, various interagency committees were working on environmental problems involving drinking water, strip mining, and air pollution, for example. Through



Miami Herald photo.

Acting on the recommendations of the newly created Council on Environmental Quality, President Nixon called a halt to construction of the Trans-Florida Barge Canal in 1970.

this interaction, we were able to shape an enormous number of recommendations. The series of environmental legislative proposals of the early 1970s represented the greatest outpouring of legislation in any single subject area in the nation's history.

The creation of EPA in December 1970 might be construed to indicate that CEQ no longer had an important role to play. That was not the case in 1970, nor is it true today. CEQ, because of its location in the Executive Office of the President, has the unique opportunity to work in the realm where environmental responsibility overlaps with the jurisdiction of other agencies. This is a crucial role, because the environment by its very nature cuts across the entire fabric of government. Agricultural policy, transportation policy, and energy policy all have enormous environmental implications. It is not easy for one agency to effectively interact with another in this kind of situation. EPA has a strong working relationship with the other agencies, but it is not always welcomed with enthusiasm. Often it is perceived as interfering in the exclusive jurisdiction of another bureaucracy. This is a hard row to hoe.

CEQ is better able to operate in that situation by virtue of its position in the

executive office, assuming it is given adequate authority by the President. It has the potential to revive the cooperation and coordination that it built to put together the comprehensive environmental messages it sent to Congress in the early 1970s. That is where CEQ's real role lies, and it is an extremely important one.

Today, CEQ clearly needs more staff and an augmented budget to go with it. Currently, it has a staff of only about

CEQ should not try to operate as the Administration's voice on the environment.

ten, one-fifth what it was in the early 1970s. This is simply inadequate to meet the challenges ahead. On the issue of global warming, for example, the interaction between energy and environmental policy will be critical. CEQ could help implement an environmentally sound energy policy by ensuring that federal agencies are aware of and abide by energy and environmental guidelines. EPA need not abdicate any authority in the area, but I would recommend a close working relationship between CEQ and EPA, with CEQ coordinating interagency responses. Such a relationship, however, will be extremely difficult to

implement without a major commitment to CEQ by the current Administration.

CEQ should not try to operate as the Administration's voice on the environment. Such a role for CEQ became unnecessary when EPA came into existence—especially when EPA is headed by a strong environmentalist like Bill Reilly. Michael Deland is an outstanding choice for Chairman of CEQ. He is a strong environmentalist, with a lot of experience in the field. He has dealt in the past with many controversial issues, and he is intelligent and tough but fair-minded. With talented environmentalists at EPA and CEQ, and with a renewed commitment by the President, the United States will be ready to confront the difficult environmental problems of the new decade. □

The Clean Air Act of 1970

by Paul G. Rogers



API/Wide World photo

(Rogers served as Chair of the House Subcommittee on Health and the Environment during the 1970 Clean Air Act deliberations. He is currently a partner in the law firm of Hogan and Hartson in Washington, DC.)

David F. Grady assisted in the preparation of this article.

Shortly after Earth Day 1970, Congress enacted the landmark Clean Air Act amendments. Progress has been made on air quality, but much more needs to be done. This 1963 photo shows a massive smog episode in New York City.

Historians of the environmental movement are likely to peg Earth Day 1970 as a key turning point in the American public's consciousness about environmental problems. I believe that Congress' enactment of the 1970 amendments to the Clean Air Act a few months later was an equally significant landmark. For the 1970 amendments moved environmental protection concerns to a prominent position on Capitol Hill, where they by and large have remained ever since.

It seems appropriate, as Congress is considering new amendments to the Clean Air Act, to assess what lessons might be learned from the events of two decades ago.

The juxtaposition of Earth Day and the 1970 amendments was no accident. As a representative body, Congress was responding to the heightened public concern about environmental pollution that was symbolized by the Earth Day demonstrations. Some have said that Congress reacted to public pressure too quickly and rushed through clean-air legislation that was not up to the task of responding to real air-pollution concerns. I disagree.

While the 1970 amendments may have been the first time that pollution-control efforts obtained such a high profile in Congress, they were not Congress' first effort to address air-pollution problems. On the contrary, we drafted those amendments to correct previous pollution-control strategies that had failed. With the passage of the 1970 amendments, Congress adopted new approaches to regulation such as national air quality standards and statutory deadlines for compliance that are commonplace today, but represented a significant turning point in 1970.

To put the 1970 amendments in proper context, one needs to look back at Congress' prior efforts to control air pollution, particularly the Air Quality Act of 1967. That statute authorized the Secretary of Health, Education, and Welfare (who then had chief responsibility for federal environmental protection programs) to designate so-called air quality regions throughout the country; the states were given primary responsibility for adopting and enforcing pollution-control standards within those regions.

Some of us involved in the enactment of the 1967 statute had significant doubts as to the viability of the regional approach to air-pollution control; after all, air contamination does not stop at

neatly defined regional boundaries. Nevertheless, Congress as a whole and American industry were not yet convinced of the need for a national strategy for pollution control; therefore, as a first step, the 1967 statute's regional approach became the law of the land.

The approach was a notable failure. By 1970, fewer than three dozen air-quality regions had been designated, as compared to an anticipated number in excess of 100. Moreover, not a single state had developed a full pollution-control program.

This unsatisfactory record, coupled with the public pressures created by the Earth Day movement, provided the necessary impetus to convince Congress that national air quality standards were the only practical way to rectify the United States' air-pollution problems. Similarly, the record of inaction under the 1967 law led Congress to impose statutory deadlines for compliance with the emissions standards authorized under the 1970 statute, in the hope that those deadlines would spur action.

Thus, the two key provisions in the 1970 act were not a frenzied reaction to public pressure, but instead were a deliberate response aimed at correcting the demonstrated failures of previous regulatory efforts.

Of course, no one would argue that the 1970 statute achieved all of its objectives; the deadlines were extended, and for the most part, the national standards were not attained. Yet I believe that history, on balance, should judge the 1970 amendments as a major and positive turning point in the national environmental-protection effort. The 1977 Clean Air Act amendments confirm this judgment.

For just as important as its deadlines and innovative nationwide standard-setting approach was the 1970 statute's underlying purpose: to raise the consciousness of the American public and American business regarding the importance of pollution control. In enacting the 1970 statute, Congress knew that a central element in any successful approach to air-pollution

control (and, indeed, environmental protection generally) would have to be a change in attitude about the value of environmental protection.

During the House floor debate on the amendments, one of my colleagues quoted a small town mayor, who (in expressing the previous conventional wisdom that environmental protection and economic growth were not compatible) is reported to have said: "If you want this town to grow, it has got to stink." Before 1970, there were still many persons and companies throughout the United States who agreed with the mayor that pollution was the inevitable price of progress. In the 1970 amendments, however, Congress signalled its firm belief that

The 1970 amendments moved environmental protection concerns to a prominent position on Capitol Hill, where they by and large have remained ever since.

economic growth and a clean environment are not mutually exclusive goals.

In order to change these previously entrenched attitudes, it was necessary to get the attention of industry and the American people. By taking the then-bold step of making air-pollution control a national responsibility, with strict deadlines for compliance, Congress accomplished that purpose in the 1970 statute. Even though the deadlines originally imposed in the 1970 amendments ultimately were not met, the amendments unquestionably succeeded in fostering a profound attitude shift in this country.

A consensus has emerged from the experiences gleaned under the 1970 amendments that environmental protection and economic growth can, and must, be accomplished hand-in-hand. Indeed, I suspect that if the mayor quoted by my colleague were to seek election today, he or she would be soundly rejected at the polls. This attitudinal change in American society

is itself a significant achievement for which the 1970 Clean Air Act amendments deserve a share of the credit.

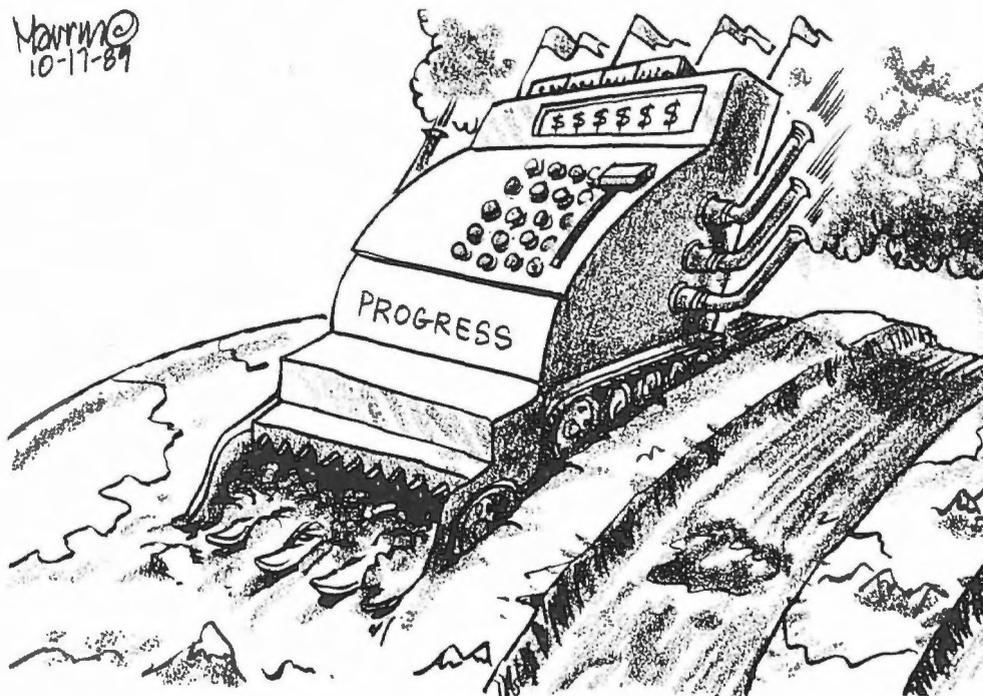
But a positive change in attitude and assumptions about environmental protection does not in itself clean up dirty air. Congress is still struggling with the difficult question of how to achieve that goal. Thus it is fair to ask what lessons the 1970 amendments might hold for Congress as it sets about revising the Clean Air Act once again. I believe several lessons may be drawn.

- *Strike while the iron is hot.* While the 1970 amendments gradually evolved to correct previous statutory initiatives that had failed, their actual enactment by the full Congress was accomplished with unaccustomed speed. This was made possible because of the high priority assigned to environmental issues on the public agenda following Earth Day.

Today's political climate is similar. Rising public concerns over well-reported environmental problems such as acid rain, global warming, and fouled beaches, coupled with the high profile that environmental issues took in the 1988 presidential elections, provide this Congress with one of the most promising opportunities for legislative initiatives on clean air in recent years. Since this positive combination of events is likely to have a somewhat limited life span, Congress should seize the opportunity—as it did in 1970—and act now to revise the statute.

- *Avoid artificial limits on pollution-control efforts.* Just as the 1970 amendments demonstrated Congress' acknowledgment that air pollution could not be effectively addressed on a regional level, the current effort to amend the statute should take into account the increasing emphasis on the international nature of air-pollution problems. The recent Montreal Protocol on reducing use of chlorofluorocarbons and our ongoing dialogue with Canada regarding acid rain are but two examples of the growing recognition that air pollution

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10-11-89



Pat Marrin cartoon

does not stop at state or regional boundaries; it crosses national boundaries as well.

Just as in 1970 Congress took the ground-breaking step of making air-pollution control a national effort, Congress today should not hesitate to lay the groundwork for international approaches to environmental issues.

- *Take advantage of improved knowledge.* Striking developments since the 1970 amendments have been the explosion of knowledge about the nature of air pollution, and the advanced new technologies available to control that pollution. The study of pollution and the design of pollution-control techniques were in their infancies in 1970. Congress did not have the benefit of the wealth of additional knowledge at society's disposal today. This expanded knowledge base should permit Congress to adopt compliance deadlines that are better pegged to technical feasibility than in 1970.

- *Follow through with oversight and enforcement.* One of the reasons the 1967 Air Quality Act failed and thus spurred Congress to enact a tough national air quality program in 1970 was the almost complete lack of enforcement of the earlier statute. A similar fate befell the 1970 amendments

A consensus has emerged from the experiences gleaned under the 1970 amendments that environmental protection and economic growth can, and must, be accomplished hand-in-hand.

and has continued to plague implementation of the Clean Air Act ever since (although enforcement activity has increased somewhat in recent years).

Congress, of course, can only pass laws; it is up to the Executive Branch to enforce them. It is imperative that Congress follow through on the upcoming amendments to the Clean Air Act with a stringent oversight role. It will be critical to keep the pressure on in order to see to it that those who are covered by the statute obey it—or pay the requisite penalties for violations.

Overall, the concepts set forth in the 1970 Clean Air Act amendments and revised and strengthened in the 1977 amendments are still valid. A national approach to air-pollution control remains the only practical way to respond to this problem. Indeed, as I mentioned earlier, the real question today is not so much whether more efforts should be ceded to more

localized governments, but the extent to which international cooperation is needed to fight air pollution.

Similarly, the use of statutory deadlines to force compliance with air quality standards is, if anything, more appropriate today, given our greater information base and technological capabilities upon which to base such deadlines. What is needed is not so much a change in approach from the framework of the 1970 amendments, but a reinvigorated commitment on the part of government, industry, and the population at large to meet the new compliance deadlines that are likely to be part of the Clean Air Act expected to pass later this year.

As our environmental problems accumulate, and as our concerns about air pollution grow broader and more complex, we cannot afford to let the current opportunity to amend the Clean Air Act go by without success. The 1970 Clean Air Act amendments were a watershed that paved the way for the widespread consensus in our country today that air-pollution control must be a top priority of the federal government. Those of us who had a hand in drafting the 1970 amendments therefore can take satisfaction because that legislation has had a positive impact on our nation's environmental protection efforts. It is now up to our successors to build on that foundation and make further progress in improving air quality in the United States. □

Earth Day: One View

by Denis Hayes

Little more than a year ago, in an article for *EPA Journal*, I proposed that someone seize the initiative and organize a global Earth Day to coincide with the 20th anniversary of the first Earth Day. As "luck" would have it, a year later that someone turns out to be me. Two months after the article appeared, a dozen national environmental leaders asked me to take a leave of absence from my legal practice to coordinate the Earth Day 1990 campaign.

At this time last year, Earth Day 1990 was nothing more than a concept. Now it is a staff of 30 in Palo Alto, California; a National Board of Directors well over 100 in number, with representatives from every sector of American society; an International Board of Sponsors spanning every continent; and a field organization with 18 regional offices. In little more than a year, Earth Day 1990 has gone from the drawing board to being a huge, global coalition determined to turn the tide in the battle to pull the planet back from the brink of ecological destruction.

In 1970, the goal of Earth Day, as articulated eloquently by then-Senator Gaylord Nelson, the true "father" of Earth Day, was to demonstrate to corporations, politicians, and our somnambulant neighbors that nobody is immune to the threats posed by environmental pollution and no one can avoid culpability. Twenty years later, some of the symptoms have changed, but the problem remains the same. Us.

(Hayes served as National Coordinator for Earth Day 1970 and is currently Chair and Chief Executive Officer of Earth Day 1990.)

Sure, there are lots of villains to point fingers at: uncaring corporate monoliths; sleazy businessmen out to make a quick buck regardless of the damage left in their wake; and politicians too dependent upon polluters' contributions and more than willing to turn a blind eye.

However, no one is holding a gun to our heads as we merrily drive ourselves into the greenhouse age. Nothing short of a society-wide commitment is needed if we are to turn our backs on the "disposable society" and move toward realizing the vision of a society that lives in harmony with the environment. The 20th anniversary of Earth Day is an auspicious time to remind corporations, politicians, and ourselves that such a profound shift is needed. The alternative is catastrophe.

The Concept

The concept of Earth Day was American in its origin. However, the problems that Earth Day addresses are global in nature. Whereas Earth Day 1970 was the catalyst for the creation of the modern American environmental movement, Earth Day 1990 is designed to catalyze a truly global environmental movement—and to make the 1990s a decade of striking environmental achievements.

In 1970, the focus was on air, water; and noise pollution. Thousands of schools, universities, and communities staged Earth Day events. In the past two decades, endangered species have been protected, once-dead waterways have been cleaned up, and air quality in some areas has improved. However, despite notable local improvements, the health of the planet has declined precipitously.

The Issues

Unfortunately, it took the discovery of holes in the ozone layer, widespread fires in the Amazon, and convincing proof of the threats posed by global climate change to make the environment an issue worthy of international press interest and pride of place at the most recent summit of the leaders of the major industrial powers. Now that environmental issues have captured the attention of our politicians and the press, we have an unprecedented opportunity to translate public concern about the environment into concerted action.

Earth Day 1990's campaign will send a clear signal to the world's leaders that the time is nigh to set aside narrow self-interest and focus on the global environmental issues that threaten the continued existence of the human race. The time has come to galvanize our collective energies on making "sustainable development" more than a pleasing rhetorical phrase.

The Constituency

To meet the formidable challenge of building a constituency for sustainable development, Earth Day 1990 is seeking the assistance, participation, and commitment of leaders from all sectors of society. Earth Day 1990's National Board of Directors is drawn from government, education, labor unions, civil rights groups, corporations, academia, and the arts, and includes the chief executive officer of every major national environmental organization in the United States.

At the grassroots level, Earth Day 1990's field staff have held organizing meetings in over two dozen cities across the country. The response has been overwhelming. Regional Earth Day 1990 offices are now open across the country. Local grassroots and student organizations now exist in hundreds of cities, including all of the nation's

largest metropolitan areas. Individuals involved in local Earth Day 1990 coalitions are a study in diversity. Participants range from members of neighborhood improvement associations to city council representatives, from environmentalists to civil rights activists, from students to senior citizens. Many have never been involved with an environmental campaign before.

Supplementing our field-organizing activities, Earth Day 1990 has developed public-education programs to reach people in their homes, their workplaces, and their recreation centers. These programs are designed to change how

people shop and affect how they vote and raise their children. Some are aimed at primarily a U.S. audience while others have been adapted for use in other countries.

Education

To reach the next generation of leaders with lessons that we have yet to learn, Earth Day 1990 has developed formal educational materials including a Lesson Plan and Survey for students in grades K-12 and a Campus Environmental Audit for colleges and universities. At the K-12 level, students will work with their parents to complete

a survey which they can use to measure the environmental soundness of their homes. The campus audit will help students, faculty, and administrators to gauge accurately the impact their college has on the community's environment through the generation of solid, medical, radioactive, and hazardous waste as well as air and water pollution, procurement policies, and dangers in the workplace.

Investment

Drawing on the examples of anti-apartheid activists and other social justice movements, the environmental movement has launched an ambitious campaign to apply environmental concerns to decisions in the corporate boardroom. I co-chair the Coalition for Environmentally Responsible Economies (CERES), which includes environmental organizations and financial institutions. In the fall, CERES unveiled a new 10-point corporate code of ethics, the Valdez Principles, which address the damaging impacts of products and production processes on consumers, employees, communities, and the global environment.

Already, the Valdez Principles have been endorsed by state, city, and religious pension funds totaling over \$150 billion in assets. In conjunction with other coalition members, Earth Day 1990 is working with corporations, state treasures, portfolio managers, universities, and cities to urge the wide adoption of the Valdez Principles as an effective gauge for corporate

NYT Pictures



Concern about pollution and other forms of environmental degradation spread across the United States in 1970. A goal of Earth Day this year is planet-wide environmental commitment.



Making a point on Earth Day 1970.

performance and a guideline for socially responsible investing.

Global Cities

Responding to an upsurge of municipal environmental activism, Earth Day 1990 has developed the Global Cities Project, which offers practical assistance to city and county authorities in expanding or creating programs that fulfill the maxim, "Think globally. Act locally."

Under the Global Cities Project, Earth Day 1990 will help cities and counties to develop or augment existing programs in areas such as ride-sharing, recycling, energy and water

conservation, hazardous waste reduction, and tree planting. Cities participating in the project also will receive an "Earth Day Project Planning Guide" and will be eligible to attend project-planning seminars held throughout the country. The response has been enthusiastic, with participants ranging from Newark, New Jersey, to West Hollywood, California, to Atlanta, Georgia.

International Earth Day

On the international level, Earth Day 1990 has a growing International Board of Sponsors, which spans every continent and includes two heads of state and the leaders of 10 international

organizations, including two United Nations agencies. Over 120 countries have Earth Day coalitions representing more than 1,000 non-governmental organizations, universities, and government agencies. Planned activities range from an "Indigenous Peoples Consultation on Bio-Diversity" in the Phillipines to a "Green Train" bearing Earth Day 1990's logo on its side as it travels through 21 major Italian cities testing pollution levels with its on-board laboratory.

The Global Challenge

International Earth Day is a concept that has come due. Global environmental issues exemplify the interdependence of communities around the world. If we truly want to develop solutions to global warming, ozone depletion, ocean pollution, and the rest of the global ecological horrors that we've created, world leaders need to take the pragmatic steps of setting aside parochial priorities and focusing on threats to the global commons. Earth Day 1990's global campaign will provide the politicians of the world with compelling evidence that there indeed exists an informed and angry constituency that considers the health of the planet an issue second to none.

If You Want To Get Involved

If you want to be a part of the Earth Day 1990 process, contact our main office in Palo Alto. Wherever you live, our field staff can put you in touch with a local grassroots coordinator. For further information, contact:

Earth Day 1990
 P.O. Box AA
 Stanford University
 Palo Alto, California 94309
 (415) 321-1990. □

Earth Day: Another View

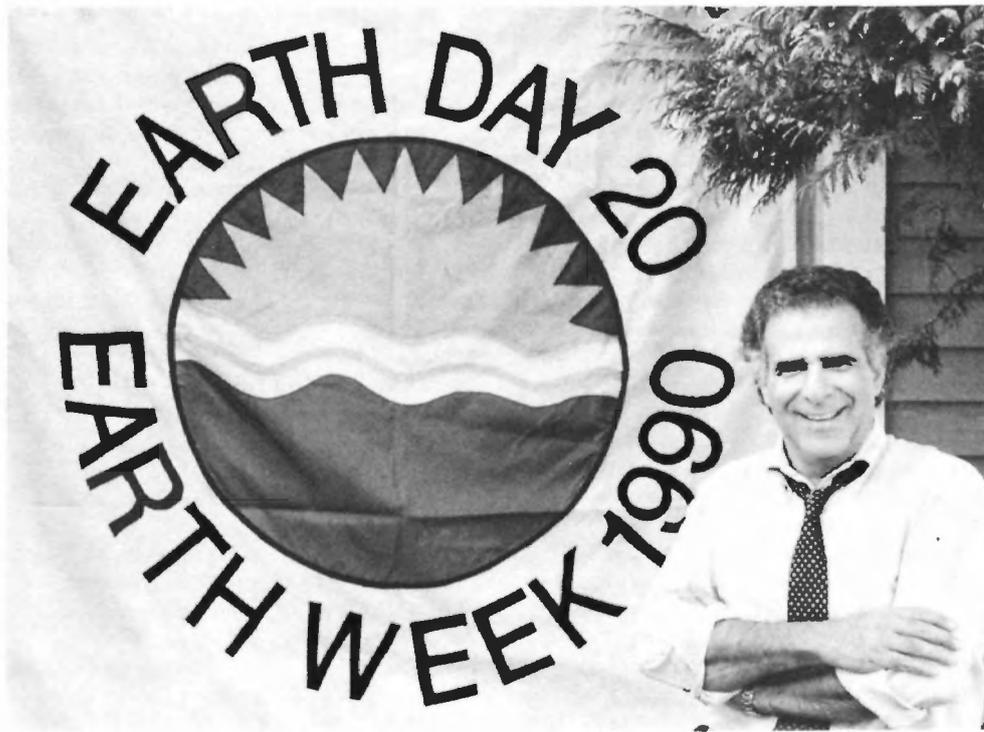
by Edward W. Furia

Recently I experienced a sense of *déjà vu* when I gave an address about Earth Day at the Threshold National Student Environmental Action Coalition (SEAC) Conference. I spoke to 1,600 student leaders of campus environmental organizations from 43 states who had converged at the University of North Carolina at Chapel Hill for this conference.

A little more than 20 years before, I was among a group of graduate students at the University of Pennsylvania City Planning School who met to discuss the famous 1969 Seattle speech of Senator Gaylord Nelson calling for the first national Earth Day. We responded by organizing the first Earth Week, a convocation on environmental issues that cut across racial, economic, and political boundaries and, for the first time, got ordinary people involved in environmental issues.

So the summer of '88 was a kind of last straw for a lot of people, including me.

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Staunch efforts are under way to make the upcoming observance of Earth Day as full of impact as Earth Day 1970. Here, one of the lead organizers, Ed Furia, stands by his group's logo.

(Furia was Project Director of Earth Week 1970 in Philadelphia. He is currently President and Managing Director of Earth Day 20/Earth Week 1990.)

The recent Chapel Hill SEAC meeting was not just another conference. It was a historic event that marked the rebirth of environmentalism on college campuses. It may also have been the first real evidence since the 1960s of a rebirth of student political activism.

Unlike the budding "yuppie" stereotypes I expected to encounter—with ambitions consisting of an MBA, a job on Wall Street, and a BMW—these young people wanted to change the world. They seemed every bit as idealistic as their predecessors on 2,000 college campuses and in 10,000 high schools who, in 1970, took up the challenge of Earth Day and helped drive environmentalism into the mainstream of American consciousness.

What were the goals of the first Earth Week, and how do they compare to the goals of Earth Week 1990?

The most widely recognized goal in 1970 was to "raise consciousness" on college campuses about environmental problems, but the group of students in Philadelphia who developed the original Earth Week also wanted to involve the general public. I was hired as Earth Week 1970's project director, partly because of my city planning master's thesis, in which I had argued that no meaningful national policy shift could be achieved without motivating ordinary people through messages embedded in riveting events that the mass media could amplify. In other words, if you want to change the world, it's not enough to be earnest, you have to be interesting.

The literature on communications and behavior provided an additional insight: Even if you succeed in getting people to listen to your message and begin changing attitudes, actual changes in behavior usually don't occur unless the message is accompanied by reinforcing action. In other words, if your goal is to change the world, after you reach ordinary people with your message, give them a way to participate.

Thus, to promote Earth Week 1970, we literally developed a marketing strategy that sold environmentalism like Proctor & Gamble sells soap.

Philadelphia's Earth Week program involved every major public and private

institution in the region. At scientific symposia, experts from universities, corporations, and state and local governments met to discuss the most pressing air and water pollution and waste disposal issues of the day. The events attracted Clean Air Act author and then-likely Presidential candidate Senator Edmund Muskie, Senate Minority Leader Hugh Scott, biologists René Dubos, Luna Leopold, and Paul Ehrlich, Nobel laureate George Wald, consumer advocate Ralph Nader, sociologist John McHale, poet Allen Ginsburg, Dune author Frank Herbert, nuclear physicist and former Atomic Energy Commission Chairman and critic, Ralph Lapp, urban planners Lewis Mumford and Ian McHarg, and ecologist Kenneth Watt. Also in attendance were several rock bands and other performers, including the entire Broadway cast of *Hair*.

The strategy worked. The Philadelphia Earth Week program became a major subject in the national media. It was featured twice on the *Today Show*, for a full hour live on PBS, and in the CBS Special Report that aired at 7 p.m. on April 22. The CBS crew arrived two weeks early, and when host Walter Cronkite opened the program, he was sitting in front of a blow-up of our logo. One-quarter of that one-hour news special was devoted to the Philadelphia program.

The new environmentalism also worked for other organizers in Berkeley, New York, Washington, Boston, Madison, Wisconsin, and thousands of other American cities and towns. On hearing of the Earth Day idea, civic groups, college and high school students, garden clubs, and others began organizing their own spontaneous events, each marked by a local vision about the environment. Earth Day was spontaneously organized and pluralistic, and it was apparently the largest public demonstration in U.S. history, involving an estimated 20 million people.

Earth Week and Earth Day's implications were not missed by national policy-makers. And for a while during the 1970s, it appeared as though

the United States was well on its way toward reversing the most troubling environmental trends. A newly created EPA had shown it intended to enforce the new environmental laws, billions of dollars were being spent to reduce municipal and industrial water pollution, and the catalytic converter and unleaded gasoline seemed to be

We need to move environmentalism an order of magnitude beyond where it has ever been.

making a dent in urban air pollution. So in 1979, when the prospect of organizing a national 10th-anniversary Earth Day was suggested to me, I said I didn't think the need existed the way it did in 1970. Laws had been passed, state, local, and federal environmental agencies were hard at work on the problems, and hundreds of new environmental organizations had been formed. Finally, I said I just wasn't interested in putting together what would amount to a birthday party for Earth Day.

By the summer of 1988, things had changed. Every day, headlines seemed to bring news of a new environmental catastrophe: Holes in the earth's protective ozone layer were confirmed by scientists; experts spoke of global warming from the Greenhouse Effect; and there was the news of medical waste washing up on east-coast beaches. Other evidence of ocean pollution damage continued to mount, including the widely reported incident of dead seals washing up on North Sea beaches. Each day brought fresh news of species extinction, deforestation, toxic-waste contamination of food and water supplies, and other insults to the environment. It was becoming clear that despite a 20-year effort to improve it, the global environment was deteriorating at an accelerating pace.

So the summer of '88 was a kind of last straw for a lot of people, including me. As a result, when I was asked to organize an international 20th Earth Day

program, I agreed. Something had gone terribly wrong since the first Earth Day, and it had happened in spite of all the new legislation, and the creation of the federal, state, and local regulatory agencies and international bodies. It had occurred in spite of the proliferation of environmental organizations in the United States and the Green parties in Europe.

To develop a meaningful program for the 20th Earth Day, we felt we needed to look both at the way governments were dealing with environmental problems and at how the environmental movement itself was addressing the issues.

As Barry Commoner pointed out in his recent article in *EPA Journal*, the *pollution-control* approach that governments have been using hasn't worked. We have failed to improve the environment in a really significant way with the black boxes we have attached to wastestreams that still end up depositing pollutants from our oceans, rivers, air, and land. Only *pollution prevention* seems to have worked. Only when we have removed pollutants in the production process have we succeeded in dramatically improving the environment: The cessation of atmospheric testing of nuclear warheads reduced traces of strontium 90 in human tissue by over 90 percent; taking the lead out of gasoline has had similar dramatic success. Dr. Commoner put it humorously—but perfectly—during the address he gave at the recent Chapel Hill SEAC conference: "*The first rule about pollution is this: if you don't let the pollutant into the environment, it isn't there.*"

Getting governments to acknowledge the importance of *pollution prevention* is a major goal of Earth Day 20 and Earth Week 1990. On April 18, 1989, just before last year's Earth Day, the Earth Day 20 Foundation delivered letters to President Bush, USSR Premier Gorbachev, China Premier Li Peng, and UN Secretary General De Cuellar. The letter, signed by Gaylord Nelson, Barry Commoner, Elliot Richardson, John O'Connor (National Toxics Campaign), Gene Karpinski (U.S. Public Interest Research Group), Peter Bahouth (Greenpeace), Cordelia Biddle, and me,

called on the leaders of the superpowers to convene an environmental summit under the auspices of the UN and immediately begin the process of implementing a five-point pollution-prevention program:

- A total ban on the production and use of chlorofluorocarbons and other chemicals that destroy the ozone layer and the establishment of a program to use safe alternatives.
- Introduction of energy-conserving power systems, such as cogenerators, fuel-efficient vehicles, and others as well as the use of solar-energy sources in order to reduce carbon dioxide emissions—the chief cause of global warming.
- Progressive reduction in the excessive use of pesticides, which are responsible for serious health hazards, by introducing integrated, biology-based pest management systems and other non-chemical techniques.
- Steps to eliminate toxic chlorinated chemicals—which are responsible for serious environmental hazards (for example, a phaseout of the use of chlorine in paper production).
- A global ban on production processes that threaten the extinction of species.

To address these environmental issues effectively, national and bilateral strategies will not be enough. Nothing will work short of unprecedented multilateral treaties and accords in which the rich nations of the Northern Hemisphere and the poor nations of the Southern Hemisphere agree to prevent environmental degradation and reverse the deterioration that has already occurred.

Something else has gone wrong over the last 20 years. In spite of the achievements and numbers of the environmental movement (some estimates are that 10 million Americans belong to some kind of environmental group), environmental organizations—without meaning to do so—have become primarily a group of elites; ordinary people tend to remain on the sidelines. "Environmentalism," as John O'Connor of the National Toxics Campaign likes to put it, "needs to

become the issue of the hamburger and Budweiser crowd, not just the issue of the Brie and Chablis crowd." We need to move environmentalism an order of magnitude beyond where it has ever been.

In some ways, we are already as advanced in our planning as we were a few weeks before the first Earth Day, and there are still a couple of months to go.

As we began planning our 1990 program, the basic strategy we used during the first Earth Week seemed to make sense as much as ever. In other words, first create Earth Week 1990 events so riveting that the newsstands and airwaves become saturated with the message of pollution prevention and multilateral cooperation to reverse the environmental deterioration of the planet. Second, provide opportunities for ordinary people not merely to hear the messages and witness the events electronically, but also to participate directly in their communities.

This mass media/grassroots dual approach is the essence of the Earth Day 20/Earth Week 1990 program:

- An Earth Week Expo at the Columbia River Gorge will provide a full week of visually exciting exhibits, addresses by major political and environmental leaders, and appearances by scores of international celebrities, musicians, and performers. Many communities will hold their own local expos and use satellite dishes at local shopping centers or theaters to receive daily broadcasts of the addresses and performances from the Columbia Gorge site.

The national media are also expected to broadcast news of the Mount Everest Earth Day 20 International Peace Climb, in which American, Soviet, and Chinese climbers will rope together and attempt to reach the summit of Everest on Earth Day as a metaphor of international cooperation to ensure survival. These

events in combination with the thousands of local Earth Day observations will attract millions of viewers and participants.

- Grassroots community organizations, led by National Toxics Campaign chapters in 1,000 communities will join with college, high school, and elementary school students and their faculties and get involved in community-focused programs and events that will reinforce the messages broadcast on the national media. The centerpiece of the local programs will be the "Good Neighbor" agreement program, in which private and public entities will be encouraged to sign agreements to reduce toxic-waste production. In addition, local newspaper-sponsored high-school essay contests as well as elementary school poster and letter-writing contests will be held; Girl Scout, and Boy and Cub Scout Earth Day merit badges will be awarded.

In some ways, we are already as advanced in our planning as we were a few weeks before the first Earth Day, and there are still a couple of months to go. The national media—the major magazines as well as the TV and radio networks—have already devoted an unprecedented amount of coverage to environmental issues; political leaders here and abroad are vying with each other for the "Who's the greenest public figure?" award; our mailbox bulges and the phones ring off the hook every time there is a new article about Earth Week or Earth Day.

It would be nice to think that this attention is somehow the result of the work of the various national Earth Day organizations, including ours, but I think it is not. Instead, it is obvious that this is finally an idea—this idea of survival—whose time has come. □

Editor's note: Readers who wish to obtain more information on Earth Day 20/Earth Week 1990 activities should contact:

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The Stars Take on the Environmental Crisis

by Roy Popkin

Spurred by growing concerns about global environmental problems, the entertainment industry is in the midst of a massive consciousness-raising effort on a variety of environmental issues. The environment is not the first social issue to be adopted by show business, but it may well be the catalyst for the most far-reaching public interest campaign yet launched by the industry.

Show business has had a long history of involvement in public affairs, dating back to World Wars I and II, when Hollywood actively promoted home-front activities. More recently, especially since the advent of television, the industry has fought illiteracy and drunk driving and taken on other social causes. TV images have aroused widespread concern for the starving in Africa, called attention to the homeless and hungry here at home, and helped the Red Cross raise \$100 million for aid to the victims of Hurricane Hugo and the California earthquake. The entertainment business has a proud record of supporting civil liberties.

Until recently, entertainment industry environmentalism was associated largely with a small group of stars such as Robert Redford, Paul Newman, Joanne Woodward, Meryl Streep, and Judy Collins, the Ted Turner broadcasting interests, and occasional news or educational TV specials. But now Hollywood has gone green in a big way. Says Andy Spahn, president of one of the two major Hollywood organizations focusing on environmental issues: "We're in it for as long as it takes. They tell us we may have as little as 10 to 12 years to correct or reverse some of the most serious threats. You might say that length of time is our minimum commitment."

One indication of this commitment is a two-hour ABC-TV Earth Day special to be aired on the evening of April 22, starring Barbra Streisand, Kevin Costner, Bette Midler, Robin Williams, Michael Keaton, and others. Still other

(Popkin is a writer/editor in EPA's Office of Communications and Public Affairs.)

performers may be expected to appear at various Earth Day functions around the country.

Two Hollywood groups, the Environmental Media Association and the Earth Communications Office, are spearheading the entertainment industry's approach to creating national and international environmental awareness.

In general, their goal is to create a steady stream of environmental messages written into plot lines of regular programs and motion pictures, entertainment specials, and other outlets

The communications industry is in a unique position in its ability to reach millions of people around the world . . .

such as special events and new music and songs. These messages are intended to complement ongoing public service announcements, occasional news specials, and science programs on cable or public television. Stars and other industry leaders are also being asked to take the kinds of environmental leadership roles that Redford and Streep have assumed in recent years.

The EPA Office of Communications and Public Affairs has staff assigned to act as liaison to producers and writers working on scripts or treatments who need quick information about environmental problems related to the plot lines they are developing.

The burgeoning interest in environmental concerns is already reflected on the air and in current production plans. For example, a recent episode of "Murphy Brown" was devoted to recycling. From September to December of last year, CBS ran one-minute "Earthquest" reports during prime time. "Thirtysomething" is planning to deal with environmental problems on several programs. Several episodes of the ABC series "Head of the Class" will have environmental

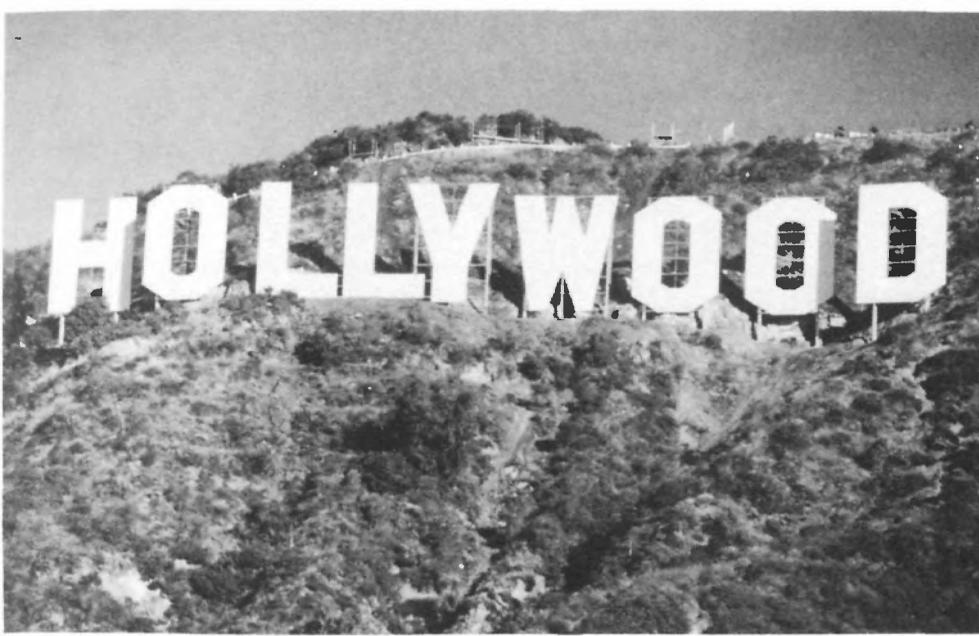
messages. There will be environmental themes on "ALF," "Baywatch," "LA Law," "My Two Dads," and other shows.

Turner Broadcasting System, long heavily into environmental programming—owner Ted Turner in 1985 co-founded the Better World Society to produce documentaries and air a weekly documentary, "Earthbeat"—is working on an animated cartoon series named "Captain Planet." Puppeteer Jim Henson is working on a children's series about nature entitled "W.I.L.D.," and the Children's Television Workshop, already doing special educational material on natural disasters, is also working on environmental programming. Olivia Newton-John is doing a special called "A Very Green Environment." Musical stars like Streisand, Quincy Jones, Belinda Carlisle, and Newton-John are having environmental messages printed on their records, tapes, and compact discs.

The Environmental Media Association—described by the *New York Times* as the brainchild of Norman Lear and his wife, Lyn—was formed in June 1989 by a group of industry leaders to complement the work of environmental groups by encouraging the creative community to incorporate environmental themes into its projects. Its Board of Directors includes top executives of major studios and other parts of the industry. According to its President, Andy Spahn, the organization "hopes to generate a climate of concern about our environment and give creative expression to the vision of a healthy future for the planet."

The aim of the Environmental Media Association, says Spahn, "is to do for the environment what the Entertainment Industries Council did for seatbelts and what the Harvard Alcohol Project is doing for designated drivers. Roseanne arguing with her family about the importance of recycling or the characters on 'thirtysomething' discussing cloth versus disposable diapers can have a tremendous impact. Hearing their favorite characters discuss environmental issues and watching their favorite shows grapple with environmental themes can encourage individuals to think about changing their lifestyles and becoming actively involved in environmental issues."

The association plays a coordination role—networking and outreach—by contacting hundreds of writers, producers, and others who may be interested in anything from endangered



Hollywood and the rest of the entertainment world are taking a stance on behalf of the environment.

species to air, water, and land pollution. For instance, environmental experts have been brought to meet creative staffs at major motion picture and TV studios to give writers a sense of the environmental crisis and to help generate ideas for environmentally conscious characters or dialogue that could be written into plot lines.

The Environmental Media Association has also sponsored a variety of forums and other events where participants have included EPA Administrator William K. Reilly, U.S. Senators Al Gore, Tim Wirth, and Alan Cranston, Dr. Michael Oppenheimer, expert on global warming and senior scientist with the Environmental Defense Fund, Dr. Amory Lovins, co-founder of the Rocky Mountain Institute, Dr. Noel Brown of the United Nations Environment Programme, leaders of the 10 leading national environmental organizations, and the international representatives of the World Commission on Environment and Development.

This coming spring, the association will co-sponsor a day-long symposium on the environment with the Academy of Television Arts and Sciences. The group is also creating an environmental resource library for the creative community and will give annual Environmental Media Awards honoring exemplary television and film productions that deal responsibly and effectively with environmental themes.

Recognizing that preservation of the environment is a global problem, both the Environmental Media Association and the Earth Communications Office are encouraging the film and television industries in other countries to emulate their efforts. The International Council

of the National Academy of Television Arts and Sciences has formed a new committee to serve as liaison with the Environmental Media Association. The Earth Communications Office is starting offices in Australia, West Germany, Brazil, and the USSR, hoping to organize media people in industrial countries around the world.

The Earth Communications Office was founded by Bonnie Reiss, who gave up her entertainment law practice to form the organization after attending a three-day global warming conference. The conference, she says, "transformed my perception of the world in which we live. I learned that we have an estimated 10 years to change our present course toward the irreversible destruction of our environment and its ability to support life. This shocking information led me to give up my entertainment law practice to form the Earth Communications Office, a non-profit organization dedicated to getting out environmental messages through the mass media.

"It is evident that the crisis at hand demands world attention, and action [must be] be galvanized. Scientific studies and political action are obviously necessary to the environmental movement, but education on a grand scale is just as crucial. Whatever the issue—global warming, deforestation around the world, poisoning of our water, acid rain, waste disposal, off-shore drilling, overpopulation—people must learn that they can make a significant difference as individuals," says Reiss.

This is where Hollywood comes in, Reiss and Spahn believe. The communications industry is in a unique position in its ability to reach millions

of people around the world with environmental messages conveyed through TV, film, and radio, they point out.

The Earth Communications Office is an industry-wide grassroots, non-partisan organization. Its core is a Board of Directors made up of about 100 creative and concerned leaders from film, music, radio, art, literature, TV, and advertising. Says Reiss, "They are people of conviction who understand that our planet is critically threatened and that our industry can effectively educate people and get them to reexamine their values."

The organization's advisory board represents a broad spectrum of environmental leadership from the United Nations, major environmental organizations, and national, state, and local governments; the board is chaired by Dr. Thomas Lovejoy, Assistant Secretary for External Affairs at the Smithsonian Institution. The Earth Communications Office's hundreds of members channel their efforts through committees dealing with research and education, children's outreach, music and radio, literary and fine arts, events and fundraising, film and television, a newsletter, and industry action. The group has offices not only in Hollywood but in New York and Nashville.

"At the core of our philosophy," says Bonnie Reiss, "is the understanding that we in the communications industry must examine and change our own lifestyles before we have any real credibility in asking others to do the same. The Earth Communications Office is focusing initially on recycling and energy conservation, in which quantifiable progress can be measured. We are proud that in just 10 months all those involved in the Earth Communications Office are recycling, reducing energy consumption, and buying environmentally sound products. We hope the industry can get millions more Americans doing the same, thus benefitting the environment and creating a nationwide atmosphere of environmental concern and awareness."

Both organizations report a tremendous industry response. Spahn notes that when environmentalists see their favorite film and television characters involved in carpooling, recycling, reducing their use of chlorofluorocarbons and reliance on fossil fuels, and, in some instances, warring against polluters, they will know that the entertainment industry is right there with them. □

Re-Inventing the Refrigerator

by John S. Hoffman and Robert Kwartin

A home in Anytown, USA. The refrigerator is an unremarkable appliance in an American household: quiet, reliable, camouflaged in its exterior of white or burnt-almond. Virtually every household in the United States has one. Once it's plugged in, its owner barely spares the machine a thought. Who thinks about the careful engineering that makes the modern refrigerator so easy to take for granted?

Now change the scene to a small town in Guangdong Province in southeastern China. Here the arrival of a refrigerator is an event worthy of celebration. It means fewer trips to the market and less spoilage of the leftovers from a major holiday feast. And it symbolizes the wealth and status of a family that has made its way in the new economy of China. China produced 32,000 refrigerators in 1979; in 1987 it produced over 4 million, and production continues to grow. There are still several hundred million households in China that don't have a refrigerator. Yet.

But neither complacency nor celebration will greet the arrival of a refrigerator in the 1990s, in China or the United States. In the past few years the box in the kitchen corner has been implicated in two potential environmental catastrophes: stratospheric ozone depletion and global climate change.

The refrigerator will have to be re-invented within five years. The new refrigerator will have to maintain the quality that American consumers have come to expect, at the low price that Chinese consumers can afford.

(Hoffman is the Director of EPA's Global Change Division, and Kwartin is an Environmental Protection Specialist in the division.)

To meet these challenges, EPA has formed a partnership with the U.S. refrigerator industry and other federal agencies to massively increase investment in refrigerator research and development. In an offshoot of this program, EPA is working with the Chinese refrigerator industry to involve the Chinese in the research program so that they will be able to successfully adopt the progressive technology of the 1990s.

CFCs and the Refrigerator Industry

Before the 1930s, household refrigeration was either cumbersome (during ice deliveries), somewhat dangerous (where potentially hazardous refrigerants such as sulfur dioxide (SO₂) or methyl chloride were used), or non-existent. The invention of chlorofluorocarbons (CFCs) was the technical breakthrough that helped make household refrigeration possible on a wide scale.

CFCs are a group of non-toxic and non-flammable chemicals, one of which, CFC-12, has thermodynamic properties that closely match the requirements of household refrigerators. Another CFC, CFC-11, is an excellent agent for producing insulating foam for the refrigerator's shell; CFC-11 foam is a much better insulator than the fiberglass and mineral wool insulation previously used. With better insulation, less heat invades the refrigerator, yielding better energy efficiency.

The Refrigerator Takes Two Turns for the Worse

As refrigerators changed from a household luxury to an everyday appliance, their use boomed. And as the technology matured, reliability and convenience increased with no appreciable increase in price. But new concerns forced refrigerator manufacturers, governments, and consumers to take a new look at the refrigerator.

The first jolt came in the 1970s, when energy prices soared in response to the Arab oil embargo. To help the nation use energy wisely, the federal government mandated that refrigerators (which use 19 percent of the electricity consumed in the average household) carry labels to inform potential buyers about energy consumption and operating costs. Consumers were eager to avoid high electricity bills, and manufacturers responded by improving energy efficiency by 44 percent between 1972 and 1987.

Energy prices declined in the early 1980s, but new concerns kept public attention focused on the refrigerator. In 1974, two scientists—F. Sherwood Rowland and Mario Molina—proposed that CFCs were destroying an important constituent of the Earth's atmosphere, stratospheric ozone, which screens out certain kinds of harmful ultraviolet (UV) radiation from the sun. Enough UV radiation passes through even a normal ozone layer to induce millions of cases of skin cancers and cataracts. If the amount of ozone in the stratosphere were appreciably reduced, they proposed, dire consequences might follow: millions of additional skin cancers and cataracts, damage to crops and ecosystems, and possibly suppression of the human immune system.

Rowland and Molina's predictions eventually proved accurate. By 1987, CFCs had reduced the ozone over the Northern Hemisphere by 2 to 4 percent and torn a gaping hole in the ozone layer over Antarctica.

However, before this depletion was revealed through monitoring data, the United States, under the leadership of former EPA Administrator Lee Thomas, had proposed a phaseout of CFCs. Thus, as evidence of ozone depletion and its

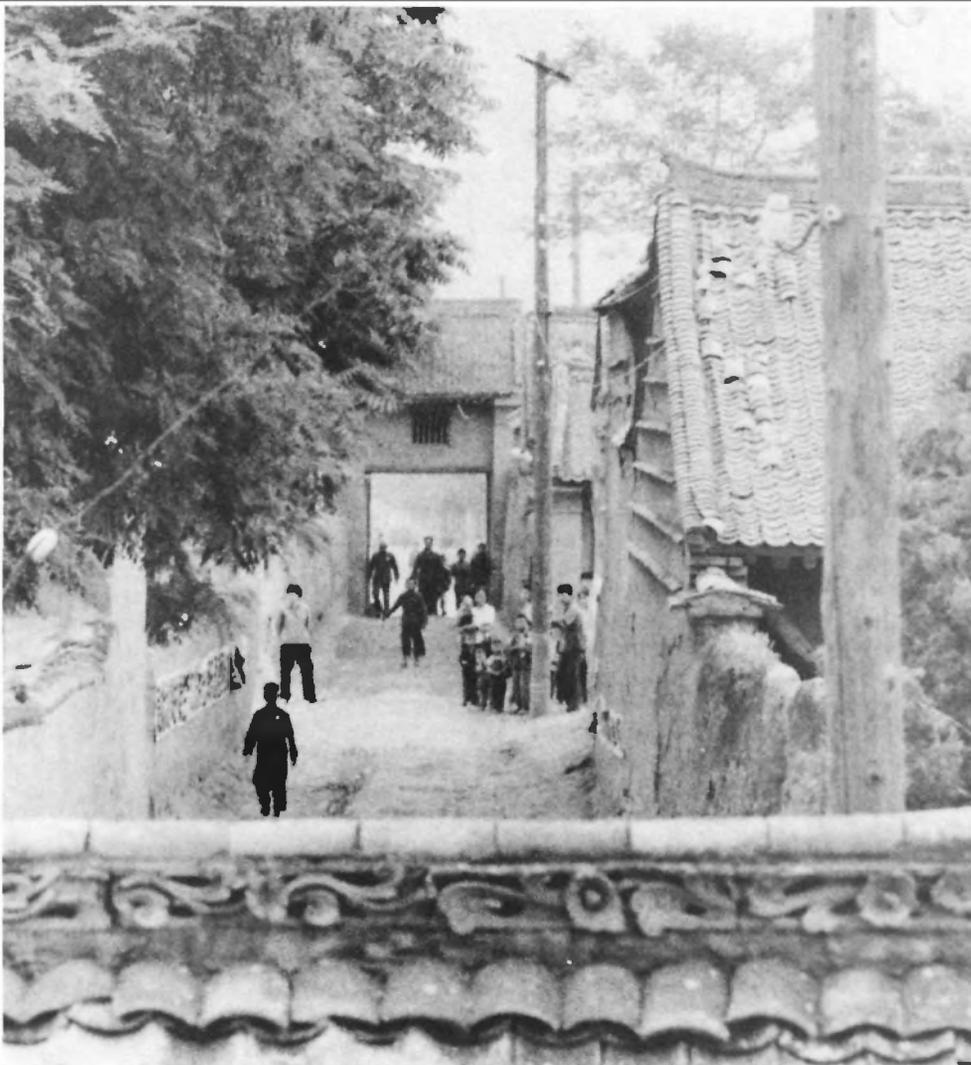
Chinese villagers, like the rest of us, want modern refrigerators. The challenge is to develop a product that will satisfy demands without damaging the environment.

expected consequences accumulated, it was possible to replace words with strong action. In September 1987, a landmark treaty was signed in Montreal (the Montreal Protocol) that bound its members to reduce their production and consumption of CFCs by 50 percent by 1998. The United States and every other industrial country joined the Protocol, which is being renegotiated to mandate a complete phaseout of CFCs by 2000.

A second global environmental threat—climate change—poses an even greater challenge for household refrigeration. A variety of gases in the atmosphere—such as carbon dioxide (CO₂) and water vapor—are transparent to the visible light energy that reaches the atmosphere from the Sun but are partly opaque to the infrared energy reradiated by the Earth. This phenomenon traps heat in the atmosphere (like the glass in a greenhouse), causing the Earth's surface to warm.

Greenhouse gas emissions have been increasing since the Industrial Revolution and threaten to substantially warm the planet to potentially dangerous levels. Two greenhouse gases are closely connected to refrigerator use: CO₂ (which powerplants release when fossil fuels are burned to generate electricity), and, yet again, CFCs. Pound for pound, CFCs are thousands of times as potent as CO₂ in causing greenhouse warming.

Although energy prices are low at the moment, we must focus public attention now on the energy efficiency of refrigerators. If future refrigerators use electricity more efficiently, then future powerplants will have to burn less fuel and will release smaller volumes of greenhouse gases. But it will take five to eight years to reinvent a refrigerator that uses much less energy than existing models. Fortunately, the process has begun.



Copyright Audrey Topping Photo Researchers photo

By 1988, several states and the federal government had set minimum energy-efficiency standards for refrigerators (and for several other categories of household appliances). These standards will be revised before 1998. With increasing concerns about the greenhouse effect, energy-efficiency goals will inevitably become more and more stringent. Now is the time to start research and development of super-efficient refrigerators. Furthermore, given the enormous growth expected in the refrigerator markets of developing countries such as China, it is critical that new technologies be transferred to them as expeditiously as possible.

The Research Challenge

Refrigerator manufacturers now face two formidable challenges: They will have to completely eliminate the use of CFCs by the year 2000, and they must upgrade the energy efficiency of their products. Research and retooling time is short. Because CFC-based technologies

are so well-established, basic refrigerator research and development have been thin in the United States over the past decade. Marketing has been dominated either by the sales-floor price or by attractive new features, not by energy efficiency or new refrigerator cycles. Consumers have come to expect an appliance that they could ignore for its 15-year lifetime.

EPA recognized the industry's need and also saw an opportunity to prevent vast quantities of pollution: This once-in-a-generation re-invention of a ubiquitous technology could reduce the Greenhouse Effect expected over the next 100 years by almost 2 percent. (By comparison, increasing the fuel efficiency of new cars in the United States from 27 to 40 miles per gallon by the year 2000 and increasing the fuel efficiency of cars worldwide to 50 miles per gallon by 2050 would reduce Greenhouse warming by about 7 percent over the next century.)

Some manufacturers wanted to use an

alternative to CFC-12 known as HFC-134a, which would have led to a loss in energy efficiency. EPA and other manufacturers saw things differently; together we recognized that a more deliberate investigation of many alternative chemicals and system designs could produce a refrigerator with far superior energy efficiency.

Consensus on the best replacement chemicals has not yet been forged, but a framework for research and cooperation is in place. Recently, the Association of Home Appliance Manufacturers, EPA, and the Department of Energy organized an industry-wide research consortium to undertake joint research on alternative refrigerants and foaming agents. By coordinating research among refrigerator companies and government agencies, the consortium eliminates wasteful duplication of effort and ensures that research results are disseminated rapidly.

The combined resources of the consortium allow exploration of ideas which no single manufacturer would have considered pursuing alone. For example, the use of HFC-152a, a refrigerant, has been limited due to concerns about its slight flammability. Recent tests demonstrate that HFC-152a

would improve refrigerator energy efficiency by up to 10 percent, which would make it an attractive near-term option in the transition away from CFC-12. Since the amount of refrigerant used in refrigerators is very small (only 4 to 8 ounces), it is possible that the flammability of HFC-152a can be safely managed.

The consortium has organized manufacturers, Underwriters Laboratory, EPA, U.S. government safety agencies, and consumer groups to investigate the feasibility of using HFC-152a in household refrigerators. If HFC-152a turns out to be a viable refrigerant, the investment of consortium resources could have outstanding rewards. If 100 million U.S. refrigerators cut their electricity use by 10 percent, 10 billion kilowatt-hours would be saved every year. This would put \$700 million back into consumers' pocketbooks and prevent the emission of 8 million tons of CO₂ and 60,000 tons of SO₂.

EPA and the Department of Energy have also invested millions of dollars in longer-term fundamental research on refrigerants and refrigerating systems. These investments are pushing the limits of refrigeration science: Old ideas long-buried have been dusted off and

new ideas given a chance in the laboratory. Among the ideas being tested:

- "Non-azeotropic" refrigerant mixtures: Today's refrigerators all use a single refrigerant, CFC-12, which boils at exactly -30 degrees Celsius. (The boiling point of water, by comparison, is 100 °C.)

Most early discussions of replacing CFC-12 focused on finding a single "drop-in" replacement. However, certain mixtures (termed non-azeotropic mixtures) of non-CFC refrigerants boil over a range of temperatures. This property provides a number of thermodynamic advantages in designing a refrigeration system.

- The Lorenz cycle: The modern refrigerator/freezer has its evaporator in the freezer where a fan blows air over it. (See illustration.) This cools the air below the freezing point of water, which removes moisture from the airstream. The cold, dry air circulates through the freezer and then into the refrigerator, where it is likely to desiccate the vegetables.

A better system would use a non-azeotropic refrigerant mixture and have two evaporators (one in the

How Refrigerators Work

Simply put, refrigerators soak up heat from the inside of the box and squeeze it out into the kitchen. (See illustration.) Starting at the compressor, gaseous refrigerant at low pressure is compressed to a high pressure and passed into a heat exchanger outside the refrigerator (the condenser). The condenser transfers heat from the refrigerant to the kitchen, and the refrigerant changes from a hot high-pressure gas to a cooler high-pressure liquid.

The high-pressure liquid refrigerant then passes through a tube into the refrigerator and into another heat exchanger (the evaporator). The refrigerant is allowed to expand during this leg of the cycle, so that it absorbs heat from the interior of the box and boils into a low-pressure gas. (It may seem odd that a boiling fluid would be cold, but think of how rubbing alcohol feels as it evaporates from your skin, and you get the idea.) The gaseous

refrigerant then passes through the compressor, where the cycle begins anew.

A refrigerator doesn't run continuously, only long enough to remove the heat that entered the box through the walls and during door openings. The refrigerator's walls are insulated to slow the passage of heat; better insulation means that the compressor runs less frequently and for shorter periods of time, reducing electricity consumption.

Different refrigerants have very different thermodynamic properties. The freezer should be kept around 5° Fahrenheit, so ideally, the refrigerant in the evaporator should boil at a temperature somewhat lower than that to ensure that heat will flow from the (relatively) warm interior of the freezer to the cold refrigerant.

However, only a few chemicals boil within the proper temperature range. Additionally, some

chemicals absorb large amounts of heat per unit volume as they pass through an evaporator, while others absorb only a little (this is the measure of a refrigerant's capacity). A compressor has to pump a large volume of low-capacity refrigerant through an evaporator to achieve the same cooling effect as pumping a smaller volume of high-capacity refrigerant. Balancing efficiency and capacity makes the job of selecting refrigerants more difficult. There are also a number of safety considerations: even though the refrigerant is confined to a sealed system, in ideal circumstances it would be non-toxic, non-flammable, and non-corrosive. In reality, non-flammability may not be a crucial attribute; many of us use gas stoves and aerosol cans that contain much larger volumes of flammable materials that are not confined.

refrigerator, one in the freezer). Each compartment would be designed to chill to the correct temperature. This design, named after the German scientist who proposed it in 1975, could reduce electricity consumption by 20 to 23 percent and provide a "vegetable-friendly" refrigerator section.

- **Superinsulation:** The foaming agents that have been proposed as replacements for CFC-11 are likely to produce a foam with slightly poorer insulation properties, which will either degrade energy efficiency or require thicker refrigerator walls as compensation. A totally different approach, however, may work better: vacuum insulation.

Vacuum insulation has insulating properties far superior to foam (even CFC-11 foam), but manufacturers have not yet perfected a technique for making vacuum panels that will last for 30 years. One European manufacturer has been producing a commercially available vacuum insulation that, if adapted to refrigerators, could reduce electricity consumption by as much as 30 to 40 percent.

- **Advanced design concepts:** There are many other possible design technologies

under investigation at EPA-supported facilities: machines with totally independent refrigerator and freezer loops; two-loop refrigerators with two compressors and one compressor motor; and others.

Theoretical predictions and computer simulations indicate that the next generation of refrigerators could use less than half the energy that the most energy-efficient model sold today uses. EPA's and industry's research programs have identified a number of tantalizing possibilities, but years of research, product testing, and product development are still required to determine which ideas are practical, and to retool production lines for the new products.

What Will China Do?

And what about the Chinese? The Chinese have not yet signed the Montreal Protocol, believing themselves too poor to afford major investments in research or alternative technologies. Many Chinese refrigerators are built with older technology. As a result, these refrigerators have low energy efficiency. What will happen if every household in China buys a CFC-filled refrigerator that uses two or three times more

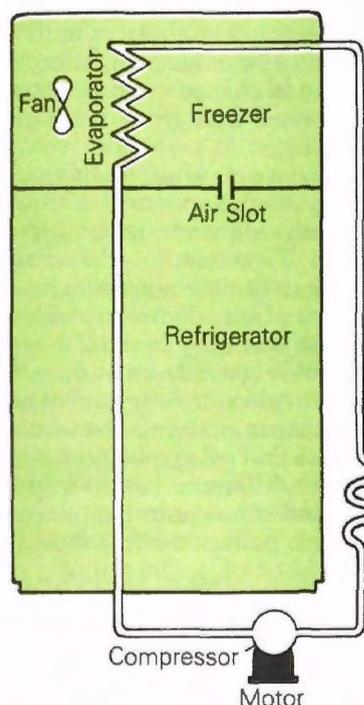
coal-generated electricity than it needs to? Fortunately, the Chinese recognize the consequences and want to explore alternatives.

EPA has opened negotiations with several Chinese institutions to explore the possibility of integrating the Chinese refrigerator industry into the U.S. research effort. In 1988, contacts were established with the Beijing Household Appliance Institute (a quasi-governmental body that conducts appliance research and sets appliance standards), refrigerator factories, and the government ministries responsible for refrigerators and CFC production. And in October 1989, a U.S. mission to China began hammering out the terms of cooperative projects, training missions, and sharing of research results.

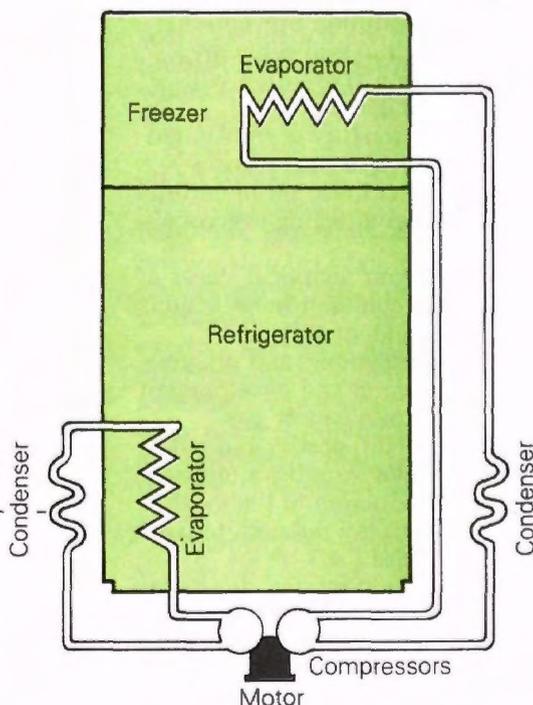
It appears likely that the Chinese will contribute greatly to the process of inventing a better refrigerator; already, Wanbao Company is testing refrigerators with HFC-152a. And the Beijing Household Appliance Institute has indicated a desire to take the lead in investigating options like the Lorenz cycle. Since Chinese refrigerators usually have the two evaporators characteristic of the Lorenz cycle (but not some other design requirements), they may be easy to adapt.

Refrigerator Design Options

Current Design



Dual-Loop Two Compressor Design



Conclusion

Stratospheric ozone depletion and the greenhouse effect are dangerous environmental problems, but solving them does not have to bleed U.S. industry and consumers of billions of dollars. In fact, through judicious use of government and private research funds, it is likely that the consumer will be able to buy a refrigerator (perhaps as early as 1995) that is ozone-safe, extraordinarily efficient, and does not dry out vegetables. The nation will benefit from lower electricity bills, and the refrigerator industry will improve its competitive position in the world economy.

And by pursuing a cooperative spirit with China during this difficult transition, the groundwork has been laid for hundreds of millions of Chinese families to participate in a better way of life at a lower cost to themselves and with a much smaller impact on the environment. In Chinese, the character for "crisis" also implies "opportunity." So it does in English too. □

Preventing Industry Waste

by Joel S. Hirschhorn

Pollution prevention offers industry an enormous opportunity, but its exact costs, benefits, and risks cannot be fully identified or quantified. The general proposition is this: By practicing pollution prevention, industry can obtain improved environmental protection and increased industrial efficiency, profitability, and competitiveness. But praising something is not the same as doing it.

Preventing pollution at its source, through changes in manufacturing processes or product design, is an ideal. *At issue is not the ideal, but its practicality, the scope of its application, and the pace of its implementation.*

There are numerous examples of successful waste-reduction initiatives and a smattering of impressive data, usually on a wastestream or plant basis. But no comprehensive company, industry, or national data demonstrate broad success at cutting industrial-waste generation. Indeed, enormous amounts of wastes, pollutants, and discharges continue to be generated.

It is not a matter of choosing between the traditional end-of-pipe or pollution-control approach and pollution prevention. Preventing pollution is like preventing disease by changing eating habits and lifestyle; pollution control is like using medicine and surgery to minimize ill effects.

Moreover, pollution control has often simply shifted pollution around. Air and water pollution-control equipment extracts harmful substances and generates enormous amounts of solid, hazardous waste for landfills, often resulting in ground-water contamination. Regulatory loopholes, regulatory noncompliance, the difficulty of responding to newly identified environmental problems, threats from very small residual levels of pollution, and continuing global population growth and industrialization: All these provide even more reason to pursue pollution prevention.

(Hirschhorn is a Senior Associate at the Congressional Office of Technology Assessment, where he has examined waste reduction for 10 years; the views expressed here are his and not necessarily those of the Office of Technology Assessment.)

Pollution prevention can help meet public demand for solutions to urgent and terribly complex problems, such as dealing with global warming and safely managing toxic and solid waste. This is why so many environmental activists advocate pollution prevention as a solution in contrast to so much they criticize.

Pollution prevention also makes sense in economic terms. The costs to government and industry of devising, enforcing, and complying with pollution-control regulations have become onerous, both nationally and on a company-by-company basis. Pollution prevention offers more environmental protection per dollar spent instead of less and less—as seems to be the trend now. To paraphrase Ben Franklin, a pound of cure costs a lot more than an ounce of prevention.

But the vision of universally used clean technology and commonplace, environmentally benign, low-waste products is not easily realized. Everyone needs a deeper understanding of the technical means of pollution prevention and the human, organizational, and social obstacles to it. A national commitment to pollution prevention will restyle our industrial economy. Practicing pollution prevention will mean more than changing the technological personality of the United States. Just as much as engineering improvement, it will also mean cultural and social changes affecting everyone's daily living.

Let me define four technical stages of waste reduction: common-sense actions; information-dependent actions; analysis-driven decisions; and progress that requires research and development (R&D). Pollution prevention gets increasingly difficult, costly, and risky as companies move from the simplest kinds of waste reduction to the most difficult. However, my research tells me that with successful R&D, about 75 percent of all current wastes, discharges, and emissions can be eliminated within 10 to 20 years, although this will vary greatly across industries, plants, and specific wastestreams. And stressing pollution prevention can keep industrial and population growth from creating large amounts of new pollution.

Stage One: Using Attention and Common Sense to Get Fast Results

Common-sense waste reduction means that people exploit readily visible, easily implemented, low-cost, and low-risk opportunities. Neither technology nor capital stands in the way. Studies, engineering analyses, and testing are unnecessary. It is possible, with pollution prevention in mind, to walk through industrial operations and spot opportunities for waste reduction that can be implemented in days or weeks. Actions generally involve changing procedures—not core production technology, major equipment, or products.

For example, industry people have described many such cases of waste minimization: reducing wastewater from cleaning operations involving toxic chemicals, covering vessels containing volatile chemicals, improving inventory controls to eliminate outdated chemicals that become hazardous waste, reusing off-specification products, and replacing water or solvent cleaning of equipment with other methods. Dow Chemical saves \$20,000 a year because the company replaced a clumsy bucket with a precisely measured bottle to sample the chemical stream of an herbicide plant; this simple change cut way down on waste generated from the sampling process.

The key to common-sense waste reduction is getting people to pay attention to reducing waste where it is first generated. Therefore, the challenge to managers is to bring waste reduction to the attention of literally everyone, educate people about the benefits involved, provide rewards for successful efforts, and provide simple information about the successes achieved elsewhere. One problem is that many people in industry see no difference between an end-of-pipe, pollution-control approach and a front-end, pollution-prevention solution. For instance, incinerating hazardous waste and sending wastes off-site for recycling are often believed to offer the same benefits as true preventive actions. *But they do not,*



A national commitment to pollution prevention will restyle our industrial economy.

because there are always risks when waste is handled and processed.

Corporate and government policy statements on the importance of waste reduction can effectively focus people's attention on waste reduction. Slogans, campaigns, speeches, buttons, and all the other paraphernalia of motivating and selling ideas to people are critical. People who have never considered waste generation their responsibility—which is most people—need to understand that waste is not something that someone else, such as environmental engineers or waste haulers, will take care of. Moving from the end-of-the-pipe mentality to pollution prevention will mean making waste reduction an intrinsic part of everyone's everyday thinking and responsibility, much as preventive health care is an individual responsibility.

Stage Two: Obtaining Information on Wastes and Reduction Techniques

The danger is that people and companies may not move beyond the first stage of waste reduction. To make further progress, it is necessary to have detailed information to assess opportunities that are more subtle and

sophisticated. However, as with stage one, in stage two there are no major technological obstacles or major capital investments, and quantum reductions in waste generation are possible. The problem lies in discovering exactly where to use technology and deciding what technology to use.

A full range of information is needed on all wastes (e.g., on their quantity, chemical composition, hazards and liabilities, regulatory status, and the relationship between generation and production levels). Information on waste-reduction techniques from many external sources is also needed, such as information about new raw materials or manufacturing techniques available from vendors. More and more people are discovering that they can replace traditional chemical solvents with water or biological solvents.

Although costs and benefits are self-evident or easily calculated at this second stage, companies must build a framework for implementing waste reduction, including getting and distributing information and measuring progress. Getting detailed information on waste-generation and reduction techniques can cost millions of dollars for large facilities. Large companies

typically are better able to handle this second stage than small- and medium-size firms, which may find it difficult to devote people and money to this kind of effort. Even in some large companies, maintaining interest in waste reduction may be hampered because costs of waste management and pollution control may seem relatively low. For example, automobile, aerospace, and electronics companies have intrinsically lower environmental costs than chemical companies.

The role of government becomes more evident at this point. Government agencies can distribute information about successful waste-reduction techniques in many different industries; state agencies can provide on-site technical assistance, which has been shown to be very effective and low-cost. Some government requirements for information on waste generation, as under the Resource Conservation and Recovery Act, help drive companies to obtain detailed information on waste generation. Information required of companies for the Toxic Release Inventory, under Title III of the Superfund Amendments and Reauthorization Act, provides a strong incentive to focus attention on waste

reduction. Many such requirements do not apply to small businesses.

Stage Three: Overcoming Concerns About Investment and Risks Through Analyses

Passing through the first two stages may take from one to five years for individual plants or companies. The next major obstacle to waste reduction is economic uncertainty associated with substantial changes in technology and equipment. For such changes may involve core process technologies and require an interruption in production.

At this stage, greater involvement of senior production people probably is necessary. The environmental impacts of changes made for waste-reduction purposes have to be analyzed. Major capital investment becomes necessary, and risk increases. Investment payback periods become longer, and capital needs compete with more traditional uses for capital. Testing and development needs increase. The imperative to consider changes in products—either to minimize manufacturing waste or to reduce post-consumer waste generation or toxicity—also increases. In other words, waste reduction is no longer simple and self-evidently feasible or profitable.

All of this leads to the need for the kind of formal analyses which are being called waste-reduction audits or assessments. These analyses must capture and identify costs, benefits, uncertainties, risks, schedules, and relationships to other company plans and programs, such as R&D, expansion, diversification, and marketing of new products.

For example, General Electric Medical Systems replaced a paint-stripping operation using methylene chloride with sand-blasting and mechanical sanding. The company had found that methylene chloride material and waste-management costs were \$2,525 annually, whereas the sand-blasting replacement would cost only \$2,000, offer a 0.8-year payback, and lower the company's liability. There are hundreds of such examples in the literature on waste reduction in virtually every industry.

Without formal analyses, people may incorrectly conclude that they have exhausted their waste-reduction opportunities or that the costs of implementing waste reduction are too high. On the other hand, they may pursue projects which are technically, economically, or environmentally ill-advised. Or they may miss opportunities to reduce non-regulated wastes or relatively small wastestreams which nevertheless pose substantial costs and liabilities.

Experience has shown that an important obstacle to success is the "feeling" of many engineers that they have already optimized their processes and products. Formal analyses can overcome such unintended prejudices against change.

Finally, a continuing problem, even when formal analyses are done, is that many economic benefits of waste-reduction options are not captured because they are difficult to quantify. Examples include reductions in future liabilities associated with any form of hazardous-waste management, spin-off technological innovations and businesses, and improvements in the public image of a company which could reduce public opposition to new company activities.

Small businesses may find this stage particularly difficult because it requires much more time and money than the previous two stages and because it is a continuing activity, at least for the next decade or two. The use of outside consultants becomes increasingly necessary. But even large companies may find this stage so burdensome that interest in waste reduction may wane. At the highest levels of corporate management, there may be less interest in pursuing uncertain, high-cost activities even if they are labeled waste reduction. Seasoned technical professionals and managers may feel that they have reached the limits of improving or fine-tuning processes.

The potential for this stage to become the "wall" that brings an end to a company's or plant's waste-reduction effort means that the role of government becomes more critical here. Government policies, national goals, jawboning, and performance requirements can maintain

pressure on companies to maintain their commitment to waste reduction. Special economic incentives such as tax breaks, for example, may be useful to spur capital investment which may seem less attractive than other uses of capital (such as expansion and diversification). Government small business loans for waste reduction could be given special preference. And much more attention needs to be given to offering flexibility in compliance with current regulations, so that companies can channel their capital investment into pollution prevention instead of more pollution-control facilities.

Stage Four: R&D Creates New Technology and Products

Eventually, for both process and product changes, new technical solutions must be sought through R&D. Indeed, from the previous stages, many needs will have been identified. Completely new manufacturing processes and products can be considered, with waste reduction a primary goal. Designing, making, and marketing new consumer products pose the greatest challenge.

The idea of gaining competitive advantage through selling products which appeal because they offer environmental benefits is only now emerging, but it could be the major marketing breakthrough of the 1990s. Products free of toxic chemicals and products that generate little household waste could have the same kind of appeal to consumers as foods that help prevent disease and products which have higher quality. Conversely, more conventional products which contain hazardous substances and generate lots of garbage could be increasingly seen as being as dangerous as cigarettes and as unattractive as defective and short-lived products. U.S. manufacturers need to see international market opportunities for what are being called safe substitutes, toxic-free products, and "green" products.

But large-scale product change will require major R&D programs by manufacturers of consumer products, and eventually these efforts will affect



General Dynamics photo

Thanks to a new electrical circuit board plating system that recovers virtually all copper from rinse water and process solutions, General Dynamics' Pomona Division no longer sends sludge to landfills. Instead, the byproduct, shown here, is a 30-pound slab of copper to be sold as scrap.

producers of primary chemicals and materials which are used by those manufacturers. For example, Polaroid Corporation spent years developing a battery for its film packs which does not contain toxic metals. In addition to helping reduce Polaroid's own hazardous waste, this is a real environmental benefit for municipal wastestreams.

Other industries have also developed new industrial processes. Union Carbide found a way to use carbon dioxide to replace between 30 and 70 percent of current organic solvents for spraying paints, particularly in large industrial operations; it took four years of research and millions of dollars for Union Carbide to develop the innovative process.

Clearly, many small, medium, and large companies will face problems in committing resources to R&D. Some industries already have problems with low levels of R&D, and others aim R&D at other objectives that have little to do with concerns about waste or pollution generation. Government could play a major role at this stage by funding R&D programs that could benefit large segments of industry, by providing assistance through tax breaks for company R&D, and by working with industries to establish R&D priorities to benefit all companies within them.

And of course government has sometimes applied the greatest pressure of all by banning chemicals or products. This is a potent tool to spur research and one which may be used with more frequency. The rapid apparent success in finding substitutes for CFCs is impressive. To spur development of new consumer products, the government could help develop special labeling to identify environmentally beneficial products for consumers. This is happening already in Canada and Europe.

Charting the Future

Maximizing pollution prevention is comparable to a national commitment to landing on the moon or limiting the spread of AIDS and finding a cure for it. Serious commitments of human and financial resources over the long term, accurate measurement of progress, and development of government policies and programs to assist and guide private-sector activities are necessary.

And as with other major national efforts, pollution prevention requires understanding and willingness to change on the part of many individuals. For example, engineering education could change so that every engineering effort automatically includes pollution prevention as a criterion for success.

Pollution prevention does not threaten our quality of life or standard of living, but it does ultimately require

changes in the style of American industry and consumerism. Nations such as Japan and Switzerland, which generate much less waste than the United States, demonstrate that a high standard of living is possible without producing so much waste. For years, the American public has expressed idealistic positions in polls, such as a willingness to pay more for more effective environmental protection. Clean and low-waste manufacturing technologies and products require consumer actions in the marketplace.

Similarly, American corporate leaders have said that they have a commitment to environmental quality. The degree to which they embrace and implement pollution prevention and give consumers real alternatives will test that commitment.

This is just the beginning of a social experiment in pollution prevention. Public policy and government programs on pollution prevention have barely begun. If the technological personality of American industry changes for the better and American consumers translate their beliefs into actions, then the per-capita generation of hazardous and municipal waste in the United States will decrease demonstrably, and the waste that is generated will be easier to manage.

This is definitely a case where the United States should give up its number-one position—as the planet's leading generator of waste. We will have collected more than enough data to know in five years whether we are making progress and certainly to know in 20 years whether we—industry, government, and consumers—have made a serious commitment to pollution prevention. Success will depend more on genuine leadership than on technology. Leadership is needed now, especially to overcome inevitable anxiety and resistance to change as people correctly sense that there will be winners and losers as industrial processes and products change to prevent pollution.

Finally, if U.S. industry does not respond quickly, then foreign industries may begin selling clean technologies and products here, adding another dimension to the competitive threat. □

Thinking About Our Environmental Future

by Anne and Paul Ehrlich

It seems fortuitous that the far-reaching changes taking place now in the international arena coincide with the 20th anniversary of Earth Day

The 20th anniversary of Earth Day finds us facing a daunting array of environmental problems of global dimensions—problems linked more clearly than ever to unchecked human growth. The problems of 1990 are not only larger in scope and scale than those we confronted in 1970, but much more complex and entangled with our way of life. Moreover, the time and resources available to deal with them are much scarcer.

The responsibility of people in rich nations to help developing nations grapple with these problems is inescapable. Why? The answer is partly because we have the lion's share of resources and partly because much of the trouble can be laid at our doorstep.

This is not to say that people in rich countries have purposely brought on planetary degradation. Rather, we have failed to perceive the consequences of our actions and ignored warnings by those who did. But our purpose here is not to assign blame, but rather to shed light on causes and reveal ways to reduce or prevent impacts.

The environmental damage a society causes can be summed up in a simple equation: Impact (I) equals the number of people (P) times per-capita affluence, or consumption of resources (A), times the technology (T) used to create each unit of affluence. In short, $I = PAT$. This is an oversimplification, of course. Nevertheless, it is a useful approximation.

A rough measure of the environmental impact of each individual ($A \times T$) in a society is average per-capita commercial energy use. Energy is closely connected to numerous environmental problems, from air and water pollution to acid precipitation and global warming.

While the affluence or consumption (A) factor is a major component of environmental impacts associated with energy, the technology (T) factor is also important. All energy technologies have

environmental impacts, but these impacts differ widely in kind and degree. Just consider, for instance, the differing environmental risks of mining, transporting, and using coal, oil and natural gas, as compared with those associated with hydroelectric facilities, passive or active solar technologies, or nuclear power.

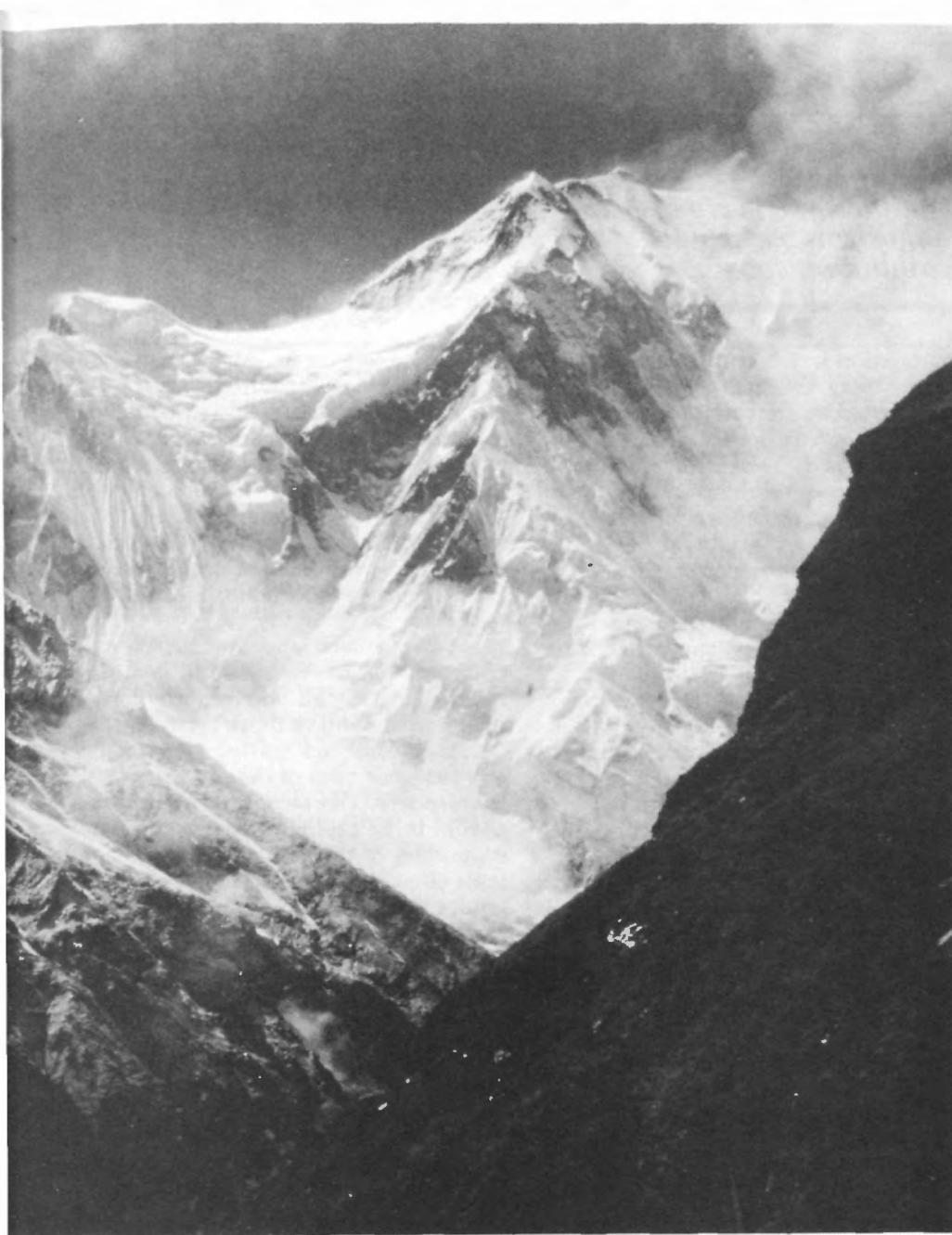
People in industrial nations comprise about 20 percent of the global population but account for about 80 percent of the world's commercial energy use today. By this measure, the average American has some 33 times the impact on the environment as the average Indian and more than 200 times that of a Tanzanian.

Moreover, the environmental consequences of rich nations' activities are global in scope. We obtain resources from around the world and emit huge amounts of industrial pollutants to the atmosphere and oceans. Human activities in poor countries usually cause only local environmental degradation—horrendous though that may be for the people affected. In short, developed nations tend to create global environmental problems, whereas the burgeoning populations in poor countries mostly impoverish their own resource bases and themselves.

Sometimes a technical (T) factor is the principal source of a problem, as in the depletion of the stratospheric ozone layer and significant contributions to global warming caused by the production and release of chlorofluorocarbons (CFCs). In such cases, focusing on that technological factor may be the most effective strategy. Indeed, the decision made by the United States to stop using CFCs in aerosol cans in 1977 may have delayed global warming effects by as much as 20 years, according to atmospheric scientists.

Opportunities to solve environmental problems through straightforward technological changes are rare, however. Much more common and difficult to resolve are dilemmas arising from all

(Anne H. Ehrlich is a senior research assistant, and Paul R. Ehrlich is Bing Professor of Population Biology in the Department of Biological Sciences at Stanford University. Their latest book is *The Population Explosion* (Simon & Schuster, New York, 1990).)



Ken Andrasco photo

Can the planet endure the impact of the human race? Pictured is the peak known as Annapurna South in the Himalayas, one of the few relatively untouched areas of the Earth.

three factors acting in roughly equal measure, such as the contribution of carbon dioxide (CO₂) emissions to greenhouse warming. Because developed nations are responsible for four-fifths of the CO₂ injected into the atmosphere by fossil-fuel burning, the role of population in generating the problem has been largely overlooked. The vast potential for worsening the situation by industrial development in poor countries has also received insufficient attention.

To illustrate the impact of population (P) on total CO₂ emissions, consider the results if China were to use its abundant coal reserves to double energy use per person. Their per-capita energy use would thus increase from the equivalent of 7 percent of U.S. energy use to 14 percent of the U.S. level. For the purpose of this illustration, let's assume

no further growth of the Chinese population (now approaching 1.2 billion)—an unrealistic assumption. The resultant increase in CO₂ emissions would completely offset an emissions reduction that the United States could achieve by ceasing to burn coal—which now supplies nearly a quarter of our energy—without increasing the use of other carbon-based fuels.

Or consider the case of India. The current Indian population of 840 million is still growing fast, and demographic projections indicate that it could reach two billion before growth can be stopped—even if India's now-languishing family planning program is revitalized. India also possesses rich coal deposits. India's per-capita commercial energy use today is less than half of China's. But if it were doubled per person, using coal, as the population increases to two billion,

India also would produce as much additional CO₂ as the United States could save by giving up coal.

These examples suggest the power of very large and fast-growing populations to amplify the effects of quite moderate increases in development. Even if rich countries do not reduce their fossil-fuel use, the expansion of both population and energy consumption in developing nations guarantees that their proportional share of atmospheric CO₂ emissions will rise substantially in the next few decades. (This does not include the 25 to 35 percent of global CO₂ releases estimated to result from tropical deforestation.)

Dozens of other greenhouse gases are being released to the atmosphere besides CO₂ and CFCs. Within a few decades, methane may overtake CO₂ as the leading component of global warming. It is 20 to 30 times as effective in heat absorption as CO₂, and its atmospheric concentration is rising much faster. Methane comes from diverse sources, but several are closely tied to population size—notably emissions from rice paddies, flatulence of cattle, deforested soils, and garbage dumps. Again, technological adjustments may ameliorate some aspects of the methane problem, but affluence and population must also be factored into any long-term solution.

It is now widely recognized that population growth has played, and continues to play, a large role in the deepening human predicament. The economies of more and more poor nations are faltering. Food production has failed to keep pace with population growth in many regions. Agricultural land is deteriorating around the world. All these are persuasive clues. Each year it becomes more evident that continuing with business as usual means pursuing an increasingly unsustainable course.

Humanity in the last century or so has moved from depending predominantly on "income" (energy from the sun,

When the time is ripe, social changes can occur with breathtaking speed.

which warms the planet, drives climate and weather, and is the source of all food energy) to increasing dependence on "capital." The capital we are consuming today includes our Earthly inheritance of minerals (metals and fossil fuels). More critically, it also includes our ground-water supplies, agricultural soils, and the vastly diverse lifeforms that share this planet with us and are part of Earth's life-support system.

Human beings now occupy or use over two-thirds of Earth's land surface. As recent analysis has shown, human beings consume or somehow divert about 40 percent of net biotic productivity on land (the solar energy captured by green plants through photosynthesis and not used for their own life processes). This huge fraction includes a sizable and growing portion of potential production that is being lost as more productive systems (such as forests) are converted to less productive systems (such as farms and pastures), degraded through overcultivation or desertification, or simply destroyed by being paved over.

If capital accumulated over hundreds of millions of years must be depleted to sustain 5.3 billion people today, what are the prospects for supporting the 10 billion or more projected by demographers for the next century? How much more of Earth's biotic productivity can humanity co-opt without severely damaging the capacity of natural ecosystems to support us?

The trends just mentioned are grave enough, but the consequences of greenhouse warming will surely intensify them. If global warming causes flooding of coastal areas, disruption of once-dependable agricultural weather, and accelerated degradation of natural ecosystems, to what extent will Earth's carrying capacity for human life be still further diminished? What, if anything, can we do about all this?

The short answer is, human beings caused the problems, and human beings can solve them if they apply their collective wisdom to doing so. But it is essential to understand all interacting factors and to deal honestly with them.

While the global warming calculations cited above throw a spotlight on the role

of population in the current human dilemma, they also glaringly display the disproportionate consumption and waste of resources in rich nations. Also revealed is the scale of change that will be required to avoid the worst consequences of global warming and still permit modest economic development for the poor majority of humanity.

Compared to what will be needed in the decades ahead, past efforts to reduce environmental impacts in developed nations, including the United States, have amounted to tinkering around the edges. This holds true despite seemingly endless arguments over economic disruptions and costs of pollution control.

In the 1970s, the environmental movement and the "energy crisis" led many Americans to re-examine our wasteful, resource-intensive way of life. In particular, alternatives to the prevailing urban/suburban lifestyle based on automobile commuting were seriously considered. But the "crisis" faded—partly because successful energy conservation programs reduced global demand, creating a temporary oil "glut"—and Americans resumed their old, bad habits. Between 1975 and 1985, the U.S. population increased about 9 percent, while the number of cars and trucks increased by 30 percent.

If anything, automobile commuting is more entrenched than ever today, despite some attempts to improve public transportation. Indeed, the vulnerability and inefficiency of auto commuting were spotlighted by the earthquake in California last October, but few noticed. While modestly increasing automobile fuel efficiency and curbing some emissions after 1974, Americans acquired tens of millions more cars and are driving billions more miles a year.

Small wonder air pollution is worse than ever. The population factor was ignored; consumption was addressed briefly, then forgotten; and most effort went into regulation through technology, sometimes making consumption worse by reducing energy efficiency. Until we tackle the difficult population and consumption questions in a serious way, we will make no real headway in solving the global problems

now looming over us. And because the dilemma is global, solutions must be globally agreed upon and implemented.

Until very recently, such a course appeared politically impossible. But when the time is ripe, social changes can occur with breathtaking speed. The latest demonstration of this potential is the dramatic lowering of political tensions between East and West in the past year.

For two generations, the East-West confrontation has overshadowed and soured virtually all other international relations, including those between the rich nations of the Northern Hemisphere and the poor ones of the Southern Hemisphere. The recent transformation should bring profound changes in the economies of the two superpowers and their allies. If nothing else, it is likely to render their huge military establishments largely unnecessary and obsolete and free resources to address more compelling aspects of global security.

The political transformation of the Eastern Bloc nonetheless may hold rich irony, as 400 million Soviets and East Europeans rush to adopt the West's profligate consumerist lifestyle. While we wish them success in seeking political and economic freedom, as environmentalists we view with some concern the possibility that their economies will come to mirror ours. We hope they will embrace, along with free enterprise, a conservation ethic.

It seems fortuitous that the far-reaching changes taking place now in the international arena coincide with the 20th anniversary of Earth Day and a renewed commitment in the West to environmental goals. The economic and political shifts that will be demanded by the new relationships offer an unprecedented opportunity to make the sorts of changes in economic structure that are needed if civilization is to survive the challenges ahead. The way is open. Every day, the world is becoming more closely knit economically. We need only recognize that we are united in our problems as well. If 5 billion people tackle them, how can we fail? □

Cleaning Up the Auto: A Rough Ride

by Jerald F. terHorst

When President Bush sent his Clean Air bill to Congress early last year, one of the surprises came from the oft-maligned automobile industry.

"The automobile industry will do its share to help clean up the nation's air," said a joint statement by Detroit's Big Three.

"Chrysler, Ford, and General Motors support, and are willing to meet, the objectives of President Bush's clean air program. We support tighter tailpipe standards for cars and trucks, tighter controls on the evaporation of fuel when cars are parked or running, and a clean fuels program."

The industry's critics first were surprised by the statement, then turned suspicious and skeptical. What was Detroit up to? No less than this: America's automakers were openly acknowledging that clean air is

something everyone needs to care about; not just parents concerned about the world their children will inherit, or biologists working to save forests in Brazil or New England, but also engineers designing motor vehicles. Isn't this what Earth Day 1990 is all about?

The skeptics and the cynics were caught off guard: You mean the Big Three auto companies and the hundreds of thousands of their U.S. employees are allies in the battle to clean up the environment? Naw, you can't be serious. (Hey, if they're not the enemy, who is?)

That's been the history of the clean air battle involving autos: lots of rhetoric but precious little reasoning. Or, as has been said, improving air quality has been more a political struggle for supremacy than a calm judgment based on scientific or technological evidence.

It's a fact that motor vehicles contribute to smog. With 150 million cars and trucks on American roads, being driven almost 2 trillion miles annually, it's no wonder motor vehicles account for about 44 percent of the primary ingredient in smog—hydrocarbons. That's the bad news.

The good news is that clean-air equipment is standard on all cars sold today in the United States. Indeed, the

That's been the history of the clean air battle involving autos: lots of rhetoric but precious little reasoning.

auto industry has done more than any other to clean up America's air. Statistics from EPA prove it: Compared with cars built in the early 1970s or before, today's new cars eliminate 96 percent of the hydrocarbons, 96 percent of the carbon monoxide, and 76 percent of the nitrogen oxides that come out of the tailpipe. Can any other segment of the industry—or any government agency—claim a better record?

Because emissions control systems on vehicles already are so effective, not much more can be accomplished by further tightening tailpipe controls, although even here the American automakers are willing to try. It won't be easy, technologically, to wring out the last few percentage points. And it won't be inexpensive for American car buyers either.

Senator David Durenberger, a member of the Senate Environmental Protection subcommittee, put it this way during a November 1989 session on even-tighter tailpipe standards proposed for the turn of the century: "There is no one who testified before the Committee who can tell us how these standards will be achieved. The Office of Technology Assessment says they are not technically feasible. The California Air Resources Board can't tell us how it will be done. The EPA can't identify any technology that reaches these levels."

Even if such superstringent vehicle controls were achievable, Durenberger went on to say, "It is doubtful that they



This Ford Taurus has been modified to run on methanol, ethanol, gasoline, or any combination of these fuels. Flexible-fuel cars may be a near-term means of alleviating the nation's air-quality problems. Shown is Roberta J. Nichols, who heads the company's Flexible Fuel Vehicle team.

(terHorst is the Director of National Public Affairs for the Ford Motor Company.)

would be the most cost-effective way to clean up air." Also, he said, it was obvious that state and local governments are not doing enough under existing enforcement provisions of the federal Clean Air Act to ensure that stationary sources of air pollution are doing what's required to clean up their operations.

"The auto industry has achieved more to realize the goals of the Clean Air Act than almost any other sector of the American economy. I think the auto industry can do more. And I think they can do more than they think they can," Durenberger declared.

"But I won't vote for those standards to make life easier for state and local governments. For the Congress to now insist that the auto industry make up for the failures of governments of all kinds at all levels over the past 20 years just doesn't seem right to me."

What more can be done? We at Ford have identified some useful targets.

For example, air quality could be improved by 25 percent by reducing the evaporative emissions from millions of vehicles, new and old. Evaporation of hydrocarbons is a primary cause of smog.

Only recently has anyone in government or in environmental circles begun to pay serious attention to the fact that fuel evaporation from vehicles stalled in heavy traffic or parked on the streets and in shopping mall lots

represents a heavy contribution to urban smog in Los Angeles and other metropolitan areas.

How to curb evaporative pollutants to achieve this potentially huge gain in air quality? Several methods are available.

One obvious way is to improve America's road network so that cars and trucks don't have to sit in daily gridlock. Environmentalists should rally behind public and auto industry efforts to eliminate clogged roads, because the payoff not only would help expedite traffic but would also improve air quality by a quantum leap.

Another avenue for reducing harmful evaporative emissions is to reduce the volatility of fuels that exude from parked and gridlocked vehicles. The petroleum industry could help significantly by finding ways to lessen fuel volatility. American and foreign auto manufacturers are working on ways to reduce evaporative emissions, and the research is promising.

But let's face it. The greatest automotive progress in cleaning up the air will not come from exotic new technology or tougher federal legislation but from the marketplace. It will be achieved as new cars and trucks with today's sophisticated emissions-control systems replace older cars currently in use.

Just from normal vehicle turnover in the next 10 years, average vehicle tailpipe emissions will decrease by

about 38 percent, even assuming a normal 2-percent annual growth in total vehicle miles traveled.

There would be even greater improvement in air quality if older cars were replaced more quickly. The reason: Older cars, built to less stringent standards, account for 54 percent of all the cars on the road—but emit more than 80 percent of America's smog-producing exhaust! Clearly, upgrading America's vehicle fleet by eliminating older cars and trucks would result in tremendous improvement in the air we breathe. Yet the rate of vehicle turnover may in fact be slowed if a punitive mandate by Congress forces tomorrow's car prices even higher than the price tags of today's already air-friendly vehicles.

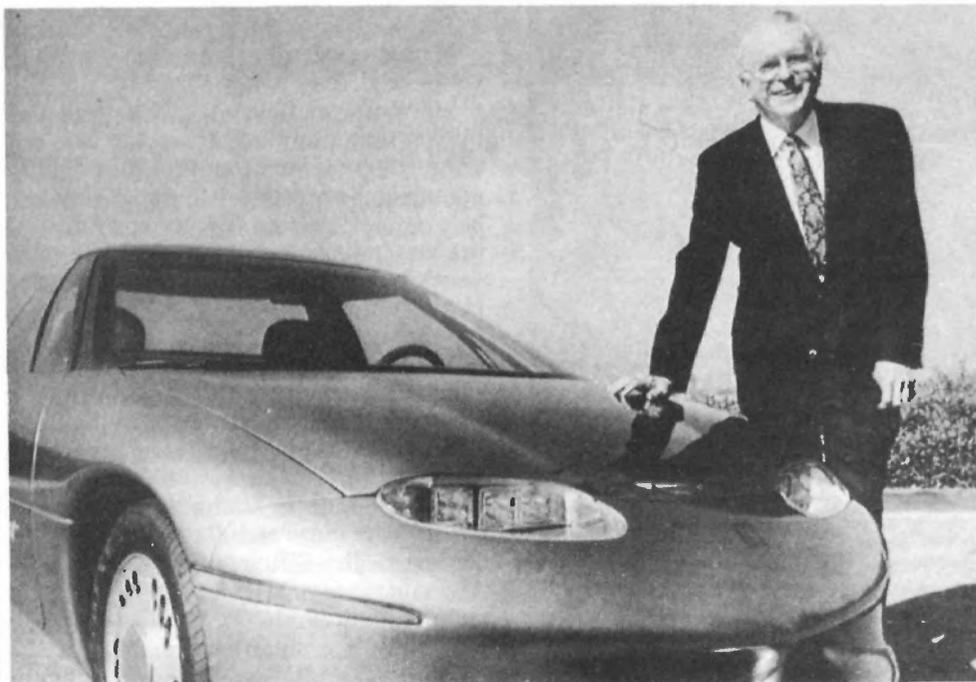
Despite the gains made in reducing automotive pollution in recent years, there still are some large urban areas of the country that can't meet national air quality standards every day of the year. That's why the industry has supported the objectives of President Bush's clean-air plan. It not only calls for tighter emissions standards for vehicles but also for sales of vehicles that can operate on less-polluting, alternative fuels in sprawling metropolitan areas with major smog problems such as Los Angeles, Chicago, Baltimore, New York City, San Diego, and Philadelphia.

Why alternative fuels? Precisely because the auto industry has made so much progress on reducing tailpipe pollutants that ever-tighter standards will result in scant improvement in air quality.

What comes out of the tailpipe is directly related to what goes into the fuel tank. In other words, the type of fuel can make a difference in reducing smog.

"Ford engineers see this [Bush] plan as an innovative and challenging move," according to Helen O. Petrauskas, Ford vice president for environmental and safety engineering. In a recent article in the *Environmental Forum*, she said:

For the first time we would be looking at the vehicle and its fuel as an integrated system. This is a concept that expands engineering horizons and offers new potential for improving air quality. While there are many questions to be answered, such as what incentives are required to induce customers to buy cars that use new fuels, the concept provides a real opportunity for progress toward



General Motors' Impact is a futuristic, electrically powered car. It is not yet in production, but may be within the next five years. Pictured is Roger B. Smith, chairman of the corporation.

these ambitious environmental goals through cooperative industry/government research and action.

Methanol, ethanol, natural gas, electricity—possibly other alternative fuels like reformulated gasoline—are prospects because emissions from these fuels are less likely to form smog.

Ford's research in this area has accelerated in the last 10 years. We have placed about 700 Ford demonstration vehicles in service since 1981, and they have provided valuable knowledge in resolving some of the technical and functional problems with alcohol and gaseous fuels as well as with electric cars. Each has advantages and disadvantages when compared with present-day gasoline. But achieving widespread public acceptance remains a conundrum until problems of limited driving range, fuel availability, and vehicle convenience can be solved.

Ford can commit to producing vehicles capable of operating on alternative fuels. Ford engineers have developed a "flexible-fuel vehicle" that is capable of using ethanol, methanol, gasoline, or any combination of these fuels with one common fuel tank. The driver isn't required to make any engine adjustments—the process is automatic—no matter which fuel or mix of fuels is in the tank. These vehicles have demonstrated excellent road performance in the last three years.

In those urban areas where clean fuels would help reduce the smog problem, such as in Los Angeles, a driver could use one of these alternative fuels, but use gasoline on a cross-country trip. Flexible-fuel vehicles are one possible solution to the problem of assuring an orderly transition while a new fuel delivery system is developing. It would be up to government, however, to create an environment that encourages the public to purchase and use such vehicles and fuels.

Electric vehicles are another prospect for improving air quality. Ford has been involved since 1982 in a \$20-million research program with General Electric, several battery manufacturers, and the U.S. Department of Energy. Similar efforts have been launched by the Electric Power Research Institute in conjunction with Chrysler and General Motors.

What makes electric vehicles attractive, environmentally, is that there are no noxious motor emissions to foul the air. However, one has to take into account that electric cars must recharge

their batteries by plugging into electric sockets. And smokestack emissions from electricity-generating plants fueled by coal, oil, and gas already have been targeted as major sources of air pollution, particularly acid rain.

Electric vehicles, advocates agree, will have only a modest impact for the foreseeable future (perhaps 100,000 vehicles in a 15 million annual vehicle market) and would mainly be used as delivery trucks and service vans required to travel only short distances each day. The batteries require six to eight hours recharging time during every 24-hour period, assuming 8 to 10 hours of daily vehicle operation. At present, the driving range of Ford's experimental electric Aerostar is 100 miles; the maximum speed is 65 miles per hour.

In all electric vehicle prototypes, major vehicle redesign is required to accommodate batteries and to power such things as power steering, brakes, and air conditioning. And the price of an electric vehicle, mainly due to battery cost, will be well above comparable vehicles using internal combustion engines and conventional fuels.

What the United States, indeed the world, must face is that correcting any single environmental concern, such as urban smog, hazardous waste disposal, or global warming, often creates a backlash that has a negative impact on other environmental concerns. This is not theory, but a conclusion based on the auto industry's experience of some 20 years during which well-intentioned environmental goals sometimes turned into inflexible mandates that proved costly and ineffective.

For example, the federal requirements to rush newly developed emissions-control systems into production in the late 70s resulted in serious degradation of vehicle performance and driveability. That, in turn, prompted customers either to disconnect their catalytic converters or to delay purchase of improved but more expensive new vehicles. Either way, air quality suffered.

Improvements in fuel economy can also affect safety and consumer preferences. Federal statistics show that large cars are safer than small ones in accidents. This is a simple matter of kinetic physics: Large cars are heavier and longer, so they offer more occupant protection against fatal or serious injury. Americans like safe cars, even if this means greater fuel consumption. Yet today's largest cars have better fuel

mileage than the smallest cars 10 years ago. This is true across the auto industry.

Additionally, millions of people purchase large vehicles to accommodate their families or to meet particular business needs. An obvious question: Which is better for air quality—one large car capable of doing what a customer needs or two small cars? For environmental and safety reasons, one large car is preferred.

Let's consider both national and personal costs. Currently, clean-air, fuel-economy, and safety legislation under consideration in Congress would add as much as \$1,200 to the price of a car or truck. And if some of the environmentally driven provisions affecting the auto industry become law, the result could signal the demise of family-size cars, farm-to-market trucks, and commercial vehicles across America.

Thousands of workers would face unemployment, surely a matter of social concern for state and federal welfare agencies, plus heavy tax losses for the U.S. Treasury, states, and cities—not to mention the degradation of America's vital transportation system.

Such prospects should be of tremendous concern to policymakers, lawmakers, and labor and business leaders worried about the nation's economic future. For one thing, there is no substitute national plan to offset this problem by providing adequate mass public transit systems or expanded railroad service to keep America working, moving, and competing in a very tough global market.

Many critical choices confront the U.S. government, industries, and workers in this laudable national campaign to improve the quality of the air we breathe. Much can be done and should be done. Ford Motor Company concedes that autos are part of the problem and it wants to be part of the solution: "At Ford, Quality Air is also Job One." The rest of the auto industry shares this objective.

The 20th anniversary of Earth Day, therefore, is a good time to note that tremendous air quality improvement already has been achieved by the auto industry, and the industry is willing to try to do more. But it is also time to note that there are complex, global interrelationships among differing environmental goals that require careful balancing and judicious tradeoffs by lawmakers, federal regulators, environmental crusaders, industry, and the public. □

The Greens of Europe: A New Environmentalism

by Konrad von Moltke

In all Western countries, the growing environmental movement has been an important political development over the past 20 years. Numerous environmental organizations have been created. Indeed, not just Western nations but virtually all countries now have indigenous environmental organizations that are helping to shape the perspective of governments on environmental issues.

While environmental organizations have become nearly universal, it is nevertheless important to recognize the differences among these organizations in different countries. Indeed, the structure of the environmental movement in the United States, France, or West Germany, for example, often more closely reflects the specific political system within which these organizations operate than the common agenda that unites them.

As environmental organizations have developed, they have faced the question whether to work with existing political parties or to create their own. While American organizations generally work through existing structures, in West Germany a new political party, the Greens, has emerged which is closely identified with the environmental agenda. As distinguished from environmental organizations, the need for a "Green" party is not evident in every country. Nevertheless, the West German Greens have been emulated in many countries, so that it is possible to speak of a "Green phenomenon."

Yet the rise of the Greens in West Germany is first and foremost a reflection of the West German political system. In assessing the Green phenomenon, it is important to keep the specific West German components versus the more universal issues in perspective. In Germany, political parties have programmatic identities: They are "Christian," "Social Democratic," or "Liberal." Traditionally,

parties have also been associated with colors: Conservatives are black; socialists are red. But in the past few years, the West German political scene has been rocked by a political party which turned tradition around; it called itself Green before it had any clearly defined political identity.

Green has long been associated with environmental, and the new party sought identification with environmentalism. By taking a color for its name rather than a more traditional programmatic label, such as "progressive ecologists," it acquired a

West German parties considered the environment no more than an irritant in the quest for continued economic growth. The West German government, for example, led the resistance against international measures to reduce acid rain in Europe.

The West German environmental movement was severely fragmented throughout the 70s; government policy tended to foster that fragmentation in the misguided belief that a divided movement would protect the authorities from public pressure. The structure of the West German political system

This dancing eagle is well-known as the logo of the politically active West German Greens.



API/Wide World photo.

more traditional political advantage: The founders could avoid difficult choices between an "ecological" wing which rejected traditional ideologies and a "socialist" wing which came to environmentalism via traditional left-wing politics. Avoiding that choice was important because the Greens began life as a marriage of convenience between groups that had been neglected by West German politics of the 1960s and early 1970s.

During the 70s, being an environmentalist in West Germany meant being on the periphery of the political system. Official policy reflected a belief in technology and the assumption that the environment could be adequately protected without fundamental changes in social or economic practices. The traditional

reinforced this idea. While it is superb in representing major social and economic interests, it is also remarkably ineffective in articulating the views of small minorities. A complex system of apportionment of seats at all levels of government ensures that no party receiving less than 5 percent of the vote will be represented in any elected body. Votes cast for such a party are effectively "lost," creating an additional disincentive for voters to support marginal groups.

The most visible part of the environmental movement in the 70s was a loose coalition of local activist initiatives, the *Bund Bürgerinitiativen Umweltschutz (BBU)*. The *BBU* organized some of the most massive public demonstrations in West German history. Many of these demonstrations

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West German Greens were elected to the Frankfurt City Parliament in 1981. Their poster translates, "Green protection against disasters inside and outside Parliament."

opposed nuclear power, and some of them degenerated into violent confrontations with the police. Most other environmental organizations were almost invisible compared to the BBU, and all of them were poorly funded and severely understaffed. But the BBU was the practical breeding ground of the environmental faction of the Greens, even though it was a non-partisan organization.

In the West Germany of the 1970s, the environmental movement and political parties on the far left of the political spectrum had something in common: Both had little or no representation in the West German political system. The Greens began as an electoral alliance of these groups to overcome the minimum requirement of 5 percent. Their initial program was consequently more than just an ecological manifesto; it focused on the concerns of the peace movement, which had not succeeded in stopping the introduction of cruise missiles on the continent, and other interests of these marginal groups. So the Greens' first success in the West German political system was getting elected at all.

Over the past decade, the West German Greens have struggled with their divisive legacy. For several years a debate raged between "realists" and "fundamentalists" concerning their willingness to assume executive responsibility in coalition with other parties. This question has now been

settled in favor of participation, involving acceptance of the inevitable compromises this will entail. Even participation in the West German national government is no longer inconceivable. It appears possible that a future West German government could be formed by a coalition of Social Democrats and Greens.

Thus the Greens have made important contributions to West German politics in promoting broad opposition to nuclear energy and in achieving acceptance of the peace movement or in identifying more sharply the dangers of nationalism and racism in West German society. They forced the traditional parties to confront rampant abuses in their fund-raising. Paradoxically, the Greens have had less impact on West German environmental policy than most outside observers might expect.

And while public support for environmental protection is now broadly based in West Germany, as in all other Western countries, it can hardly be attributed to the Greens. Instead, the foundations for this support were laid by the environmental movement of the 70s—the same movement the Greens have drawn upon for support.

In the 80s, environmental policy became a major item for both conservative and left-wing parties in most countries—later in the United States than elsewhere. In West

Germany, this shift occurred in 1982 following recognition of serious forest damage widely attributed to acid rain. Forest owners and forest managers, traditionally a very conservative part of the electorate, may ultimately have had more to do with the change in government policy than the Greens.

The Greens are an outgrowth of unique West German political conditions. They have, however, been emulated in other countries, taking on new forms all across Europe as the advantage of the non-ideological color label—Green—continues to allow a wide range of interpretations, depending on local conditions. Thus the Green phenomenon in Europe is a heterogeneous mix of fledgling political parties whose future is tied closely to their ability to articulate issues which go far beyond the environmental agenda.

The small West European countries of Denmark, Sweden, and the Netherlands are widely known for their strong commitment to environmental protection. All three have Green parties, but they have fared differently. Perhaps most striking is the weakness of the Greens in the Netherlands, the country with arguably the most environmentally aware electorate in Europe. Even in the most recent elections, which were fought in large measure on environmental issues, the Dutch Greens emerged with only 4.1 percent of the vote.

But this does not mean environmental issues are not represented. The Dutch political system is based on pure proportional representation; any group which attracts 1 percent of the vote will also receive 1 percent of the available seats. As a result, traditional Dutch political parties are highly sensitive to minority interests and much more open to the issues which provided a focus for the Greens in West Germany: disarmament, minority rights, and environmental protection.

Similarly in Denmark, a country where aggregate membership of

environmental organizations exceeds the total population (due to overlapping memberships), the local incarnation of the Greens has not had a major impact because the political system is sensitive to minority interests.

In neighboring Sweden, however, the Greens emerged from recent elections as a major political force despite the government's vigorous and long-standing commitment to environmental protection. The reasons presumably lie not in environmental policy but in voters' desire to protest against a consensus-oriented, policy-making process in which traditional parties did not appear to offer realistic alternatives. Sweden illustrates the extent to which the Green phenomenon may be divorced from specific environmental issues.

Three other major European countries—Italy, France, and the United Kingdom—have tended to approach environmental issues with more reserve than the smaller countries. In these three countries, Greens have been having an impact on the political scene, but in ways that differ widely from one country to another.

In Italy and France, the Greens have been remarkably successful in local and regional elections but have not yet penetrated at the national level. In Italy, this is presumably a matter of time, provided the relationship with the Radical Party—a traditional forum for protest voters and a long-standing champion of Green issues such as disarmament, women's rights, and pro-choice positions on abortion—can be worked out. In France, the electoral system creates serious impediments to small-party representation without prior electoral alliances with the large parties. Such alliances risk limiting the ability of the Greens to attract protest voters. Thus, the French Greens were more successful in the European Parliament elections, which use a different form of seat apportionment than the national elections.

No electoral system is harder on minorities than the one shared by the United Kingdom and the United States, in which elections are based on electoral districts in each of which a plurality elects an individual representative. Yet the outcomes in the two countries are quite different. U.S. Congressional representatives find it necessary to cultivate their electoral districts and to respond to minority interests at that level; such an imperative exists to a much lesser extent in the United Kingdom, where

party-line voting in Parliament is an accepted fact of political life.

While Greens exist in both the United Kingdom and the United States, there is little sign that they will be able to elect representatives in significant numbers. They are ultimately victims of the political system within which they work. In the recent European Parliament elections, the British Greens obtained 15 percent of the vote nationwide but failed to elect a single member because they could not muster a majority in any one electoral district.

Perhaps the most fascinating aspect of the Green phenomenon is the role environmental interests have played in the current transformation of Eastern Europe. For many years, environmental concerns were under-represented in official government policy.

Paradoxically, this created a vacuum in which informal environmental groups could form since they did not conflict with official structures. In many instances, both inside the Soviet Union and its republics and in Eastern Europe, these nascent environmental groups have found themselves at the very center of a transforming political system. They are one of the few organized groups which are not identified with the previous regime, not only because the environment is a severely neglected policy area but also because they are politically neutral.

Environmentalists have been a moving force in the Baltic provinces, for example, and were organized in Hungary at a time when citizen participation was still officially frowned upon. In Poland, representatives of the ecological movement sat at the roundtable negotiations which led to the transformation of that country's political system. And in Bulgaria, small environmental demonstrations triggered the process of change.

Ultimately, the Greens are a visible incarnation of a challenge to governments around the world. Electors are seeking more energetic protection of the environment, and traditional parties are struggling to accommodate this new interest.

The message of the Greens in this situation is quite simple: If you do not succeed in adopting vigorous environmental policies, your voters will turn to new parties. In West Germany the result may even be a change of government. □

Is there room for specifically Green politics in the United States? At first sight the outlook is cloudy. Unlike those European countries where Green parties flourish on small percentages of the popular vote because of proportional representation, the United States has a simple-majority, winner-take-all system of elections. This tends to freeze out third-party projects.

Also, the need for a specifically Green party is arguably less here than elsewhere because of a strong American tradition of freedom of association and the correspondingly characteristic American knack for forming pressure groups. Thus, environmental issues are pushed by a veritable throng of local pressure groups and by strong environmental lobbies centered in Washington and state capitals.

Nevertheless, there are organized Green political formations all over the country. Perhaps the best organized and the most ambitious of these are the Green Committees of Correspondence, which operate in the tradition of the committees of correspondence that helped build momentum for the American Revolution. Organized in 250 local communities, in 34 regions, with an Inter-regional Committee headquartered in Kansas City, the Greens are serious about building—from the grassroots up—a strong, locally and regionally based national political movement. In addition to supporting citizen actions on a range of issues, such as anti-incineration and pro-recycling campaigns, save-the-forest campaigns, and various conservation projects, Greens have run for political office in many localities and state legislative districts—getting as little as 1 percent and as much as 44 percent of the popular vote.

(Rensenbrink, a political scientist, teaches courses in ecology and politics and in political theory at Bowdoin College in Brunswick, Maine, and is active with the Green Committees of Correspondence. He is writing a book, due to be published this fall, on the Greens and the transformation of American politics in the 90s.)

Do the Greens Have a Future Here?

by John Rensenbrink



Steve Wort photo Copyright 1990

Walt Bresette, above, is a founder of the Lake Superior Green Party, which worked successfully to elect an environmentally sympathetic Commissioner of Bayfield County, Wisconsin. Most U.S. Green groups focus their energies on public forums and lobbying rather than elections.

Yet the question remains: What is the rationale for these Green groups over and above what they as individuals might be doing as members of already-existing organizations and lobbies?

An answer may be found along the following lines. If, as argued elsewhere in this issue of *EPA Journal*—by Administrator Reilly, for example—a major aim of environmental action is prevention of pollution, and not just its cleanup or reduction, then there may be a need for a more coherent and multi-faceted social and political force in this country than is presently available.

Pollution prevention requires a comprehensive capacity to think ahead and a steady political will. But local pressure groups tend to focus on single issues; they usually react to problems only after-the-fact. In many cases, they are driven by an attitude of “not in my back yard,” the NIMBY syndrome. NIMBY feelings are easily stirred up, but they also dwindle fast.

The big lobbies often possess a forward-looking capacity and may be more comprehensive than local pressure groups in their approach, but they are immersed in particular legislative

politicking, and they are unable to focus effectively on the larger, long-term issues. They don't have the steady political clout for a comprehensive program of pollution prevention because their social and political base is weak or non-existent. Basically, they are as effective as the direct-mail money raisers and wealthy donors they depend on enable them to be.

As for the Republican and Democratic parties, their politics are very short-term oriented and have become exercises in brilliant sloganeering and ingenious negative campaigning via ever-more-expensive TV advertising. They seem therefore to lag in their capacity to formulate and follow through on broad-based and long-term policies of prevention.

Furthermore, environmental problems are very likely to get worse. The effects of gradual global warming, for example, could be a series of continuing disasters. Swift, sure action will be necessary—a kind of action that does not come easily to large, ponderous institutions like the federal government or large corporations, where relative inertia often prevails over efforts to deal effectively with ecological problems.

The present extra-governmental response mechanism—NIMBY-minded local groups, centralized lobbies, and political parties whose anxiety for money to pay for costly TV propaganda overwhelms even their strongest and best intentions—seems insufficient. What is needed is something they can't supply: the goad and vision to stir government, business, and citizens to more effective action.

There may well be, therefore, a niche for the kind of movement and party the Greens are trying to develop. A Green movement would point public policy in a problem-solving direction, as distinct from problem-tinkering and crisis-management politics. It would be a catalyst for translating knowledge into actual policy. It is not as if Greens would have to displace the Republicans or Democrats, or the central lobbies, or the NIMBY-minded local groups. But they are needed as a creative, catalytic force.

The Greens I rub shoulders with are dedicated, practical visionaries who have committed themselves to being a steady force for the prevention of pollution and the development of sustainable communities, for a sustainable country and world based on efficiency, justice, and freedom.

They are a minority, of course. But suppose their numbers were to increase by a factor of three or four (as I think they will). Suppose they were able to supply just that degree and kind of vision, wisdom, and will without which the government and society at large probably would not respond effectively to the dire threats of ecological and economic disintegration. Wouldn't that be a boon?

I believe such a catalytic force is needed and that it has already taken root in our society and politics. Thus there is good reason for concerned Americans from all quarters—government officials, business men and women, labor leaders, grassroots organizations, big environmental lobbies, and worried citizens—to contribute their help and support to an indigenous Green movement. □

A Perspective from Another Country: The Soviet Task

by Alexei Yablokov

As the Soviet Union moves toward the year 2000, Soviet environmentalists and ordinary citizens are becoming more and more active. They have no choice. The natural resources in our rich country are being wasted and misused to an extent that the country now faces ecological crisis. Problems of toxic and radioactive wastes, polluted air and water, and agricultural pollution have reached extremely serious levels.

The policy of *glasnost* is allowing us to learn more and more about environmental disasters in the USSR, but more must be done. As members of the Supreme Soviet, my colleagues and I are committed to making *perestroika* permanent in the environmental sphere.

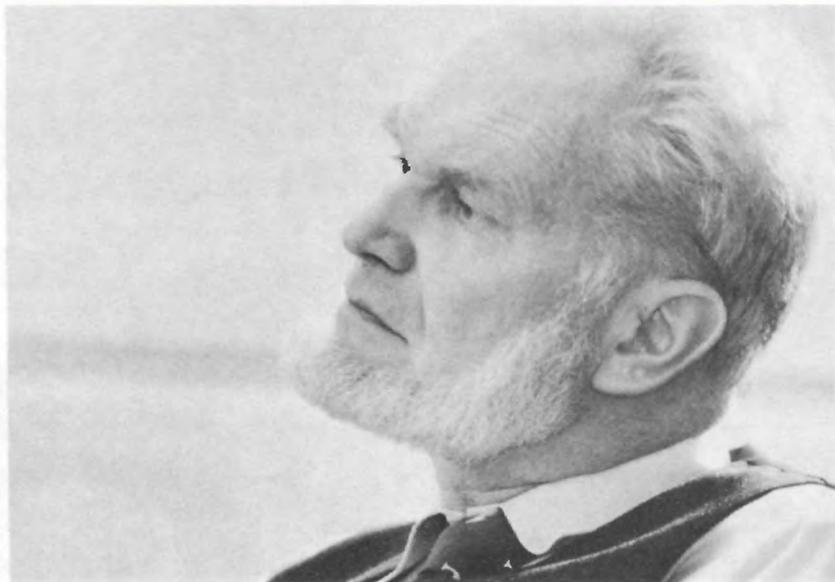
The problems cannot be underestimated. In nearly every area of the environment, Soviet citizens are facing real threats to their health and the health of their children:

- Last year the release of harmful substances into the atmosphere reached 100 million tons. In 103 cities, with a total population of about 50 million people, at least 10 times the permissible concentrations of harmful substances were emitted.
- Much of our water is extremely polluted and violates sanitary and ecological norms. In 600 cities, normal purification of water sources is not provided. At installations of the present Ministry of Water Works, up to 21 percent of the water being gathered in reservoirs for consumer use is wasted.
- More than 5 million hectares of the most productive land have been removed from agricultural production

(Yablokov is Vice-Chairman of the USSR Supreme Soviet Committee on Environmental Protection and Rational Use of Natural Resources. He is also a Corresponding Member of the USSR Academy of Sciences, Environmental Advisor to the International Foundation for the Survival and Development of Humanity, and President of Greenpeace USSR.)

—Translated by Edward B. Hodgman

Alexei Yablokov, pictured below, is a key Soviet environmental official. Like many other countries, the Soviet Union is becoming acutely aware of its serious pollution problems.



William Campbell/TIME Magazine

due to water-logging and salination. About 10 million hectares of the most valuable farm land have been flooded as a result of newly built reservoirs and hydroelectric projects.

- For each unit of production, several times more raw materials, energy, and water are used in the Soviet Union than in Western nations.
- The pesticide problem is also acute. Dangerous levels of pesticides have been found in 42 percent of children's milk products, and residues can even be detected in mother's milk.
- Declining environmental quality has fostered a rise in illness. We share the 47th or 48th place in average life expectancy and occupy 44th place in infant mortality in the world.
- We now have "ecological refugees." The Aral Basin, the Caspian Basin, the southern Ukraine, the Kuzbass region, many areas of great natural beauty, and a series of other regions are at the edge of ecological catastrophe.

This alarming ecological situation is one reason for the rise in social tensions in the country. We are also losing immense economic potential. Many of these environmental problems are, in fact, the result of incompetent economic management.

This is quite a catalogue of problems. The most difficult matter to face is that, as we begin our efforts to clean up the environment, we cannot expect to see real improvement in the situation in the next year. In the immediate prospect, we cannot expect to achieve noticeable improvement in the quality of our water or air.

The Supreme Soviet—An Organ of Change

Nonetheless, we will not lose hope. Both the new Supreme Soviet and the public are devoting new energies and resources to solving these problems. During the most recent Supreme Soviet session, we worked from morning to night analyzing the draft Government plan on economic and social development and the 1990 national budget.

We held hearings with all national agencies dealing with environmental protection—first of all Goskompriroda (the State Committee for the Protection of Nature) and Goskomhydromet (the State Committee on Hydrometeorology). We heard testimony from all national industries which pose the greatest threat to the environment: metallurgical, lumber, and chemical and gas-processing industries. We even brought in the USSR State Planning Commission (*Gosplan*), the USSR Ministry of Finances, and the State



Lake Baikal in Siberia is one of the deepest in the world. U.S. and Russian scientists are studying many aspects of life in the lake.

Committee on Science and Technology to get their views on what should be done to improve the environmental situation.

In order to save the health of the earth we must change our legislation. An "ecologization" of thinking has already taken place among the majority of Soviet people. The laws must become "ecologized" just as quickly. After all, the laws reflect the interrelationship among people, and also between people and property. All these interrelationships must now be examined through the ecological prism. The environment has become a burning political issue, a problem of health and life itself.

Environmental activism is a healthy reaction to the technocratic development of civilization. In essence, environmental action has sprung from the worldview of all people who are worried about the present environmental situation.

At the Congress of People's Deputies, every second or third Deputy spoke about ecological disasters. Several candidates for ministerial posts were rejected by the Supreme Soviet in part because their past activity had been marked by, to put it mildly, environmental "shortsightedness."

The Supreme Soviet must be the legislative guardian of our environment.

In the first session, our committee demanded (and our demands were satisfied) an accounting of the potential environmental danger of the techniques and technology purchased and used in the Soviet Union. It is no secret that many foreign firms would like to use our country as a testing ground for ecologically harmful production. Many are succeeding at the present time.

Independent Environmental Groups

The growth of independent environmental groups in the USSR is inspiring. We are "turning green" quickly. In our country, the mass ecological movement is very young, but it is growing and maturing.

There are real "Greens" in Lithuania, Latvia, Estonia, the Ukraine, and a number of areas of Russia, and numerous ecological clubs, groups, organizations, and societies. Not long ago, the Soviet division of the world-renowned organization "Greenpeace" was founded. It is best that, for now, all these different environmental groups are working on their own. The ecological movement must have a whole range of colorations and directions.

But there must also be joint actions, combining the efforts of all these groups for specific, concrete actions. There are examples of such actions in our country

and around the world. Here in the USSR we have battled to stop a canal planned to connect the Volga and the Chograi rivers. Around the world we see the efforts to save tropical forests and the Indian Tiger, the efforts to stop the slaughter of whales, seals, and other marine mammals. All groups must join together to stop the threat to our seas—the widespread use of plastic nets and the release of plastic and toxic wastes into world oceans.

Economics and the Environment

Protecting the environment depends, in large part, on economic policies and incentives. Proper use of economic incentives will allow us to implement new technologies.

A well thought-out system of taxation is crucial. Prohibitive taxes must be levied on any firms that are using dangerous technology or releasing harmful wastes into the environment. This "polluter pays" principle must be introduced into the Soviet system. This means the polluter pays for the full extent of harm inflicted: not only a fine, but the total sum necessary for the restoration of full health to the environment and the citizens affected.

This principle has not been applied in our country thus far. Conversely, firms using environmentally safe technologies should be given some relief from taxation.



Flowing through the center of the capital, the Moscow River carries discharges from many industries

Goskompriroda—the Soviet EPA

Last year, the government ruled that more than 500 million rubles should be confiscated from industries that caused environmental destruction. But this money did not go for the restoration of the destroyed environment; it was simply swallowed back into the budget. This situation must change, so that the conservation of natural resources becomes advantageous for government on the local level; these funds must be used for specific environmental projects.

We will not be able to manage without economic mechanisms for improving the environment. These mechanisms must be part and parcel of the laws on regional economic management, on local self-government and self-financing, on property, and on taxes. Goskompriroda must search out and support types of production that are good for the environment.

In developed countries, industry is actively moving toward waste-free technology (in which the waste from one type of production becomes a raw material for another type of production). This means increased production and economic benefit. For example, one cubic meter of lumber in Canada or Sweden ends up producing five to six times more products than in our country.

What Is to Be Done?

All citizens of the country must be involved in plans for protecting the environment. New environmental laws must be based on a nationwide discussion.

The Supreme Soviet and Goskompriroda can take concrete steps. For example, in the future, cars must use only two to three liters of gasoline per 100 kilometers instead of today's eight to nine. It is time not only to reduce, but to stop completely the release of chlorofluorocarbons in order to stop depletion of the protective ozone layer. And it is time to reassess the necessity of the immense amount of energy now being produced.

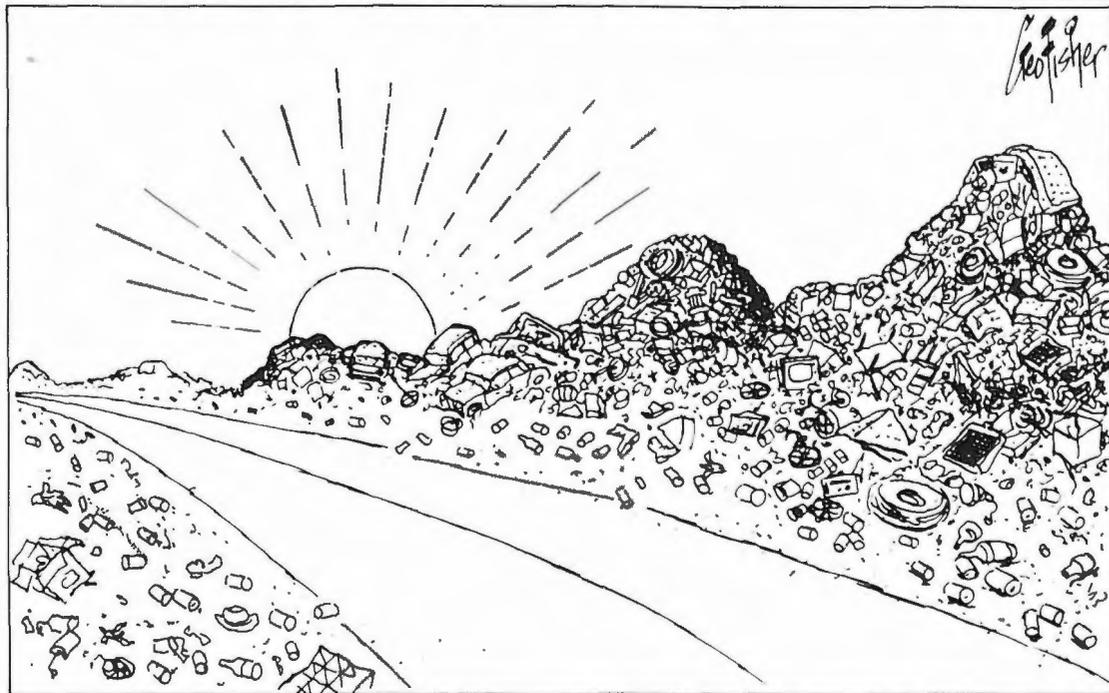
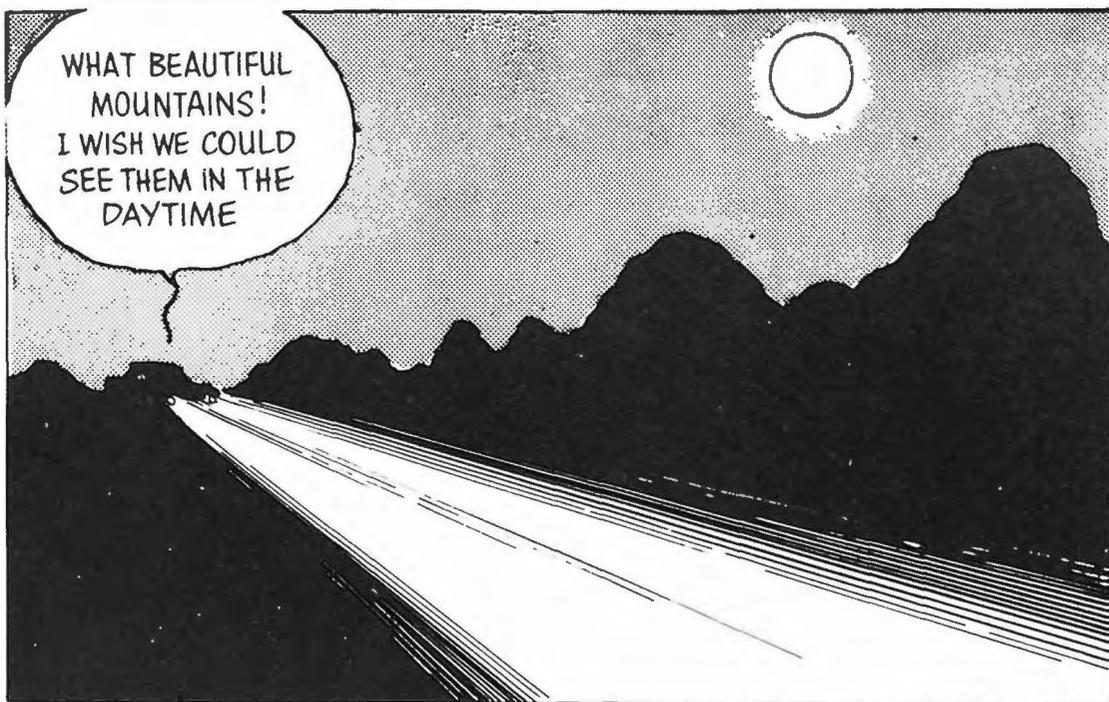
We must endorse extraordinary short-term programs for quick repair of the environment in regions of ecological disaster. This is the first step. Following this, we must simply stop the construction of huge industrial and energy projects that are environmentally irresponsible.

Among other things, it will be essential to develop a mobile ecological assessment capability; to register ecological "passports" for existing industry in order to define the degree of danger to the environment of various technologies in use; and to develop concrete measures for replacing dangerous technologies with new, less dangerous ones.

Complete *glasnost* about and access to information about the condition of the

environment and all forms of pollution—including radiation—are very important and will help us concentrate on the most urgent problems in every region. In general, the plan of action is clear. We must bring it to life. Unfortunately, we still face the problem of ignorance about severe problems on the part of people who are making decisions. At the first Congress of People's Deputies, a group of deputies—dozens of them—demanded the passage of a special resolution about the environment. It did not work out. Finally, with enormous effort, it was possible to include in the agenda of the present Supreme Soviet session a discussion of the draft decree entitled "Urgent Measures for Improving the Country's Environment." Even if it was the 34th and last question on the agenda, it was an enormous symbolic victory all the same.

It was a legislative victory as well, as the Supreme Soviet passed the decree on the last day of its session in December 1989. This decree is vitally important: It gives the government a plan of action, supports the people who are desperately trying to save the environment, and shows the rest of the world that the Soviet Union is serious about improving its own ecological record and the health of nature around the world. □



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Back Cover: Spring, a time of hope. Photo by Bill Weems, Woodfin Camp.



United States
Environmental Protection
Agency
Washington D.C. 20460

