from expert scientific advice. In a recent newsletter of the Council for a Livable World, Harvard chemist William Doering and M.I.T. physicist Bernard T. Feld wrote, "There is evidence that the President has come to rely almost exclusively on a small group of officials within his own Administration for advice on national security and defense problems. . . . Consider the President's statement [on 30 January] that an anti-Chinese [ABM] defense would be 'virtually infallible.' This assertion suggests that the President has . . . neglected to draw on informed scientific opinion outside the government. No responsible scientist or engineer with experience in military technology would support the concept of an 'infallible' population defense." Technical opinions should be presented directly to the President by qualified scientists, not "translated by Kissinger's staff," another Cambridge scientist complained recently. The system "is terribly dangerous," he asserted, and "could affect all important matters where there's a technical component."

Another complaint frequently heard from arms control specialists in Congress and the academic community concerns the role of the Defense Department on arms control matters. The Pentagon is generally acknowledged to have more resources for study of technical arms control problems than the Arms Control and Disarmament Agency (ACDA) or DuBridge's office, including the President's Science Advisory Committee (PSAC). And liberals consider the Pentagon leadership—including Foster, who opposed the 1963 limited test ban treaty, Assistant Secretary for International Security Affairs G. Warren Nutter, a foreign policy aide to Barry Goldwater in the 1964 Presidential campaign, and Defense Secretary Laird himself—uniformly unsympathetic to ending the arms race. "The Pentagon crowd represent the most negative element for arms control we've ever had in office there," a leading member of the Cambridge, Massachusetts, arms control community recently said. Such men fear that the Pentagon, using its superior technical resources to support an anticontrol bias, has dominated the SALT review. This concern was more prevalent last fall than it is at present; in the interim, scientists with views opposed to Foster's have had a chance to present their arguments to National Security Council members and the SALT review staff. But their uneasiness about the impact of their views persists.

In a recent interview DuBridge told *Science* that while "many individual scientists may feel they are not consulted," nevertheless "every possible line is explored" in the SALT review. "There are no limits on what is discussed, and all questions are thoroughly examined. I am brought in where technical matters are involved to represent the views of PSAC and its strategic panel," which in the past year was headed by Stanford physicist Sidney Drell. "The NSC staff then prepares extensive papers in which the arguments pro and con are exposed" so that the President can weigh them.

ACDA officials also contest the charge that they are handicapped by lack of staff and resources in the SALT review. In their view consultants and industry contracts can adequately supply any missing technical expertise.

But officials in the office of Defense Research and Engineering dispute this. "Weapons systems change so rapidly that a man who stays out of the business a year or so gets behind," said one. "Most of these consultants, especially in the academic community, are just not in touch. My observation during the ABM debate last year was that none of the people on the outside knew anything about the system [in a detailed way]. If I wanted to know anything about radar I would go to a junior engineer at Bell Telephone Laboratories, not to a senior guy at Rand.

"The function of prestige consultants is to provide leverage or political power for something you want. The consultants feed off that. They understand the system very well."

The problem of verification involves both technical questions and the assessment of risks. In this respect it finds a close parallel in the 1960–1963 debate on underground nuclear test inspection. Although that debate had an important technical component, it was essentially political, for two reasons. First, no technical solution can fully solve the basic problem of trust. Clever men can always think of ways in which the other side might plausibly cheat: in 1963 the big question was whether underground testing might be disguised by "decoupling"—conducting underground tests in large caverns to muffle the seismic effects. Second, policy positions on risk-taking inevitably are influenced by domestic political pressures. There are strong vested interests in developing, producing, and managing the technology of strategic war. These interests create a large economic and political constituency which is, at bottom, unfavorable to arms control agreements that reduce the amount of money the government spends on arms. Much the same situation also appears to exist in the Soviet Union.

Commenting on the failure to negotiate an underground test ban in 1963, Jerome Wiesner, then President Kennedy's science adviser, wrote (in *Where Science and Politics Meet*), "I believe that military and political conservatism on both sides prevented us from achieving a comprehensive nuclear test ban and will seriously restrict the speed with which further desirable arms limitation agreements can be achieved."

The jury on a strategic arms freeze is still out.—ANDREW HAMILTON

RECENT DEATHS

Maitland Baldwin, 51; clinical director and chief, surgical neurology branch, National Institute of Neurological Diseases and Stroke; 9 February.

Alexander F. Balmain, 71; former assistant professor of history and sociology, Fordham University; 7 February.

Alvin V. Beatty, 61; professor of biology, Emory University; 11 February.

John Davidson, 91; professor emeritus of botany, University of British Columbia; 10 February.

Gordon M. Fair, 75; former dean of engineering, Harvard University; 11 February.

Donald H. Kaump, 62; director of toxicology and pathology, Parke, Davis & Company's research laboratories; 13 February.

Walter Koppelman, 40; professor of mathematics, University of Pennsylvania; 26 February.

Daniel Ludwig, 67; professor of physiology, Fordham University; 6 February.

Ernest L. Stover, 76; former chairman, botany department, Eastern Illinois University; 30 November 1969.

Roger G. Wilkinson, 57; professor of physics, Indiana University; 25 December 1969.

William A. Wissler, 77; metallurgist and consultant with Union Carbide; 14 January.