F. A. S. *NEWSLETTER*

Vol. 23, No. 4

April, 1970

- - - - - - - - to provide information and to stimulate discussion. Not to be attributed as official FAS policy unless specifically so indicated.

PSYCHOLOGICAL ASSESSMENT AND PUBLIC POLICY

In response to a growing number of inquiries the Board of Directors of the American Psychological Association has adopted a public policy statement on the purposes and applications of psychological assessment (testing).

By way of introduction the statement notes: "In attempting to understand others and to predict how they will function, under various circumstances, all of us utilize a great variety of assessment methods—observations, careful or casual, interviews, formal or informal, and comments and recommendations based on varying degrees of acquaintance with the person being judged. Specialized psychological assessment techniques have been developed as refinements on these general methods as supplements to them."

The statement outlines several policy implications that fololw the essential features of psychological assessment:

(1) "The individual assessed should be protected against unwarranted inferences by persons not equipped with the requisite background knowledge. Normally, arrangements will need to be worked out for collaboration with psychologists who have specialized in the kinds of assessments being conducted.

(2) "The individual assessed should be protected against unfavorable evaluation based on obsolete information. All proposals for data banks and permanent record systems must grapple with this problem and provide appropriate safeguards for verifying the accuracy of the recods and for discarding periodically the obsolete information.

(3) "The individual must be protected against unnecessary intrusions into his privacy. Unnecessary tests should not be administered and unnecessary questions should not be asked.

(4) "Whatever policies are set up to insure these kinds of protection should be of such a nature as to maintain conditions which will facilitate the research upon which new and improved assessment procedures can be based."

The statement warns however, that: "Flat prohibitions of certain kinds of tests or questions would retard research on the ways in which such tests and questions might be validly used. To require the destruction of all records of test scores and protocols along with the interpretations derived from them would make impossible some very significant kinds of longitudinal research on personality.

"The objective of whatever policies are adopted should be to protect the right of each individual to be soundly evaluated, realizing that to do this requires a constant effort to improve the techniques by means of which evaluations are made. The proper control is to vest responsibility in the person carrying out the assessment rather than to place arbitrary restrictions on the methods he is permitted to use."

The statement emphasizes that one of the keys to valid psychological testing is that a competent individual make the decisions. To insure this, the Board states, (a) "It is the responsibility of organizations and agencies in which assessment is carried on to place such persons in charge. (b) It is the responsibility of universities and colleges to educate them in such a way that they can carry out this complex task. (c) It is the responsibility of professional societies, such as the APA, to formulate standards and ethical codes controlling their activity."

In summary the statement re-emphasizes: "The central concept governing what information is to be obtained from a person whose characteristics are to be assessed for a particular purpose is *relevance*. The burden of proof that assessment techniques are relevant to the situation falls on the professional person responsible for the undertaking. His competence is the foundation on which the whole structure must rest.

"The right of an individual to decline to be assessed or to refuse to answer questions he considers improper or impertinent has never been and should not be questioned. This right should be pointed out to the examinee, and, regarding the confidentiality of the results, whenever possible, he should be told who will have access to the information and for what purposes."

(A.P.A. News Release, April 1970)

NATIONAL CONFERENCE ON ENVIRONMENTAL POLLUTION

Secretary Walter J. Hickel announced today the Department of the Interior will sponsor a four-day conference and exposition early next fall on environmental pollution.

Secretary Hickel said the conference was being called in response to President Nixon's call for "a total mobilization" for cleaning up our environment.

More than 3,000 leaders from industry, government, national organizations, and universities are expected to join in the conference which will cover 18 major environmental topics in more than 50 separate sessions.

The National Environmental Pollution Conference and Exposition will be held September 29 through October 2 in the Sheraton Park Hotel in Washington, D.C.

"In his message to the Congress on the environment on February 10, President Nixon said that the task of cleaning up our environment calls for a total mobilization of all of us—involving governments at every level and requiring the help of every citizen," Secretary Hickel said.

"We hope to make this conference a productive answer to the search for new and more efficient methods, approaches, and techniques for winning the battle for a better national environment.

"Our purpose is not only to focus national attention on the threat to our environment but to help muster a nationwide effort in corrective actions to improve it."

At the national exposition being held in conjunction with the conference, industry, governments, organizations and institutions are being invited to display pollution abatement equipment, techniques and services. An estimated 65,000 feet of industrial and institutional displays are being planned.

(Department of the Interior News Release, 6 April 1970)

ECOLOGICAL ETHIC URGED ON NATION

The president of the Rockefeller Foundation proposed that America formulate a new environmental ethic that would de-emphasize such cherished industrial principles as economic growth based on constantly increasing production and consumption of goods.

"Morally, no society has the right to overutilize the world's

(Continued on Page 2)

REPORT ON INSTITUTIONS FOR EFFECTIVE MANAGEMENT OF THE ENVIRONMENT

A national program for the effective management of the environment is described in a "background paper" issued by the Environmental Studies Board of the National Academy of Sciences and the National Academy of Engineering. Its broad-ranging proposals will, in the words of Board Chairman Harold Gershinowitz, "provide a basis on which the Board will make recommendations for effective approaches and institutional mechanisms for dealing with environmental problems."

The document is being released to the public in order to stimulate further discussion and broad consideration of the proposals as a contribution to the developing literature on the environment. It was prepared by a study group composed not only of scientists and engineers from all the major disciplines, but also of economists, lawyers, and conservationists. Co-chairman were Gordon J. F. MacDonald, vice chancellor of the University of California at Santa Barbara, and Marvin L. Goldberger, professor of physics at Princeton University.

The study group report centered on nine major proposals:

¶ A Board of Environmental Affairs within the Office of the President. The Board, proposed before the National Environmental Policy Act of 1969 became law, encompasses many of the provisions of that law and of Senator Edmund S. Muskie's pending bill.

¶ A joint committee on the environment, made up of the chairman and ranking minority members of the relevant committees of both the House and Senate, to provide a focal point in the Congress for discussion of environmental affairs.

¶ A comprehensive federal program for monitoring the environment. The report notes that present efforts of governmental agencies are directed at limited special purposes rather than at an overall, ecological evaluation of the quality of the environment.

¶ Environmental Quality Indices for evaluating and reporting on the state of the environment. These indices—such as the transparency of air, purity of water, noise level, and ratio of wild animals to human population—would be combined into an overall Environmental Quality Index.

¶ A National Laboratory for the Environmental Sciences to conduct basic and applied research in the environmental sciences and to develop a quick-reaction field function that would permit it to conduct rapid field studies pertinent to potential environmental crises.

¶ A privately financed Institute for Environmental Studies which would do long-range planning, provide early warning on potential threats to the environment, conduct rapid analytical studies in response to emergencies, carry out rapid field analysis, and systematically analyze the various factors that influence environmental decisions and the management of the environment.

¶ An environmental education program in secondary schools, sponsored by the National Science Foundation, to involve teenagers with the whole range of environmental problems.

¶ Multi-disciplinary programs of environmental studies within universities and an experimental problem-oriented graduate school.

¶ A private National Environmental Coalition to stimulate public education and public action programs on matters of the environment through displays and demonstrations, semi-popular literature, radio and television, adult education curricula, popular magazine articles, and public discussions.

The 26-member study group preparing the report was assisted by 35 observer-participants during a month-long study on the campus of Stanford University in August, 1969. The study was supported by the American Conservation Foundation, the Ford Foundation, the W. H. Kellogg Foundation, and the Rockefeller Foundation.

The press may obtain copies of the report from the Office of Information. Others may request copies from Mr. Charles Reed, The Environmental Studies Board, 2101 Constitution Avenue, N.W., Washington, D.C. 20418. Phone: (202) 961-1706.

FAS NEWSLETTER

Published monthly except during July and August by the Federation of American Scientists, 2025 Eye St., N.W., Washington, D. C., 20006. Subscription price: $2.00 per year.

Chairman.....Herbert F. York

The FAS Newsletter is prepared in Washington.
Editor: Judith Eckerson.

The FAS, founded in 1946, is a national organization of scientists and engineers concerned with the impact of science on national and world affairs.

Sources of information (given in the articles in parentheses) are for further reference. Items reprinted directly from other publications are designated as such in an introductory paragraph.

ECOLOGICAL ETHIC (continued from page 1)

resources for its own contemporary and selfish interests," said Dr. J. George Harrar at a Congressional hearing on ecology here.

"Man must understand biological systems and conduct his affairs in such ways as to improve the quality of life rather than degrade it through wanton experience."

"At this critical juncture," Dr. Harrar said, "it would be well for man to question the validity of his attitudes toward nature and to consider seriously the desirability and wisdom of formulating a new ethic for dealing with his natural environment which would transcend most of the values we have traditionally held concerning the world."

The biologist said population limitation and consideration of the "equilibrium of the natural envronment" would be essential elements in the new ethic. Another would be a redefinition of economic growth.

"We, in the more advanced nations at least, should put considerably less emphasis on that form of economic growth that simply multiplies production and consumption of material goods," he said. "Our resources are not limitless, and when those that are non-renewable are consumed or transformed, they can never be replenished."

"More attention could and should be devoted to services and to those areas of life that enrich the quality of human existence: cultural activities, the arts, literature, intellectual and scientific pursuits, esthetic improvements, and human relationships.

(N.Y. Times, 12 April 1970)

BOOK NOTES

Perils of the Peaceful Atom, published last year, has been released in paperback by Ballentine for $1.25. The book, by Richard Curtis and Elizabeth Hogan, purports to document the dangers of atomic power plants past and future. It includes some information on the relative costs of atomic and other power sources, and a survey of all projected and operating nuclear power plants in the United States.

The U.S. Arms Control and Disarmament Agency has distributed a booklet entitled *World Military Expenditures 1969*. It documents the military expenditures of each country, of several groups of countries collectively and comparatively, and relates the data to population and to gross national product of each country.

Technology Review, in its issue for February 1970, has devoted five major articles to "The Protein Problem"—the shortage of protein in the diets of most of the world's population, primarily in Asia and underdeveloped nations.

The *9th Annual Report to the Congress* of the U.S. Arms Control and Disarmament Agency was issued in February 1970 for the calendar year 1969, and is for sale for $ .35 by the U.S. Government Printing Office, Washington, D.C. 20402. It contains chapters on the Strategic Arms Limitation Talks, chemical and biological weapons control, the continuing debate on arms control measures for the seabed, nonproliferation of nuclear weapons, plus other information and speeches by ACDA officials.

The testimony of Walter P. Reuther, President of the United Automobile Workers, to the Senate Committee on Labor and Public Welfare on December 1, 1969, has been reprinted as a 64-page booklet and is for sale for $ .25 from the UAW Purchasing Department, 8000 East Jefferson, Detroit, Michigan 48214. In this testimony, Reuther outlined his views on the orderly conversion from defense to civilian production of goods. The booklet is entitled *Swords into Plowshares*.

TWO VIEWS OF THE SCIENTIST'S PLACE IN SOCIETY

The first part of this article is reprinted from the National Academy of Sciences News Report for March 1970. It is a speech delivered by Jean Coulomb, a French physicist, in February of this year. The second part of the article is introduced by a letter to the editor of the FAS Newsletter, and was written by a member.

In Erevan, U.S.S.R., during an ISCU meeting two brilliant speeches were delivered, by Professor Sobolev of Moscow and by Professor Harrison Brown, and it seems perhaps appropriate to summarize some points they made, if I remember well. Academician Sobolev stressed the extended possibilities offered by scientific and technical progress, notably by the improved management of great undertakings, thanks to modern computers. He saw no real limit to the development of mankind, if necessary on other planets. Briefly speaking, Professor Sobolev was perfectly optimistic on the boundless future of our civilization, in striking contrast with the growing concern among the Western scientists.

Professor Brown was more cautious, if not completely pessimistic; his subject was the dramatic increase in the needs for natural resources, particularly for mineral resources. In spite of the fact that the number of discoveries is steadily increasing through modern methods of mining and drilling (a trend which could well change sometime in the future), Professor Brown was frightened by the growing gap between the rich and the poor nations, a gap which could hardly be filled even by the most accelerated extraction.

My own purpose is to describe a century of efforts toward international scientific cooperation in a rather dim new world, a future in which the International Council of Scientific Unions should play a leading role. Today I intend only to consider afresh this future development, without searching in the past for models which you would probably judge obsolete.

At the end we shall return to ICSU organization and examine its adaptation to its growing tasks.

According to many scientists, doing research on subjects which interest them personally is the only thing they should care about. We shall not blame them, even from the point of view of the general interest, as the practical usefulness of their position has been amply demonstrated when one considers the ever-quicker applications of recent fundamental discoveries. Some difficulties arise in deciding to which discipline the natonal money should preferentally go, but the governments are well aware of this problem; they are appointing committees for doing the job; and, after all, their decision does not matter too much if it remains sufficiently stable and if the differences of support between the disciplines are not too great. The most essential things are the quality of the research people involved and the attention paid to their work by development authorities. The choice itself is secondary. I would not insist, however, because it would be presumptuous for a Frenchman to judge development policy before American specialists.

For a long time I agreed upon the needlessness of any justification for pure scientific activity. I am still in doubt as to the real benefit for a community of prescribing to a good scientist a subject for his research. But from an ethical point of view, simply to have a clear conscience and to avoid an unfeeling polarization a scientist himself could freely recognize that he has inside or outside his own subject of research direct duties towards society. These duties are still not, however, of the type commonly envisaged. The community should use scientists for fresh thinking, not for doing awkwardly the job of engineers.

It has recently been suggested that in order to cope with the difficulties of the modern era first-class scientists should be grouped in large centers and be asked to solve the big problems of our time, as was done during the last war in England for operational research or in the United States for producing the atomic bomb. That could well be very effective, but only for a narrow class of problems: those where the target is well-defined and supposed to be not too far away but where the possible ways are still so obscure that scientists, not technologists, are needed as pathfinders. Still another feature of this solution is that it is only applicable with an iron will to succeed. Such a will (which should extend not only to the leaders, but to the majority of the participants) could rather easily be developed in a nation at war, but could hardly be attained when many countries are involved.

Consider the problems by themselves. A fundamental aspect of our world is fragility. It remains generally unrecognized except for short periods and particular places; it appears suddenly when a war or an earthquake or simply a strike has broken out, escaping from control and endangering people who previously felt completely safe. This fragility is closely related to the progress of our civilization and keeps pace with it. Of course, we shall try, by using better methods and bigger computers, to foresee such events, to reduce delays for action, to reinforce means of controlling, from the very beginning, possible disasters. But even if, thanks to such actions, the probability of bad events is not growing, which is an optimistic hypothesis, the stakes will rapidly increase. For instance, better tires or better brakes would make cars safer, if their speed were not increased. But drivers require, sometimes for business, sometimes for pleasure, the maximum possible increase; so the probability of an accident remains about the same but its seriousness becomes much higher. That's only a limited example, put just to illustrate the evidence; however it shows that it is important but far from sufficient to find safeguards, to duplicate the oil circuits of the brakes, to maintain staircases even if we get lifts, to preserve seeds of low standard varieties even if we get productive ones. In the long run, we cannot avoid discussion of whether it would be reasonable to put a speed limit on our civilization. That "reactionary" solution should not, in my opinion, apply to all aspects of

TWO VIEWS (Cont. from Page 3)

this civilization, but it probably should apply to some of them. I tried in Erevan to draw up a list of major risks according to their ripeness. First: phenomena of immediate concern, such as the atomic bomb, chemical and biological methods of warfare, hunger and underdevelopment. Second: the dangers that will threaten mankind during the present century—above all, irreversible changes in the environment due to increasing population and general developmet of agriculture and industry. Third: the problems of energy sources, which may in the long run be the most important one, as we shall see later on.

I don't believe that it would be up to science to consider the first category of these problems; of course, every scientist is closely concerned with them as a man or as a citizen, but even if technological progress is stil needed to solve them, they are scientifically clear and their solution needs essentially a strong political battle.

Problems of the second category are beginning to stir public opinion by bringing up cases of dense smoke, of poisoning rivers, of spoiling scenery by waste products, and so on. Governments have been warned, and an intergovernmental conference will be convened by United Nations in Stockholm during the year 1972. Nevertheless, these kinds of problems are not fully elucidated and the scientists should still play a prominent part in *establishing the facts*, particularly by discovering characteristic parameters of the situation, by following them permanently, and by discussing the records. To do so it is imperative to choose people whose conclusions would be above suspicion. This could be achieved by having them nominated by nongovernmental organizations. May I insist a little on this point?

Bodies such as academies or equivalent scientific societies adhering to non-governmental organizations are not, strictly speaking, completely independent of governments, from which they receive the major part of their budget. But the academic channels act as a filter, clearing the impure flow of political money; further progress is made afterwards through the association between national membes, which form an international organization. Finally, the reliability which results is the best that could be achieved, considering human weakness. The amount of money traveling through those channels is very small compared to the budgets of governmental or intergovernmental offices. For this reason direct management of large undertakings by nongovernmental organizations is not usually possible and should be replaced by simple but thorough quality control.

To be specific, the International Council of Scientific Unions has been associated since 1963 with the International Union for the Conservation of Nature and Natural Resources in a Special Committee for the International Biological Program (SCIBP), which has been strongly supported by UNESCO, together with which it has organized the successful Biosphere Conference. More recently, the last Assembly of ICSU decided to join the crusade for the environment and asked the International Union of Biological Sciences and the International Union of Geodesy ad Geophysics to present a report on its possible role, written by an *ad hoc* committee they were instructed to set up. That has been done; the *ad hoc* committee has proposed the creation of a Special Committee on the Problems of Environment (SCOPE) and an International Center for the Environmet (ICE). The report was submitted to the executive committee of ICSU, which approved the idea of SCOPE but deferred any decision concerning ICE.

Professor Farner [Chairman Donald Farner of the National Research Council Division of Biology and Agriculture], president of the International Union of Biological Sciences, and I have been busy since that time consulting every competent body in order to nominate future members of SCOPE. We are not sure that the list we have presented to ICSU officers, who will decide upon it very soon, is the best possible combination of all disciplines and all regions of the world, but when amended by ICSU it would certainly allow SCOPE to begin its work. That will not be the end of the story. We have embarked upon a very great venture, and it will be possible for any interested colleague to find plenty of work there.

To my mind, the most essential part of the future work will be *monitoring*, as I have implicitly said before and as it appears also from the word SCOPE. Monitoring could not be done by other than such an independent body, with no direct connection with any private or national interest, with no duty except to say the truth as it sees it. For financial reasons, management of the stations or data centers could or should be left to the nations, but control and discussions should be in the hands of free scientists, and this task will be so ample as to call for considerable extension of the membership and resources of SCOPE.

Proceeding now to the third category of worldwide problems, we encounter the one of increase if possible in natural resources, and above all the problem of increasing or simply maintaining the energy sources. Those sources are (and will probably remain) mainly of mineral origin. I am not expert in that matter; you could better consult Professor Brown. But roughly, taking into account future discoveries, we could say that the time after which the available power, instead of growing exponentially, will grow at a diminishing rate, is of the order of a century, or a few centuries at most. The time when the available power will really diminish is more remote and it depends strongly on what policy we adopt.

The time scale of a century, which is so short in the history of mankind, will appear incredible to most of you. As statistics are never beyond all question, I gave in Erevan independent evidence based on the impossibility of increasing the consumption of energy very much without dissipating a part of it into space, a kind of limitation which is well known to the designers of artificial satellites. If, for example, France, intended to double its available power every ten years, as is sometimes envisaged, its surface temperature would be, after 200 years, above 200°C.

Uncertain as they are, these considerations should warn us that a speed limit will be *imposed* on our civilization, sooner or later according to our willingness to prescribe, before hand, severe or lax limits. In other words, mankind shall have to economize, to save resources if it intends to endure. Science would be extremely useful for such planning. On th contrary, it doesn't seem to me that scientific migration to other planets, as incidentally envisaged by Academician Sobolev, could be a promising way to escape. It will consume a great deal of potential energy without a great hope of recovering it.

What would such an attempt mean for saving power? The impact on our life of the amount of energy available to us has been emphasized frequently, but perhaps is still not completely realized. It is customary to protest against the wastage by the consumer society. But the agricultural revolution, about which it is often said that it will solve the problem of hunger in developing countries, is based on machinery for plowing, harvesting, and so on, together with fertilizers and pesticides. Machine plants and chemical industries are great consumers of power. In that case too, agricultural progress, by feeding more and more people, increases the stakes of the human game.

My intention was not to give too dark a picture of the future world. I trust in science, including the science of man, in the fresh thinking of all scientists to find the best ways. The picture should be complete if we intend to embrace the whole situation. There is no immediate splitting of the problem among the particular disciplines. The same applies to other problems, such as information and documentation, to which Professor Brown has devoted an important part of his activity. My last purpose would be to examine what should be done in such cases within an interdisciplinary body, within ICSU. This is rather a technical question, but I shall be brief.

When it replaced the *Conseil International des Recherches* in 1931, ICSU was nothing more than a Society of Scientific Unions. Due to circumstances, mainly relations with UNESCO and launching of the International Geophysical Year, ICSU has now set up a number of committees for special purposes. There is sometimes (too often) rivalry

TWO VIEWS (Cont. from Page 4)

between the unions and such committees. For this reason some countries, France among them, are reluctant to create new committees. American scientists, on the contrary, have constantly favored such creations for the sake of efficiency, as they could appeal to new people, promote new ideas, obtain independent financing. Personally, to keep the advantages of the freshness without endangering the system of the Unions, I am strongly in favor of *temporary* committees, raised for definite undertakings, and am strongly against permanent ones. I am certainly not alone in professing this opinion. For example, ICSU has decided not to allow a prolongation of the Upper Mantle Project even though it has been very successful; it has authorized the launching of a new "Project of Geodynamics," concerning the same field but not proceeding on the same lines. The analogous question of transition from SCIBP, Special Committee for International Biological Program, to SCOPE is not completely solved, but the discussion turns only on a two-year delay.

Such a method of working by special teams for a limited number of years seems to me a sound principle for good use of scientists. When facing new problems, if you need distinguished scientists for quickest reaction and impartial advice, don't take them away from their scientific work, from their scientific, community, for too long. Otherwise you will get, instead of scientists, what we may call universal experts in international problems. You could find plenty of them in some well-known places, and I am afraid sometimes of finding another one in my looking glass.

TO THE EDITOR OF THE FAS NEWSLETTER

The letter by Mrs. Hull in the February Newsletter, written in response to my description of a planned AAAS Symposium, "The Sorry State of Science—A Student Critique", seriously misrepresented the ideas in my article. Mrs. Hull suggested that scientists refuse to work on military related projects (see SESPA pledge) and that a fund be established "to provide subsistence for the strikers until they could find, or create, or force governments to get to work on, in Mr. Weinrub's words, 'new technology based upon corporate needs'." The sentence from which this phrase was lifted said, "In fact, the development of new technology based on corporate needs is in direct conflict with the best interests of society in the following ways...." My point was that development of military technology was one of *many* ways in which the interests of big business were anthithetical to those of the people. A fund to support all the scientists who feel alienated because they are not doing socially useful work would have to be a very large fund indeed.

Enclosed you will find an article . . . which describes the ideas which we activists at the AAAS meeting were trying to convey. These ideas are quite different from those of Herbert Hyman printed in the January FAS Newsletter. Dr. Hyman recognizes some major problems in our society, but then, claiming that the generational conflict is more important, he suggests a method of diffusing the energy of youth into technological preoccupations, thus leaving the fundamental, generation independent, class conflicts unresolved. For him, technological progress seems to be more important than social progress.

I think the Newsletter readers would enjoy comparing the enclosed point of view to his.

Peace,
Allen Weinrub

The 136th annual meeting of the AAAS held recently in Boston provided a group of us the opportunity to challenge and change the political consciousness of many members of the scientific community. Our AAAS action group was composed of scientists, engineers, and other concerned individuals who feel that scientists must organize with other working people to bring about the political change necessary to prevent the further misuse of science and scientists' skills. Further, we think that most scientists have attitudes which have prevented them from understanding how the present society affects both their own and other peoples lives.

The frame of mind we are attacking is based on several prevailing myths. The scientist typically feels that science is morrally or politically neutral and that his work, being an end in itself, should require no further justification to society. He thinks himself an objective, rational individual and a member of a rather select intellectual class. He regards himself as a professional.

The scientist often feels that social problems arise from incompetence and irrationality, and believes that, as in the case of technical problems, his own expertise can be applied to their solution. Thus his unique ability to understand, apply, and develop new technology makes the scientist not only a necessary, but also an enlightened and influential member of decision-making bodies. We think that these views of science and the scientist's social role are unrealistic.

Science Is Not Neutral

Though research is carried out according to certain scientific criteria, the context in which this research is done is anything but neutral. Not only the kind of sceince which is done but the use to which it is put is dependent upon the technological needs of those who support science. For example, the Department of War funds research in those technical areas which it feels are of military significance. The advances made are used for military weaponry, the researcher's expertise is used for weapons development, and the graduate students are trained in areas of military technology. But what is obvious in the case of the DOW is true in general. Science responds to the technological needs of the dominant social and economic class in a society. It serves those who control the development of technology and use it to further their own ends.

In the United States scientific research is promoted by the government and large corporate enterprise to benefit big business. Its use has resulted in highly sophisticated instruments of death and destruction, tremendous waste of natural human resources, the fouling and despoilation of the environment, and the increased alienation and manipulation of the people. The standard of living for the few has increased but the distribution of the world's wealth becomes more lopsided and the destruction of goods which millions need increases. Science does not serve the people's needs, it serves corporate needs. To claim, therefore, that science is neutral is merely to ignore the social and economic context in which science is done. If we are concerned about human welfare, we must question the role of the scientific establishment in this society. We must see to it that science serves the people.

We Scientists Are Workers

But how can science be directed toward increasing human welfare? Scientists certainly have no control over how their work is used. They even have little control over the work they can do. Many university scientists, for example, who would like to convert to more socially useful research cannot get funding for such work. Industrial scientists are constrained by the requirements of their employer. In fact, if the scientist does not produce what is expected of him, he is out of a job. He is merely a paid technician—a worker like any other salaried employee, only with more training and money. Scientists and engineers on the west coast have found working conditions so oppressive that they have found it necessary to organize unions.

Though the scientist and the engineer play key roles in the development of new technology, control of this process

lies elsewhere. *Technology is not autonomous.* The misuse of science for death, destruction, and despoilation does not occur by chance. It happens because the assessment of new technological possibilities takes into account only the costs and benefits of those who seek to exploit these possibilities—social costs and social needs are ignored. The adverse effects of technology therefore constitute a political problem. They arise from the use of technology to serve the needs of powerful private interests at the expense of the public. The problems of pollution or the arms race are not technological problems. The basis for their solution is not technological.

It stands to reason that scientists and engineers do not make decisions about the use of science and technology. Technically trained people are used merely to implement such decisions. Their skills are used to further the goals of the organization for which they work. Their role is evident when scientists testify in favor of the ABM, American Tobacco Co., Union Oil Co., etc. In Washington science advisors either endorse existing policies or become Oppenheimers or members of an agency blacklist. To be "influential", you must first agree. Thus the scientist serves only to rationalize the existing order. His expertise is used merely to further already established goals— whether these be in the university, in industry, or in government.

Join With Other Workers To Make Science Serve the People

Then what is the solution? We must fundamentally change the present social and economic system—an undemocratic system which leaves the housing, educational, medical, and nutritional needs of a large portion of its population unmet while men go strolling on the moon. We must take control of those powerful corporate structures which use their economic strength to dominate and manipulate society to serve their own self-interest. *We scientists are workers.* Our only hope in preventing the further misuse of science is to join with all other workers to bring about a radical change in the thinking, goals, and economic structure of this country.

The challenge we have is to work toward a political system which makes impossible a hierarchal structure dominated by a decision making, isolated elite, unresponsive to the people. We can begin this task within science, by breaking down within our own laboratories the stratified organization of technicians, graduate students, secretaries, and research directors. Decisions effecting the entire laboratory can be made collectively, work can be credited to the entire team, and all members can share in the more unpleasant tasks. In this way decisions will represent everyone's needs and a rigid hierarchy will give way to a cooperative effort.

But on a broader scale, scientists in the university and industry must question the direction and use of their work. They can organize with and support the workers who challenge the goals and management of the institution in which they work. For example, scientists should have demonstrated solidarity with the 140,000 other workers who were striking against G.E.

Science For The People

On a yet broader scale the scientists can help demystify science for the public. We can destroy the myth of the all-knowing scientific expert or the infallible technocrat and we can explain the severe limitations of science in solving social problems. We can point out the political content of decisions justified by the government or industry on technological grounds. We can explain the potential dangers of new discoveries. We can expose propaganda statements such as Nixon's announcement on ABM. Many scientists have already begun such activities. The public must come to understand that technology can and must be brought under the people's control.

Instead of having large meetings of the AAAS where the experts explain with full TV coverage how society can adjust to the impact of scientific advance, we should instead hold meetings where the experts can learn how science and technology can adjust to meet the needs of the people. How can community people use our technical skills and abilities? Scientists and the community must interact in a meaningful way. We must all search for a social and economic system which utilizes our knowledge of nature to benefit all of mankind. We must make science serve the people.

FAS NEWSLETTER

Federation of American Scientists
Suite 313'
2025 Eye Street, N. W.
Washington, D. C. 20006

Volume 23, No. 4 April, 1970

Second Class Postage Paid at Washington, D. C.

Return Postage Guaranteed