

Scientists and public policy, help or hindrance?

The new law re-establishing a White House science adviser and the plans so far to implement the law do not appear to include a committee such as the former President's Science Advisory Committee, a committee of 18 scientists that met as a group two days a month and whose members worked typically on panel activities two or four more days per month for a four-year term. Of course, no one individual acting as the President's Science Adviser, nor even a group of scientists such as PSAC, can have all the expertise needed to aid the President. But practising scientists on PSAC could recognize both their lack of expertise in a field and the existence of additional resources that are only two or three telephone calls away, either via word-of-mouth or a more formal technical-resource identification system. The extensive panel activity of PSAC (both standing and *ad hoc* panels) served to provide flexible access to scientists with other knowledge and talents than those of the PSAC itself. Until the last years of the PSAC, the Committee itself exercised strong review over the reports of its panels, avoiding in this way some biases and unwonted enthusiasms and maintaining a standard of responsibility that I found as unusual as it was admirable.

Abolition in January 1973 of the President's Science Advisory Committee and the allied Office of Science and Technology denied the nation of continued activities of the dozens of members and hundreds of panelists who had worked over a sixteen-year period to understand and propose policy options in defense matters such as missiles and aircraft, tanks and nuclear weapons, and in civil programs such as health care, coal mining, air transportation and the world food problem.

Behind my own work with the government are three basic imperatives with which I have been concerned since 1950:

- ▶ to avoid nuclear war, not only year-by-year but for the long term;
- ▶ to bring the annual growth rate of the world population to zero—not to 2% or 1%;
- ▶ to avoid a transformation of our society into a system of social organization or government where individual values have no influence.

These are imperatives because their negatives are irreversible transformations, which will mean the end of our society, if not of human life. We can not see or plan



beyond these catastrophes, which are thus in the nature of essential singularities. Any of the three could bring the world to a life among the ruins of a vaguely remembered past splendor of science, law and architecture.

This is not to say that avoidance of catastrophe is the goal of life. There are other important problems and opportunities to be considered. Suppose the world arrived at a global society that had stabilized population and that had no more reason to fear nuclear war and other massive aggression between nations than we fear it between the United States and the United Kingdom. There would still remain the essentially neutral goals of reduction of world poverty, reduction of illness, and (for some) greater freedom. I cannot foresee and would not want to prescribe the *positive* goals of that society—education, art, pleasure among them, no doubt. The goals of humanity may not be reached for all in a single generation; our short-range goal could well be to provide a society and a structure where our children and their children can look forward to security and progress for millennia (not decades) with some probability. The positive goals of civilization are matters for all, including philosophers; an important problem for some specialists, which deserves and needs support from others, is to make it possible for the civilization to endure and gradually to find its destiny.

Zero population growth rate is neces-

sary if we are to look more than a few decades into the future and to avoid making irrevocable choices. After all, a growth rate of 1% per year, corresponding to the difference, I suppose, between 2.6 children per family and 2.0 per family, means a factor 3 in population in a hundred years, a factor 30 in three hundred years and so on. There is no long-term future for humanity unless the average population growth rate is strictly zero. Between a growth rate of zero and 0.2% per year, there is no difference to the individual or even to a single generation (as in average family size or age structure of society), but in the long run it makes a major difference.

Nuclear war doesn't come by conscious decision. It can come by accident; it can come by instability in a crisis; it can come from instability of a longer term arms-race instability where one side and the other interact and build ever bigger or different and perhaps less stable systems. There is no guarantee, whatever we do (so long as there are nuclear weapons; so long as the knowledge of nuclear weapons has been created; so long as nuclear weapons are possible even if we didn't know about them yet), that we can avoid nuclear war for the long run, but one has to work at it.

By the nature of these imperatives, they must be worked on simultaneously. It is no good to avoid one peril while succumbing to another. And it is not a matter of specialists by heredity or

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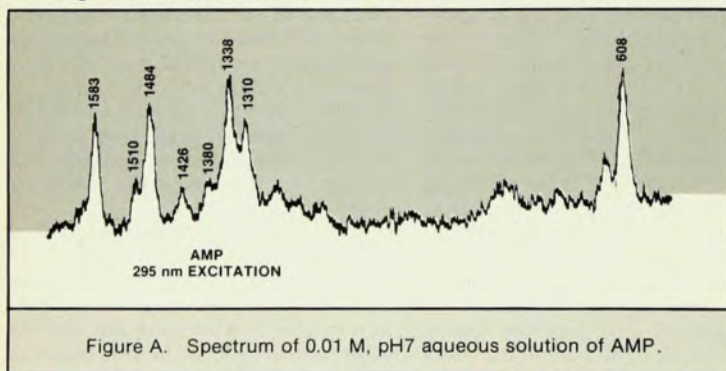


Figure A. Spectrum of 0.01 M, pH7 aqueous solution of AMP.

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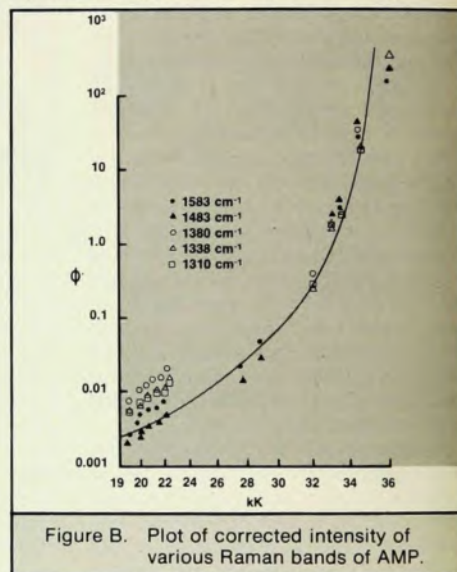


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training, but it may be a matter for *concentrators*. Concentration can help in at least two ways:

- ▶ to help provide a better return to society for the time and effort of acquiring tools and background in the field;
- ▶ because immersion in one aspect of a problem often provides insights, information, or communication channels which are helpful in another aspect.

There have been important steps in the avoidance of nuclear war since 1945 (the only time nuclear weapons were used in war), but the process seems to be all but stalled, decision makers having confused mutual interest in survival with domestic political gains, with international political rivalry or collaboration. We have done poorly also in rationalizing defense decision-making, exemplified in the present controversy over the B-1. But the more serious problem is that the Department of Defense and the Administration believe their own budget-oriented propaganda and cannot make adequate decisions in any matter touching defense.

There is a similar slackening of progress in United States involvement in control of population growth, even though there is greater awareness elsewhere in the world at the moment. And there is a lack of scientific foundation and even effort for avoiding that third great hazard, the environmental problem.

There is also a great imbalance in the public reaction to many of these problems. For instance, the problem of nuclear reactor accident, or more particularly the possibility of terrorist attack against nuclear reactors, looms fairly large in the public press. At the same time, it is national policy expressed through the public health service that children no longer should be vaccinated against smallpox. But the smallpox virus persists; it is in storage in many places all over the world. When we have a population that is not vaccinated against smallpox, one terrorist distribution of this virus will kill not tens of thousands, but tens of millions or hundreds of millions of people in the US. We need balance and understanding about these threats. The reactor problem is too complex for me to express my partially formed views here, but I am going to continue to receive smallpox vaccinations. I wish other people would, too; I don't want to have to bury them, even with low probability!

Such disasters can be imagined. They have not yet arrived. The absence of a President's Science Advisory Committee cannot be shown in the last three years to have resulted in catastrophe. On the other hand, that is no proof that in ignorance lies safety, and counterexamples abound.

What to do to understand these problems and opportunities? How can we do it? Who can do it? It is clear now, as it

was clear in 1945, that working towards these goals requires thought, organization, people, and dedication, just as much as does an effort to bar import of shoes, to defeat socialized medicine, or to lobby for or against anything else. One has to create a mechanism, motivate people, inform them, be in the right place at the right time. But we need also to have the information, analyses and judgment to decide *what* to do. We have a better basis for such action now than we had in 1945—the Forum of The American Physical Society, the Federation of American Scientists and its very active Director—but we lack an important coherence in society which arose at that time from the common effort to survive as a nation.

The single most important innovation would be for congressional staff to demand from the Administration analyses and education—alternatives, not propaganda. This was recommended also by the Committee for Economic Development, which in 1974 published a study, "Congressional Decision Making for National Security." The result of such demands would be the creation within the administration of policy choices—one couldn't present options to the Congress without having had them come to the level of the Secretary of Defense, or the head of the HEW, or Housing and Urban Development, or Treasury in regard to tax policy. These alternatives would then be available to managers within the Administration who, of course, faced with two alternatives would choose the better one. At present, alternatives are suppressed at every level in the bureaucracy, or direction is imposed from the top without knowledge of alternatives and consequences. But that's not the way it ought to be. The government has decision-making authority granted it by the people. The President delegates it to heads of agencies, and the results of analysis and the choice of policy options should come to the higher level. But neither is it right for the head of an agency to serve as an extension of the White House staff, implementing a policy decided in secret toward goals never revealed; the presentation to Congress of real alternatives, together with the reasons for Administration choice of one among them, would reduce the scope of such activities.

For the future, there is some hope. There is an Institute for Congress, which will probably come into real operation over the next few months, initially with foundation funds. There are new programs in science policy in universities. Many panels and committees of the National Academy of Sciences are doing a more responsible job with a better report review process. And so there will be more people with a scientific foundation and with some experience in policy alternatives.

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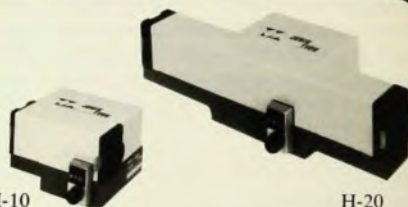


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To sum up; I have touched on the great perils of nuclear war, population growth, and political instability; early mechanisms for addressing some of these; the abolition of these mechanisms in a terrible period of our history in 1973; and looking to the future, these perils and worse. Means are available to help solve these problems, but they have been largely ignored. I hope the new Administration will consider involving scientists part time as a Science Advisory Committee at the level of Presidential policy formulation, thus to mobilize the best talents of scientists and engineers in the formulation of policy, as well as to realize the benefit of having outsiders as a partial safeguard of integrity in government.

RICHARD L. GARWIN

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Excerpted with revision from the author's response on receipt of the Leo Szilard Award presented by the Forum on Physics and Society of The American Physical Society on 27 April 1976.

Equal status

As employees of the American Institute of Physics, we were interested to read the letter from Alvin Radkowsky in the June issue (page 77). Contrary to the position expressed in the letter we believe that the AIP's move to end discrimination against women by changing the term "chairman" to "chairperson" was a necessary one. We believe that language reflects the attitudes of a society—in this case the attitude that women's identity is absorbed in that of men.

Radkowsky's lighthearted response to the AIP's word change expresses contempt for the very serious and important movement of women for equal status with men.

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6/4/76

Soviet contradiction

Recently, while serving as an intern with the Committee on Science and Technology in the US House of Representatives, I, along with a number of interns, visited the Soviet Embassy in Washington, DC. After some introductory remarks by Vladimir Belyakov, a Soviet Embassy Information Officer, concerning the present relationship between the United States and the Soviet Union, there was a brief question and answer session. I used this opportunity to inquire about the

Soviet treatment of Jewish physicists in Russia who have requested permission to emigrate to Israel, and was informed that these physicists are not denied immigration visas to Israel. He stated, nevertheless, that the Soviet Union discourages immigration because previous experience has shown that many immigrants wish to return after a short period of time and re-employment then becomes a difficult problem. I was unable to ask how many Jewish Russian physicists have been allowed to emigrate or have requested to return to the Soviet Union. When Belyakov stated that a check with the United Nations would confirm that 20 000 people are allowed to emigrate from Russia in 1974, I inquired as to the number of people who had applied to emigrate. Belyakov chose not to answer this, however, to move on to other areas of interest.

The statements made by Belyakov seem to contradict many of the letters recently published in *PHYSICS TODAY* (July 1975; January, 1976; February, 1976; and March, 1976) concerning the plight of Russian physicists.

The purpose of this letter is to encourage scientists to respond to the various appeals made on behalf of Russian physicists who have attempted to emigrate from the Soviet Union and as a result have received constant harassment from Soviet officials. A short letter to the appropriate parties stating displeasure over such deplorable treatment of our Soviet colleagues may be an effective means of maintaining scientific freedom.

D. WAYNE COOKE

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8/2/76

Unpublished results

Over the past few years, I have written to authors of scientific papers, requesting details of various materials they had referenced in their papers as "unpublished results." Out of more than a dozen such requests, only one author even bothered to reply, let alone send the information I had requested. I think that the scientific journals should follow one of the two policies with regard to references of this sort in the papers they print:

- ▶ prohibit all such references
- ▶ permit the referencing of unpublished work with the understanding that this material will be available to people requesting it.

I can understand and sympathize with the referencing of unpublished results, and therefore favor the adoption of the second policy; but I do not think that authors should be permitted to reference work they are unwilling to release to their fellow scientists. This also applies to "private communications." Another category is that of "paper in preparation." In this case, an area of research is essen-

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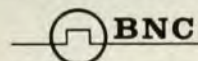
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