academy committees have drawn up recommendations which go straight to the archives and never get acted on," Wittwer observes.

Wittwer is also critical of the amount of time the NAS has taken to respond to the President's request for advice on the world food crisis. Ford's letter was received by NAS president Philip Handler on 5 December 1974, and Handler appointed a steering committee to address the charge. According to Wittwer, the steering committee (of which he is a member) had accomplished so little by April this year that he decided to contribute a report from his own committee, the NAS Board on Agriculture and Renewable Resources. The report was completed in 4 months and was available in time to influence the 1977 budget proposals drawn up last month. "Everyone said it couldn't be done, but I have always felt it shouldn't take 2 years to get out an academy report," Wittwer remarks. "We should have got started in December 1974, not in April. Obviously I think action should have been taken earlier but there may have been extenuating circumstances I don't know about."

Handler comments that the contract for the academy's main report was not signed until June, and it was only then that the steering committee could get to work. The circumstances of Wittwer's operation were "completely different" because his was a standing committee already funded, although even he got to work by "spending money in advance we didn't really have."

An interim report from the academy's steering committee was sent over to the White House at the same time as that from the Wittwer committee. The interim report offers a broad overview of how the United States can contribute by research to combating world hunger, and sketches out areas for further emphasis. Study director Joel Bernstein says the three unique features of the report are that it assesses research possibilities in terms of their practical effects, that it picks out eight research areas of special priority, and that it stresses the importance of worldwide collaborative research. Bernstein, a former assistant administrator of the Agency for International Development who joined the NAS this July, says the first 6 months of the year were spent in discussing with the government the terms of what the academy should do. Thereafter, the NAS moved ahead with what he considers "truly remarkable speed." President Ford, if he is still in office then, will receive the academy's final report on what he should do about the world food crisis in June 1977, 2½ years after he asked for it.

Whatever guidance the White House may find in the academy's interim report, the proposals from the Wittwer committee are specific and, in the committee's belief, of urgent priority if the American agricultural research system is to contribute its best efforts to assisting with the long-term world food situation. White House planners may at first glance tend to dismiss the report as the work of another group of scientists requesting more money for their own specialty, but in fact the report can also be seen as an offer by the agricultural research community to make some radical and probably quite painful changes in its traditional system of governance. There are the elements of a deal here which, despite the present political requirement for a tight budget, it would probably be shortsighted to turn down.—NICHOLAS WADE

Energy: Nuclear Critics Say Academy Names a "Stacked" Study Panel

The National Academy of Sciences (NAS) has just established a Committee on Nuclear Power and Alternative Energy Systems to carry out what Philip Handler, the president of NAS, is billing as "perhaps the most important and complex [study] the Academy has ever undertaken." It could also turn out to be one of the Academy's most controversial studies because, while the study committee has the task of producing a report to clarify the issues associated with nuclear energy and foster a consensus of opinion, Ralph Nader and other leaders of the movement to stop or slow down nuclear development already are describing the committee as "stacked" in favor of pushing ahead with it.

Commissioned by the Energy Research and Development Administration (ERDA), the $2 million study will, according to the Academy announcement, "focus on the prospects for the various nuclear power options, particularly the breeder reactor, and compare them with other energy systems, such as liquid and gaseous fuels produced from coal and solar, geothermal, and fusion energy. The study will also address the problem of socio-economic effects of various mixes of energy technologies and of strategies for energy-demand management."

The committee has been established under the Assembly of Engineering of the National Research Council, the principal operating unit of the NAS and its offshoot, the National Academy of Engineering. Its cochairmen are Harvey Brooks, a former dean of engineering and applied physics at Harvard and now a professor there of technology and public policy, and Edward L. Ginzton, chairman of the board of Varian Associates, a company based at Palo Alto, California, which manufactures scientific instruments.

A nuclear engineer by background, Brooks was employed by the General Electric Company during the late 1940's and was a consultant to the Atomic Energy Commission, ERDA's predecessor, during the 1950's. Also, he was a member of the AEC's Ad Hoc Advisory Committee on Reactor Policies which, in January 1959, enthusiastically advocated development of the breeder reactor and of plutonium recycling. Brooks acknowledges that his present attitudes are "on the pronuclear side" but adds that they are not fixed and unchangeable. As for Ginzton, Handler says that neither he nor his company have been significantly involved in nuclear work and that, if anything, Ginzton is probably more interested in solar energy than in nuclear.

Included among the other 13 members of the committee* are several individuals who have been deeply involved in nuclear engineering and development—specifically, the head of the Bechtel Group of Companies, a high official of the Chase Manhattan Bank of New York, the executive vice-president of the Exxon Research and

*These other members are Stephen D. Bechtel, Jr., chairman, Bechtel Group of Companies; Kenneth E. Boulding, economist, University of Colorado; Robert H. Cannon, Jr., chairman, division of engineering and applied science, California Institute of Technology; Richard R. Doell, geophysicist, U.S. Geological Survey; Otis Dudley Duncan, sociologist, University of Arizona; Edward J. Gornowski, executive vice-president, Exxon Research and Engineering Co.; John P. Holdren, associate professor of energy and resources program, University of California, Berkeley; Hendrik S. Houthakker, economist, Harvard University; Henry L. Kohn, radiation biologist, Harvard Medical School; Stanley Lewand, vice-president in charge of the public utilities division, Chase Manhattan Bank; John C. Neess, zoologist, University of Wisconsin; David Rose, nuclear engineer, Massachusetts Institute of Technology; David Sive, New York attorney and specialist in environmental law; and Bernard I. Spinrad, nuclear engineer, Oregon State University.

Engineering Company, and two professors of nuclear engineering. Other members include two economists, a geophysicist, a sociologist, a zoologist, a radiation biologist, an environmental lawyer, and the head of Caltech's division of engineering and applied science. Apparently the only committee member well known to critics of nuclear power as being actively and vocally on their side is John P. Holdren, who is an associate professor of energy and natural resources at the University of California at Berkeley and one of the signers of a recent statement presented to the National Council of Churches opposing "the plutonium economy" and recommending that the resources now devoted to nuclear power be diverted to "safer and more constructive channels."

In announcing the study, Handler said, "We are aware of the polarization of attitudes on nuclear energy among the public and in the scientific community as well. Accordingly, [the committee that] has been selected not only contains a broad range of competence but also represents the full spectrum of opinion surrounding this controversial issue." He added that, in January, the committee will hold public meetings in five cities—San Francisco, Denver, Minneapolis, New York, and Atlanta—to receive "essential input from interested groups and citizens." A preliminary report will be made to ERDA in December 1976 and the final report will be issued by 30 June 1977.

Science reporters asked several leading nuclear critics—Nader, J. G. Speth of the National Resources Defense Council (NRDC), Dan Ford of the Union of Concerned Scientists (UCS), and Dean Abrahamson (a University of Minnesota professor of public affairs who was a prime mover in the preparation of the petition to the National Council of Churches)—for

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Hope Slim for Sakharov Nobel Trip

Since late October, after the first news that the Soviet government had denied dissident physicist Andrei D. Sakharov permission to go to Oslo, Norway, on 10 December to accept the Nobel peace prize, a number of prominent scientists have protested the denial—but so far to no avail. It is still too soon to guess whether the Soviet leadership will reverse its initial decision—as it has done sometimes in the past.

Sakharov has told Western visitors that he had asked for permission to go to Norway and for assurances he would be allowed to return to the Soviet Union, in keeping with his long-standing aim of remaining a critic of Soviet repression from within that country's borders. However, at some level in the government—it is not clear where—his request has been denied. The issue is particularly noteworthy to Western observers since the Soviet Union earlier this year signed the Helsinki Accords, which are interpreted in the West as pledging the Soviets to show greater respects for human rights, such as the freedom to travel.

On 12 November, 35 American Nobel prizewinners—some of whom don't often sign their names to political statements—addressed a petition to Soviet leaders urging them to allow Sakharov to go. Signers included Luis W. Alvarez, John Bardeen, Murray Gell-Mann, Glenn T. Seaborg, and Eugene P. Wigner, among others. Protests have also been sent by the International League for the Rights of Man and the Federation of American Scientists. Both groups urge those wishing to protest, in the closing days before the award is given, to address statements to Soviet Ambassador Anatoliy F. Dobrynin, in Washington.*

At present, hope is slim that Sakharov will be allowed to go. On the other hand, the Soviet bureaucracy is certainly capable of abrupt changes in policy. In fact, for many months, it denied Sakharov's wife, Yelena Bonner, permission to go abroad for an eye operation, but then it reversed that decision after protests from Western scientists, organizations, and political leaders.

—D.S.

*Embassy of the U.S.S.R., 1115 16th St. NW, Washington D.C. 20036.

Rumsfeld No Friend to Arms Control Scientists

Donald Rumsfeld, the former naval aviator whom the Senate confirmed last month as Secretary of Defense, is even less likely than his predecessor to listen sympathetically to the arms control lobby and its allies in the scientific community. While counselor to President Nixon, Rumsfeld enthusiastically supported the attack on certain arms control scientists by the Operations Research Society of America.

ORSA's vituperative criticism—it went beyond technical points of disagreement to impugn professional behavior—focused on the congressional testimony given by George W. Rathjens, Steven Weinberg, and Jerome B. Wiesner against the now much reduced and soon to be mothballed ABM system, a project then being pushed hard by the Nixon Administration (*Science*, 15 October 1971). Rumsfeld wrote to the then president of ORSA, Robert Machol of Northwestern University, in terms considerably more fervent than demanded by a mere thanks-for-hitting-our-critics letter. He had discussed the ORSA critique personally with the President, he told Machol. Indeed, he had heard Admiral Zumwalt himself discuss the work of the society in a most favorable way. "All in all, I would say," Rumsfeld continued, "that you and the Society have performed a magnificent service. . . ." Since this tribute presumably sounded insufficiently hyperbolic the counselor to the President added the encomium that "To me the action by your Society, and certainly by you personally, is the kind of incremental act of leadership and good sense that makes this such a wonderful country."—N.W.

Sociologists of Science Get Organized

How scientists go about their business is a matter of such interest to sociologists that there has grown up a thriving young specialty in the subject. Sociologists of science have now undergone that crucial *rite de passage* in a discipline's struggle for acceptance, the transformation from a coterie of like-minded colleagues into a fully fledged learned society. The Society for Social Studies of Science, whose debut was announced in August this year, already has 120 members. (Those wishing to join should apply to Robert McGinnis, SSSS, SASS/Department of Sociology, 323 Uris Hall, Cornell University, Ithaca, New York 14853.)

Several of the leading members of the society are pupils of Robert K. Mer-

comment on the study. Without exception, they regarded the committee as conspicuously unbalanced in makeup and as unlikely to accomplish the declared aim of clarifying the nuclear issues.

"It's been set up to justify proceeding with nuclear power," said Abrahamson, who added that ERDA, the study's sponsor, is still essentially the "AEC, despite what people say." Speth spoke similarly, "If I had to characterize it, what we are seeing is the industrial establishment of the country organizing for an attack on the nuclear critics," he said. Technical people associated with the "public interest community," which is comprised of organizations such as NRDC, UCS, and Nader's Public Interest Research Group, simply were not represented on the committee at all, Speth observed.

Furthermore, he said, except for John Holdren, none of the 66 signers of the petition to the National Council of Churches was named to the committee—and this despite the fact that, among the petitioners, there were 26 members the National Academy itself (14 of whom also were Nobel laureates). In Speth's view, the Academy's "lack of credibility" on the nuclear issue is demonstrated both by the makeup of the committee and by Handler's "about-face" early this year on the breeder reactor and the use of plutonium.

This last refers to an episode which Handler, though confessing to some embarrassment about it, says points up the wisdom of excluding from the study committee such publicly committed advocates as Nader and Abrahamson. September a year ago, Handler, in a lengthy formal speech "On the State of Man," addressed the hazards that would be posed by an all-out commitment to the breeder reactor as the world's primary source of energy. Evoking a "worst case" scenario in which

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ton of Columbia University, one of the founding fathers of the subject in the United States. The society also includes historians of science such as Derek Price of Yale and Arnold Thackray of the University of Pennsylvania. Merton is the society's president, and its first benefactor is Eugene Garfield, president of the Institute for Scientific Information, a profit-making organization on which sociologists of science depend for certain raw data, such as that to do with citation analysis.

The studies emerging from use of the citation analysis technique (*Science*, 2 May) afford one of the most obvious examples of how the new discipline promises, or threatens, to influence the conduct of its object of study.—N.W.

Knowledge 2000

The federal government's chief effort at hooking science up to the Bicentennial was announced in the Capitol the other day. It's called Project: Knowledge 2000, and will be a series of three 3-day symposia on the need for, generation of, and communication of knowledge. The $736,000 project was conceived of and largely funded by the National Science Foundation (NSF); the Xerox Corporation will feed, board, and provide an estimated $250,000 worth of sophisticated communications facilities for the crowd at its training center in Leesburg, Virginia.

Two senators lent their presence to the announcement—Edward Kennedy (D-Mass.), chairman of the authorization subcommittee for NSF, and Lowell Weicker, Republican from Xerox's home state of Connecticut. Weicker said he was not enthusiastic about most Bicentennial projects—"too much steel and concrete"—but he really likes this one because the results are to be disseminated around the country to educate and provoke discussion within the body politic.

Everyone has high hopes that the symposia, to be conducted by leaders and heavy thinkers from all major segments of society, will have a lasting impact via the videotapes and teaching materials that are to be distilled therefrom. Jacob Goldman, chief scientist at Xerox, said these were the greatest-sounding symposia he'd seen, and he'd seen a lot. A spokesman from the American Revolution Bicentennial Administration, which is kicking in $150,000, said the project was "one of the jewels in the crown of the Horizons program" (the Bicentennial is divided into Heritage, Festival, and Horizons).

There is no official word as yet on who the star panelists will be—each forum will have a core of 12—but active participation by foreigners is promised. The meetings are scheduled for January, April, and June.—C.H.

Psychiatrist is New Head of Institute of Medicine

David A. Hamburg, whose appointment as the third president of the Institute of Medicine (IOM) was announced earlier this fall, is characterized by Philip Handler, president of the National Academy of Sciences, as a "quite profound scholar" who has exhibited a strong and "growing concern with the manner in which medical care is brought to the American people."

Hamburg comes to the IOM from the Stanford University School of Medicine, where he was the Reed-Hodgson professor of human biology and professor of psychiatry, specializing in the biological aspects of emotional stress and aggressive behavior. He was for 11 years chairman of the psychiatry department at Stanford and led in developing it into a nationally recognized center for scientific inquiry into psychiatric problems.

Hamburg was the last to know he was IOM's first choice to replace Donald S. Fredrickson (who left last July to become director of the National Institutes of Health), for he spent most of last summer racing around Africa negotiating the release of four Stanford students who had been kidnapped from the Gombe Stream Research Centre in Tanzania. Hamburg has done research at the center, which until the kidnappings was partially supported by the Stanford Laboratory of Stress and Conflict.

The IOM, which was started in 1971, has had difficulty keeping its presidents. The first, John R. Hogness, left after 3½ years to return to the University of Washington; Fredrickson moved on after a year. Hamburg says he intends to stick out the full 5-year term. His wife, Beatrix Hamburg, also a psychiatry professor at Stanford, will be coming along too, to work on problems of early adolescence at the National Institute for Mental Health (NIMH).

Hamburg, 50, comes from Evansville, Indiana, and got his medical degree at Indiana University. He did his residency at Yale and at Michael Reese Hospital in Chicago. He has already worked in Washington, first at Walter Reed Army Medical Center and later as chief of the Adult Psychiatry Branch at NIMH.—C.H.

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."