

TAKING SIDES



Clashing Views on Controversial
Environmental Issues

EIGHTH EDITION

Theodore D. Goldfarb

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Controversial
Environmental Issues**



Eighth Edition

Edited, Selected, and with Introductions by

Theodore D. Goldfarb

State University of New York at Stony Brook

Dushkin/McGraw-Hill

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*This book is dedicated to my children and grandchildren
as well as all other children for whom the successful
resolution of these issues is of great urgency.*

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PREFACE

For the past 22 years I have been teaching an environmental chemistry course, and my experience has been that the critical and complex relationship we have with our environment is of vital and growing concern to students, regardless of their majors. Consequently, for this eighth edition, I again sought to shape issues and to select readings that do not require a technical background or prerequisite courses in order to be understood. In addition to the sciences, this volume would be appropriate for such disciplines as philosophy, law, sociology, political science, economics, and allied health—any course where environmental topics are addressed.

Faculty are divided about whether or not it is appropriate to use a classroom to advocate a particular position on a controversial issue. Some believe that the proper role of a teacher is to maintain neutrality in order to present the material in as objective a manner as possible. Others, like myself, find that students rarely fail to recognize their instructors' points of view. Rather than reveal which side I am on through subtle hints, I prefer to be forthright about it, while doing my best to encourage students to develop their own positions, and I do not penalize them if they disagree with my views. No matter whether the goal is to attempt an objective presentation or to encourage advocacy, it is necessary to present both sides of any argument. To be a successful proponent of any position, it is essential to understand your opponents' arguments. The format of this text, with 36 essays arranged in pro and con pairs on 18 environmental controversies, is designed with these objectives in mind.

In the *introduction* to each issue, I present the historical context of the controversy and some of the key questions that divide the disputants. The *postscript* that follows each pair of essays includes comments offered to pro-voke thought about aspects of the issue that are suitable for classroom discussion. A careful reading of my remarks may reveal the positions I favor, but the essays themselves and the *suggestions for further reading* in each postscript should provide the student with the information needed to construct and support an independent perspective. Also, the *On the Internet* page that accompanies each part opener provides Internet site addresses (URLs) that should prove useful as starting points for further research.

Changes to this edition This eighth edition has been extensively revised and updated. There are five completely new issues: *Should a Price Be Put on the Goods and Services Provided by the World's Ecosystems?* (Issue 1); *Will Pollution Rights Trading Effectively Control Environmental Problems?* (Issue 7); *Is Biotechnology an Environmentally Sound Way to Increase Food Production?* (Issue 8); *Is the Environmental Protection Agency's Decision to Tighten Air Quality Standards for Ozone and Particulates Justified?* (Issue 10); and *Will Voluntary Action by*

Industry Reduce the Need for Future Environmental Regulation? (Issue 15). For four of the issues retained from the previous edition, the issue question has been significantly modified to focus the debate more sharply and to bring it up-to-date. For two of these issues both selections have been replaced: Issue 11 on agricultural pollution and Issue 14 on nuclear waste. For the other two modified selections, only the YES selection has been replaced: Issue 6 on property rights and Issue 13 on recycling. In addition, the following selections have been replaced in issues retained from the previous edition: the YES selection for Issue 2 on the value of wilderness; the NO selection for Issue 4 on environmental racism; the YES selection for Issue 9 on environmental hormone mimics; the NO selection for Issue 17 on global warming; and the YES selection for Issue 18 on the threat of a global environmental crisis. In all, 20 of the 36 selections in this eighth edition are new.

A word to the instructor *An Instructor's Manual With Test Questions* (multiple-choice and essay) is available through the publisher for the instructor using *Taking Sides* in the classroom. Also available is a general guidebook, *Using Taking Sides in the Classroom*, which has general suggestions for adapting the pro-con approach in any classroom setting. An online version of *Using Taking Sides in the Classroom* and a correspondence service for *Taking Sides* adopters can be found at <http://www.dushkin.com/usingsides/>. For students, we offer a field guide to analyzing argumentative essays, *Analyzing Controversy: An Introductory Guide*, with exercises and techniques to help them to decipher genuine controversies.

Taking Sides: Clashing Views on Controversial Environmental Issues is only one title in the *Taking Sides* series. If you are interested in seeing the table of contents for any of the other titles, please visit the *Taking Sides* Web site at <http://www.dushkin.com/takingsides/>.

Acknowledgments I received many helpful comments and suggestions from friends and readers across the United States and Canada. Their suggestions have markedly enhanced the quality of this edition and are reflected in the new issues and the updated selections.

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INTRODUCTION

The Environmental Movement

Theodore D. Goldfarb

ENVIRONMENTAL CONSCIOUSNESS

In June 1992 Rio de Janeiro was the site of the United Nations Conference on Environment and Development (UNCED), popularly billed as the Earth Summit. UNCED, which was the follow-up to a much more modest United Nations conference held 20 years earlier, consisted of two massive, global conferences—one of official government delegations and the other of a diverse array of nongovernmental organizations (NGOs)—as well as a separate “Earth Parliament” comprised of 800 delegates of indigenous peoples. The most far-reaching outcome of UNCED was a 600-page agreement called Agenda 21, which sets guidelines for how, under UN leadership, the governments and businesses of the world should attempt to achieve economic growth while maintaining environmental quality. Two years prior to the Earth Summit, on April 22, 1990, 200 million people in 140 countries around the world participated in a variety of activities to celebrate Earth Day. It was also a follow-up to an event that took place two decades earlier, the first Earth Day (celebrated only in the United States), which many social historians credit with spawning the ongoing global environmental movement.

Comparing the enormous increase in size, complexity, range of issues, and diversity of participation in either UNCED or Earth Day 1990 with its predecessor event reveals the explosive growth in political, scientific and technical, regulatory, financial, industrial, and educational activity related to an expanding list of environmental problems that has developed in the intervening years. Industrial development has reached a level at which pollutants threaten not only local environments but also the global ecosystems that control the Earth’s climate and the ozone shield that filters out potentially lethal solar radiation. The elevation of environmental concern to a prominent position on the international political agenda persuaded commentators on Earth Day 1990 events to speculate that the world was entering “the decade—or even era—of the environment.” The initial attention given to UNCED and the ongoing activities it spawned at first appeared to confirm this prediction. However, as the world enters the new millenium with increasing concern about future worldwide economic prosperity, there is growing resistance from the international industrial community to the imposition of further environmental regulations and restrictions. In June 1997 a five-year review at a special session of the UN General Assembly revealed little progress in implementing the Earth Summit agreements. The unprecedented and sur-

prising progress made in controlling the release of pollutants that destroy stratospheric ozone has not resulted in similar, rapid progress in reducing the emission of "greenhouse gases" that threaten global climatic stability. In December 1997 an international forum was held in Kyoto, Japan, to consider such actions, but it produced only a modest protocol that even the most optimistic assessments judged to be no more than a first step. Yet even this agreement has encountered strong congressional opposition in the United States and its implementation seems unlikely.

THE HISTORY OF U.S. ENVIRONMENTALISM

The current interest in environmental issues in the United States has its historical roots in the conservation movement of the late nineteenth and early twentieth centuries. This earlier, more limited, recognition of the need for environmental preservation was a response to the destruction wrought by uncontrolled industrial exploitation of natural resources in the post-Civil War period. Clear-cutting forests, in addition to producing large devastated areas, resulted in secondary disasters. Bark and branches left in the cutover areas fueled several major midwestern forest fires. Severe floods were caused by the loss of trees that previously had helped to reduce surface water runoff. The Sierra Club and the Audubon Society, the two oldest environmental organizations still active today, were founded around the turn of the century and helped to organize public opposition to the destructive practice of uncontrolled natural resource exploitation. Mining, grazing, and lumbering were brought under government control by such landmark legislation as the Forest Reserve Act of 1891 and the Forest Management Act of 1897. Schools of forestry were established at several of the land grant colleges to help develop the scientific expertise needed for the wise management of forest resources.

The present environmental movement can be traced back to 1962, when Rachel Carson's book *Silent Spring* appeared. The book's emotional warning about the inherent dangers in the excessive use of pesticides ignited the imagination of an enormous and disparate audience who had become uneasy about the proliferation of new synthetic chemicals in agriculture and industry. The atmospheric testing of nuclear weapons had resulted in widespread public concern about the effects of nuclear radiation. City dwellers were beginning to recognize the connection between the increasing prevalence of smoky, irritating air and the daily ritual of urban commuter traffic jams. The responses to Carson's book included not only a multitude of scientific and popular debates about the issues she had raised but also a ground swell of public support for increased controls over all forms of pollution.

The rapid rise in the United States of public concern about environmental issues is apparent from the results of opinion polls. Similar surveys taken in 1965 and 1970 showed an increase from 17 to 53 percent in the number of respondents who rated "reducing pollution of air and water" as one of the three problems they would like the government to pay more attention to. By

1984 pollster Louis Harris was reporting to Congress that 69 percent of the public favored making the Clean Air Act more stringent. A CBS News/*New York Times* survey revealed that 74 percent of respondents in 1990 (up from 45 percent in 1981) supported protecting the environment *regardless of the cost*.

The growth of environmental consciousness in the United States swelled the ranks of the older voluntary organizations, such as the national Wildlife Federation, the Sierra Club, the Isaac Walton League, and the Audubon Society, and has led to the establishment of more than 200 new national and regional associations and 3,000 local ones. Such national and international groups as the Environmental Defense Fund, Friends of the Earth, the National Resources Defense Council, Environmental Action, the League of Conservation Voters, and Zero Population Growth have become proficient at lobbying for legislation, influencing elections, and litigating in the courts.

Environmental literature has also grown exponentially since the appearance of *Silent Spring*. Many popular magazines, technical journals, and organizational newsletters devoted to environmental issues have been introduced, as well as hundreds of books, some of which, like Paul Ehrlich's *The Population Bomb* (1968) and Barry Commoner's *The Closing Circle* (1972), have become best-sellers.

CLASHING VIEWS FROM CONFLICTING VALUES

As with all social issues, those on opposite sides of environmental disputes have conflicting personal values. On some level, almost everyone would admit to being concerned about threats to the environment. However, enormous differences exist in individual perceptions about the seriousness of some environmental threats, their origins, their relative importance, and what to do about them. In most instances, very different conclusions, drawn from the same basic scientific evidence, can be expressed on these issues.

What are these different value systems that produce such heated debate? Some are obvious: An executive of a chemical company has a vested interest in placing greater value on the financial security of the company's stockholders than on the possible environmental effects of the company's operation. He or she is likely to interpret the potential health effects of what comes out of the plant's smokestacks or sewer pipes differently than would a resident of the surrounding community. These different interpretations need not involve any conscious dishonesty on anyone's part. There is likely to be sufficient scientific uncertainty about the pathological and ecological consequences of the company's effluents to enable both sides to reach very different conclusions from the available "facts."

Less obvious are the value differences among scientists that can divide them in an environmental dispute. Unfortunately, when questions are raised about the effects of personal value systems on scientific judgments, the twin myths of scientific objectivity and scientific neutrality get in the way. Neither the scientific community nor the general population appear to understand

that scientists are very much influenced by subjective, value-laden considerations and will frequently evaluate data in a manner that supports their own interests. For example, a scientist employed by a pesticide manufacturer may be less likely than a similarly trained scientist working for an environmental organization to take data that show that one of the company's products is a low-level carcinogen in mice and interpret those data to mean that the product therefore poses a threat to human health.

Even self-proclaimed environmentalists frequently argue over environmental issues. Hunters, while supporting the prohibition of lumbering and mining on their favorite hunting grounds, strongly oppose the designation of these regions as wilderness areas because that would result in their being prohibited from using their vehicles to bring home their bounty. Also opposed to wilderness designation are foresters, who believe that forest lands should be scientifically managed rather than left alone to evolve naturally.

Political ideology can also have a profound effect on environmental attitudes. Those critical of the prevailing socioeconomic system are likely to attribute environmental problems to the industrial development supported by that system. Others are likelier to blame environmental degradation on more universal factors, such as population growth.

Changes in prevailing social attitudes influence public response to environmental issues. The American pioneers were likely to perceive their natural surroundings as being dominated by hostile forces that needed to be conquered or overcome. The notion that humans should conquer nature has only slowly been replaced by the alternative view of living in harmony with the natural environment, but the growing popularity of the environmental movement evinces the public's acceptance of this goal.

PROTECTING THE ENVIRONMENT

There has always been strong resistance to regulatory restraints on industrial and economic activity in the United States. The most ardent supporters of America's capitalist economy argue that pollution and other environmental effects have certain costs and that regulation will take place automatically through the marketplace. Despite mounting evidence that the social costs of polluted air and water are usually external to the economic mechanisms affecting prices and profits, prior to the 1960s, Congress imposed very few restrictions on the types of technology and products industry could use or produce.

As noted above, the turn-of-the-century conservation movement did result in legislation restricting the exploitation of lumber and minerals on federal lands. Similarly, in response to public outrage over numerous incidents of death and illness from adulterated foods, Congress established the Food and Drug Administration (FDA) in 1906.

Regulatory Legislation

The environmental movement of the 1960s and 1970s produced a profound and controversial change in the political climate concerning regulatory legislation. Concerns such as the proliferation of new synthetic chemicals in industry and agriculture, the increased use of hundreds of inadequately tested additives in foods, and the effects of automotive emissions were pressed on Congress by increasingly influential environmental organizations. Beginning with the Food Additives Amendment of 1958, which required FDA approval of all new chemicals used in the processing and marketing of foods, a series of federal and state legislative and administrative actions resulted in the creation of numerous regulations and standards aimed at reducing and reversing environmental degradation.

Congress responded to the environmental movement with the National Environmental Policy Act of 1969. This act pronounced a national policy requiring an ecological impact assessment for any major federal action. The legislation called for the establishment of a three-member Council on Environmental Quality to initiate studies, make recommendations, and prepare an annual Environmental Quality Report. It also requires all agencies of the federal government to prepare a detailed environmental impact statement (EIS) for any major project or proposed legislation in which they are involved. Despite some initial attempts to evade this requirement, court suits by environmental groups have forced compliance, and now, new facilities like electrical power plants, interstate highways, dams, harbors, and interstate pipelines can proceed only after preparation and review of an EIS.

Another major step in increasing federal antipollution efforts was the establishment in 1970 of the Environmental Protection Agency (EPA). Many programs previously administered by a variety of agencies, such as the departments of the Interior, Agriculture, Health, Education, and Welfare, were transferred to this new, central, independent agency. The EPA was granted authority to do research, propose new legislation, and implement and enforce laws concerning air and water pollution, pesticide use, radiation exposure, toxic substances, solid waste, and noise abatement. The year 1970 also marked the establishment of the Occupational Safety and Health Administration (OSHA), the result of a long struggle by organized labor and independent occupational health organizations to focus attention on the special problems of the workplace.

The first major legislation to propose the establishment of national standards for pollution control was the Air Quality Act of 1967. The Clean Air Act of 1970 specified that ambient air quality standards were to be achieved by July 1, 1975 (a goal that was not met and remains elusive), and that automotive hydrocarbon, carbon monoxide, and nitrogen oxide emissions were to be reduced by 90 percent within five years—a deadline that was repeatedly extended. Specific standards to limit the pollution content of effluent wastewater were prescribed in the Water Pollution Control Act of 1970. The Safe Drinking Water Act of 1974 authorized the EPA to establish federal drink-

ing water standards, applicable to all public water supplies. The Occupational Safety and Health Act of 1970 allowed OSHA to establish strict standards for exposure to harmful substances in the workplace. The Environmental Pesticide Control Act of 1972 gave the EPA authority to regulate pesticide use and to control the sale of pesticides in interstate commerce. In 1976 the EPA was authorized to establish specific standards for the disposal of hazardous industrial wastes under the Resource Conservation and Recovery Act—but it was not until 1980 that the procedures for implementing this legislative mandate were announced. Finally, in 1976, the Toxic Substance Control Act became law, providing the basis for the regulation of public exposure to toxic materials not covered by any other legislation.

All of this environmental legislation in such a short time span produced a predictable reaction from industrial spokespeople and free-market economists. By the late 1970s attacks on what critics referred to as overregulation appeared with increasing frequency in the media. Antipollution legislation was criticized as a significant contributor to inflation and a serious impediment to continued industrial development.

One of the principal themes of Ronald Reagan's first presidential campaign was a pledge to get regulators off the backs of entrepreneurs. He interpreted his landslide victory in 1980 to mean that the public supported a sharp reversal of the federal government's role as regulator in all areas, including the environment. Two of Reagan's key appointees were Interior Secretary James Watt and EPA Administrator Ann Gorsuch Burford, both of whom set about to reverse the momentum of their agencies with respect to the regulation of pollution and environmental degradation. It soon became apparent that Reagan and his advisers had misread public attitudes. Sharp staffing and budget cuts at the EPA and OSHA produced a counterattack by environmental organizations whose membership rolls had continued to swell. Mounting public criticism of the neglect of environmental concerns by the Reagan administration was compounded by allegations of misconduct and criminal activity against environmental officials, including Ms. Burford, who was forced to resign. President Reagan attempted to mend fences with environmentalists by recalling William Ruckelshaus, the popular, first EPA administrator, to again head the agency. But throughout Reagan's presidency, few new environmental initiatives were carried out.

Despite campaign promises to return to vigorous efforts to curb pollution, President George Bush received poor grades for the overall environmental policies of his administration. However, he can be credited with providing the support that resulted in the enactment of the long-stalled 1990 Clean Air Act amendments. Despite some criticisms concerning compromises with the automobile and fossil fuel industries, most environmentalists were pleased with many aspects of the new law, particularly its provisions designed to decrease the threat of acid rain. This early optimism was soon negated by what many perceived to be weak efforts to implement and enforce this legislation. Bush has also been faulted for his failure to implement an environmentally sound

energy policy and his refusal to support other industrial nations' proposed initiatives to slow global warming and deforestation.

Once again a new president, Bill Clinton, was elected in 1992 on a platform that pledged to reverse the environmental neglect of his predecessors. This pledge was reinforced by the fact that his choice for vice president, Al Gore, had gained a reputation as an environmental activist. The administration failed to make much headway in fulfilling its campaign promises during its first two years in office, despite the appointment of committed environmentalist Carol Browner to head the EPA. Initially encouraged by the selection of environmental advocate Bruce Babbitt as secretary of the interior, environmentalists were soon disheartened by his failure to successfully press for restrictions on the ecological damage that results from the commercial exploitation of public lands. Since the 1994 elections, the U.S. Congress has been dominated by legislators who once again echo Reagan's promise to reduce the burden of environmental restrictions on industry and commerce. In their successful 1996 reelection campaign, Clinton and Gore again promised vigorous promotion of an environmental protection agenda, but little progress has been made. Efforts to reauthorize and update such important legislation as the Endangered Species Act, the Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) have been stalled since 1993. Having failed to override presidential vetoes of legislation designed to weaken environmental protection, the antienvironmental members of Congress switched to the tactic of trying to attach riders and other such legislation to important, end-of-the-year budget appropriations bills. A strong, organized response from the environmental community has thus far succeeded in having most of these riders removed. Among the riders that survived and were signed into law in October 1998 is one that could double logging in California's ancient forest ecosystem and another that blocks the upgrading of automobile fuel efficiency standards.

GLOBAL DEVELOPMENTS

Although initially lagging behind the United States in environmental regulation, many other developed industrial countries have been moving rapidly over the past two decades to catch up. In a few Western European countries where "green parties" have become influential participants in the political process, and in Japan, certain pollutant emission standards are now more stringent than their U.S. counterparts. A uniform system of environmental regulations and controls is prominent among the controversial issues being planned and implemented by the nations of the European Economic Community.

Following the dissolution of the Soviet Union, it became clear that the former Soviet bloc countries had enforced few environmental restraints during their postwar industrialization. As a result, these countries—as well as China—presently suffer the consequences of the most severely degraded environ-

ments in the world. In many cases economic priorities preclude the prospect of a rapid reversal of this unhealthy situation.

Although the feeding and clothing of their growing populations continue to be the dominant concerns of developing countries, they too are paying increasing attention to environmental protection. Suggestions that they forgo the use of industrial technologies that have resulted in environmental degradation in developed countries are often viewed as an additional obstacle to the goal of raising their standard of living.

During the past decade, attention has shifted from a focus on local pollution to concern about global environmental degradation. Studies of the potential effects of several gaseous atmospheric pollutants on the Earth's climate and its protective ozone layer have made it apparent that human activity has reached a level that can result in major impacts on the planetary ecosystems. A series of major international conferences of political as well as scientific leaders have been held with the goal of seeking solutions to threatening worldwide environmental problems. The "North-South" disputes that limited the agreements reached at the Rio Earth Summit were about how to promote future industrial development to avert or minimize the threats to the world's ecosystems, while satisfying the frequently conflicting socioeconomic needs of the developed "North" and developing "South" nations.

CURRENT ENVIRONMENTAL ISSUES

Most analyses of the ongoing environmental movement conclude that it has been unsuccessful in stemming the tide of ecosystem degradation while acknowledging that the world would now be in much worse shape without the educational and regulatory response that the movement has generated to date. Among the proposals for the future is for regulatory agencies to adopt a more holistic approach to environmental protection, rather than continue their attempts to impose separate controls on what are actually interconnected problems. Another idea, supported by business leaders and even some environmental organizations, is the use of market-based strategies, such as pollution taxes or the trading of pollution rights (see Issue 7), which some feel are potentially more effective than regulatory emission standards. However, many environmentalists are enraged by the idea of selling the right to pollute, which they consider immoral.

✓An entirely new paradigm for protecting the environment is embodied in the concept "sustainable development," whose advocates propose replacing our entire system of energy production, transportation, and industrial technology with systems that are designed from the start to produce minimal cumulative environmental degradation. An excellent introduction to this concept is included in the 1987 World Commission on the Environment report *Our Common Future* (often referred to as the *Brundtland Report* after its principal author, commission chairperson Gro Harlem Brundtland). This idea is related to the theme of prominent environmentalist Barry Commoner's book

Making Peace With the Planet (Pantheon Books, 1990). In *Making Peace*, Commoner argues that attempts to merely limit pollution that is produced by existing inappropriate technologies, in the face of continuing global development, are doomed to failure.

An important recent development is the growing movement for environmental justice (see Issue 4). Largely absent from the group of activists who promoted the early agenda of the environmental movement, representatives of minority groups and the economically disadvantaged are organizing around the contention that they have been made to bear far more than their fair share of the effects of pollution. In response to this development, President Clinton has committed the EPA to making environmental equity an important component of future policy decisions.

Much concern in the environmental community has resulted from the emergence of what has been popularly labeled the "environmental backlash movement." With considerable funding and support from regulated industries, organizations with environmental-sounding names like Wise Use/Property Rights, the Council on Energy Awareness, and the Information Council on the Environment have rallied together to oppose environmental regulations. Some of these groups go so far as to claim that environmental problems like ozone depletion, global warming, and acid rain do not exist. One strategy of these groups that has had some success is fighting restrictions on land development on the basis of the constitutional prohibition against the "taking" of private property, which they argue applies to virtually any governmental action (see Issue 6).

Another complaint of many environmentalists is the increasing popularity of a tactic by which self-proclaimed "green" corporations mislead the public by falsely portraying their developmental strategies as environmentally sound. An example of this public-relations ploy (which has been labeled "greenwashing") that received much criticism was the extent to which the organizers of the 1990 Earth Day events allowed wealthy industrial sponsors to control the agenda and to promote their self-serving propaganda.

In response to the antienvironmental backlash, a militant wing has sprung up within the movement. Building on the confrontational tactics used by the highly successful Greenpeace organization, a radical group calling itself Earth First! staged a campaign in 1990 that they called Redwood Summer. During this campaign members chained themselves to trees and embedded metal spikes in the tree trunks to prevent the cutting of redwoods in the ancient forests of northern California. In advocating a tactic referred to as "monkey wrenching," Earth First! and other new, radical groups have condoned the destruction of earth-moving tractors and other equipment that is used for development projects that threaten the habitats of endangered animals. Recently, a small fringe group calling itself the Earth Liberation Front has upped the ante even further by burning ski lifts and buildings in Vail, Colorado, in response to a planned expansion into a National Forest area that is a habitat for lynx.

In a more moderate, mainstream response to the backlash, environmental activists are proposing that the movement return to its grassroots origins. The growing chorus of advocates of this strategy assert that in recent years the cause of environmental protection has lost its activist, populist base and is now mostly in the hands of the leaders of the major environmental organizations. These leaders, it is argued, have interests and lifestyles that are closer to those of the executives of the major polluting corporations than to those of the general public, and the policies advocated by these leaders too often involve unwise compromises that fall short of what is needed to promote a change toward sustainable development.

ECOLOGY AND ENVIRONMENTAL STUDIES

Efforts to protect the environment from the far-reaching effects of human activity require a detailed understanding of the intricate web of interconnected cycles that constitute our natural surroundings. The recent blossoming of ecology and environmental studies into respectable fields of scientific study has provided the basis for such an understanding. Traditional fields of scientific endeavor such as geology, chemistry, and physics are too narrowly focused to successfully describe a complex ecosystem. Thus, it is not surprising that chemists who helped to promote the use of DDT and other pesticides failed to predict the harmful effects that accumulation of these substances in biological food chains had on birds and marine life.

Ecology and environmental studies involve a holistic study of the relationships among living organisms and their environment. It is clearly an ambitious undertaking, and ecologists are only beginning to advance our ability to predict the effects of human intrusions into natural ecosystems.

It has been suggested that our failure to recognize the potentially harmful effects of our activities is related to the way we lead our lives. Industrial development has produced lifestyles that separate most of us from direct contact with the natural systems upon which we depend for sustenance. We buy our food in supermarkets and get our water from a kitchen faucet. We tend to take the availability of these essentials for granted until something threatens the supply.

SOME THOUGHTS ON ARMED CONFLICT AND INTERNATIONAL COOPERATION

It has long been recognized that a major nuclear war would produce devastating environmental consequences. In *The Fate of the Earth* (Alfred A. Knopf, 1982), Jonathan Schell provides a chilling analysis of the likely effects of radioactive fallout, including destruction of the ozone layer and radioactive contamination of the food chain. In 1983 a group of eminent scientists initiated a controversial debate by predicting that a "nuclear winter" that could

threaten the continued existence of human civilization might result from even a limited nuclear conflict.

Perhaps, as some political analysts suggest, the realignment of power following the demise of the Soviet Union has reduced the threat of nuclear war. Unfortunately, we have recently learned from the Persian Gulf War that modern, *conventional*, nonnuclear war can also produce catastrophic ecological damage. The intentional release of huge quantities of petroleum into the Persian Gulf and the ignition of the vast Kuwaiti oil fields produced severe water and air pollution problems whose long-term effects are still being assessed. Several analysts have suggested that environmental factors will figure prominently as both causes and effects of future armed conflicts. Whether or not this proves to be the case, it is beyond doubt that solutions to the growing list of threats to global and regional ecosystems will require unprecedented efforts toward international cooperation.