THE IMPORTANCE OF COMMUNICATING SCIENCE TO THE PUBLIC

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I want to thank Dr. Kingman for the opportunity to talk to you about the communication of science to the public, a topic which was my primary concern at the American Association for the Advancement of Science, and which continues to interest me in my present position at Science Service.

There are a variety of reasons why it is important to communicate science to the public, but as one goes through them, there is a recurring theme which seems to me to stand out more than all the rest. This concerns the need for a scientifically literate citizenry that can participate intelligently in the democratic decision-making process. This is not to say that the citizen can or should be able to participate directly in the formulation of policy, but he should have the information which will enable him to choose among alternatives offered. And while he may never be as qualified as the experts who recommend policy, he should have background better to judge their ability and the recommendations which they make.

As you all know, this is not a new rationale. Mr. E. W. Scripps of the Scripps-Howard newspapers, who was responsible for the founding of Science Service in 1921, was at that time concerned about the need for citizens who understand science in society. And since then this need has been referred to countless times in speeches, panel discussions, meetings, and reports. In fact, it has been mentioned so often that there is a tendency on the part of many to ignore it.

I would like to suggest that at no time has the importance of communicating science to the public been greater, for more and more important decisions are going to be made in the coming months and years that are going to directly affect the conduct of scientific enterprise, from the limitations under which scientific research is carried out to the funds available for the support of scientific research. I see these decisions being affected by a number of trends.

First, there is a growing tendency for the public to perceive science and the applications of science as impinging on widely held human values. Science has not only moved out of the laboratory into the area of policy, but now it has moved even further on into ethics. From questions relating to human experimentation to those involving the prolongation of life, science is touching on basic values that have been evolving since the beginning of mankind.

When anything touches on such elemental feelings, there is bound to be a reaction, and not all of this reaction may be completely satisfactory to the scientific community. Thus, it is essential that the scientific point of view be presented. I would also like to suggest that communication is a two-way process, and that it is important for scientists to receive messages as well as send them out. By receiving such messages, ranging from personal conversations to public opinion polls, the scientists can have a far better idea of what the need for information is, and satisfy this need more rapidly and efficiently.

A second trend is the great increase in controversy concerning science. When I first came to the AAAS, the principal controversy at the time was about fallout. Then came Rachel Carson and the pesticide controversy. And now it is hard to keep up with all of the new issues that are being raised about science and the applications of science.

I personally feel that this is a healthy trend if there is adequate communication about the various sides of issues. Democratic-decision making is not a neat and orderly process, but it is an effective one when there is participation from all sides, and the issues are given a wide airing. For science-related issues, scientists are an essential element in providing bacground information and alternative solutions for consideration.

A third trend is that more future-oriented issues are being raised than in the past. More and more, the question is where some particular line of research or research application will lead. The interest in such questions is so great, in fact, that it is being institutionalized in such organizations as the Office of Technology Assessment.

Here again is an area which should have participation on the part of scientists in order to come up with the best possible answers. Prediction of effects of research, like decision-making, is a process in which there may be differences of opinion, and it is essential that the scientific community participation not only in the formulation of predictions, but of the evaluation of the final results.

A fourth trend is the gradual recognition of the dual role that the scientist plays in the communications process. When I first came to the AAAS, the image was largely that of somebody who communicated more or less value-free information to the public, which then utilized the information as it saw fit. Today, we now recognize the role of the scientist as advocate, communicating information in order to support a position or bring about a decision. There is nothing wrong with this, as democracy functions on the basis of competing solutions to problems, and so the scientist should not denigrate the process.

A fifth trend is the realization that many issues are so complex that there are often no absolutely right or wrong answers, even from a purely "scientific" point of view. There once was a happy day when we all thought that we could give the problem to the experts and they would come up with "the" answer. We are now beginning to accept the fact that it is not "the" answer we want but "the best" answer under the circumstances and at the particular point in time that the answer was devised.

I have mentioned the democratic decision-making process several times, and since it is important not only to communicate science, but communicate it to the right people, let us examine who it is who participates.

The most useful model of democratic decision-making that I have found is that proposed by the political scientist, Gabriel Almond (1). He points out first of all that most people don't participate in decision-making and are generally content to leave the action to leadership groups and what he calls "the attentive public."

Any sufficiently interested person can be a member of the attentive public, but it tends to be made up of the better educated, higher income segments of the general public. It contains persons who are interested and active in some area of decision-making at the local, state or national level. This group forms the audience for the discussion of issues among the leadership groups in their decisions.

Thus, democratic decision-making, according to the Almond model, has a number of leadership groups who offer competing solutions to problems before the audience of the attentive public, whose response helps to modify and select the solutions finally adopted.

There is one interesting aspect to this model, which seems to be born out in fact. There is a specialization of labor among both the leadership groups and the attentive public, in that different problems tend to have different leadership groups and different portions of the attentive public. Thus, it is not exactly the same people who are interested in radiation problems that are interested in the ethical questions arising from medical prolongation of life.

There is one last point in regard to the persons involved in decision-making. As I indicated, they tend to be made up of higher educated segments of society. This fact should not lead you to the conclusions that by virtue

of their education they do not need to learn any more about science.

In the first place, only a small proportion of students take very much science in either high school or college. But even more important, scientific knowledge is increasing so rapidly that much of the information a person needs to know as an adult may not even be in existence at the time he is in school. And one can't learn ideas that don't exist.

Therefore, the only solution is for citizens to continue to learn as adults in order to keep abreast of the scientific information that is being generated, as well as fill in the gaps in the educational background already possessed. Since most adults have major commitments of time to work and to the home, the new knowledge must usually be provided through something other than the traditional formal education.

This means of communication is generally the mass media. I know that some scientists feel that it is a waste of time to be involved with the media. But research indicates two very important things. There is a close correlation between knowledge of science and use of the mass media -- particularly the print media. And after the school years, most of the increment in scientific knowledge comes from the mass media. (2)

I do not mean to say that face-to-face communication should not be used But since the scientist's time is limited also, the mass media are probably the most efficient way to communicate, reaching the largest possible audience with a relatively small amount of effort.

In closing, let me repeat that science is becoming so interwoven with society that more and more issues are being raised which effect scientific activities in one way or another. For better or for worse, these issues will be decided, and it is essential that scientists communicate to interested persons about these issues, both for the sake of science and for the sake of society itself.

(1) Gabriel A. Almond, "The American People and Foreign Policy," Prager, New York, 1960. See also Bernard C. Cohen, "The Press and Foreign Policy," Princeton University Press, 1963 and V. O. Key, Jr., "Public Opinion and American Democracy," Knopf, New York, 1963.

(2) Wilbur Schramm and Serena Wade, "Knowledge and the Public Mind: A preliminary Study of the Distribution and Sources of Science, Health and Public Affairs Knowledge in the American Public," Institute of Communications Research, Stanford, 1967.
