could not be ready until 1990, "but found none at all." He pointed out that the Polaris nuclear submarine was built from scratch and put to sea within 4 years, and "the entire nuclear submarine revolution from the 1949 go-ahead . . . to the first deployment of the first Polaris SSBN boat in 1960 required only 11 years." Development of SUM, he maintains, is far less challenging technologically than these early projects were. If we begin now, Drell thinks, there is no reason why it should take a decade to complete the task.

Drell also challenged the DOD's chief argument—that moving the MX to sea would eliminate one leg of the strategic triad and make it easier for the Soviets to devise a first-strike attack. It is not important that America's newest strategic weapon be placed on land, but it is important that it be different from existing systems and able to survive. SUM, Drell believes, meets these standards and adds diversity to U.S. strategic forces. It would complicate the Soviets' targeting problem, he claims. Because the small submarines would be so numerous, they would be difficult to trail. They would also be quieter and slower than the existing missile-bearing subs, and thus less likely to be spotted, even if antisubmarine technology is improved. The Defense Department has no analytic basis, according to Drell, for claiming that the triad would be more vulnerable with the MX underwater rather than on land.

These hearings were inconclusive in that the senators neither endorsed nor rejected the new format for a land-based MX, revised at the last moment by harried Air Force planners. They made clear, however, that despite the warning about the importance of moving quickly, they will be prepared to cause delays if they find the Administration to be uncooperative. It remains to be seen whether—or at what price—Utah and Nevada will go along with this unwelcome construction project.—ELIOT MARSHALL

Gus Speth, Planning the "Conserver Society"

As chairman of the President's Council on Environmental Quality, Speth loses as often as he wins in White House policy debates; but he has a vision for tomorrow

In light of the antiregulatory mood widely perceived to exist in Congress and elsewhere in the land, many environmentalists are in a beleaguered state of mind. They see, in the decade ahead, a cold war between themselves and those proponents of economic growth and rapid energy development who would rollback environmental regulation.

But Gus Speth, the new chairman of the President's Council on Environmental Quality (CEQ), believes that the 1980's can be a time of major advances for the environmental movement—if the movement adopts the strategies necessary to build broad-based political coalitions, increase grass roots organizing "by a hundredfold," and curb the political power of corporations through such measures as partial public financing of Senate and House elections.

Speth has, as indicated by some of his recent speeches before environmental groups, been emerging as the Carter Administration's advocate and planner for a "conserver society" that is committed to "doing more with less."

The conserver society, he says, "celebrates economy in design and avoidance of waste. It realizes that there are limits to low cost resources and to the environment's carrying capacity. It insists that market prices reflect all costs, social as well as private. . . . It prizes recycling over pollution, durability over obsolescence, quality over quantity, diversity over uniformity. It knows," he says, "that 'the best things in life are free.' "

Speth, who before joining the Administration in 1977 had built a reputation as a pioneer in environmental law, may enjoy higher standing with the environmental community than any other federal official. He might, in fact, be termed the Administration's "environmental conscience," and, if the White House is not always faithful to its conscience, environmentalists do not fault Speth on that account.

Speth's friends know that he represents but one side—although not necessarily an insignificant side—of the Carter Administration's divided state of mind with respect to a whole range of energy-and-environment issues. Some of these issues are of vital importance, and their outcome could have a lot to do with what life in the United States will be like in the next century. Accordingly, it is in order to look at how Speth and CEQ fit in the scheme of things in the Carter Administration and at what they represent as a source of ideas and policy direction for the future.

President Carter has sent two environmental messages to Congress during his first term, and Speth, from his conversations with the President, is convinced that he is a committed environmentalist. On the other hand, as Speth well knows, the themes of the conserver society clearly are not today controlling ones at the White House, which is being buffeted by worries about energy supplies and double-digit inflation, not to mention Ronald Reagan's skill at exploiting popular resentment against big government and federal regulation.

Speth has become increasingly well regarded at the White House since the President appointed him to the CEQ chairmanship last August. But his advice has often been rejected, especially on issues that turn in one way or another on the Administration's concern to reduce oil imports.

For instance, Speth and CEQ were unsuccessful in trying last summer to persuade Carter not to propose a massive $88-billion crash synfuels program. And, just recently, CEQ failed to persuade the President to include in his subsidy proposal for converting oil-fired utility boilers to coal the condition that there not be an overall increase in sulfur emissions. And, on a number of other issues, the President's decisions have gone against CEQ's advice; this was the case, for example, when Carter decided (as an anti-inflation measure) to allow the harvesting of timber in the national forests to exceed sustainable yields, and when he chose not to veto the congressional override of action taken under the Endangered Species Act to stop the Tellico Dam project.

But Speth, an individual of natural ebullience and little cynicism, can cite a

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number of presidential actions and decisions which he feels are moving the nation in the right direction. These include Carter's efforts to do away with the water projects pork barrel through reforms that stress stricter benefit/cost analysis, water conservation, and such "nonstructural" solutions as zoning flood plains to keep them free of development; his technically conservative policy for ultimate disposal of radioactive waste and his indefinite deferral of nuclear fuel reprocessing (this latter meant to discourage reprocessing and commercial traffic in plutonium abroad); and his encouragement of energy conservation and development of renewable energy sources through large increases in federal spending for these programs and a relative decline in spending for nuclear fission.

Three years ago President Carter considered, but rejected, a reorganization plan that would have abolished CEQ, which remains as an anomalous but apparently now accepted feature of the Executive Office of the President. It is an officially sanctioned Janus that looks in one direction toward the environmental community, which gives it much of its inspiration and political clout (such as it is), and that looks in the other direction toward the White House, which it seeks to advise.

During the last years of the Nixon Administration and during the Ford years, CEQ had little access either to the President or his top aides because environmental issues were perceived at the White House as being of secondary importance. Indeed, Russell Peterson, who was chairman of the council during nearly all of this period, has had better access to the Oval Office in his present job as president of the National Audubon Society than he ever had at CEQ.

President Carter has been quite willing for CEQ to have a direct voice in White House policy deliberations, and since Speth became chairman this has been happening. Like his predecessor, Charles Warren, Speth has been attending Cabinet meetings, but in addition he has been included in the twice weekly meetings which White House chief of staff Hamilton Jordan has with the President's other senior aides and he meets privately each week with Stuart Eizenstat, Carter's special assistant for domestic policy.

Thus, Speth is being heard, and this can make a difference even if the present political climate is not one in which environmental viewpoints thrive. "When you have a bright guy in the room he can have an influence, and Gus Speth is a very bright guy," remarks Douglas M. Costle, administrator of the Environmental Protection Agency (EPA).

At one time, Speth is said to have been regarded by some at the White House as a "loose cannon." Once back in 1977, when Speth was a member of CEQ but not yet its chairman, Eizenstat called him to ask that he not give the speech which he was about to deliver. The speech, which Eizenstat felt might give misleading signals as to Administration policy, recommended an eventual moratorium on further licensing of nuclear power plants unless it were determined that radioactive waste could be disposed of safely.

Inasmuch as copies of the speech already had been distributed, Speth could not change it or call it off without embarrassment to the White House and himself. So it was given as planned, much to the consternation of some people in the nuclear industry and at the Department of Energy. But Eizenstat now brushes the episode aside. "It's part of my job to see that Administration officials do not give misleading signals," he says. "I do that with every cabinet officer."

Had Speth not enjoyed the confidence of a White House official of Eizenstat's importance, the CEQ chairmanship no doubt would have been denied him. "I think Gus is an exceptional person," Eizenstat says. "He is sensitive to the views of environmental groups and does a fine job presenting CEQ's positions. And he is operating in the real world. He is practical and realistic."

Douglas M. Costle: "When you have a bright guy in the room he can have an influence, and Gus Speth is a very bright guy."

Recently, Speth and Esther Peterson, the President's adviser on consumer affairs, are said to have proposed that Carter speak out forcefully in defense of environmental and consumer product regulation. But other presidential advisers felt that this is no time for Carter to be wearing regulation on his sleeve, and the proposal got nowhere. Speth accepted this judgment (he will not even confirm that the proposal was made), and has launched his own counterattack on those he regards as irresponsible and self-serving critics of regulation, lashing out especially at the Mobil Oil Company for what he calls the "imMOBILization of truth."

Now 38, Speth grew up in Orangeburg, South Carolina, and came of age during the civil rights revolution. He may have gotten some of his sense of commitment to social and political change from two local school officials whom he admired as farsighted and courageous in their efforts to ease the way for racial desegregation in the face of strong opposition.

He entered Yale in 1960 intending to become a chemist, and, as the chairman of the chemistry department later informed his parents, his first year marks in that subject were the highest any Yale freshman had ever made. But Speth found that being a chemistry major was too intellectually confining and he dropped it in favor of a broad liberal arts education. Eventually, after graduating summa cum laude and then earning a degree in economics as a Rhodes Scholar at Oxford, he wound up at Yale Law School.

Then, inspired by the example of the National Association for the Advancement of Colored People's Legal Defense Fund, Speth and several other young attorneys founded the Natural Resources Defense Council—one of the first environmental law groups. As an NRDC attorney, Speth won some important lawsuits, including *SIPI* vs. *The Atomic Energy Commission*, wherein the AEC was required by the courts to prepare an environmental impact statement on the liquid metal fast breeder reactor.

At CEQ, Speth sees himself building on a tradition established by previous chairmen who left an imprint on the agency. Principally, these were Russell Train, Russell Peterson, and Charles Warren, all of whom enjoyed the respect of the environmental community.

Of Speth's predecessors, only Train, who eventually left CEQ to head EPA, had an influence at the White House equal to or greater than his own. Train was appointed in early 1970 after President Nixon signed the National Environmental Policy Act (NEPA), which called for CEQ to serve in the dual and somewhat conflicting roles of presidential adviser and environmental advocate and ombudsman. With the environmental movement then in full swing, Nixon sent to Congress a draft of environmental bills generated by Train and CEQ; among them were measures such as the 1972 amendments to the pesticide control act, the Noise Control Act, the Ocean Dumping Act, and the Toxic Substances Control Act, all of which became law.

Thus, Train had a key role in helping to bring on, in the 1970's, an "environmental revolution" that Speth has compared to the civil rights revolution of the 1960's. Some 20 new environmental laws, including the clean air and clean water laws, were enacted during the decade to mandate a complex web of federal and state regulation that is proving difficult to put in place and implement (*Science*, 2 May).

CEQ, consisting of Speth, the other two council members (Robert Harris and Jane Yarn), and the council policy staff of about 30 persons, now has the formidable task of trying to have the revolution of the previous decade consolidated and extended.

In part this means overseeing the compliance of other agencies with NEPA. This function was strikingly illustrated recently when Speth followed up a CEQ-sponsored study by the Environmental Law Institute of impact statements prepared by the Nuclear Regulatory Commission (NRC). The study revealed that in nearly all of these statements the discussion of possible nuclear reactor accidents consisted largely of uninformative boiler plate and did not deal at all with the possibility of so-called "Class 9" accidents that might involve a core meltdown and breach of containment. In a letter to the NRC, Speth called for corrective action, and, at a meeting on 16 April, the commission indicated that it would be moving to adopt an NRC staff proposal that would meet most of the CEQ criticisms.

Also, Speth and CEQ are now finding themselves in an almost constant struggle to keep existing environmental laws from being weakened or overriden. A high priority goal has been to keep the House and Senate conferees on the Energy Mobilization Board legislation from accepting a provision that would allow the EMB to waive or override substantive laws, such as the pollution and strip-mining control acts.

Last fall, in a memorandum to the President, Speth, together with Douglas Costle of EPA and Secretary of the Interior Cecil Andrus, blew the whistle on White House lobbyists for supporting a House bill that contained such a provision. Carter later reiterated his previously stated position that no substantive waiver provision was acceptable to him.

As matters have since turned out, however, the President is going along with a compromise worked out by House and Senate conferees. It calls for the Congress itself, using a special fast track procedure, to consider and grant EMB requests for waivers of certain laws and regulations in the case of specific energy projects. In effect, the waivers will represent statutory amendments, which Congress is always at liberty to make. But CEQ and EPA are understood to have argued that even this is unacceptable, in that a special hunting license for waivers is being sanctioned.

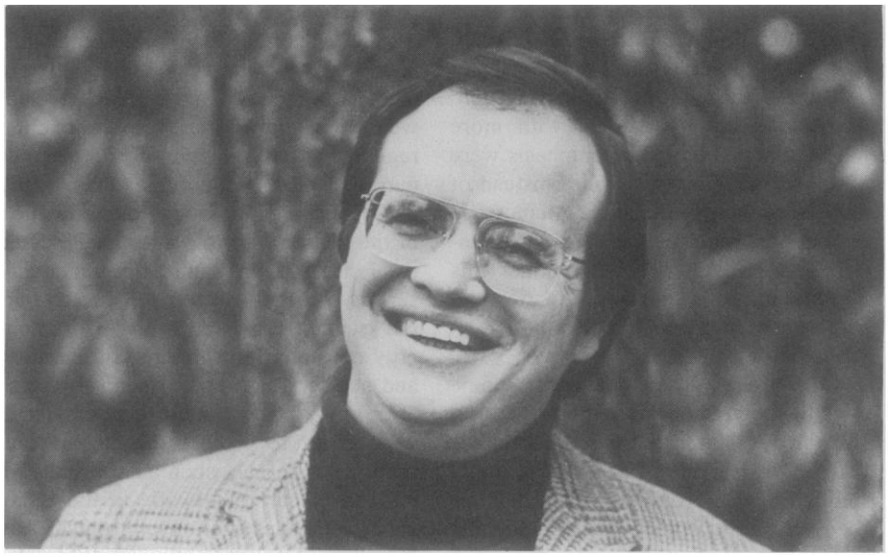

Photo by Luther J. Carter

Gus Speth

Besides these rearguard actions, Speth and his associates are trying to focus the attention of government officials and the public on major problems or opportunities that either have not been addressed at all or have been addressed inadequately. In part, this is done through the CEQ annual report and special publications; but it is also done by initiating special interagency studies and policy reviews.

Currently under way are joint studies by CEQ and the Department of Agriculture of the serious threat to the United States' agricultural resource base posed by soil erosion and the loss of prime farm land to development. Reports from these studies, which deal in part with politically sensitive questions of land use control, are not due until January 1981, or comfortably after the fall election.

The Administration's domestic policy review of the potential of solar energy, undertaken on a CEQ initiative in 1978, is a particularly good example of how the council, through studies and policy reviews, has helped lay the foundation for what is fast becoming a major federal program supported by big bucks. Speth's sharp thrust at a National Academy of Sciences' study which challenged the conclusions of that policy review also points up the importance he attaches to defending that foundation—which he does with a certain joy of combat.

The solar policy review culminated in a report in early 1979 which said that, with continuing increases in the price of oil, solar energy could—given a substantial national effort—provide up to 20 percent of the nation's energy by the year 2000. Moreover, the then Secretary of Energy, James R. Schlesinger, signed off on the report; this had been one of Speth's prime objectives because a significant impediment to a large federal commitment to solar energy was the DOE view that it would not become an important energy source in this century.

As a matter of fact, Frank Press, the President's science adviser, and some high-ranking DOE officials—Deputy Secretary John O'Leary and Assistant Secretary for Research John Deutch, in particular—had argued strongly that the 20 percent figure was not a realistic number for use in energy supply planning, however desirable it might be as a goal. Recently, the National Academy of Sciences' Committee on Nuclear and Alternative Energy Systems (CONAES) issued a report stating that solar energy probably will not contribute much more than 5 percent to energy supply in this century without massive government intervention both in terms of subsidies and restrictions on use of nonrenewable fuels. But Speth replied, in a letter to the *New York Times*, that CONAES' assertion was unsupportable and not documented in the report.

Speth has promoted solar energy vigorously because it figures large in his hopes for a sustainable energy future which is, in turn, a key element in the conserver society. Another key element is energy conservation. According to a CEQ report last year ("The Good News About Energy"), conservation has the

potential of limiting the increase in energy consumption over the next 20 years to only 10 or 15 percent more than current consumption; moreover, a healthy economy could be maintained, with more jobs available than if the emphasis were on increasing energy supplies instead of increasing energy efficiency. An increase in coal-fired and nuclear electricity generation would be necessary under this CEQ scenario, but not more than would be provided by plants already under construction or on order.

The conserver society has not become a big theme yet in White House rhetoric. But the President did speak of it in the talk he gave at the White House on 29 February to environmentalists attending the Second Environmental Decade celebration. Speth had arranged this affair partly in an effort to keep Carter on the right side of the environmental constituency that helped elect him in 1976.

How often, and with what emphasis, the President returns to the conserver society theme in this political season is uncertain. But given the theme's controversial implications and the President's cautious political style, it may not become a major part of his 1980 campaign.

Nonetheless, Speth and CEQ are fitting together the diverse elements of a plan for the conserver society. These elements include: strengthening, not weakening, the fabric of environmental regulation, a fabric which Speth believes may be more vulnerable than many people imagine; looking to the protection of the country's prime farm land, scenic rural landscapes, and environmentally sensitive coastal resources, such as barrier islands; slowing down growth in energy consumption through conservation and accelerating development of renewable energy sources; leading a worldwide effort to protect the global commons from threats such as an excessive buildup of carbon dioxide in the atmosphere, the destruction of tropical rain forests, and desertification; and, by relying increasingly on energy conservation and renewable resources at home, enhancing U.S. leadership abroad in efforts to help the world's poor, share fossil fuel resources more equitably, and reduce the risks of nuclear weapons proliferation.

But Speth thinks the conserver society may be impossible to achieve unless the influence of corporations is checked through reform of political campaign financing. He has called, too, for reform of the way companies are governed. "The legal institutions for corporate governance—the stockholders and the directors—function too often as little more than rubber stamps for management decisions," he said recently. "Those that are affected most by the corporations' actions—labor, consumers, the community at large—have the least to say in its decisions. As a solution to these ills, I think the time has come for a healthy dose of democracy in corporate decision-making."

He would have the stockholders themselves elect a number of "public directors" to serve on the corporate boards, and would have the companies issue periodic "social reports," as is now required in West Germany and some other European countries.

Jimmy Carter seems especially unlikely this year to beard the lions of industry by pushing for reform of corporate governance. Moreover, if the recent past is any guide, he will downplay environmental regulation, too. But, should he ever give the sign, Speth and company are ready to help him spell out an ambitious agenda for the conserver society.

—LUTHER J. CARTER

Bern Dibner: Science Bibliophile

Library founded by inventor-entrepreneur is a unique repository of the seeds of modern science

Bern Dibner, head of the Burndy Corporation and owner of the world's largest collection of books devoted to the history of science, is a modest and delightful human being who probably comes as close as anyone does these days to being a Renaissance man. This is no accident, because for almost the past half-century Dibner has been influenced by that model of the successful marriage of science and humanism, Leonardo da Vinci.

Dibner has long been known to historians of science and antiquarian book dealers around the world. At present, visitors to the Smithsonian Institution are learning a little about his collection, because the Museum of History and Technology is staging a small but striking exhibit of books from among the 11,000 that Dibner donated to the institution in 1974. The occasion is the 25th anniversary of the first publication of *Heralds of Science*, a catalog compiled by Dibner of 200 seminal contributions to science since the invention of the printing press in 1455.

The exhibition contains such gems as the first edition of Copernicus's *De Revolutionibus Orbium Coelestium*, published in Nuremberg in 1543; Galileo's *Sidereus Nuncius Magna* (Venice, 1610), Newton's *Principia Mathematica* (London, 1687), Darwin's *Origin of Species*, and a 1482 edition of Euclid's book on geometry, the world's oldest science textbook.

These are only the tip of the iceberg of the vast Dibner collection, which, until the "mitosis" involving the Smithsonian, contained more than 40,000 volumes. But the Burndy library in Norwalk, Connecticut, is still a growing concern, still actively headed by its 82-year-old founder.

The Dibner collection is regarded as the most extensive one in the world exclusively devoted to science texts and by far the greatest accumulated by a single individual. "We can match book for book" the items contained in other large repositories such as those at Cambridge University, the Bodleian Library at Oxford, Harvard, and Yale, says Dibner. Although many private collections are difficult for the scholar to gain access to, the Burndy library sends materials to scholars on request. In 1959 it donated a sizable collection of Vinciana to Brandeis University—a collection second only to that amassed by Elmer Belt, an 87-year-old Los Angeles urologist, who has turned over his Leonardo materials to the University of California at Los Angeles.

Dibner, who emigrated to New York with his family from the Ukraine in 1904, began his career at General Electric, with a degree in electrical engineering obtained in 1921 from the New York

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