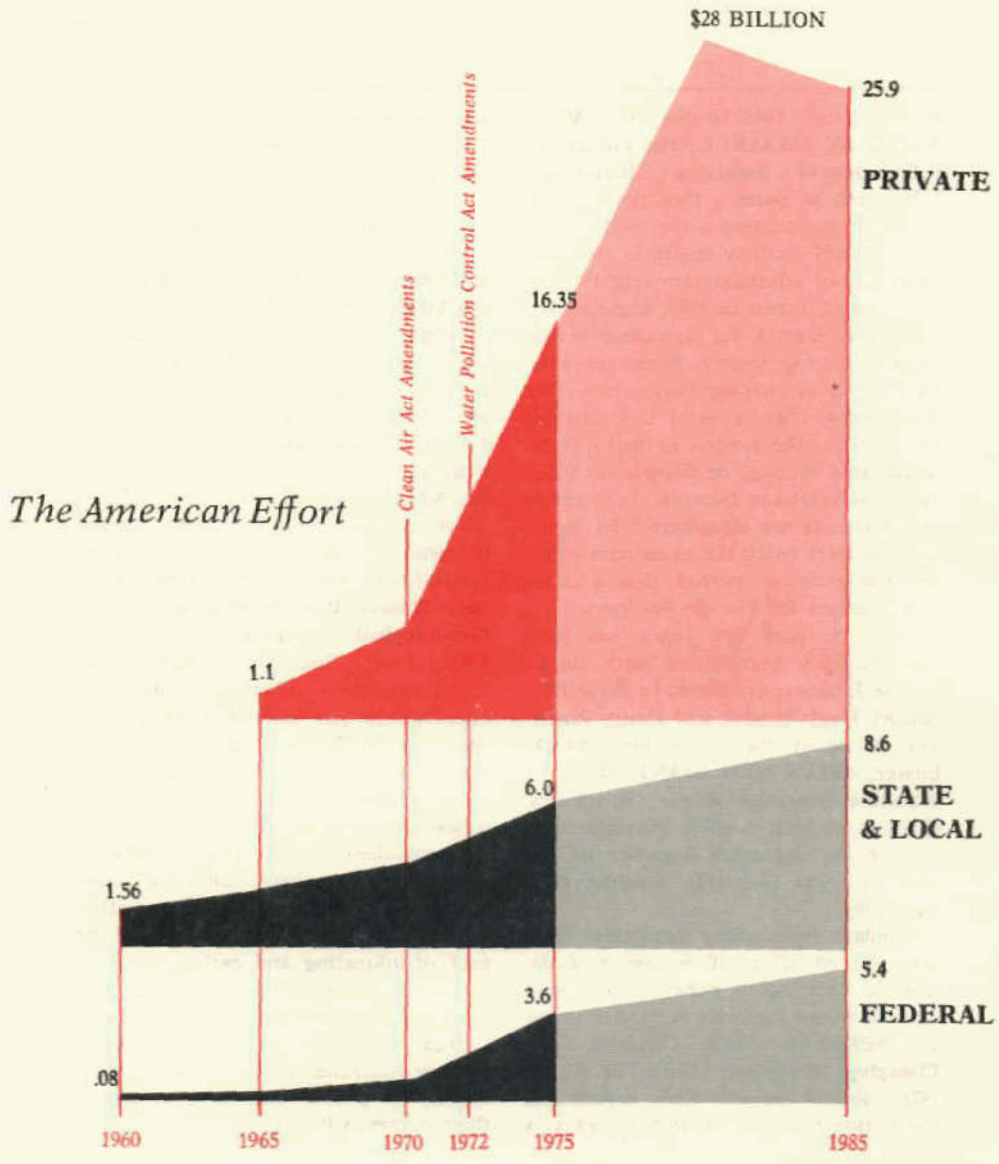

Total 25-Year Pollution Control and Abatement Expenditures: $120 Billion

Private spending includes capital investment and operating and maintenance costs of pollution control equipment, as well as added individual costs of auto emission control devices. *State and local* spending includes all expenditures generated by state and local governments for air and water pollution control and solid waste treatment. Grants to states and municipalities are included in *federal* spending. (Pre-1975 outlays are in current dollars, 1975–85 projections are in 1975 dollars.)

Source: Estimates of the Council on Environmental Quality.

The Environment

From colonial times to the present, Americans have variously viewed their natural surroundings with greed, ignorance, and Thoreau-like sensitivity. The early Western trappers who learned to live with nature, for example, were followed by buffalo hunters who wasted more than they took. But the record shows an abiding, if somewhat erratic, public concern for the well-being of the American environment. Since 1970, the country has been engaged in an unprecedented effort to clean up its air and water, as the chart indicates. And of late, there has been a revival of the turn-of-the-century notion that natural resources are not limitless. Here, conservationist J. Clarence Davies III sketches the historical antecedents of the present environmental movement, and former EPA administrator Russell Train focuses on recent problems and progress.

THE GREENING OF AMERICAN POLITICS

by J. Clarence Davies III

The origins of organized environmental politics in the United States go back at least as far as the period just after the Civil War, but isolated events, foreshadowing later environmental concerns, go back much further.

As early as 1647, the Massachusetts Bay Colony passed regula-

tions for preventing the pollution of Boston Harbor, and in 1710 the Colony forbade the creation of any "disturbance or incumbrance . . . on or across any river that would operate to stop or obstruct the natural passage of fish . . . without the approbation and allowance first had and obtained from the general sessions of the peace." In 1832, the Hot Springs in Arkansas were set aside by Congress as a national park. Then in 1864, George P. Marsh's *Man and Nature,* revised 10 years later as *The Earth as Modified by Human Action,* laid much of the philosophical groundwork for the modern conservation movement. Appalled by the overgrazing of meadows and the ruthless cutting of forests in his native Vermont, Marsh observed:

> The ravages committed by man subvert the relations and destroy the balance which nature had established. . . . The earth is fast becoming an unfit home for its noblest inhabitant, and another era of equal human crime and human improvidence . . . would reduce it to such a condition of impoverished productiveness, of shattered surface, of climatic excess, as to threaten the depravation, barbarism, and perhaps even extinction of the species.

The massive industrialization of America that took place in the decades following the Civil War created conditions that made it impossible to ignore environmental degradation. Cities were covered with a pall of smoke from factories, coal-heated homes, and steam locomotives; rivers became sewers; the threat of waterborne epidemics was constant. The heavy demands of a rapidly growing population resulted in devastation of the countryside by mining and timber cutting.

In the context of man's assault on land, air, and water, the political foundations were laid for the flowering of environmental concern that was to occur at the turn of the century. In 1873, the first major national organization devoted to conservation matters was founded; John Wesley Powell, an ex-army officer—the

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first American to examine the close relationship between land use and water supply in the arid West—and others concerned about forest preservation and land use formed the American Association for the Advancement of Science.*

Parks for the People

During the same period, the passage of several innovative conservation laws showed that environmental matters were already on Washington's agenda. In 1872, Congress established Yellowstone as the first major national park "for the benefit and enjoyment of the people." In 1875, Congress passed a buffalo protection bill, the first measure ever passed by Congress to protect a species of wildlife (President Grant vetoed it because the buffalo hunters were proving more effective than the army in beating back the Plains Indians). In 1891, the first national forest legislation was enacted. It authorized the President to establish forest reserves on federally owned land in the Western states for the purpose of conserving timber and water and to prevent floods.

When Theodore Roosevelt became President in 1901, conservation matters were given high priority. In his second State of the Union Message, he declared that "the forest and water problems are perhaps the most vital internal questions of the United States." During the first years of his Presidency, the landmark Reclamation Act was passed and the first national wildlife refuge created. Roosevelt appointed a Public Lands Commission, which supported federal ownership—not sale—of the public lands; he established an Inland Waterways Commission, which recommended that plans for river and harbor improvements take pollution control into account; and he named Gifford Pinchot, the foremost proponent of scientific forestry and coiner of the term "conservation," as his Secretary of Agriculture.

Throughout Roosevelt's administration (1901–09), conservation proposals came primarily from scientists within the federal government. As historian Samuel Hays wrote in 1959, "Conservation neither arose from a broad popular outcry, nor centered its fire primarily on the private corporation. . . . It is from the vantage point of applied science, rather than of democratic pro-

*Followed by the American Forestry Association (1875); the nucleus of the Audubon Society (1885); Teddy Roosevelt's Boone and Crockett Club, devoted to fighting the slaughter of big game (1888); the Sierra Club (1892); and the American League for Civic Improvement and the Society for the Preservation of Historical and Scenic Spots, both devoted to beautification and preservation (1900).

test, that one must understand the historic role of the conservation movement."* The movement was an elite, intellectual affair, based on the gospel of scientific efficiency.

In 1908, William Howard Taft was elected President, and Roosevelt's vigorous conservation efforts began to encounter strong opposition from Congress, from the new President, and from key federal agencies; any restriction on the further development and exploitation of American resources was resented as improper interference with the "invisible hand of the market." Roosevelt, Pinchot, and the other conservation leaders applied the strategy of "enlarging the arena of conflict." Through speeches, conferences, and the press, they turned to the public for support. The public responded with massive enthusiasm for conservation, and thus a movement that had been largely limited to federal scientists and planners found a broad base of support in the public at large.

To a marked degree, the change from an intellectual to a popular base changed the ideology of the conservation movement. Its more dogmatic supporters in 1908 and 1909 tended to look upon all commercial development as crass materialism. They viewed conservation, in Hays' words, "as an attempt to save resources from use rather than to use them wisely." Thus, what began as an effort to improve economic efficiency became tinged with the enthusiasm of a religious crusade to save America from its materialistic enemies.

Within a few years, the conservation coalition that TR had unleashed splintered apart. Its vague evangelistic ideology and tenuous unity could not sustain the political pressures involved in taking a position on particular projects or in initiating legislation. After 1910, the movement fractured into a variety of narrowly focused groups, and the first stage of the American conservation movement came to an end.

Between 1910 and 1933, conservation was no longer a popular cause, but the movement did not die out altogether. For example, the Oil Pollution Act of 1924 was the first major federal statute to be directed explicitly at the pollution problem. The Act authorized the Secretary of the Army to prescribe regulations for the discharge of oil from vessels "in such quantities, under such conditions, and at such times and places as in his opinion will

*See Samuel P. Hays, *Conservation and the Gospel of Efficiency* (Harvard, 1959). Other major sources used for this article include Stewart L. Udall, *The Quiet Crisis* (Holt, 1963); Leonard B. Dworsky, ed. *Pollution* (Chelsea House, 1971); and Richard A. Cooley and Geoffrey Wandesforde-Smith, *Congress and the Environment* (University of Washington, 1970).

not be deleterious to health or sea food."*

On the organizational front, the major governmental addition was the creation in 1916 of the National Park Service, a result of long and dedicated efforts by John Muir, Frederick Law Olmsted, and other preservationists. (Prior to this time, each of the national park superintendents reported directly to the Secretary of the Interior, who generally paid little heed.) A wide range of private conservation-oriented organizations came into being. In 1919, the National Parks Association was formed. The Izaak Walton League was founded in 1922, followed in 1928 by the Federation of Sewage Works Associations, later to become the Water Pollution Control Federation. The gains made under TR were consolidated during the 1920s. Neither the White House nor the general public showed much interest in conservation, and defense of the earlier legacy was left to Congress.

In 1933, with the coming of the New Deal, conservation was again caught up in a broader movement with popular roots, tied to a general policy of federal intervention. Franklin Roosevelt, like TR, took a personal interest in the subject and in fact learned much from the same teacher, Gifford Pinchot. Historian Arthur Schlesinger, Jr., in discussing the origins of what was to become the New Deal, observed that "the central theme in Roosevelt's emerging philosophy was the conservation of natural resources." An interesting insight is contained in a 1937 presidential memorandum to Aubrey Williams, acting administrator of the Works Progress Administration. FDR wrote from Hyde Park:

> I realize that sewer projects are useful but I think we should adhere strictly to my memorandum of August twenty-first, directing that no future WPA projects shall be approved for improving, repairing or adding to sewers which dump [directly] into any creek or river. The only modification, or, to be more accurate, interpretation, of this order would be in a case where the sewer project has nothing to do with the ultimate disposal of sewage. . . . In order to be absolutely on the safe side in these cases, I wish you would submit to me any projects which seem to come within the above interpretation.

*Congress also extended the forest preserve system to the entire United States (1911). The Public Health Service Act was amended to authorize surveys and investigations of water pollution (1912), and the 1913 Annual Report of the Public Health Service recommended federal control over pollution of interstate waters. A law was enacted providing for the establishment of migratory bird refuges (1913). In 1920, the Federal Water Power Act and the Mineral Leasing Act established national policy in two areas vital to conservation interests. These were followed in 1924 by the Clarke-McNary Act, which extended the national forest system still further.

With White House support, major progress was made on many fronts between 1933 and 1939. The Civilian Conservation Corps, the Tennessee Valley Authority, the Soil Conservation Service, and the Fish and Wildlife Service were established. Congress passed, and FDR signed, the first Fish and Wildlife Coordination Act, the Taylor Grazing Act, the Historic Sites Act, and the Pittman-Robertson Act providing federal funds for state wildlife projects. Twice Congress approved a federal water pollution control bill, but in 1938 it was vetoed by Roosevelt because of a dispute over budget procedures; in 1940 the House and Senate were unable to reconcile their versions of the bill. The Public Works Administration and its successor agencies built $325 million worth of sewage treatment projects across the nation. In 1935, the WPA organized an air pollution survey of New York City, and the following year the Public Health Service began a similar survey in 14 major cities.

The Killer Smogs

New Deal conservation efforts were cut short by World War II. But the immediate postwar years were marked by increased scientific and public concern over air and water pollution, which was to become the leading concern during the subsequent, or third, stage of the environmental movement. In 1947, California passed the first modern air pollution legislation to deal with the smog problem in Los Angeles (although it was not discovered until the early 1950s that the automobile was the chief cause of the problem). An air pollution episode in Donora, Pennsylvania, the following year, which killed 20 people and made several thousand sick, brought an outcry that led eventually to passage of the first federal air pollution law in 1955. The law gave the Public Health Service authority to do research on air pollution and to conduct demonstrations and training. The first federal statute designed to deal with the overall water pollution problem was signed in 1948 and strengthened in 1956. It provided for federal subsidies to build local sewage-treatment plants and allowed limited federal moves to control pollution in interstate waters.

The postwar years also brought a new environmental threat —radiation. Radioactive fallout from the testing of Soviet and American nuclear weapons became a major concern of the general public in the early 1950s. Headlines such as "Strontium-90 in Babies' Milk" stirred the scientific community into political action. Just as scientists formed the nucleus of Teddy Roosevelt's conservation movement, so scientists, aroused by the nuclear

hazard, played a major role in the new conservation. Barry Commoner, referring to the impact on scientists of the fallout controversy in 1953 and 1954, wrote, "For many of us, the meaning of the environment and its importance to human life was suddenly brought to light." Another ecologist, Grahame J. C. Smith, noted, "Radioactive material was the first pollutant to be properly monitored and the first to show clearly the worldwide distribution and effects of a pollutant released at one point. It was this pollutant that alerted us to the dangers inherent in our treatment of the Earth."

Nuclear fallout dramatized the impact of man's environmentally disruptive actions on man. The controversy over pesticides, in particular DDT, dramatized their effects on nonhuman life. Research findings during the late 1950s showed that pesticide residues were pervasive in the environment and that their effects on wildlife could be extremely damaging. Supreme Court Justice William O. Douglas observed in 1961, "There is growing fear that due to DDT and other pesticides we will witness in a few years a greater extermination of animal life than man has known in all his previous centuries on earth." A year later, Rachel Carson's *Silent Spring* vividly conveyed the same message to a wide audience and helped to trigger a continuing series of governmental curbs on pesticides.

Renewing the Conservation Ethic

With John F. Kennedy's election in 1960, conservation problems again received extensive federal attention. In 1961, Kennedy sent to Congress a special message on natural resources, followed by a special message on conservation in 1962. In May 1962, the White House held a National Conference on Conservation. The emphasis in these efforts was on traditional conservation matters, such as proper development of water and timber resources, the public lands, electric power, and recreation. Pollution control was not yet a major issue in Washington.

Lyndon Johnson was even more committed to the conservation cause than Kennedy. As in other policy areas, Johnson in his first year in office pushed through Congress many of the conservation measures advocated by his predecessor: the Multiple Use Act of 1964, the Land and Water Conservation Fund Act, and the law establishing a National Wilderness Preservation System. Typically, Johnson went much further. Each year after 1964, he sent to Congress new broad proposals. Lady Bird Johnson supplemented her husband's efforts by publicizing a cam-

INDEX OF PUBLIC ATTENTION TO AIR AND WATER POLLUTION, 1963–73*

	'63	'64	'65	'66	'67	'68	'69	'70	'71	'72	'73
Air pollution	125	128	244	394	552	194	297	**819**	**559**	**456**	**779**
Water pollution	119	121	265	239	240	166	472	**966**	**828**	**706**	**511**
Combined	244	249	509	633	792	360	769	**1785**	**1387**	**1162**	**1290**

Public attention to air and water pollution peaked in 1970, the year of Earth Day and the Nixon administration's major environmental initiatives, and has since subsided to a moderately high level.

paign for "natural beauty," and Stewart Udall, as Secretary of the Interior, gave eloquent voice to the conservation ethic.

The Congress generally supported the President's efforts; a group of Democrats, notably Senators Edmund Muskie and Henry Jackson, began to assume greater prominence as independent advocates in the media and in Congress itself. In 1965, the Water Pollution Control Act was strengthened, and the Clean Air Act was extended to cover automobile emissions. Congress passed the Highway Beautification Act and the Federal Water Project Recreation Act. In 1966, the Clean Water Restoration Act was signed by Mr. Johnson—who, optimistically, promised to clean up the Potomac in 10 years—and an air pollution scare in New York City spurred further strengthening of the Clean Air Act. The movement for wilderness preservation reached its peak in the so-called "conservation Congress" of 1968, which created the North Cascades and Redwoods National Parks, halted plans to dam the Grand Canyon, and established a Wild and Scenic Rivers System and a National Trails System.

These actions in Washington were accompanied by a massive increase in public concern with environmental matters. The membership of the Sierra Club almost tripled to 90,000 between 1965 and 1969, and other private environmental groups registered

*Mr. Davies' index, which roughly measures the degree to which a problem rates as a political "issue," is derived from the sum of five *weighted* components: (1) the number of articles and editorials in the *New York Times* dealing with the issue; (2) mention of the issue in the Republican and Democratic Party platforms; (3) passage of relevant major legislation by state legislatures; (4) mention of the issue in the annual policy statement of five major interest groups (e.g., the AFL–CIO); and (5) mention of the issue in the annual policy statements of four major environmental groups (e.g., the Sierra Club).

large gains in membership. Press coverage also increased. The number of environment-oriented articles in major periodicals increased from 68 in the 1957–59 period to 226 in the 1967–69 period. The number of articles in the *New York Times* concerned with the effects of pollution rose from 101 in 1960 to 492 in 1969. National opinion polls revealed that 35 percent of the citizens in 1965 considered water pollution a "very serious" or "somewhat serious" problem. By 1968, this figure had jumped to 58 percent. The comparable poll figures for air pollution were 28 percent in 1965 and 55 percent in 1968.

In 1968, media interest in environmental problems flagged, and some observers thought that the great boom was over. Richard Cooley and Geoffrey Wandesforde-Smith, two specialists on environmental politics, wrote in 1969:

> There is some indication that the close of the Ninetieth Congress late in 1968 may mark the end of this remarkable period in the history of conservation politics. . . . Some members of Congress, as well as of the new Republican administration, have suggested that we are reaching the end of a long wave of significant and highly visible progress, and that the widely hailed "environmental crisis" has, in a certain sense, passed the peak of critical national interest and public concern.

In fact, 1968 marked the transition from the "old" to the "new" conservation, from the New Deal stage to the '70s stage of the movement. The new conservation stressed protection of the environment, primarily through pollution control, with industry as a prime target, as contrasted with the narrower traditional emphasis on wilderness preservation, erosion control, and recreation.

As during the Teddy Roosevelt period, the change in emphasis also changed the nature of environmental politics. One scholar had this to say about the "old" conservation: "Virtually every major conservation success in our country's history, from the National Park System to the Tennessee Valley Authority to the Soil Conservation Service, has deep roots in what is commonly referred to as pork barrel politics." The old conservation issues were "distributive" issues; they involved the government in subsidizing some segment of American society. The new conservation placed far more emphasis on government regulation, on government control of the behavior of certain groups, in this case, industrial polluters and developers.

AN INDUSTRY VIEW

Robert O. Anderson, chairman of the board and chief executive officer, Atlantic Richfield Company, writing in the magazine Catalyst for Environmental Quality, *October 17, 1973:*

So we have two problems which, to some, would appear to be in conflict: energy and environment. While technology has been pointed to as the culprit, actually it is our only hope for solving the environmental problem. I agree with the scientist . . . who said, "Technology and ecology are by no means at war; it is merely that they have suddenly discovered each other."

We cannot go back in time to a less productive society, so we must find new ways to use energy and still maintain an acceptable environment. We can do this only if all segments of society work together toward that common goal. The adversary confrontation approach to restructuring public policy will not work, for the situations created by this approach only threaten to sacrifice the welfare and even the well-being of our citizens. . . .

The task ahead of us, as a nation, is to make public choices in a more informed and rational way. This implies trade-offs, compromises and the ability to come to balanced values. It is important that we know where we are going, but it is just as important that we pay attention to the selection of the paths by which we will get there.

The newer environmental demands, particularly in the area of pollution control, had considerable popular appeal, especially to the American middle class. During the autumn of 1969, a number of developments coincided to produce an explosion of environmental interest in 1970. Although doctrinally opposed to "excessive" federal regulation, the Nixon administration decided to place major emphasis on environmental issues—in part, to steal the Democrats' thunder. Senator Muskie, a potential challenger to Nixon in the 1972 election, was preparing amendments to the Clean Air Act; Senator Jackson was shepherding his National Environmental Policy Act through Congress. Senator Gaylord Nelson of Wisconsin and a group of student leaders were making preparations for a nationwide celebration of Earth Day, to be held in April 1970.

On January 1, 1970, Mr. Nixon signaled his administration's new commitment to environmental improvement with the strong statement that accompanied his signing of the National Environ-

mental Policy Act. A few days later he devoted almost one-third of his State of the Union Message to the environment, stating that environmental quality "may well become the major concern of the American people in the decade of the seventies." On February 10, he sent to Congress a special message containing a number of recommendations, including the strengthening of the acts for air and water pollution control. On April 22, Earth Day was celebrated across the nation with an outpouring of public concern. In Washington, D.C., 50,000 people turned out, some to march on the Interior Department, others symbolically to protest beach pollution by throwing oil on the sidewalks. The full tide of environmental law-making crested in 1970–73. The Council on Environmental Quality and the Environmental Protection Agency were created, thus firmly institutionalizing advocacy within the government. In the private sector, yet another wave of environmental organizations came into being; existing environmental groups increased in membership and sophistication, and certain national associations that had previously ignored environmental problems began to devote considerable attention to them. Dramatic changes were made in the laws governing air and water pollution control, pesticides, and occupational health. New issues competed for attention—land use, noise, recycling, growth. The media devoted twice as much time and space to environmental problems as they had prior to 1970.

Declining Political Momentum

However, by 1973, the high cost of environmental improvement became increasingly apparent. Industry opposition to pollution controls stiffened, and the public became increasingly concerned about inflation. The Nixon administration showed less interest in new environmental outlays. Finally, during the Arab oil embargo in the winter of 1973–74, "energy" usurped "environment" as a top federal concern. With the Watergate scandals full-blown in 1974, Mr. Nixon, for the first time in five years, failed to send an environmental message to Capitol Hill. Environmentalists in Congress during 1974 and 1975 spent as much time opposing the weakening of environmental laws as strengthening them. New proposals covering land use, which a year or two earlier had seemed likely to become law, languished and died.

Despite the decline in political momentum, two new laws, passed in late 1976, closed the remaining gaps in the federal government's *authority* to regulate pollution. The Resources Conservation and Recovery Act established a regulatory framework

for land disposal of pollutants comparable to the regulations dealing with air and water pollution. The Toxic Substances Control Act encompassed literally all substances with the exception of those specifically regulated by other acts, such as pesticides, drugs, and nuclear wastes. The regulatory powers given to the government were equally broad, ranging from labeling to the outright ban of certain chemicals.

Despite high unemployment and "energy" problems, public concern and media attention continue to be greater than what they were prior to 1970. Environmental organizations in and outside the government have persisted in their efforts to see that the complex, sometimes controversial antipollution laws enacted in 1970 and 1972 are implemented. Many new issues have appeared with an environmental "connection"; the primary public worry—over the future availability of fuel, food, and other resources—is reminiscent of the first Roosevelt era. In some ways the movement has come full circle, and conservation is once more the top priority of the environmentalists.

THE BEGINNING OF WISDOM

by Russell E. Train

Little more than seven years have passed since zealous young people were burying automobiles to celebrate the first Earth Day. A great deal has happened since then. But how much has really been achieved?

Is our environment better than it was? Are toxic wastes and dirty air any less of a hazard than they were in 1970? There are no simple answers. The beginning of wisdom about environmental problems is an appreciation of their complexity. In fact, we are discovering environmental hazards today—fluorocarbons, heavy metals, asbestos fibers—that were scarcely considered hazards a few years ago.

Certainly we are now far better prepared to cope with pollution and other environmental degradations, at least in our own country. The essential institutional framework for protecting ourselves and our children is in place at the federal level. The Council on Environmental Quality is a focal point for White House policy-making, while the Environmental Protection Agency (EPA), created in December 1970, is the strongest experimental-research, standard-setting, and enforcement institution of its kind in the world.

EPA has strongly influenced Japan, Canada, Britain, West Germany, Sweden, and other countries where political leaders have decided to centralize environmental management. All of our own state governments have established agencies to deal with pollution. Some, like California's large, well-staffed Air Resources Board, enforce standards more stringent than those of the federal government; others are still ill-equipped to enforce any standards.

Since 1970, the National Environmental Policy Act has required federal agencies to prepare an environmental impact statement, spelling out all possible adverse environmental consequences, for every major federally funded project—dams, highways, airports, public buildings. This landmark reform, almost revolutionary in its implications, means that federal agencies, for the first time in history, must engage in truly comprehensive decision-making, taking into account a broad range of social and economic factors seldom considered in the past.

The Council on Environmental Quality monitors the Environmental Impact Statement (EIS) process. Thousands of these documents are filed each year routinely. All too often, this procedure, in which experts compile mountains of excessively detailed data, has become a burden. Copies must be available to all interested parties, and it is this public disclosure requirement that provides the operative force behind the EIS process by offering environmental action groups and others an opportunity to scrutinize and challenge controversial projects.

Of course, the EIS process can be abused. It is time-consuming. It has been used to block or delay badly needed low-income housing projects as well as highways of questionable value. Federal employees in Washington, D.C., have even invoked it to avoid moving their offices to an undesirable part of the city.

The Council on Environmental Quality has also served the nation as a drafter and initiator of legislative proposals. In addition, the Council has prompted the issuance of executive orders from the White House, such as President Nixon's order

banning the use of poisoned bait to kill coyotes on public land—the poisons were killing other species, including the endangered bald eagle.

The performance of the Environmental Protection Agency is less easy to assess but, given its problems, I believe its record is remarkable. Its statutory mandates have been extraordinarily sweeping and complex, and they continue to multiply. Unfortunately, EPA's resources have always lagged behind its responsibilities as legislated by Congress. The Ford administration submitted a request to Capitol Hill for $802.7 million for fiscal year 1978, only 4 percent ($28.7 million) above the previous year's appropriation, despite EPA's sharply increased responsibilities under the Toxic Substances Control Act and Resource Conservation and Recovery Act. As EPA administrator, I had recommended an increase of $350 million, including funds to increase the agency's staff from 9,680 to 12,350. So far, President Carter has proposed a small increase of funds and 600 additional positions.

EPA has almost doubled in size since it was established in 1970 with 5,000 personnel but has had trouble in building up the technical resources it requires. It must try to provide design assistance to more than 8,000 municipalities involved in sewage-treatment construction programs. The agency desperately needs toxicologists to help with the re-registering of some 35,000 pesticide compounds. But industry needs these specialists too (and pays them better) in order to carry out the testing required by the new toxic substances legislation and by the growing number of requirements of the Food and Drug Administration and the Occupational Safety and Health Administration.

Since 1970, Americans have come to expect prompt solutions to pollution problems. Overall, we have made some notable progress, particularly in dealing with air and water pollution. Air quality has been significantly improved in urban areas. Nearly 40 percent fewer people were exposed to unhealthy levels of particulates in 1975 than in 1970. Sulfur oxide levels in urban areas have declined an average of 30 percent since 1970. Some 92 percent of

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major stationary sources of air pollution (e.g., power plants and factories) are in compliance with state regulations or adhering to compliance schedules. Auto pollution levels are down, including hydrocarbons in California, a major source of smog in that state.

The Price of Cleanliness

Nonetheless, we have a long way to go. Sulfur oxide levels threaten to rise again because of shifts from oil to coal. Air quality standards have been achieved in only a minority of the nation's 247 air quality regions. It would appear that many of the goals originally set for 1975 may not be reached for another decade.

With its construction grants for treatment of municipal waste, EPA is now administering the largest public works program in the country. Despite delays, some $16 billion of federal funds have been obligated to the program, but it will take at least 10 more years and billions of dollars more before satisfactory "secondary treatment" is achieved nationwide. Industry, generally, is well ahead of municipalities in achieving the 1977 targets. However, industry is now mounting a major attack on the "best available technology" (BAT) standards mandated for 1983, claiming that they are both unnecessary and too costly. They are neither. The 1983 requirements should be maintained, especially for toxic effluents.

Although it is impossible to assess the condition of all the nation's waterways at any one time, the best available data show a decline in levels of bacteria and oxygen-absorbing waste but a rise in nitrogen and phosphate contaminants (particularly from agricultural runoff), which encourage algae and other undesirable vegetation. Fish have returned to portions of such major rivers as the Willamette, Detroit, Monongahela, Savannah, Buffalo, and Arkansas. Particularly satisfying has been the reduction in the flow of contaminating phosphorus that had been accelerating the eutrophication of the Great Lakes. Further reductions are needed and new concerns have arisen in the Great Lakes region with the contamination of fish by toxic chemicals, such as PCBs.*

Passage of the Safe Drinking Water Act of 1974, establishing new purity standards for all states, was a major achievement, but we still know far too little about the potential hazards of toxic

*Polychlorinated biphenyls. These exceptionally stable industrial compounds, when lost through vaporization, leaks, or spills, prove more persistent in the environment than DDT. Dangerously high PCB levels have been found in fish, waterfowl, water supplies, cattle, and even in mothers' milk.

substances in drinking water. New Orleans, for example, draws its water from the Mississippi, which contains minute amounts of carcinogens and other chemical contaminants, some in the parts-per-trillion category. We have inadequate knowledge of the effect on human health of long-term exposure to low levels of such contaminants.

Looking back on the past six or seven years, it is easy to conclude that key environmental legislation was usually too ambitious and too complex for easy and effective administration. Unrealistic deadlines were set. Standards were mandated that could not be met in the time allowed. Vast programs, such as the one for construction of municipal sewage treatment plants, were initiated but not funded. As frustrating as these circumstances often were to those charged with carrying out the legislation, I would not have had it any other way. To have asked only for what was clearly and easily achievable would have brought little progress. By demanding what often seemed impossible, we have, in fact, made remarkable headway.

Divergence in Congress

The fact that the legislation was written by congressional committees with sometimes opposing philosophies has not made EPA's job any easier. Water quality legislation is a case in point: The Senate, in a move spearheaded by Senator Edmund S. Muskie (D.-Maine), has stood for stringent regulation, while the House has sought more flexibility.

On occasion, divergent congressional approaches to specific issues in the water pollution legislation, such as user charges, are *both* reflected in the final statute, leaving it to EPA to find a way to implement the law. In 1976 and again this year, congressional consideration of the extent of EPA authority over dredge-and-fill operations in the nation's wetlands reflected a desire by the House to reduce that power, whereas the Senate has tried to sustain it.

Citizens groups, particularly public-interest law firms, have played an immensely important and valuable role, especially by holding EPA's bureaucratic feet to the fire through court action (or threat of court action) in order to force prompt implementation of new statutes. These groups have not hesitated to bring suit when deadlines for pollution control measures were not met by EPA. I imagine that I was the most sued man in government, taking into account legal actions brought by both public-interest

law firms and by industry. In this regard, one must bear in mind that for every environmental group that believes EPA is moving too slowly or too leniently in a given case, there is a business or farm group, or some other organization, that finds the agency acting too rapidly or too strictly.

Much environmental legislative activity in the 1975–76 Congress was essentially defensive in character. Thus, the extension of EPA's authority to regulate pesticides turned into a fight to prevent Congress from giving the Secretary of Agriculture veto power over the exercise of that authority. The fight was won in the House by an uncomfortably close margin.

Struggles of this kind were perhaps an inevitable consequence of moving from the conceptual to the implementation stage of the environmental effort. Practicing what you preach is often painful. Sewage treatment plans cost taxpayers dollars. Sulfur oxide controls instituted by public utilities often mean higher electricity bills. Pesticide regulation restricts the freedom of the farmer. EPA control over development of valuable wetlands means that some developers, as well as other private property owners, may no longer exploit their land without restriction. The ban on the use of poisons to kill coyotes antagonizes ranchers who claim livestock losses. Mandatory auto-emission control devices added to the cost of cars and created some engine performance problems, at least initially.

Matching Costs with Benefits

In 1970, environmental issues were often viewed simplistically and emotionally; Utopia seemed easy to attain. We have become more sophisticated since then; the energy crisis and economic troubles have led to closer scrutiny of the costs and benefits of environmental proposals. The days of uncritical congressional acceptance of environmental controls are gone.

The continued success of the environmental effort in the United States will depend on three things: first, our ability and willingness to find ways of keeping costs, inequities, and inefficiencies to a minimum and of encouraging constructive reconciliation of environmental, social, and economic goals; second, the effective redirection of the environmental effort to ensure a steady shift from the *control* of pollution to its *prevention;* third, the strength of the general public's commitment to environmental protection.

Several items remain on the agenda of needed legislation, as

I see it. We need strip mining legislation. We need to enact a bill giving permanent legal status to EPA and providing a more coherent framework for the agency's policies and programs. We should give serious consideration to the creation of a Cabinet-level Department of the Environment, which would include EPA's present authorities and programs as well as appropriate elements now located elsewhere in the federal government, such as the National Oceanic and Atmospheric Administration, the Fish and Wildlife Service, and portions of the Geological Survey, the National Park Service, and perhaps the Coast Guard.

Painful Preventive Medicine

As a society, we must learn to assess every decision, every action in advance to determine the adverse environmental impacts that might result. This means recognizing that manmade environmental hazards are a serious threat to human life and health and that we must practice preventive medicine with respect to the environment. It means recognizing that lasting environmental progress comes not from add-on controls but from basic changes in industrial and automotive processes. Mass conversion to coal, for example, will require billions of dollars for new technology to remove sulfur. But in the longer run, we need clean, renewable sources of energy, such as solar energy.

The greatest successes of EPA so far have come from applying technology to specific sources of emissions and effluents, such as particulate and sulfur oxides from factory smokestacks and liquid industrial waste. Still to be introduced—and far more difficult—are pollution control measures that involve real changes in American lifestyles and land-use patterns, such as urban transportation control plans that affect the ways we use our private autos.

Our reliance on regulatory approaches to pollution has brought positive results, but regulation often carries with it a rigidity of application that can prove counterproductive, particularly as we reach high levels of control. We now need greater flexibility in administration as well as new approaches involving the use of economic charges as a supplement to regulation.

Noncompliance charges for motor vehicle emissions, for sulfur oxide emissions from power plants, and for some point sources* of water pollution are attractive possibilities as regu-

*Point sources are specific sewer outlets, discharge pipes, and the like, in contrast to generalized sources of pollution such as agricultural runoff.

KEY ENVIRONMENTAL COURT CASES

Scenic Hudson Preservation Conference v. Federal Power Commission (Dec. 1965)

The 2nd Circuit Court held that factors other than economic interest could be the basis for being an "aggrieved" person, thus giving environmental groups legal standing to sue in defense of scenic, historical, and recreational values affected by power development.

Zabel v. Tabb (July 1970)

The 5th Circuit Court held that the Army Corps of Engineers was not limited in the issuance of dredge-and-fill permits to considerations of navigation, flood control, and hydroelectric potential but could deny such permits on environmental and ecological grounds.

Sierra Club v. Morton (April 1972)

The U.S. Supreme Court held that, once a citizen or group established its direct stake in an environmental decision, the plaintiff could assert the interest of the general public as well. The decision reaffirmed that injury is not limited to economic values but extends to aesthetic and recreational values as well.

Sierra Club v. Ruckelshaus (Nov. 1972)

The Circuit Court in Washington, D.C., held that EPA acted in violation of the Clean Air Act in approving state plans that permitted significant deterioration of existing air quality.

U.S. v. SCRAP (June 1973)

The U.S. Supreme Court held in class-action environmental suits that, if the alleged harm will affect a small group of people, the plaintiff must be able to prove that he will be one of those affected; but, if the harm affects all citizens, then any citizen may bring suit.

Scientists' Institute for Public Information v. AEC (June 1973)

The Circuit Court in Washington, D.C., held that the National Environmental Policy Act (1969) required the preparation of an environmental impact statement, even at the research stage of a federally funded project.

Kleppe v. Sierra Club (July 1976)

In what was viewed as a defeat for environmentalists, the U.S. Supreme Court held that since there was no federal plan or program for regional coal development (in the northern Great Plains), no immediate preparation of a regional environmental impact statement was required from the Department of Interior.

E. I. du Pont de Nemours and Co. v. Train (Feb. 1977)

The U.S. Supreme Court held that EPA has the authority to establish uniform 1977 and 1983 effluent limits for classes or categories of existing point sources of water pollution, provided that allowances are made for variations in industrial plants.

latory supplements. Other promising economic approaches could involve a mandatory deposit on throwaway beverage containers and taxes on packaging to create an incentive to reduce this country's growing mountain of solid waste at the source.

Our society places a premium on adversary approaches to problem solving. Citizen action must remain strong. But I also believe that we must curb extreme advocacy and ideological polarization. Businessmen must develop a less paranoid attitude toward environmental protection, and environmental activists must become more sensitive to the real-life concerns of others, particularly when it comes to jobs, economic well-being, and adequate profits.

White House leadership is vital as the conflicts over environmental policy sharpen in the years ahead and regulatory actions really begin to affect commuters, farmers, workers, and small businessmen. Growing population and increased competition for scarce resources are going to produce both greater harmful stress on the environment and more political conflict over environmental programs. Yet, if we are to succeed in maintaining environments that both sustain and enrich human life, we will need—above and beyond all regulatory systems, technologies, ideologies, institutions, and mechanisms—a new ethical awareness of our relationship with our environment and other forms of life.

BACKGROUND BOOKS

THE ENVIRONMENT

A sizable literature is available on various aspects of the environment: ecology, nature, conservation, preservation, pollution and its control, economic growth, endangered animal species, the seas, the wilderness, parks, forests. Offshoot subjects—environmental law, ethics, economics, and politics—are treated in scores of specialized works.

But dispassionate full-length studies are rare, as are scholarly critiques of the leading environmentalists' contemporary assumptions and proposals concerning energy, land use, and agricultural methods.

Of the "basic" books, most ardent environmentalists would place Aldo Leopold's **A SAND COUNTY ALMANAC** (Oxford, 1949, cloth and paper; Sierra Club/Ballantine, 1970, paper) at the top of the list. For two decades this book had a small but devoted following; the environmental awakening of the late 1960s brought hundreds of thousands of readers to *Almanac.*

Leopold, who takes the reader through each month of the year at his Wisconsin farm, has been called a 20th-century Thoreau because of his fine descriptive prose. But it is his philosophy, expressed in such essays as "The Land Ethic," that has guided his disciples.

"A land ethic," he writes, "changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members and also respect for the community as such." Leopold defines conservation as "a state of harmony between men and land. . . . The land is one organism. Its parts, like our own parts, compete with each other and co-operate with each other. The competitions are as much a part of the inner workings as the co-operations. You can regulate . . . but not abolish them."

The first environmental best seller was Rachel Carson's **SILENT SPRING** (Houghton Mifflin, 1962, cloth; Fawcett, rev. 1973, paper). A biologist already widely admired for her 1961 book *The Sea Around Us,* Miss Carson challenged the agricultural pesticide industry when no other writer was either competent or willing to do so and documented the harm that DDT and other popular pesticides were doing to the soil, water, wildlife, and, potentially, to humans as the poisons passed up through the food chain.

"The chemicals to which life is asked to make its adjustment," she wrote, "are no longer merely the calcium and silica and copper and all the rest of the minerals washed out of the rocks and carried in rivers to the sea; they are the synthetic creations of man's inventive mind, brewed in his laboratories, [with] no counterparts in nature."

What happened as a result of Miss Carson's impassioned plea for biological instead of chemical control of harmful insects? In **SINCE SILENT SPRING** (Houghton Mifflin, 1970, cloth; Fawcett, 1970, paper), Frank Graham, Jr. describes the Velsicol Chemical Corporation's unsuccessful campaign to get the publishers to withhold Miss Carson's book, the controversy it created, and the partial ban on DDT that followed.

MAN AND NATURE (Scribner's, 1864, cloth; Harvard, 1965, paper) by George Perkins Marsh is the granddaddy of ecological books. It appeared in many languages besides English and in an

1874 revision entitled **THE EARTH AS MODIFIED BY HUMAN ACTION: A New Edition of Man and Nature.** Marsh, a Vermont lawyer, congressman, and U.S. ambassador in Europe, recorded in graphic language man's depredations against nature: "Vast forests have disappeared from mountain spurs and ridges; rivers famous in history and song have shrunk to humble brooklets; . . . the estuaries, and the consequently diminished velocity of the streams which flow into them, have converted thousands of leagues of shallow sea and fertile lowland into unproductive miasmatic morasses."

In **NATURE AND THE AMERICAN: Three Centuries of Changing Attitudes** (Univ. of Calif., 1957, cloth; Univ. of Nebr., 1972, paper), Hans Huth traces the rise of the U.S. conservation movement. He provides abundant detail on the Theodore Roosevelt era and the development of the great Western parks —Yosemite, Yellowstone, and the Grand Canyon. The standard historical study of this period is **CONSERVATION AND THE GOSPEL OF EFFICIENCY: The Progressive Conservation Movement** by Samuel P. Hays (Harvard, Historical Monograph Series, 1959, cloth; Atheneum, 1969, paper). Hays highlights social and political tensions that plagued the movement.

MAN'S RESPONSIBILITY FOR NATURE: Ecological Problems and Western Traditions by John Passmore (Scribner's, 1974) examines changing attitudes toward nature in terms of pollution, conservation, preservation, population. Passmore, an Australian professor of philosophy, goes back to Biblical sources and the ancient Greeks; he punches holes in a number of theories held by ecologists as well as by the ecologists' critics.

"There is certainly a risk that we shall be utterly discouraged by the implications of Barry Commoner's first ecological law," he writes. To say, as Commoner does, that " 'everything is connected to everything else' makes it appear that to act at all is the height of imprudence. . . . It is just not true that everything I do has effects on *everything* else. Rather . . . the unintended consequences of our actions are often surprisingly remote in time and place from those actions."

Which brings us to Barry Commoner's **THE CLOSING CIRCLE: Nature, Man, and Technology** (Knopf, 1971, cloth; Bantam, 1972, paper). Advocate-biologist Commoner gives examples of technological and social actions that have broken nature's cycle and produced an environmental crisis which, in his view, endangers mankind's survival.

Less polemical analyses of environmental problems and possible remedies are available in a number of superior textbooks, including Raymond F. Dasmann's well-written classic, **ENVIRONMENTAL CONSERVATION** (Wiley, 1959, rev. 1972, cloth & paper), and the more pedantic but useful **SOCIAL BEHAVIOR, NATURAL RESOURCES, AND THE ENVIRONMENT** (Harper, 1972, paper), edited by William R. Burch, Jr., Neil H. Cheek, Jr., and Lee Taylor.

Three newly published books by former federal officials offer glimpses into the making of environmental policy. One is **CLEANING UP AMERICA: An Insider's View of the Environmental Protection Agency** by John Quarles, Jr. (Houghton Mifflin, 1976). In it, the former EPA deputy administrator describes his frustration with the federal bureaucracy and his gloom over the prospect of diminished public support for environmental action. John C. Whitaker's **STRIKING A BALANCE: Environment and Natural Resources Policy in the Nixon-Ford Years** (American

Enterprise Institute, 1976, paper) presents background on major environmental policy decisions as seen by the author, a Nixon White House aide and later Under Secretary of the Interior. Whitaker blames most mistakes and delays on what he calls the "iron triangle" of vested interests embracing lobbyists, congressional committees, and middle-level federal bureaucrats.

THE NEW AMERICAN DREAM MACHINE: Toward a Simpler Lifestyle in an Environmental Age by Robert L. Sansom (Doubleday/Anchor, 1976) views the complexities from lower down the federal totem pole. Sansom, EPA assistant administrator for Air and Water Programs (1972–74), analyzes energy, pollution, transportation, and land-use problems facing the nation. All, he contends, are linked to Americans' profligate way of life.

Two books based on task force studies sponsored by the Rockefeller Brothers Fund rate special mention. **THE USE OF LAND: A Citizen's Policy Guide to Urban Growth,** edited by William K. Reilly (Crowell, 1973, cloth & paper), is a comprehensive account of land use and urban growth problems in the United States. **THE UNFINISHED AGENDA: A Citizen's Policy Guide to Environmental Issues** (Crowell, 1977, cloth & paper), edited by Gerald O. Barney, is a collection of papers and recommendations for action on pressing problems from the heads of 12 major environmental organizations—all aimed at influencing the new administration.

Books on specific subjects range from West Virginian Harry Caudill's eloquent case against strip mining, **MY LAND IS DYING** (Dutton, 1973, cloth & paper), to novelist and nature interpreter Freeman Tilden's introspective **THE NATIONAL PARKS** (Knopf, 1968, cloth; 1971, paper). Ian L. McHarg's **DESIGN WITH NATURE** (National History Press, 1969, cloth & paper) is aimed at urban planners. In McHarg's view, existing soils, terrain, and waterflow show us how to use land; human settlements work best when designed in harmony with nature's patterns.

Lewis Mumford's two-volume *The Pentagon of Power* makes excellent reading for environmentalists. In the second volume, **THE MYTH OF THE MACHINE** (Harcourt, 1964, 1970 cloth; 1974, paper), Mumford examines the historical basis for man's "overwhelming commitment to his technology" with its miscarriages of production that lead to pollution and waste.

Inspiration and hope for the future come from several writers, among them René Dubos. **A GOD WITHIN** (Scribner's, 1972, cloth; 1975, paper) is Dubos' eloquent plea for a "creative stewardship" of the earth. Reminding his readers of the Biblical injunction that man was put in the Garden of Eden "to dress it and to keep it," he calls this passage from Genesis (2:15) "an early warning that we are responsible for our environment."

—Lois Decker O'Neill, Associate Editor (Books)

EDITOR'S NOTE: *We are grateful for suggestions and comment from members of Washington-based environmental organizations in the choice of the books described above. Michael J. Lacey, assistant director of the Wilson Center, also provided guidance. Mr. Lacey is at work on a book about government scientist W. J. McGee and his role in the early U.S. "cult of conservation."*