Herbicides in Vietnam: AAAS Board Seeks Field Study

Qualified scientists, both inside and outside our government, and in the governments of other nations, have judged that seriously adverse ecological consequences will not occur [from use of herbicides and defoliants in Vietnam]. *Unless we had confidence in these judgments, we would not continue to employ these materials.*—JOHN S. FOSTER, JR., Director of Defense Research and Engineering for the Department of Defense, in a letter to the AAAS Board of Directors on 29 September 1967.

Dallas. Like other professional organizations, the AAAS often moves slowly. But, on the question of conducting a study on the effect of the wartime use of herbicides in Vietnam, the AAAS Board of Directors has decided to continue its movement of the past 2 years. In effect, the board is saying that Foster and other Defense Department officials do not have scientific assurance that herbicides cause no seriously adverse ecological consequences in Vietnam.

On 30 December, the board announced to the AAAS Council that the AAAS would participate in a study of the use of herbicides in Vietnam.

In a heated meeting in an overheated room on Monday, the board's inclusion of Vietnam in its original resolution was challenged by council members. The attack was opened by James B. Ross, representing the Nature Conservancy, who said that the board should concern itself with other environmental hazards and should not single out Vietnam. A resolution expressing the agreement of the council with the sense of the board resolution to conduct a study of the use of herbicides in Vietnam, but advising changes in the language of the board's original resolution so as to delete mention of Vietnam, was passed overwhelmingly. In passing such a resolution, the council was taking a position similar to that adopted at the 1966 AAAS meeting in Washington, D.C.

In accordance with this advice from the council, the board revised its resolution to read as follows.

"It is the sense of the Board that the Association, looking not only to the effects of the wartime use of herbicides, but also to the opportunities for the peacetime reconstruction of the agriculture and economy of affected areas:

"1) Determines that it shall be a purpose of the Association to bring into being the most effective possible field study of the potential long-term and short-term ecological risks and benefits to the areas affected;

"2) Specifically directs the AAAS staff to convene, as soon as possible, an ad hoc group involving representation of interested national and international scientific organizations to prepare specific plans for conduct of such a field study and with the expectation that the AAAS would participate in such a study within the reasonable limits of its resources."

The board's adoption of a statement marked another step in a journey which began in 1966 when the AAAS Council passed a resolution expressing its concern about "the long-range consequences of uses of biological and chemical agents which modify the environment" and establishing a committee "to study such use including the effects of chemical and biological warfare agents." After conversations between the AAAS and the Defense Department, the Department engaged the Midwest Research Institute (MRI) to review the literature on herbicides. (These events were described in greater detail in the 23 Feb. 1968 issue of *Science*.)

Although board members have praised the MRI report as a comprehensive summary of the existing literature, they point out that it is not an on-the-spot field study. In the 19 July issue of *Science* there appeared the following statement by the board: "we do not share the confidence expressed by the Department of Defense . . . that seriously adverse consequence will not occur as a result of the use of herbicidal chemicals in Vietnam, insofar as arsenical compounds are concerned"; the board called for the suspension of the use of arsenical herbicides in Vietnam and urged that a field study be undertaken under the auspices and direction of the United Nations.

It has not been possible to obtain the assistance of the United Nations in conducting such a study. The pressure for AAAS action in this matter, however, has continued. At the Dallas meeting of the AAAS, E. W. Pfeiffer of the University of Montana introduced, before the Committee on Council Affairs, a resolution calling for a AAAS study and urging council backing of the board's July statement. Also on Friday, papers on the possible ecological consequences of the use of herbicides in Vietnam were presented at a meeting jointly sponsored by the AAAS Committee on Science in the Promotion of Human Welfare and the Scientists' Institute for Public Information. Those scientists, such as Pfeiffer, who had wanted more action from the AAAS on herbicides seemed to be pleased by the board action.

The fact that the board has decided to participate directly in a study on the use of herbicides in Vietnam seems attributable to the desire of the board members to see the results of a comprehensive on-the-spot examination and a growing impatience with Defense Department explanations. It also seems partly due to the dogged persistence of AAAS members such as Pfeiffer and of some members of the board. For instance, one board member, Barry Commoner, a Washington University botanist, has spent a good deal of time studying herbicides and has been adamant in trying to focus attention on the ecological effects of the uses of herbicides as a scientific rather than a political matter. Whatever their individual views on Vietnam or on the wisdom of using herbicides, most scientists find it difficult to oppose a purely scientific study.

The attention that the AAAS statements on the use of herbicides has engendered seemed not to be matched, among AAAS members at the Dallas meeting, by a great desire to participate in a group, formed outside the structure of the AAAS, that seeks to curtail chemical warfare in Vietnam. Fewer than 40 people attended a meeting, on 28 December, organized to enlist such participation. (Part of the low attendance may have been due to the generally sparse turnout at Dallas. There were only about 3500 registrations at this meeting; at some AAAS meetings, there have been double that number. The

AAAS OFFICERS

Election of Athelstan Spilhaus, president of Franklin Institute, as president-elect of the AAAS was announced at the association's meeting in Dallas last week. Elected to 4-year terms on the board of directors are Richard H. Bolt, chairman of the board of Bolt, Beranek and Newman, Inc., and Mina S. Rees, provost, Graduate Division, City University of New York. Spilhaus is scheduled to succeed to the presidency at the AAAS meeting next year when H. Bentley Glass, who takes office as president this week, completes his 1-year term.

lower number of registrations was attributed to the location of the meeting, the fact that less travel money is available this year, the Asian flu, and the bad weather in other parts of the country.)

J. B. Neilands of the University of California, Berkeley, who is chairman of the newly created "Scientists' Committee on Chemical Warfare in Vietnam," called the formation of this committee an evidence of "the quickening conscience of the American scientific community." Arthur Galston of Yale said that scientists might ask "what chance do we have that's better than a snowball in Hell" of helping stop chemical warfare in Vietnam. He argued, however, that a small group in the Federation of American Scientists had played a significant role in bringing atomic energy under civilian control after World War II, and said that scientists could play an equally important part in controlling chemical and biological weapons.

On the other hand, anthropologist Margaret Mead warned the group that they had better make it clear that the defoliation in Vietnam was "just peanuts" as compared to other environmental hazards caused by technological intrusion, such as the building of the Aswan Dam in Africa. "The issue here is warfare, not defoliation," Dr. Mead argued; scientists, she said, should be working on methods to control violence throughout the world.

Earlier that day, Dr. Mead and other scientists had participated in a scholarly discussion on the use of herbicides in Vietnam. Boysie E. Day, of the University of California, Riverside, explained the uses of herbicides in agriculture in the United States. During the discussion, Day was challenged by Galston and Commoner, who quoted from the MRI report. At one point, Day replied that the MRI report was prepared in 60 days by people who do not understand herbicides. Commoner then noted that Day was one of the consultants for the MRI report.

One of the most widely discussed papers on herbicides was that given by Fred Tschirley, of the U.S. Agricultural Research Service. At the request of the State Department, Tschirley made a 1-month study of defoliation in South Vietnam, from mid-March to mid-April 1968. He noted that his study was short, and made during the dry season, when natural defoliation and many fires make it more difficult to determine the extent of defoliation by herbicides. He explained that he had to make most of his observations by aircraft and was able to get out into defoliated forest only around three Special Forces camps. Although he had expected to work in a team of scientists, his study had, he said, turned out to be a one-man operation.

"The defoliation program has caused ecologic changes," Tschirley reported; "I do not feel that the changes are irreversible, but complete recovery may take a long time. The mangrove type is killed with a single treatment. Regeneration of the mangrove forest to its original condition is estimated to require about 20 years.

"A single treatment on semideciduous forest would cause an inconsequential ecologic change. Repeated treatments will result in invasion of many sites by bamboo. Presence of dense bamboo will then retard regeneration of the forest."

Tschirley reported that about one-third of the mangrove forests and about one-sixth of the semideciduous forests in South Vietnam had been treated with herbicides. He did not examine closely areas in which crops have been treated with herbicides in the highlands of Vietnam.

In summary, Tschirley made three recommendations. (i) The desirability of ecologic research in Vietnam after the war cannot be overemphasized. (ii) Continuing assessment of the defoliation program as it affects forestry and watershed values should be made. (iii) From an ecologic point of view, the concept of defoliating in strips or in a checkerboard pattern has great merit and should be pursued further.

There has been no firm decision yet concerning the form of the AAAS ad hoc committee, or the form of the study group on herbicides in Vietnam that it is to appoint. Don K. Price of Harvard, past president of the AAAS, speculated that the ad hoc committee would be comprised of about 12 people representing about eight organizations. Members of the board who spoke on the subject seemed to be skeptical about the possibility of making a full-fledged study before hostilities cease in South Vietnam. Tschirley, in his three trips into the defoliated forest, had to carry a carbine and a revolver for protection. One Special Forces camp underwent a Viet Cong mortar attack during his visit. Obviously, it is much easier to authorize a study of the use of herbicides in Vietnam than it will be to carry it out in the near future.

—BRYCE NELSON

RECENT DEATHS

Mariano R. Castex, 82; former rector of the University of Buenos Aires and president of the 8th International Congress of Internal Medicine; 30 July.

Christian H. Cochran, 51; a missile systems engineer with the Johns Hopkins University Applied Physics Laboratory; 15 Dec.

Giotto Dainelli, 90; Italian geographer, geologist, and explorer who was professor of geography and geology at the universities of Pisa, Naples, and Florence; 16 December.

Carl Epling, 74; emeritus professor of botany at the University of Los Angeles; 17 November.

Walter Friedrich, 85; former president of the Medical-Biological Research Centre in Berlin-Buch, former chancellor of Humboldt University, and former president of the German Academy of Science in Berlin; 16 October.

Oliver J. Irish, 76; former chief biochemist for the Veterans Administration; 14 December.

George M. Murphy, 65; professor emeritus of chemistry at New York University; 7 December.

William M. Wallace, 56; director of the department of pediatrics at Case Western Reserve University School of Medicine; 9 November.

Henry Wermer, 55; chief of the adolescent unit at Beth Israel Hospital; 5 November.