

SCIENCE FOR THE PEOPLE

The 1969 meeting of the American Association for the Advancement of Science (A.A.A.S.) was attended by radical scientific workers wearing buttons emblazoned with red fists and the inscription "Science for the People". They chastized the scientific establishment for uncritically creating knowledge, technology, and hardware which promoted military and corporate interests through the impoverishment and oppression of people here in America and around the world. We are here in Chicago to continue that struggle, and to drive home the point that scientific work has become inevitably political.

One very basic connection between scientific research and politics is that the former has come to be funded almost exclusively by the government and the large corporations (if not directly, then through various tax-exempt foundations). Thus, the goals of government and business, as well as their interactions, typically dominate the politics of scientific research. Common interests unite the various levels of government and corporations into an interconnected and interdependent network. This network is comprised of a very small minority of the population which exercises an inordinate amount of control over the majority. Under corporate capitalism, this minority constitutes a small, ruling class with the achieved purpose of highly efficient domestic exploitation of human and material resources and even more efficient imperial robbery in our foreign economic preserves. This ruling class has made no secret of its willingness to use anything, including scientific research, to achieve its primary and overriding objective: the maintenance and enhancement of its own power.

Scientific research itself has enjoyed a long and comfortable history in its intellectualized ivory tower. Significant opposition to the goals and practices of the scientific establishment is barely two decades old. This criticism increasingly comes from within as scientific workers themselves begin to evaluate their work in terms of the uses to which it is put. This is neither surprising nor avoidable at a time when so many oppressive and exploitive institutions in our society are finding it more difficult to function because of increasingly vigorous political opposition. However, the infusion of politics into scientific activities raises perplexing, but critical, questions. Is it possible for a scientific worker who desires meaningful social change in our society to put his talents to work for a movement capable of achieving that change, or must his politics remain split off from his work? What kinds of scientific work would be capable of furthering such a movement, i.e., what exactly would be the content of a true "Science for the People?"

To answer these questions we must grasp the extent to which scientific work affects our lives. The most obviously malevolent application of science is to military technology, as can be seen in nuclear weapons, chemical and biological warfare agents, and sophisticated counterinsurgency technology now in use in Vietnam.

These perversions of science have not occurred without opposition. Several of the early atomic researchers tried unsuccessfully to prevent an A-bomb

detonation over civilians.¹ In the 1950's, scientific workers and laymen combined in a movement opposed to nuclear weapons tests because of the harmful effects of radioactive fallout. In the 1960's, widespread public criticism was directed against the Army's stockpiling and research activities in the area of chemical and biological warfare.

After the onset of the American war in Vietnam, a surge of protest grew within the universities against the Department of Defense research being conducted there. Individual campus actions, such as those directed against Operation Spicrack at the University of Pennsylvania or against the Stanford Research Institute, were accompanied by nationally coordinated efforts such as those opposed to the research of the Institute for Defense Analysis or the recruitment by the Dow Chemical Co. During the past year, radical caucuses have been organized in the American Physical Society, the American Medical Association, the American Sociological Association, and many other professional organizations.

While all of this is encouraging, it falls far short of what is required. Hit and miss opposition may achieve short range goals, but it is impotent in the long run. As far back as the 15th Century, Da Vinci refused to publish plans for a submarine because he anticipated that it would be used as a weapon. In the 17th Century, for similar reasons, Boyle kept secret a poison he developed. Such individual actions, however, are eventually outflanked by the work and cooperation of other researchers. Now especially, scientific knowledge is accumulating so rapidly that opposition to any specific project is often obsolete before the struggle against it has run its course. Questioning the "humanity" of individual scientific projects is not enough. Scientific workers themselves are seriously wrong in assuming that personal prostitution to the rich and powerful can be avoided simply by refusing to participate in only that work which is narrowly useful to those in power, such as weapons, counterinsurgency, or technological research. For these reasons we need an analysis of the role of science in our society which will enable us to act collectively against socially destructive uses of science.

It is not surprising to find the ruling class funding applied research which is narrowly beneficial to them. Because their goal is to increase their own power (and/or wealth), this work is counter to the real interests of those upon whom that power is exercised, that is, the majority of the people. We are all aware of examples of this type of research: developing guidance systems for inter-continental ballistics missiles, inventing weapons like chemical Mace, designing new techniques of drilling for oil, etc. Applied research of this kind which is clearly malevolent and exploitive requires no further discussion.

But this same ruling class also supports almost all of our basic or, to use the euphemism, "pure" research; it is called pure because it is ostensibly performed not for specific applications but only to seek the truth. Many scientific workers

¹ These scientists succeeded in lobbying for civilian management of nuclear energy (Atomic Energy Commission); but in failing to realize how well the government had integrated civilian and military interests, their original vision of the AEC was lost. And now in 1970 we see the final integration of military, public sector, and private sector science as Glenn Seaborg, current chairman of the Atomic Energy Commission and ex-chancellor of the University of California at Berkeley, takes over the presidency of the AAAA.

engaged in some form of basic research do not envision any applications of their work, and thus believe themselves absolved of any responsibility for such applications. Others perform basic research in hopes that it will lead to the betterment of mankind. In either case, these scientific workers have failed to understand the contemporary situation.

Many centuries ago the discoveries of science were of interest to only a small and widely scattered scientific community with negligible social and political influence. Today basic research is closely followed by those in a position to reap the benefits of its application--the government and the corporations and their tax-exempt foundations. Since these are the institutions which fund the work in the first place, all research proposals must be submitted to them. Thus, they are not only able to determine which research gets done and which does not, but they also have first access to the scientific workers' ideas and judgments of the potential gain in pursuing various investigations. Furthermore, only the government and the corporations have the resources and staff to keep abreast of as much of the research in the scientific community as they wish to and to mount the technology necessary for its application. This is easily accomplished given the openness of professional meetings, as well as the individual scientific workers incentives to publish the results of their work.

As the attention paid by government and corporations to scientific research has increased, the amount of time required to apply it has decreased. In the last century, fifty years elapsed between Faraday's demonstration that an electric current could be generated by moving a magnet near a piece of wire and Edison's construction of the first central power station. Only seven years passed between the recognition that the atomic bomb was theoretically possible and its detonation over Hiroshima. The transistor went from invention to sale in a mere three years. More recently, research on the laser beam was barely completed when engineers began using it to design new weapons for the government and new long distance transmission systems for the telephone company.

The result is that in many ways discovery and application, scientific research and engineering, can no longer be distinguished from each other. Our technological society has brought them so close together that today they can only be considered part of the same process. Consequently, while most scientific workers are motivated by humane considerations, or a detached pursuit of truth for truth's sake, their discoveries cannot be separated from applications which all too frequently destroy or debase human life.

Theoretical and experimental physicists provided the knowledge out of which hydrogen bombs were made. Mathematicians, geophysicists, metallurgists, astrophysicists, and others wittingly or unwittingly made the discoveries necessary to construct ballistic missiles. Physicists working in the areas of optics and infrared spectroscopy enabled government and corporate engineers to build detection and surveillance devices currently in use in Vietnam. Anthropologists studying social systems of mountain tribes in Southeast Asia did work for the Central Intelligence Agency, even if unwittingly. The basic research of molecular biologists, biochemists, cellular physiologists, neuropsychologists, and physicians was essential for the creation of chemical and biological weapons, defoliants, herbicides, DDT, and gaseous crowd control devices. Findings in the social psychology of attitude

change have helped the advertising industry to manipulate public taste and buying habits for the benefit of the corporate profit-makers. Methodology developed in the area of psychometric testing and evaluation enabled the Selective Service System to pick, channel, and train men for war. The work of sociologists and anthropologists on the Third World has been used by the U.S. government to help maintain ruling elites in power. This list is hardly exhaustive. Indeed it barely scratches the surface.

If we are to take seriously the observation that discovery and application are practically inseparable, it follows that basic researchers have more than a casual responsibility for the widespread ruling-class application of their work, despite their predictable inability to prevent or control these applications. The economic and political ruling class which funds research and sponsors its applications, systematically functions in a manner geared to enhance and maintain its own power. For this reason, most discoveries lead first to exploitive and weapons applications and only much later to uses which entail at least some peripheral benefit for most of the people, providing, of course, that there is a profit to be made by distributing such benefits. For this reason the possible consequences of research in progress or planned for the future must be subjected to careful scrutiny. This is not always easy. The following few examples might indicate, perhaps, the scope of the job.

Basic research in meteorology and geophysics gives rise to the hope that man might one day be capable of exerting a high level of control over the weather. However, such techniques could easily be used to produce massively destructive typhoons or droughts over "enemy" countries like North Vietnam or China. As far back as 1960 the U.S. Navy published a paper on just this possibility and the need to develop the requisite techniques before the Russians did. Physicists working in the areas of optics and planetary orbits have provided knowledge which the American military was, and might still be, considering for the development of satellites in stationary orbit over Vietnam equipped with gigantic mirrors capable of reflecting the sun and illuminating the countryside at night. While scientific workers perform experiments on the verbal communication of dolphins, the Navy for years has been investigating the possibility of training them to carry torpedoes and underwater cameras strapped to their backs. Not surprisingly, much of the support for basic research on dolphins comes from the Office of Naval Research. Neurophysiologists are developing a technique called Electric Brain Stimulation in which microelectrodes capable of receiving radio signals are permanently implanted in areas of the brain known to control certain gross behaviors. Thus, radio signals selectively transmitted to electrodes in various parts of the brain are capable of eliciting behaviors like rage or fear or of stimulating appetites for food or sex. The possibility of implanting these electrodes in the brains of mental patients or prisoners (even welfare recipients or professional soldiers) should not be underestimated, especially since such uses might be proposed for the most humane and ennobling reasons. Again, the list of examples could be extended indefinitely.

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Unfortunately, the problem of evaluating basic research does not end with such obscene misapplications as these. There is another major problem. Our economic system of corporate capitalism demands that the products of scientific

research are not equally distributed to, equally available to, or equally useable by, all of the people. These products, like any other products and services in a corporate capitalistic society, are marketed for profit. They are channeled through an organization and distribution of scarcity in such a way as to become the prerogative of the middle and upper classes.

For example, research in comparative and developmental psychology has shown that enriching the experience of infants and young children, by increasing the variety and complexity of shapes, colors, and patterns in their environment might increase their intelligence as it is conventionally defined. As these techniques become more standardized, manufacturers are beginning to market their versions of them in the form of toys at a price prohibitive to the poor. Or, many hundreds of millions of dollars are currently being spent for basic research in aerodynamics, metallurgy, radiation chemistry, and other sciences so that a supersonic transport (SST) aircraft can be built. This is tax money which the government spends on subsidies to corporations and research grants. Thus, the development costs of the SST have been socialized; that is, we all help pay for them. Obviously, the profit derived from the planes will belong only to a few persons. In the end a product that everyone deserves to share will be used only by an elite (estimates of the percent of Americans who have ever been up in an airplane run as low as 10%). The distribution of the products of science in a capitalist economy enhances the already existing class oppression.

On a larger scale, nearly all of the people and most organizations of people lack the financial resources to avail themselves of some of the most advanced technology that arises out of basic research. Computers, satellites, and advertising, to name only a few, all rely on the findings of basic research. These techniques are not owned by, utilized by, or operated for, the mass of the people, but instead function in the interests of the government and the large corporations. The people are not only deprived of the potential benefits of scientific research, but corporate capitalism is given new tools with which to extract profit from them. For example, the telephone company's utilization of the basic research on laser beams will enable it to create superior communications devices. This, in turn, will contribute toward binding together and extending the American empire commercially, militarily, and culturally.

The thrust of all these examples, which could easily be elaborated and multiplied, is that the potentially beneficial achievements of scientific technology do not escape the political and economic context. Rather, they emerge as products which are systematically distributed in an inequitable way to become another means of further defining and producing the desired political ends of those in power. Unhappily, in a highly developed capitalist economy the best one can hope for is that scientific research be merely maldistributed rather than misapplied in ways which directly threaten life. New knowledge capable of application in ways which would alleviate the many injustices of capitalism and imperialism is either not created in the first place or is made worthless by the limited resources of the victims.

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An analysis of scientific research merely begins with a description of how it is misapplied and maldistributed. The next step must be an unequivocal statement that scientific activity in a technological society is not, and cannot be, politically neutral or value-free. Some people, after Hiroshima and Nuremberg, have accepted this. Others still argue that science should be an unbridled search for truth not subject to a political or a moral critique. J. Robert Oppenheimer, the man in charge of the Los Alamos project which built and tested the first atomic bombs, said in 1967 that "our work has changed the conditions in which men live, but the use made of these changes is the problem of governments, not of scientists." A pathetic comment from a man so alienated from his best creative efforts that he felt no responsibility for the uses to which they are put. But also a ridiculous comment, like a claim of innocence and disinterest from someone who has just left a loaded gun on a table between two others he found locked in a passionate and irrational argument.

Oppenheimer's attitude, justified by the slogan of truth for truth's sake, is fostered in our society and has prevailed. It was first advanced centuries ago by people who assumed that an increase in available knowledge would automatically lead to a better world. This was a time when the results of scientific research would not easily be anticipated. Today, in a modern technological society, this analysis is a rationalization for socially destructive behavior, put forth by people who at best are motivated by a desire for the intelligent pleasure of research, and often are merely after money, status, and soft jobs. It would be lame indeed to continue to argue that the possible unforeseen benefits which may arise from scientific research in a capitalist society will inevitably outweigh the clearly foreseeable harm. The slogan of truth for truth's sake is defunct, simply because science is no longer, and can never again be, the private affair of scientists.

No particularly nasty trick of scientific application was visited upon the nuclear physicists who did the research which resulted in the bomb. They simply assumed a somewhat notorious vanguard role. We don't have two governments, one which beneficently funds research and another which malevolently kills in the ghetto, in Latin America, and in Southeast Asia. Nor do we have two corporate structures manipulating for profit on the one hand while desiring social equity and justice on the other. Rather, there is a single government-corporate axis which supports research with the intention of acquiring powerful tools, of both the hard and software varieties, for the pursuit of exploitive and imperial goals.

In this society, at this time, it is not possible to escape the political implications of scientific work. In 1946, Leo Szilard, who had been wartime co-director of the University of Chicago experiments which led to the first self-sustaining chain reaction, quit physics in disillusion over the manner in which the government had used his work. He devoted the rest of his life to research in molecular biology. In subsequent years other physicists followed Szilard's lead into biology, including Donald Glaser, the 1960 recipient of the Nobel Prize in physics. Yet in 1969, James Shapiro, one of the group of microbiologists who first isolated a pure gene, announced that for political reasons he was going to stop doing any research. Shapiro's decision points up the inadequacy of Szilard's, but is no less inadequate itself. The damage was done. The research was completed and published and therefore is now in the 'wrong' hands.

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What is to be done? Traditional attempts to reform scientific activity, to disentangle from its more malevolent and vicious applications have failed. Actions designed to preserve the moral integrity of individuals without addressing themselves to the political and economic system which is at the root of the problem have been ineffective. The ruling class can always replace a Szilard with a Teller. What is needed now is not liberal reform or withdrawal, but a radical attack, a strategy of opposition. Scientific workers must develop ways to put their skills at the service of the people and against the oppressors.

There are actions we can take immediately which do not demand a high degree of organization or preparation. For example, we can contribute scientific services very publicly to nations with revolutionary regimes, following the lead of many who have volunteered for work in Cuba. We can begin to move away from that kind of professionalism which leads to scientific elitism, the creation of hierarchical authority relationships in classrooms and laboratories, and the fragmenting of scientific work off from the political and economic context in which it is performed.

It is impossible to escape the contradictions inherent in operating within establishment institutions. To a greater or lesser extent one is forced to do what the institution requires, and to that extent one serves the institution's goals. Nevertheless, some radical objectives can be achieved, especially if they are treated as personal priorities. Science and technology, with their accompanying machines, jargon, and ways of conceptualizing things, exert a powerful influence over people's lives, the more so when they are only barely understood. One thing scientific workers can do is to explain and demystify science so that it can be brought within the people's understanding. Those in teaching positions have a unique opportunity to begin doing this. For example, courses in any of the biological sciences should be considered incomplete if they do not deal with the political reasons why our society is committing ecological murder/suicide. Courses in psychopathology should spend at least as much time on our government officials and our insanely competitive economic system as they do on the tortured souls incarcerated in our mental hospitals, many of whom would not be there in the first place if they lived in a society where normality and sanity were synonymous. Within these and other disciplines, individuals can prepare reading lists and syllabi to assist colleagues interested in teaching such courses.

However, the most significant and exciting alternative available to radical scientists is participation in the creation of what might be called a "People's Science." Ideally, the task of building a movement for radical social change should enable the participant to perform work which is both individually satisfying and socially meaningful. In this regard, scientists have a unique opportunity. The movement which is gradually taking shape all around us will require certain kinds of new knowledge which can be developed out of scientific research. Both the potentiality of radical science and the complexity of developing it can be illustrated by considering what a people's medicine could be.

This illustration must begin with an understanding of how existing medical research and practice does not serve the health needs of the people. The discovery of a specific disease cure or preventive measure invariably depends upon prior basic research which is frequently linked to nonmedical misapplications, often before it is used to produce disease cures. For example, the work of microbiologists

who are decoding the DNA molecule gives hope for the genetic control of a wide variety of birth defects. Already this research has been used by government and military technicians to breed mutant strains of virulent microbes for germ warfare. Further, it is not unreasonable to expect that some day this research will lead to genetic engineering capable of producing various human subpopulations for the use of those who are in technological control. These might include especially aggressive soldiers for a professional army, strong drones to perform unpleasant physical labor, or 'philosopher kings' to inherit control from those already possessed of it.

Applied medical research, as well as the more basic variety typified by DNA work, is no less free of the possibility of misapplication. More than purely humane consequences could emerge from one of the latest dramatic medical advances, organ transplantation. Christian Barnard has publically urged that people be educated to "donate" their organs. It is not overly visionary to imagine that society's underclass, whose labor is decreasingly in demand, might be nourished as a collective 'organ bank.' If this occurred, it would most probably be on a de facto rather than de jure basis, as is the case with other forms of class and racial oppression. That is, monetary and other incentives would be instituted to encourage 'volunteers' so that direct coercion would be unnecessary. Models for the poor selling parts of their bodies already exist in the very old personage of the wet nurse and the more modern indigent professional blood donors.

The misapplication of medical or premedical knowledge is, however, only half of the problem. The tragically overcrowded and understaffed city and country hospitals of our large metropolitan areas testify to the inequities and class biases in the distribution of medical knowledge as well. People here and throughout the world needlessly suffer and die because the money to pay for, the education with which to understand, or the physical proximity to modern medicine has been denied them. By virtue of this, much of medical research has taken place for exclusive or primary use by the affluent.

Some medical discoveries have been equitably and, at least in our society, almost universally distributed. The Salk and Sabin vaccines are one example. Yet, one is forced to wonder if this would have occurred had polio been less contagious. If the people who are in charge of the people who are in charge of our public health services could have protected their own children without totally eradicating polio, would they have moved as fast and as effectively? Witness their ability to prevent or reverse malnutrition, while thousands of children suffer from it within our borders alone. In fact, while the polio vaccine may have been an exception, the gravest problem we face in terms of disease is not discovering new cures or preventive measures. Rather it is discovering ways of equitably distributing the medical knowledge we already possess, and that, ultimately, is a political problem.

It's not by accident that the first groups to deal with the problem of the people's health needs have been political organizations. The free people's health center movement arose from the initiative of the Black Panther Party and was picked up quickly by other peoples groups such as the Young Lords Organization. This sparked the mobilization of health and scientific workers into groups like the Student Health Organization and the Medical Committee for Human Rights which are among the most highly developed efforts to provide Science for the People.

It is through organizations like these that health science workers can begin to provide real medical service for the people. However, in a free people's health center one can provide more than simply diagnosis and treatment. One can begin to think of medical problems as social problems and through medical education begin to loosen the dependency of people on medical 'expertise'. Furthermore, medical research can be oriented to the immediate and perceived needs of the people. For example, a simple way of detecting lead paint poisoning was developed by health workers in New York for the Young Lords. This enabled the Young Lords to serve their people their people and to organize them to struggle against their oppression.

It is this type of scientific practice that most clearly characterizes People's Science. It directly serves the most oppressed and impoverished classes and strengthens their ability to struggle. The development of People's Science will depend upon achieving these and other characteristics. For example, any discoveries or emergent technology would have to be easily within the people's means. This would also mitigate against their use as a method of generating individual or corporate profit. Finally, we must carefully avoid developing anything which can be used as weapons against the people, whether in the natural or social sciences. Programs posing as meeting the needs of the people but which in fact strengthen the existing political system and defuse their ability to struggle are the opposite of People's Science. Thus, the liberal panacea of pouring funds into social science research and creating Oak Ridg type institutions for the social sciences (as discussed in the pages of Science) is no more likely to serve the people than the namesake institution has. The social sciences are not performed in a political vacuum any more than the natural sciences are. They all serve the same masters.

A good deal of creative imagination will be necessary to develop People's Science projects. Nonetheless, many opportunities do exist. Workers in the medical and social sciences could help design a program for client-controlled day care centers which would serve the women's liberation movement, and which would explain how to educate young people into the rich humanity and noncompetitive spirit of socialist men and women who are dedicated to fighting for socialism. Political scientists and sociologists could research ruling elites and power structures for the people rather than researching the people for the power structures. Groups like the North American Congress for Latin America have already done exemplary work in this area. Biologists and chemists could develop an all-purpose gas mask for which the necessary materials are simple, easy to assemble, readily available, and cheap. Physiologists and others could perform definitive research in nutrition which would enable the people to nourish themselves most effectively at the least cost. Ecologists could design and distribute simple kits for the detection of environmental poisoning. People's weapons, of which the Molotov Cocktail is a classic example, could be developed. These combine the qualities of being readily available to the people, and useless to their highly technological opposition. Many other examples can be imagined, such as creating a body of nontechnical medical knowledge useable by sensible laymen, developing organizing methodology for the movement, performing economic research for consumer unions.

If projects like these are to constitute a real People's Science, they will have to achieve more than the straightforward research objectives. The specific solutions which emerge through research should provide issues or techniques around which people can be organized to act in their own self-interest. Serious radical political work of any character demands ties both to community organizations and

to political groupings with broad and long-range perspectives; People's Science is no exception. Projects must flow out of both the needs and demands of the people and be related to the political priorities of the movement as a whole. In practice this means consulting with and relying on the experience of community and movement groups, and taking seriously the criticisms and suggestions that they put forth. If they are serious, each People's Science group must develop means of financially supporting themselves and their work, and also must see that an important part of their task lies in the dissemination and utilization of what they produce.

The notion of a People's Science is not proposed lightly. The time has come for scientific workers to begin meeting in small groups and discussing People's Science, initially from a general political perspective, but soon afterwards from the perspective of developing specific projects they might undertake. Scientific workers must succeed in redirecting their professional activities away from services to the forces and institutions they oppose and toward a movement they wish to build. Short of this, no matter how much they desire to contribute to the solution, they remain part of the problem.

People's Science Collective
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