Defoliation: AAAS Study Delayed by Resignations from Committee

A start on the AAAS's study of chemical and biological agents that affect the environment is temporarily delayed following the resignation of two of the four members of the group appointed to conduct the inquiry. The study group, known as the Committee on Environmental Alteration, was established at last December's annual meeting and was charged with studying all environment-modifying chemical and biological agents. But the inspiration for its creation was concern about the military defoliation program in Vietnam, and its initial efforts were to be directed at that subject.

Those who resigned are committee chairman David R. Goddard, who is provost of the University of Pennsylvania, and Athelstan F. Spilhaus, president of the Franklin Institute. Both cited extensive professional commitments as the reason for their resignation, though Goddard, in a telephone interview with *Science*, added, "no sooner was my appointment announced than I started getting pressures from all directions. The emotional overtones were terrific." Remaining on the committee are Barry Commoner, of Washington University, St. Louis, and Rene Dubos, of Rockefeller University. The appointment of additional members is to be taken up at the quarterly AAAS Board meeting in March.

The immediate effect of the resignations is to delay the beginning of a AAAS review of a herbicide-literature review that was conducted by the Midwest Research Institute (MRI) under a Defense Department contract. Meanwhile, in accord with the train of reviews that was scheduled, a group appointed by the National Academy of Sciences has reviewed the MRI study and pronounced it, with some minor qualifications, "a creditable job." The general conclusion of the MRI study was that, on the basis of the available literature, which it acknowledged to be "scanty" in some areas, there are no substantial grounds for concern over the possibility of long-term adverse effects from the U.S. defoliation program in Vietnam (see *Science*, 9 February, for a report on a Defense Department summary of the 369-page MRI study).

Since, as things are now proceeding, it is likely that Vietnam will be depopulated before it is defoliated, the urgency of these reviews is perhaps questionable, but the succession of events flowing from the AAAS interest in defoliation is of some interest in the affairs of the scientific community, and therefore bears some examination.

The genesis of the AAAS role in this matter goes back to the December 1966 annual meeting, when a resolution was offered calling for the AAAS to investigate the military use of chemical and biological agents in Vietnam. Substantial opposition was voiced on various grounds, but, in general, it was based on the feeling that, by pinpointing military defoliation, the resolution's authors were attempting to use the AAAS as an instrument of opposition to the Johnson administration's Vietnam policies. Following a debate, the Council adopted a resolution that was broadened to cover "the uses of biological and chemical agents to modify the environment, whether for peaceful or military purposes. . . ." On the basis of this formulation, the AAAS Board appointed a committee headed by Dubos to advise on implementation of the resolution. The Dubos committee recommended the establishment of a special AAAS body to maintain a continuing overview of all problems of environmental contamination, and, in accord with this recommendation, the Board, at the December 1967 meeting, established the Committee on Environmental Alteration.

Meanwhile, 3 months prior to this action, AAAS president Don K. Price, who had helped lead the effort to broaden the original resolution, stated the AAAS concern about defoliation in a letter to Defense Secretary McNamara. Price wrote that the AAAS "Directors . . . agreed that it would be in the public interest if more were known about the effects on the natural environment (and thus indirectly on the population) of the agents to destroy crops and to defoliate jungles in the course of military operations in Vietnam." He added, "The Directors do not consider the AAAS to be equipped to conduct such a study, and do not believe that any effective study of the effects of such agents could be carried out in an active theater of war without military or other official permission and sponsorship.

"The Board of Directors," he continued, "therefore respectfully recommends that the Department of Defense authorize and support a study by an independent scientific institution or committee of both the short- and long-range effects of the military use of chemical agents which modify the environment."

Two weeks later, John S. Foster,

Detrick to Mark 25th Anniversary

The U.S. Army Biological Research Center at Fort Detrick, Maryland, will observe its 25th anniversary in April with a series of events including two scientific symposiums organized by the American Institute of Biological Sciences (AIBS).

The first, on 4–5 April, will be on Entry and Control of Foreign Nucleic Acid, a subject which has relevance in the field of bacteriological weapons. The second symposium, which will be held on 8–9 April, is titled Leaf Abscission, which is of relevance to defoliation. AIBS executive director John Olive said AIBS is administering a $14,000 fund which the Army has made available for the costs of the conference. Of this amount, AIBS receives 25 percent for overhead costs. Participants in the conference will be from universities and research institutes throughout the country. In addition, several hundred other scientists have been invited to attend. Olive said that AIBS last handled a conference for Fort Detrick in 1959. The decision to administer the forthcoming symposiums, he said, "was made as part of our job of advancing the biological sciences."—D.S.G.

A POINT OF VIEW

President Johnson, an excerpt from remarks made during National Medal of Science award ceremony, 13 February, at the White House.

For the coming year, we must make a government-wide effort to reduce expenditures. So we have not been able to allot as much as we would like for fellowships for our basic research. I begrudge every economy and every necessity of today that limits our support of science—even momentarily. Although our spending for science is vast in comparison with earlier days, I want it to be larger still. For science has a big job to do.

In eight years, America will enter its third century. Science and technology enable us to look forward to an age that will further enlighten our lives, ease our labors, and exalt our civilization. But there are

President Johnson presenting the National Medal of Science to George B. Kistiakowsky, Harvard chemist and longtime adviser to the federal government. In the background is Donald F. Hornig, presidential special assistant for science and technology. Kistiakowsky was among 12 scientists and engineers who received the medal in a White House ceremony.

other, grimmer forecasts. Wise men worry about a world that is unable to feed itself—about a society that is smothered in smog—about the coming of a silent spring. These flaws in our environment are not the fault of science alone. Their more immediate causes lie in the growth of technology, in industry, and, of course, urbanization.

But an aggrieved public does not draw the fine line between "good" science and "bad" technology. The passenger in the jet credits science with the miracle of flight. But when he is on the ground, he is just as quick to blame science—for the traffic jam at the airport, or for the noise of jets overhead. You and I know that Frankenstein was the doctor, not the monster. But it would be well to remember that the people of the village, angered by the monster, marched against the doctor.

In a democratic society, the public attitude toward science must be a real concern of the scientific community. If that attitude is to be favorable, science must be prepared to play its part in correcting the flaws in our environment.

director of Defense Research and Engineering, replied to Price that, though the Defense Department was convinced that defoliants would not have adverse long-term effects, "we agree that a more complete understanding of the effects of herbicides and defoliants should be developed. In fact," he pointed out, "we recently commissioned a leading non-profit research institute [MRI] to thoroughly review and assess all current data in this area." Foster added that he had also asked Frederick Seitz, president of the National Academy of Sciences, "to assemble a group within the National Academy of Sciences–National Research Council to review the results of the study and to make appropriate recommendations concerning it."

Seitz, who is chairman of the Defense Department's highest science advisory body, the Defense Science Board, assigned the task of selecting the Academy review group to A. Geoffrey Norman, vice president for research at the Univerity of Michigan and chairman of the NAS–NRC biology and agriculture division. From 1946 to 1952, Norman was a biochemist and division chief at the Army Chemical Corps Biological Laboratories at Fort Detrick, Maryland, the principal Army center for research on chemical and biological weapons. Selected to conduct the NAS–NRC study were A. S. Craft (chairman), University of California, Davis; Keith C. Barrons, Dow Chemical Company; Richard Behrens, University of Minnesota; William S. Benninghoff, University of Michigan; William R. Furtick, Oregon State University; and Warren C. Shaw, U.S. Department of Agriculture.

The report of this group was released earlier this month. In a covering letter accompanying the report, Seitz wrote to Foster, "I believe that the memorandum complies in every respect with our joint understanding that the review would constitute an assessment of the thoroughness and accuracy with which the scientific literature relating to herbicides and their ecological effects had been examined and evaluated by the Institute. The reviewers were not asked to consider the specific issue of how well or how fully the [MRI] report responds to the questions expressed in the American Association for the Advancement of Science resolution of December, 1966. Also, they were not asked to endorse, approve, or reject the report."

The NAS–NRC report, which is slightly over two typewritten pages, is addressed from Norman to Seitz. Following an introduction that notes that the members of the review body "did not function as a committee in the usual sense because of the time constraints that were imposed," the Norman letter states,

"The consensus of the reviewers can be expressed as follows:

"1) Midwest Research Institute has done a creditable job of collecting, correctly abstracting and citing much of the relevant published information, although, under the circumstances, the report could not be expected to cover in a truly comprehensive way so vast a literature.

"2) Of necessity, the proponderance of the material deals with herbicides as they are used in vegetation management in a diversity of situations and environments. On this general topic, abundant data are available. However the scientific literature provides markedly less factual information on the ecological consequences of herbicide use and particularly of repeated or heavy herbicide application. The Midwest Research Institute report correctly reflects this disparity."

Thus, the inquiry inspired by the AAAS resolution of December 1966 is proceeding with all deliberate—speed?

—D. S. GREENBERG

The McNamara Legacy: A Revealing Case History—Death of the B-70

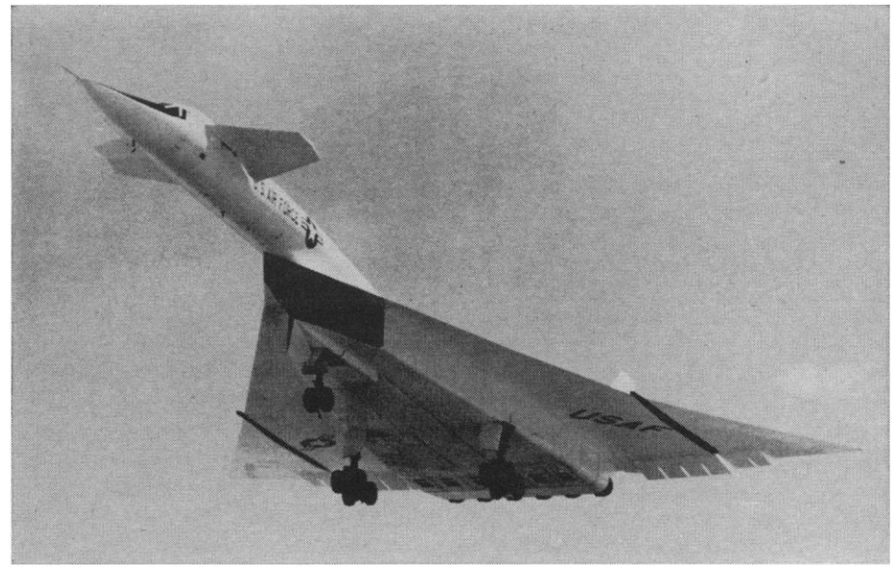
Most assessments of Secretary of Defense Robert S. McNamara's 7-year regime as master of the Pentagon will acknowledge that McNamara, who leaves office on 29 February, has insisted on great new rigor in the analysis of strategic requirements and weapons development. Moreover, he usually has stood firm on the results of such analysis even in the face of political pressures to do otherwise. His performance in this regard can be illustrated by a brief review of the costly and once much-debated B-70 bomber project, which, by coincidence, enters its final phase just as McNamara leaves office.

The B-70 program, conceived in the early 1950's, had run up expenditures and obligations of about $800 million before McNamara took office in January 1961. While roughly another $700 million was spent on it after he came to the Pentagon, McNamara reoriented the project from the goal of producing a $10-billion fleet of supersonic bombers to that of building a few experimental aircraft, dubbed the XB-70. If, instead of the reorientation, McNamara had abruptly canceled the entire B-70 program (provided this had been politically possible), the close-out costs would still have pushed the total investment in the B-70 to well over $1 billion. Moreover, such an action would have meant there would not be even a research vehicle to show for the large outlay of money and technical resources.

Two XB-70's were finally built, by North American Aviation, Inc., the contractor for the airframe, and the General Electric Company, the contractor for the engines. As the result of this production effort and the earlier R & D activities associated with the bomber project, some 1000 patent applications have been filed, mostly for small incremental improvements in various aircraft and electronic technologies.

Though designed to fly at the 2000-mile-per-hour speed and 70,000-foot altitude contemplated for the bomber, the XB-70 was not outfitted with the navigation system, the reconnaissance radar, and the other elaborate electronics equipment required for attack missions. This aircraft's most notable achievement has been to show that a plane of its size is capable of sustained Mach-3 flight.

If scarcely worth the huge expenditures the B-70 program has entailed, the XB-70 for the past 3½ years has been producing useful information on the performance and flight characteristics of large airframes at supersonic speeds and on the sonic booms they produce. This information has some relevance for the commercial super-



The XB-70, believed to be the world's largest experimental aircraft, is 189 feet long, has a 105-foot wingspan, and, fully loaded, weighs more than 500,000 pounds. This Mach-3 plane, based at the Flight Test Center at Edwards Air Force Base, California, since its first flight in 1964, will be retired at the end of the year. Although its fate is undecided, the aircraft may remain at Edwards as a symbol of the Test Flight Center's mission, or be flown to Wright-Patterson Air Force Base, Dayton, Ohio, to become an exhibit at the Air Force Museum.