tured was a day during which students participated in a mock trial before Judge Dale Shannon in a local Colorado court. The trial involved a lawsuit brought by a hypothetical "Fish Forever Society" against an equally hypothetical "Corbett Power Company" for polluting the environment. The students took the parts of lawyers for and officials of the two contestants. "It sure gave me an idea of what we are up against," said one student.

In terms of the education it provided, the school appeared to be a success. Most of the graduates of the course said that they had acquired a wide range of information particularly in areas in which they were not specialists.

But information dissemination by itself accomplishes little. "What you must do now," said Donald C. Burnham, chairman of the Board of Westinghouse, in his commencement address, "is to go home and start something." He asked the students to begin an environmental program in their companies, even if the task seems overwhelming and the chance of success small.

The difficulty of carrying out Burnham's proposal is compounded by the fact that the students in the Westinghouse school were from the middle level of management. Most of the men directed their companies' environmental engineering divisions. None was the head of a company or agency. Top-level industrial policy makers in general have neither the time nor the inclination to spend 4 weeks in school. So the real success of the school in terms of meaningful change depends on how well the students are able to bring home to their bosses the problems and possibilities of environmental control.

In terms of promoting Westinghouse products, the school achieved its aim without appearing to be an unalloyed sell (the lecturers included nine Westinghouse executives who did not hesitate to point out to the utility executives the merits of the new Westinghouse nuclear power plant).

Burnham, in his commencement speech, for example, said that the development of the nuclear plant "has come at a critical time in our history and is, perhaps, the best single weapon in our fight against environmental pollution."

Whatever publicity value the school might have had, it also did provide a meaningful step toward improving the environment. McCloskey, one of industry's sharpest critics, said that he was favorably impressed with the school and that it showed a concern for the environment which most companies have lacked in the past.

—THOMAS P. SOUTHWICK

CBW: Interagency Conflicts Stall Administration Action

On 25 November 1969, President Nixon affirmed a U.S. policy of "no first use" for lethal and incapacitating chemical weapons. He also renounced the U.S. use of any biological weapons, even in retaliation. Furthermore, he pledged to submit to the Senate for ratification the long-neglected Geneva Protocol of 1925, which binds nations to refrain from first use of chemical and biological weapons. At the time, Nixon's announcement was hailed as a major policy decision that would generate positive initiatives toward world peace.

However, it seems that U.S. initiatives in the chemical and biological warfare (CBW) area up to now have not been as sweeping as they first seemed to be. The White House appears to be holding back on declassifying biological warfare research completely. In addition, the Geneva Protocol remains stalled in the Executive branch. Nixon's inaction of late on the CBW issue is causing critics to speak out. Last week, for example, Charles W. Yost, U.S. Ambassador to the United Nations, warned the State Department that the United States might face a "quite embarrassing" situation unless the protocol is sent to the Senate soon for ratification.

Nixon had stated that existing biological warfare stockpiles would be destroyed and that all offensive biological warfare research would cease. He had indicated that the only biological warfare research to continue would be defensive research.

On 14 February, a high official at the White House held a background briefing for newsmen on CBW policy and stated unequivocally that all future biological warfare defensive research would be done on an unclassified basis. "There will be no need for secret research in this field under this program," he said. "What we are now doing is examining the biological facilities to see to what extent they could be used for unclassified research and for the defense research that is authorized under the President's policy," he added. However, it seems that the Pentagon is successfully bypassing the White House's commitment to stop classified research on biological warfare. When the White House official mentioned "biological facilities," he was presumably referring to Fort Detrick (*Science*, 13 January 1967), the chief research facility for biological warfare. Fort Detrick employs 1595 civilians and has 650 military personnel attached to it. Colonel Thomas D. Buyrne, an Army public relations spokesman, said that, of the 1085 Fort Detrick civilians directly involved in the biological warfare research effort, the Pentagon plans to move 240 civilians to Dugway Proving Grounds in Utah (where 6000 sheep were killed accidentally by lethal chemical gas) and to Edgewood Arsenal, the chief research facility for chemical warfare research. Classified research is carried out at both sites. The 240 civilians, in addition to 190 military personnel who would be moved under the plan, would do defensive biological warfare research on a classified basis.

The Public Health Service (PHS) is reportedly interested in taking over Fort Detrick. In addition, the PHS has proposed taking control of the portion of the Pine Bluff Arsenal in Arkansas which develops and stockpiles biological warfare munitions.

According to the White House, defensive biological warfare research would be completely unclassified. Ac-

cording to the Pentagon, it would continue to be conducted at classified facilities and would still remain secret. Colonel Buyrne told *Science*, "There's an implication in everything that we said that classified research may have to be carried on."

Dr. K. C. Emerson, assistant for research in the office of the Secretary of the Army, defended the Pentagon's plan: "As long as the Army was at Fort Detrick, people would say we were doing offensive work because the name Detrick is associated with it." Emerson conceded that, if biological warfare operations are moved either to Dugway or to Edgewood Arsenal, the public with some justification might continue to claim that offensive biological warfare research is being conducted. Emerson said that most biological warfare research is currently unclassified and that the only classified material deals with "U.S. vulnerability" to specific germs. However, the Associated Press reports in a 13 July dispatch that only one-fifth of the Fort Detrick research is actually unclassified.

Meselson is Apprehensive

Matthew S. Meselson, Harvard professor of biology who recently left for Vietnam on an AAAS grant to undertake a study of the effects of herbicides, said that he and many of his colleagues are apprehensive of any continued classified biological warfare research. He said that secret research might permit the biological warfare establishment to linger quietly until public opinion lets it flourish once again.

James D. Watson, professor of biology at Harvard and director of the Cold Spring Harbor laboratories, told *Science* his impression of what necessary biological warfare defensive research would entail: "I can't really imagine anything they would have to do that would have to be classified. I think that the whole apparatus should be dismantled except for people continuously studying plague on an open basis."

Last 25 November, Nixon said he would submit the Geneva Protocol of 1925 to the Senate for ratification. This pledge remains to be fulfilled. The protocol binds nations to refrain from first use of "asphyxiating, poisonous or other gases." It does not preclude stockpiling or domestic use of chemical or biological warfare agents. Forty-five years ago, the United States drafted the protocol but the Senate, at a time when isolationism prevailed, buried the protocol in committee. It was sent back to the Executive branch in 1948. During the past 45 years, however, various Presidents have stated that the United States would not engage in first use of lethal chemical or biological weapons.

The use of tear gas and defoliants in Vietnam raises the question of whether the United States is in violation of the protocol. On this point, the protocol is ambiguous. Nixon's continued authorization of tear gas and defoliants in Vietnam is undoubtedly causing him a dilemma with regard to the protocol. On 16 December 1969, the United Nations voted on a resolution to interpret the protocol as encompassing tear gas and herbicides. This resolution passed with 80 in favor, 3 opposed, and 36 abstaining. Australia, Portugal, and the United States voted against the interpretation.

In a background briefing for newsmen last 25 November, a White House official clarified the White House position on tear gas and defoliants—that they are not encompassed within the scope of the protocol. This official said that the Senate would be informed of the White House interpretation, but he did not go into details. Again, on 14 February, this same official said simply, "We will indicate that we do not believe that the Geneva Protocol covers incapacitating agents that are also used in Vietnam."

Before submitting the protocol to the Senate, Nixon took the customary action on treaties when he asked the related agencies in the Executive branch for interpretations of the protocol. These agencies include the State Department, Defense Department, Arms Control and Disarmament Agency, Office of Science and Technology, and National Security Council. He also asked the State Department to draft a letter of transmittal for him to give to the president of the Senate.

Nixon did not envision the delay that would be caused by sharp interagency struggles over the issue of tear gas and defoliants. The main lines of battle were drawn between the Defense Department, which wants a formal reservation attached to the protocol, and the State Department, which wants to take a softer approach and buy time while the United States is still engaged in Vietnam. Irwin Gubman, a member of the General Counsel's office of the Arms Control and Disarmament Agency, told *Science*, "Originally, the White House wanted all interagency work finished by December. The agencies were unable to come to terms in December but laid out their differing positions by early February."

The Pentagon feels that using tear gas and defoliants is much more humane than using bullets and bombs. The argument is also made that there is no reason to refrain from using agents frequently employed in domestic riot control situations.

Those opposing the use of tear gas point out that tear gas is used not to save lives but in conjunction with conventional weapons to flush the enemy out of hiding and cause additional deaths. Critics say that civilians are least likely to have gas masks and therefore are most susceptible to tear gas. Harvard professor of economics Thomas C. Schelling is noted for his argument that the use of tear gas has the danger of eroding the barriers to lethal gas warfare. In World War I, the use of tear gas preceded the implementation of deadly chlorine gas.

One Way Out . . .

The House Subcommittee on National Security Policy and Scientific Developments studied the CBW issue and suggested a way for the Nixon Administration to continue using tear gas and defoliants, but nevertheless to avoid a political showdown. In its report released 16 May 1970, the subcommittee stated "The continued, large-scale use of chemical agents in Vietnam by the United States creates troublesome political problems. Those problems are virtually certain to be central to Senate consideration of the protocol, if it is submitted as expected with an interpretation that the treaty's prohibitions do not cover the use in war of tear gas or chemical herbicides." Accordingly, the subcommittee recommended that the tear gas and defoliant questions "should be left open." It suggested that, after Senate ratification, the United States "should seek agreement with the other parties on a uniform interpretation of the scope of the protocol, either through a special international conference among the parties or through established international juridical procedures," such as the World Court.

Congressional aides from both parties suggest that Nixon is leery of submitting the protocol to the Senate until late this session, because of the Novem-

ber elections. They predict that, if the liberal Senate Foreign Relations Committee holds hearings before November, the committee will dramatically exploit the U.S. use of tear gas and antiplant chemicals. In addition, they cite the historically low priority which has been accorded this document.

Last month, on the 45th anniversary of the protocol's signing, Senator Edward M. Kennedy (D–Mass.) and Representatives Donald M. Fraser (D–Minn.) and Clement J. Zablocki (D–Wis.) issued statements in the *Congressional Record* charging Nixon with stalling on this crucial issue. A Senate amendment put forth last week by Gaylord Nelson (D–Wis.) and Charles Goodell (R–N.Y.) would force the Defense Department to stop using herbicides and to destroy its herbicide stockpiles.

Significant groups of persons outside the government feel that the Senate should ratify the protocol with the express understanding that tear gas and antiplant chemicals are encompassed within its scope. In March, a group of Harvard students launched an unsuccessful effort to mobilize a nationwide movement against the use of tear gas and defoliants. The students wanted to send the Senate a national petition urging that tear gas and antiplant chemicals be explicitly included within the protocol's scope. In May, the Federation of American Scientists, which claims to represent 2000 scientists and engineers concerned with arms control and public policy, adopted a position similar to that taken by the Harvard group.

Perhaps the most dramatic display of opposition to CBW was staged 1 to 9 July. Members of the Campaign against CBW, a Quaker-funded group, completed a 9-day march from the White House to Edgewood Arsenal and Fort Detrick. At Edgewood Arsenal, where most of the chemical warfare research and development is carried out, they tried to plant pine trees (as a symbol of life) within the base's boundaries.

Critics, both inside and outside government circles, continue to be disenchanted with CBW policy. The discontent nourishes itself on Administration delays. If Nixon does not declassify defensive biological warfare research, and if he insists on a reservation to the protocol instead of leaving the tear gas issue open, he may lose much of the positive response that he received from his original CBW announcement.

—SAMUEL Z. GOLDHABER

APPOINTMENTS

Milton U. Clauser, director, Lincoln Laboratory, M.I.T., to dean, Naval Postgradaute School, California. . . . **George H. Herbig**, professor of astronomy, University of California, Santa Cruz, to acting director of Lick Observatory. . . . **John M. Ward**, dean, School of Science, Oregon State University, to director, Desert Research Institute, University of Nevada. . . . **Dean G. Epley**, former chairman, sociology department, Bradley University, to chairman, sociology department, Monmouth College. . . . **John L. Garrett, Jr.**, professor of education, Louisiana State University, to dean, College of Education at the university. . . . **Coleman J. Major**, chairman, chemical engineering department, University of Akron, to dean, College of Engineering at the university. . . . **Jack N. Blechner**, member of the faculty of obstetrics and gynecology, University of Florida, to chairman, obstetrics-gynecology department, University of Connecticut. . . . **Victor H. Hutchison**, director, Institute of Environmental Biology, University of Rhode Island, to chairman, zoology department, University of Oklahoma. . . . **Derek P. Hendry**, associate professor of psychology and bioengineering, University of Illinois, Chicago-Circle, to chairman, psychology department, Marquette University. . . . **Peter T. Flawn**, director, Bureau of Economic Geology, University of Texas, Austin, to director, division of natural resources and environment at the university. . . . **Carl G. Baker**, acting director, National Cancer Institute, to director of the institute. . . . **Judson S. Denson**, acting chairman, anesthesiology department, University of Southern California School of Medicine, appointed chairman. . . . **George D. Penick**, professor of pathology, University of North Carolina, to chairman, pathology department, University of Iowa College of Medicine. . . . **Kenneth R. Cook**, member of the engineering faculty, Colorado State University, to chairman, electrical engineering department, University of Arkansas. . . . **Arthur M. Breipohl**, professor, electrical engineering department, Oklahoma State University, to chairman, electrical engineering department, University of Kansas. . . . **Bernard Czernobilsky**, associate professor of pathology, Hospital of the University of Pennsylvania, to chief, pathology department, Kaplan Hospital, Rehovot, Israel.

RECENT DEATHS

Isadore Amdur, 60; professor of chemistry, Massachusetts Institute of Technology; 3 June.

Raymond E. Davis, 85; retired director, Materials Testing Laboratory, University of California, Berkeley; 14 June.

E. Thayer Gaston, 68; professor of music education and director of music therapy, University of Kansas; 3 June.

Vincent V. Herr, 69; former chairman of psychology, Loyola University, Ill.; 29 May.

Homer C. Lawson, 74; former associate dean, School of Medicine, University of Southern California; 21 May.

Joseph K. Long, 75; former dean, East Carolina University Graduate School; 30 May.

Robert M. MacIver, 88; former president and chancellor, New School for Social Research; 15 June.

Daniel A. Mulvihill, 67; former associate clinical professor, New York University School of Medicine; 11 July.

Abraham Oppenheim, 62; assistant professor of surgery, Albert Einstein School of Medicine, Yeshiva University; 16 June.

Benson H. Paul, 80; retired division chief, U.S. Forest Products Laboratory, Madison, Wis.; 23 June.

Loyal F. Payne, 80; emeritus professor of poultry science, Kansas State University, Manhattan; 12 June.

Felix J. Rauzzino, 41; senior group leader in pharmacology, U.S.V. Pharmaceutical Corporation; 7 July.

Siegfried H. Reiger, 50; vice president-technical, Communications Satellite Corporation; 14 July.

David A. Rosenberg, 52; assistant professor of pediatrics, Albert Einstein College of Medicine, Yeshiva University; 14 July.

Harold R. Wanless, 71; professor emeritus of geology, University of Illinois, Urbana-Champaign; 3 June.

W. Lloyd Warner, 71; former professor of sociology and anthropology, University of Chicago; 23 May.

Austin S. Weisberger, 56; director, medicine department, Case Western Reserve University School of Medicine and University Hospitals of Cleveland; 20 June.

Donald M. Wilson, 36; professor of biology, Stanford University; 23 June.

Philip G. Worcester, 86; emeritus professor of geology and emeritus dean, Graduate College, University of Colorado; 26 May.