Scientists and Lawyers Explore Weather Modification at AAAS-ABA Conference

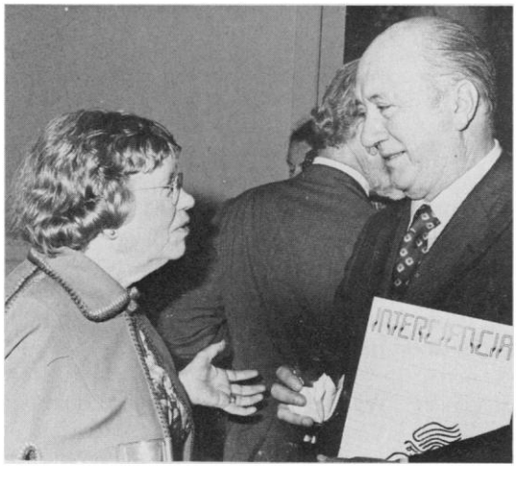
Technology provides the ability to modify weather and with that ability comes a host of questions and problems for lawyers and scientists alike. Because of its increasing importance as a technological and political issue and the complexity of its scientific-legal implications, weather modification was the topic of discussion at a March conference sponsored by AAAS, the American Bar Association, and Duke University, site of the conference (see "AAAS News," *Science*, 6 February 1976, page 458).

The program was an outgrowth of the alliance formed in 1974 by AAAS and the American Bar Association to investigate issues involving science and law and to facilitate communication and cooperation between professionals of both disciplines. The American Bar Foundation and the American Meteorological Society cooperated in planning the conference.

The meeting's objective, as outlined for the 80 invited participants by co-chairman Emilio Q. Daddario and W. Brown Morton, Jr., was to increase the availability of scientifically valid and legally acceptable advice on weather modification for administrators, legislators, and judges. This, in turn, should promote sound decision making and public confidence in how the legal system handles scientific issues.

Scientific and legal uncertainties of this subject were addressed by Lewis O. Grant of the Department of Atmospheric Science, Colorado State University, and Ray J. Davis of the College of Law, University of Arizona. The two speakers reported on such activities as precipitation enhancement, hail reduction, lightning suppression, and redirection of cyclonic storms in the context of unknowns in atmospheric physics and modified meteorological phenomena. In addition, they imposed the legal questions of burden of proof, allocation of atmospheric moisture, and conflicts in laws among jurisdictions. Also speaking on the legal issues raised by this relatively new technology were Howard J. Taubenfeld of the Southern Methodist University School of Law, and John W. Firor of the National Center for Atmospheric Research in Boulder, who later in the conference also presented a paper written by David Atlas, his colleague at NCAR. Atlas' paper concerned a conceivable hail suppression program that unquestionably would

Interciencia Welcomed at D.C. Reception



Some 200 scientists and diplomats celebrated publication of the first issue of *Interciencia*, a new trilingual journal of science and technology for development, on 17 June at the Carnegie Institution of Washington.

Margaret Mead, chairman, AAAS Board of Directors, and Brazilian Ambassador João Baptista Pinheiro (above left) engage in an informal review of the new journal, which focuses on Latin America, during the AAAS-hosted reception.

Also pictured are (above right, from left to right) Marcelo Alonso, director, Office of Scientific Affairs, Organization of American States; Leonard M. Rieser, former chairman of the AAAS Board and vice president, Interciencia Association; Philip H. Abelson, editor of *Science* and United States regional editor of *Interciencia*; Victor Paz Estensorro, former president of Bolivia; and James W. Rowe, project director, Western Hemisphere Cooperation, AAAS Office of International Science, and executive secretary, Interciencia Association.

The Interciencia Association, publisher of the journal, is a federation of associations for the advancement of science in the Americas. It was founded in 1974 by representatives of AAAS and members of scientific associations in Argentina, Brazil, Colombia, Venezuela, and the National Council of Science and Technology of Mexico (CONACYT), and was chartered in Venezuela in 1975.

Call for Nominations

Upon completion of the 1976 AAAS elections, the Committee on Nominations will meet to select candidates for the 1977 general election. The committee invites members of the Association to submit nominations, including self-nominations, for consideration at that meeting for the positions of president-elect and members of the Board of Directors.

Two members of the Board are elected each year. A list of present members is given on the contents page of *Science*. Candidates for terms to start on 1 January are listed in the 11 June issue (pages 1093–94).

Nominations should be sent to the Executive Officer, AAAS, 1776 Massachusetts Ave., NW, Washington, D.C. 20036, no later than 15 October. Each must be accompanied by a curriculum vitae of the proposed candidate.

raise combined scientific and legal problems yet to be considered.

Louis Battan of the Institute of Atmospheric Physics, University of Arizona, and Denver attorney Roger P. Hansen also focused on the opportunities for lawyers and scientists to work together toward resolving and understanding scientific issues.

Conference participants joined one of three working groups: (i) social implications of weather modification, (ii) institutional relations and dissemination of information, or (iii) risk-benefit analyses, where they reviewed the role of proper planning and action in approaching interdisciplinary questions and the priorities for allocating resources to preclude or resolve them. Other public policy factors were investigated, including division of research and operational responsibilities among governmental units and between public and private organizations concerned with weather modification. Participants concluded that an effective division of responsibilities will be necessary to determine who sets programmatic goals; who assesses cost/benefit factors; who defines what risks are acceptable; and who, if anyone, compensates persons who suffer losses during attempts to modify weather.

Leading the three groups were Barbara C. Farhar of Human Ecology Research Services, Boulder; Dean Mann, Department of Political Science, University of California at Santa Barbara; and Stewart W. Borland, Economics Branch, Agriculture Canada, Ottawa.

Dean Mann described the Yuba City, California, episode in weather modification that resulted in extensive damage and extended litigation. His presentation confirmed the conclusions reached in all working groups that neither the legal system nor the scientific establishment alone is capable of predicting the physical effects of weather modification projects nor their legal consequences.

Conference rapporteurs Thomas F. Malone of the Holcomb Research Institute, Butler University, and Milton Katz of Harvard Law School emphasized the need for coordinating the intellectual resources of scientists and lawyers while reconciling the traditional differences in the ways these professionals define "fact" and structure the "fact finding" process.

Several consensus observations evolved during the conference. First, participants expected an increase in attempts to modify weather, both because people tend to do what is technically possible and because the perceived benefits often exceed the associated costs. Second, the group felt that a central issue appears to be whether concerned parties should take prospective legal precautions or rely solely on retroactive measures since redistribution of social costs and benefits resulting from weather modification cannot be assessed accurately in advance. Third, the conference agreed that weather modification must be considered a means toward achieving national or international goals, such as ecosystem stabilization or food protection, and not an end in itself. The fourth observation of the group was that the readiness of scientists and lawyers to cooperate in policy matters appears to be increasing. Members of both professions understand that scientific knowledge accumulates over time and that scientific "facts" are more likely than not subject to change. Legal processes cannot always wait for the certainty of science, and persons working within the legal system often must determine what constitutes a "fact" without the benefit of an extended investigation.

The AAAS-ABA group* welcomes suggestions for future activities that focus on important issues of mutual concern and interest to scientists and lawyers.

Publication later this year of the proceedings of the Conference on Legal and Scientific Uncertainties of Weather Modification should encourage other thoughtful persons to consider the pressing problems that involve both legal and scientific uncertainties, and to work toward overcoming the institutional and social inertia we now face.

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*Members of the AAAS-ABA group are: (Representing AAAS) Emilio Q. Daddario (co-chairman), Office of Technology Assessment, U.S. Congress; Robert Berliner, School of Medicine, Yale University; William Bevan, Department of Psychology, Duke University; Richard H. Bolt, of Bolt, Beranek & Newman, Inc., Cambridge; Ruth M. Davis, Institute for Computer Sciences and Technology, National Bureau of Standards; Vincent P. Dole, Rockefeller University Hospital, New York City; and David J. Rose, Department of Nuclear Engineering, Massachusetts Institute of Technology. (Representing ABA) W. Brown Morton, Jr. (co-chairman), of Morton, Bernard, Brown, Roberts & Sutherland, Washington, D.C.; Roger P. Hansen, of Hansen & O'Conner, Denver; Haywood H. Hillyer, Jr., of Milling, Benson, Woodward, Hillyer & Pierson, New Orleans; Harold Horvitz, of Guterman, Horvitz, Rubin & Rudman, Boston; Milton Katz, Harvard Law School; Lee Loevinger, of Hogan & Hartson, Washington, D.C.; and Preble Stolz, California Office of Planning and Research, Sacramento.

Puerto Ricans Investigate Underrepresentation in Science Professions

Discrimination in the schools, negative counseling, and lack of genuine bilingual/bicultural education programs are some of the reasons that few Puerto Ricans living in the mainland United States enter the science professions.

A group of 22 Puerto Rican scientists offered these thoughts at an 11 May meeting sponsored by the AAAS Office of Opportunities in Science (OOS) at the New York Academy of Sciences.

The meeting, chaired by Warren Washington of the National Center for Atmospheric Research, chairperson of the AAAS Committee on Opportunities in Science, was the first gathering of mainland Puerto Rican scientists to address these broad issues.

The group of 12 men and 10 women, representing health, engineering, education, social work, and research and other academic fields, called the problem a reflection of the dire socioeconomic problems of Puerto Ricans in general. With extremely high drop-out rates, there are low numbers finishing high school at all, and of the even smaller numbers who enter college, even fewer pursue graduate or professional training, especially in the sciences. A socialization and assimilation process leads some of those who do continue their education away from the Puerto Rican community. Ultimately, this filtration process leaves a very small number of individuals who can function as scientists and be accessible to Puerto Rican youth as role models.