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.