3000 nuclear parks each having eight fast breeder reactors were needed a century from now, Handler presented this disturbing vision:

> .... [T]hat would mean putting four reactors on line each week for the next century and also replacing those that wear out, an absolutely staggering task. When one adds the nightmare of the existence of the 15,000 tons of plutonium required for that many breeder reactors, the health hazards in handling plutonium, the police effort required so that no plutonium is removed for the construction of illicit nuclear weapons, and the task of waste disposal, one need not invoke the possibility of a catastrophic accident to consider that *this is an insupportable scenario. Somehow, the world must skip the breeder reactor and go from petroleum and coal—solid, liquid, and gasified—to fusion and/or solar energy or it is inconceivable that the human race will avoid a worldwide calamity on so large a scale as to jeopardize the continuing future of our species* [emphasis added].

In January, Handler revised the above in such a way as to retreat from a hard-and-fast position against the breeder to a skeptical but uncommitted position consistent with a continuation of ERDA's multibillion-dollar program of breeder research, development, and demonstration. Later, Handler wrote a letter explaining his change of mind to Senator John Tunney (D-Calif.), who had cited Handler's original remarks in questioning Robert Seamans, the administrator of ERDA. He had not, he said, fully considered that, because of the problems and uncertainties associated with further development of coal, oil shale, and other energy resources, development of the breeder might be essential to "buy the time" necessary to develop solar and fusion for future generations.

On Eating One's Words

In a telephone interview Handler told this reporter that he "did not enjoy eating [some of his] words" and that, had it been necessary to eat all of them, his discomfort would have been all the worse. "All of us find it hard to change our minds," he observed. "But it is extraordinarily difficult if you've taken a public position." Hence, his argument that the new study would be a futile exercise if the committee members included a number of publicly committed advocates.

Brooks, who along with Handler, Ginzton, and Courtland Perkins (president of the Academy of Engineering) made the final selection of committee members, sized up the problem this way: "It is not so much a matter of having publicly expressed a strong view as it is having a constituency to which you are beholden." Nader was cited as a prime case in point. "The [pronuclear] arguments would have to be absolutely overwhelming for an individual like this to change his mind. But, in a matter this complex, the arguments will never be that overwhelming."

In Brooks' view, such committee members as the officials from Bechtel and Chase Manhattan are not beholden to a constituency, because although their companies have been involved in designing and financing nuclear plants, they have also been similarly involved in the development of fossil-fuel plants. Furthermore, said Brooks, to insist that all persons appointed to the committee be completely disinterested as to the nuclear issue would be to rule out some individuals needed because of their direct, firsthand experience in dealing with nuclear matters.

Brooks and Handler indicate that about the most they expect of the study is to clarify the terms of the debate by bringing about wider agreement as to the established facts, the key questions requiring further research, and what the questions are that simply involve matters of values and political judgment. But, if no more than this is expected, why all the pains to exclude from the study committee some of the very people who could best elucidate the concerns that fuel the movement to stop further nuclear development?

—LUTHER J. CARTER

Opposition to Nuclear Power: Raising the Question at the Polls

The second national meeting of the opponents of nuclear power was bigger and better organized than the first one a year ago, and the participants were more bullish about their chances of achieving the objective summed up in their slogan, "stop nuclear power." * The conference, held under the sponsorship of the Ralph Nader organization on 16 to 18 November in Washington, D.C., attracted representatives from the major antinuclear activist groups from around the country. The meeting had aspects of both a strategy session and a pep rally, and the program was bolstered by the presence of several scientific guest stars, including Nobel laureate Hannes Alfvén and former presidential science adviser George Kistiakowsky.

The focus of attention at the meeting moved away from the question of reactor safety which has preoccupied the opponents of nuclear power—seemingly because they feel they have made their point about the noninfallibility of reactor safety systems. Nader, in his opening remarks, struck the keynote by claiming that economic and technological trends have forced the nuclear industry to adopt a "de facto moratorium on nuclear expansion in the United States," and urged that citizens groups should devote themselves "to stopping the Ford Administration's nuclear power bailout program."

A good deal of interest at the conference centered on the use of the initiative procedure by which citizens groups can gain a place on the ballot for legislation controlling nuclear power development. A "nuclear safeguards" proposition has been qualified for the ballot in the June primary elections in California, and an effort is under way to do the same thing in at least a dozen other states in the November election.

Perhaps because of criticism that the antinuclear forces have maintained an essentially negative posture, a substantial part of the program was devoted to a discussion of energy conservation measures and to the examination of alternative sources of energy, such as solar energy and wind power.

The meeting did not provide an arena for the so-called nuclear debate; no pronuclear speakers were on the program, nor was there much pronuclear sentiment evident in the question and answer sessions. Some of the speakers alluded to industry representatives in the audience, but these seemed to restrict themselves to quiet note-taking.

A range of opinion on the future of nuclear power was represented at the meeting, however, with by no means all the participants regarding the development of nuclear power as unsafe at any speed.

*The formal title of the conference was "Critical Mass '75: Second national gathering of the citizen movement to stop nuclear power."

Kistiakowsky, for example, said he was convinced that nuclear power will ultimately play a role in providing energy needs. But the problem, he said, is that "the technology is not ready for major acceleration. We are not ready. The world is not ready."

Kistiakowsky, who was science adviser to President Eisenhower, said that his doubts about rapid expansion of nuclear power capacity lie in four categories. He listed the possibility of "catastrophic accidents" and said he questioned the wisdom of committing so large a fraction of available capital to nuclear power as has been discussed, but he did not discuss these two issues in detail.

He said he felt a movement into a "plutonium economy," in which plutonium would be used as fuel either in breeder reactors or in regular fission reactors, "creates unpredictable consequences." Like other speakers, he noted that plutonium is not only a highly toxic substance but is a material from which nuclear bombs can be made. With a large number of reactors operating, he said, he could foresee no possible system of supervision which could prevent some loss of plutonium. "Plutonium will have to be moved around the country and there will be major opportunities for sabotage and blackmail." The security measures necessary to operate under these conditions, he said, would be "tied to a police state." Such things as infiltration by informers and wire tapping would be employed, posing a serious threat to civil liberties. And he remarked that even such measures might not prevent nuclear terrorism.

Kistiakowsky believes that, if the United States decides on a policy of nuclear power expansion, "the world will follow us." The proliferation of nuclear weapons will be uncontrollable, and such weapons will be used in local conflicts which would be likely to escalate into global nuclear war.

Kistiakowsky also expressed concern about the unsolved problems of dealing with the disposal of nuclear wastes. He discussed leaks of radioactive wastes from temporary waste storage facilities and said that unless a satisfactory solution to the waste storage problem is found "we would be leaving an evil inheritance if we proceed with rapid expansion."

Nader, in his remarks at the meeting, declared that nuclear power is in serious straits economically and that citizen groups should be on the lookout for a federal bailout. A master wielder of the rhetorical needle, especially, perhaps, with corporate targets, Nader suggested that "It looks as if Westinghouse and GE are opening a convention for corporate welfare rights."

At a press briefing, Nader cited a sharp decline in purchase orders for new nuclear plants to bolster his argument that the "nuclear power industry is no longer capable of being self-sufficient without major federal subsidies." As evidence that utilities are having trouble operating nuclear plants he charged that "modest breakdowns cause months' delays" and characterized a fire at the Brown's Ferry, Alabama, nuclear plant, which caused heavy damage (but no release of radiation) and put the plant out of operation for a long period, as a "one in a billion accident" which the industry denied would happen.

Academics Mull over Science and Values for the Bicentennial

The National Academy of Sciences, doing its bit for the Bicentennial, recently held the first of a series of four public forums on science and history. The topic was Scientific Theories and Social Values, and the question put to the eight-man panel related to the extent to which great scientific discoveries have shaped human values and world views, and vice versa.

As might be expected when eight well-developed Weltanschauungen are thrown together on one podium, the discussion was fragmentary and at times not entirely comprehensible.

The panel was about equally divided between scientists and historians. It developed that the latter group were a little more optimistic about the future than the former, and less inclined to believe that any unprecedented cataclysms were in the offing. The historians also felt science was more shaped by than shaping of values; that the role of scientific theories has been to rationalize and amplify existing philosophies. Harvard historian Donald Fleming observed, for example, that social (applied) Darwinism supplied a scientific justification for the prevailing laissez faire philosophy; and, more recently, that science amplifies the current debate over the relative contributions of environment and heredity to intelligence and aggressive behavior.

The panelists failed to come to grips with whether modern thought had been significantly influenced by the great discoveries of the 20th century, such as quantum mechanics and the laws of relativity. Princeton physicist Robert H. Dicke suggested they would be more difficult to assess: whereas the basic elements of Newtonian physics were readily perceivable by everyone, he said, recent achievements are "less accessible, and foreign to our everyday ways of looking at things." He noted that public policy decision-making emanates more from a deterministic (Newtonian) world view, where things are either true or false, rather than the kind of thinking suggested by the uncertainty principle of quantum mechanics, which creates a spectrum of possibly correct answers.

Harvard mathematician Raoul Bott found recent advances in physics "frightening," having the "complete opposite effect" of the rational, nonrelativistic Newtonian thought system. He did not at all like the idea of "the world as a casino"—a reference to a comment by Einstein, who believed physics would once again become deterministic because "I shall never believe that God plays dice with the world."

The forum topic was dealt with in scattershot manner in the 4 hours allotted, and the talk drifted from the relationship of science and values to the current concern about values within science. Some panelists felt it was up to the universities to incorporate man's "value-setting endeavors" into scientific endeavors, but all agreed higher education is moving in the wrong direction, toward increasing hyper-specialization.

The audience for this first forum was small, but those who spoke seemed as well equipped to grapple with the issues as the panel members. They were dissatisfied with the panel's failure to focus on the original question, and complaints were lodged about the fact there were no engineers, social scientists, young scientists, or "counterculture" representatives on the panel.

The next three forums, to be held in January, March, and May, will deal with, respectively, "the citizen and the expert," "frontier expansion or inward development," and "rude colony to dominant power." The NAS has not yet decided what to do with the results of the forums, but it will probably take some doing to fashion from all this a coherent body of Bicentennial thought.—C.H.

Nader characteristically put strong emphasis on citizen action and noted that scientists are increasingly active not only in questioning the safety of nuclear power but in working on alternative sources of energy. And he obviously regarded the initiative campaigns in a number of states as a major manifestation of energy consciousness.

California has been in the forefront of the initiative movement with the Los Angeles–based People's Lobby and its director, Ed Koupal, providing much of the drive. The idea of using the initiative mechanism was an outgrowth of last year's national meeting. Originally, the intention was to seek to organize initiative drives in a few Western states—Oregon, Washington, and Colorado—but apparently when word got around, activists from more states wanted to be included. The result was the organization of all but a few of the 22 states which permit the initiative process into a "partnership" dubbed the Western Bloc. Efforts to qualify nuclear safety initiatives are under way in 16 states for next year's elections.

In California, Koupal and his allies have not taken a total prohibition line. In 1972, a vote on a proposed 5-year moratorium on the building of nuclear power plants lost 2 to 1. The law to be proposed on next year's ballot would permit the licensing of nuclear plants so long as they met requirements suggested in the formal title of the law—the Land Use, Nuclear Power Liability and Safeguards Act. The major requirements would be that the effectiveness of all safety systems would be demonstrated to the satisfaction of the state legislature, that there would be provision for full compensation for damages caused by any nuclear accident (this would require lifting of the limitations on liability provided in federal law), and that nuclear wastes would be safely stored. If the requirements were not met over a stated period of years in a particular plant the law provides for a progressive "derating" of the plant (reduction of the percent of capacity at which a plant operates).

Koupal and others are not flatly predicting victory at this point. With the proposal on the ballot in California, a lot of effort is going into petition campaigns in other Western Bloc states, including Massachusetts, a non-Western member of the bloc. But as the political climate warms up in California with the approach of the June primary, the nuclear issue will come into sharper focus. According to Koupal, California candidates so far have treated the issue cautiously. Few have come out against the iniative proposal. It should be noted that California has a presidential primary, so that national candidates will no doubt be asked their stand on the nuclear power issue.

Nader's view is that the initiative drive will have an educational as well as political impact. "Next year, more people will learn about the risks and diseconomies of nuclear power." He says he thinks that "win or lose," the initiative effort will broaden the nuclear debate. Nader says that nuclear power opponents have found that "exposure" of the issues result in a shift of public opinion toward opposition to nuclear power.

The Western Bloc may be the first sign of the coalescence of the "antinukes" into a genuine national movement. Until now the movement has been made up of disparate organizations which generally grew out of local groups concerned with intervening in specific situations, usually involving siting of nuclear power facilities.

Critical Mass is the catchy title not only for the national meeting, but also for a monthly newspaper and other Nader activities in the nuclear power field. The Washington organization does serve as a national clearinghouse for information in the field but has to call on sibling Nader groups such as Congress Watch and the Public Interest Research Group for manpower and expertise when special demands arise. The Critical Mass meeting at the Sheraton-Park Hotel was financed by registration fees and a contribution from Tom Laughlin and his wife, Dolores Taylor. Laughlin is the actor-producer responsible for the "Billy Jack" films.

Nader said in remarks prepared for the meeting that the energy crisis and the government's failure to formulate a coherent energy policy have aroused public interest in learning about nuclear power. Citizen concern, he said, "has made the organizing of a mass movement against nuclear power a practical and achievable goal."

An early test of muscle in making policy on nuclear power is likely to come in congressional consideration of the Price-Anderson Act which insures the public against losses incurred in nuclear power accidents but limits liability to $560 million.

Opponents of nuclear power, including Nader, have argued for full financial responsibility by industry and the ending of federal indemnity provisions which are a main feature of the law. A bill (H.R. 8631) which the Joint Committee on Atomic Energy reported out on 10 November, provides for a phasing down of the government role but would not end the limit on liability. Action on Price-Anderson will provide a clue to how far the opposition to nuclear power has come as a national force.—JOHN WALSH

RECENT DEATHS

James P. Bennett, 88; professor emeritus of plant physiology, University of California, Berkeley; 1 June.

Helmut K. Buechner, 57; senior scientist emeritus, National Zoological Park, Smithsonian Institution; 7 October.

Daniel A. Brody, 60; professor of medicine, University of Tennessee, Memphis; 30 September.

Deane N. Calvert, 46; professor of pharmacology, Medical College of Wisconsin; 3 July.

Susan P. Cobbs, 69; former dean, Swarthmore College; 4 October.

Nicholas Cottrell, 38; associate professor of psychology, University of Iowa; 23 October.

Wilbur H. Cramblet, 83; former president, Bethany College; 9 November.

Otto C. Croy, 85; professor emeritus of agriculture, Ohio State University; 24 September.

Michael M. Dasco, 66; clinical professor of community medicine, Mt. Sinai School of Medicine; 11 October.

Lowell S. Ensor, 68; president emeritus, Western Maryland College; 9 October.

Norman N. Epstein, 79; professor emeritus of dermatology, University of California, San Francisco; 6 October.

Joseph F. Foster, 57; professor of chemistry, Purdue University; 6 October.

H. Orin Halvorson, 78; first director, School of Life Sciences, University of Illinois, Urbana-Champaign; 20 October.

Thomas E. Hicks, 54; director, Nuclear Energy Laboratory, University of California, Los Angeles; 29 September.

C. Donald Larsen, 69; retired executive secretary, physiological chemistry study section, National Institutes of Health; 11 June.

Norman Levinson, 63; professor of mathematics, Massachusetts Institute of Technology; 10 October.

F. Bruce Morgan, 56; dean, Carleton College; 2 October.

Aaron Nimetz, 75; former assistant clinical professor of pediatrics, George Washington University; 6 October.

Joseph J. Pfiffner, 72; professor emeritus of physiology and pharmacology, Wayne State University School of Medicine; 13 August.

Werner B. Schaefer, 73; microbiologist, National Jewish Hospital and Research Center; 14 October.

Richard T. Sollenberger, 68; professor emeritus of psychology, Mt. Holyoke College; 21 August.

Errol Willett, 80; former dean of dentistry, Emory University; 3 September.