

Conversations with the Community: AAAS at the Millennium

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In June 1996, the AAAS board of directors met for the first time in the newly completed William T. Golden Building on New York Avenue in Washington, D.C. The occasion was appropriate for reflection about the association's responsibilities to its members, to science and technology, and to society.

Two years short of celebrating its 150th anniversary, AAAS was lodged in offices consciously designed to facilitate communication with other scientific societies, policy-makers, and the public. The end of a century loomed near, with accelerating changes in knowledge, information, and the environment transforming the global landscape. President Clinton and high-level officials in his administration have issued a consistent message about the need for greater outreach to the public about the scientific and technical issues that are affecting every aspect of their lives (1). What steps should the association take to meet the challenges and uncertainties of this new era? More specifically, what should the board of directors do to steer AAAS along lines considered most fruitful by the membership, who represent a cross section of the U.S. scientific community?

To help frame our thoughts more concretely, President Jane Lubchenco proposed a survey of present and former board members and past presidents to sample their ideas about AAAS's mission. The board sent out a letter in October 1996 (2) posing four questions: What are the major issues facing society? What is the role of science in addressing these issues? What are the major issues and challenges confronting science? What should the role of AAAS be?

We received many eloquent and thoughtful answers. A selection of these can be reviewed on the AAAS Web page (3). In addressing the board's questions, the authors converged on some core themes. There was, to begin with, almost universal agreement about the critical issues confronting science and society: environmental change and degradation; population; public health, particularly emergent and reemerging diseases; food and energy; education;

equity, including the global maldistribution of wealth; and the public's understanding of science and technology. Most respondents agreed that new technologies such as the Internet would have tremendous impact on society, including business and government as well as the public. They also noted the danger of stratification resulting from unequal access to new technologies. There was strong commitment to the idea that AAAS should expand its traditional focus on the advancement of science and technology so as to further science's growing obligation to elucidate, and if possible mitigate, the pressing problems confronting the planet.

At its December 1996 meeting, the board reflected on the survey responses and considered appropriate next steps. An early and vital task, we concluded, was to communicate with the AAAS membership and to ask for further reactions and guidance. This paper represents the initiation of a AAAS-wide dialog about the changing roles of science and technology and the responsibilities of science to society.

We hope to identify appropriate new directions for AAAS in the next few years. We have targeted the association's 150th anniversary in February 1998 as a time to pull together the ideas generated by the membership and begin charting a course for the future.

New Paradigms

In discussing the responses to the board's questionnaire, we were struck by one common characteristic of the issues our colleagues had identified as most urgent. Each one, from population and the environment to the public's understanding of science, seemed to have radically outgrown its previously accepted conceptual framing. For each of these issues, new theories, explanations, and cause-effect relationships were appearing on the horizon. These paradigm shifts call for more creative forms of collaboration between scientists and society and for a broader range of disciplines and competencies to take part in the process.

The biggest issues confronting science

and technology, and indeed society at large, in the coming decades require us to consider three sets of ideas that we and many of our respondents see as basic to the conduct of science. These can be grouped under the headings of complex causes, interdisciplinary research, and expertise.

There has been a movement away from assigning simple causes to complex physical, biological, and social phenomena. Feedbacks and synergies are now known to complicate causal stories that once were regarded as simple and linear. Dynamic cross-systemic explanations are sought where static and reductionist models once prevailed. Nowhere is this more clearly evident than in our understanding of the global environment, where the physical sustainability of the biosphere is now seen to be inseparably bound up with issues of economic development, social equity, and international peace and security. Jane Lubchenco touched on these themes more extensively in her presidential address at the 1997 annual meeting (4).

In some important problem areas, scientific inquiry and public policy are already responding to basic shifts in our understanding of causes. Scientific solutions are being undertaken with greater attention to their social context. A case in point is population policy, in which recent debate, both at and after the 1994 Cairo conference on population and development (5), has focused as much on the goal of "women's empowerment" and the economic concept of "unmet need" as on the narrowly biological objective of "fertility control." Science and technology are fundamental in managing global population growth, but there is widespread recognition that the problem cannot be addressed without consideration of its economic and social dimensions. In other cases, such as emerging diseases (6) and climate change (7), science has begun to chart the complex interaction between natural and social systems, but policy-makers and the public are only gradually responding to the resulting challenges.

Phenomena whose causes are multiple, diverse, and dispersed cannot be understood, let alone managed or controlled, through scientific activity organized on traditional disciplinary lines. More than at any time in the recent past, there is a demand for mechanisms and incentives to foster interdisciplinary research, education, and problem solving. The distinction between basic and applied research, and the professional hierarchy implicitly founded on that distinction, are increasingly being questioned. Boundaries between scientific disciplines are collapsing, and the rise of interdisciplinary sciences is challenging the very concept of "science as usual."

Institutional reforms have tended, as always, to lag some distance behind scientific entrepreneurship. We have an unparalleled opportunity to reduce the barriers among disciplines, particularly between the natural and social sciences, as well as those separating academia, government, and industry. Initiatives for crossing disciplinary and institutional lines will have to come from many quarters, including, prominently, the research universities. With its broad-based and active membership, AAAS could serve as an especially effective forum for raising and debating new possibilities.

Changing ideas about expertise are apparent in recent debates concerning the nature and purposes of graduate training in the sciences, as well as in sometimes heated exchanges over the public's scientific illiteracy and the rise of antisemitic sentiments. A recent study by the National Academy of Sciences (8) concluded that today's young scientists will find their advancement restricted unless they are trained from the start to diversify their expertise and career objectives. In some areas of the sciences, the separation between careers based in universities, industry, government, and other types of organizations needs to be revisited in the light of this and similar reports. All concerned institutions will have to consider how to foster more varied, flexible, humane, and socially beneficial career paths for young scientists. Again, we need new forums and modes of communication to allow scientists, administrators, and the concerned public to question earlier orthodoxies about education and training.

Science and technology cannot thrive in democratic societies unless they are backed by strong public support. Recently, some have suggested that public understanding and appreciation of science are yielding to an age of renewed superstition (9). Others, however, believe that faulty communication, rather than lack of public enthusiasm, may be the more basic problem. Communication between science and its varied audiences has been structured all too often on a "deficit model" that assumes that the public simply does not know enough and that information flow should therefore be unidirectional, from knowledgeable experts to the ill-informed public.

Yet many researchers who systematically study the public understanding of science have concluded that the problem is more in matching science's deliverables to people's actual needs and preferences (10). Concepts such as "just-in-time" science instruction (11), continuing education, and other forms of two-way communication seem more promising in this context than inflex-

ible tests of scientific literacy. In two-way exchanges, the ability of scientists to understand the public becomes at least as much a concern as the public's understanding of science.

AAAS Conversations

In the past, AAAS has originated many initiatives to bridge the gaps that separate science, technology, and society. For the most part, these have concentrated on specific products or outcomes, with primary attention given to written reports and mission-oriented policy statements. The present board of directors believes that additional forms of activity are needed to address the dynamic, open-ended, and boundary-crossing issues currently confronting science and society. AAAS will continue to lead as before with studies, workshops, seminars, reports, briefings, and data collection on significant problems related to the advancement of science. However, we believe that it is now appropriate to consider a new, more inclusive mechanism to enhance communication among the association's diverse constituencies and to identify new ways of engaging with the public. We propose, as a first step, the AAAS conversation.

Anthropologists have used the term "conversation" to describe the attempts of different cultures to understand one another through repeated interaction and communication. Conversations, as the board conceives of them, would have similar characteristics. They would take place over relatively long periods of time, possibly in multiple formats, with relatively few limits on participation and, most important, with no predetermined endpoints in view. Conversations sponsored by AAAS could be as tightly structured as a series of invited meetings on an urgent well-defined topic or as unstructured as a chat on the Internet. A conversation on a complex subject such as "education" or "epidemics" or "the underclass" could begin by involving hundreds of participants and later be streamlined into several concurrent discussions among parties with shared specialist interests. The goal would be to elicit a multiplicity of views, to foster the free exchange of opinions, and to aim eventually for a more sophisticated definition of problems rather than simplistic and premature solutions.

AAAS is privileged to have an exceptionally talented and dedicated staff, a proactive membership, a tradition of organizational leadership, and high credibility in the communities of science and technology as well as public policy. The question before us is how best to deploy these

invaluable assets in fostering more productive relationships between science and society during a time of unprecedented change. To explore this issue comprehensively, we will begin on 18 December 1997 with an 8-week open comment period, during which readers will be able to post their reactions to this piece, offer suggestions for conversation topics, and begin online discussion at the AAAS Web site (12). At the end of that time, we hope to initiate conversations on a number of specific themes, both electronically and through events at AAAS headquarters in Washington, D.C. Ideas for future conversations will be discussed in several public sessions at the 1998 annual meeting. We now invite comments and suggestions from our fellow AAAS members.

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