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Science for Democracy

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SCIENTISTS—whether they like it or not—are forced by the circumstances of this new age to reassess their role in civilization. They are the trustees of the magnificent instrument of scientific method and of the great public domain of organized knowledge. Our complex and disordered civilization can no longer function without incorporating scientific method into the whole body politic and cultivating the domain of organized knowledge for its greatest social yield. Science must become the right hand of statesmanship.

Science of and for democracy must lift its imagination above the test tube and the laboratory to the whole realm of human life. It must envisage its task, not in cold abstract terms of "pure" science, but in terms of humanity itself. The job of science is to put its shoulder to the wheel and help rid civilization of poverty, squalor, disease, ignorance, subjugation, and violence. Its job, in short, is to help build a science of civilization.

Science cannot do this job unless, first of all, it has generous and assured public financial support, especially for basic research, which, though often far removed from immediate "practicality," is nevertheless the foundation and touchstone of all scientific progress. Science cannot do this job unless its freedom of inquiry is rigorously safeguarded. And, above all, science cannot do this job if it remains on the periphery of our civilization instead of being at the center. Neither science nor government can flourish as long as science is penuriously treated as a scarcity product rather than as a basic necessity of democratic civilization.

These are the underlying concepts motivating the proponents of a far-reaching, government-sponsored, all-science program, in which organized society, through government, would join hands with organized science in making the most of science for human life.

Yet the ideal of a broadly conceived national science program is threatened by a division of opinion among scientists. The newly formed Committee for a National Science Foundation, sponsored by Drs. Harlow Shapley and Harold C. Urey, warns that this division threatens the possibility of Congressional legislation and calls on scientists for a united front. Their appeal is based, not on the self-interest of science and scientists, but on the urgent needs of civilization itself for democratic well-being, security, and world order.

This emergency has arisen because a minority group of scientists, spearheaded by the Committee to Support the Bush Plan, is still actively pushing the fragmentary and ill-organized program embodied in *Science, the endless frontier,* despite the fact that the exhaustive Senate hearings sharply challenged its pretensions of being a comprehensive, democratic, all-science program. The broad trend of the hearings was for a far more effective alliance between government and science than the Bush program would permit. And this trend represented a real cross-section of competent American opinion—of natural and social scientists, of private and government scientists, of educators, of leaders of labor, agriculture, and industry, and of leading government officials. These hearings produced great clarification of thought on the difficult problem of organizing science as the "brain trust" of civilization, so that it is now possible, by continuing the democratic process initiated by these hearings, to create legislation that will meet the united needs of science, of government, and of the people.

Science, the endless frontier, as an obstacle to the attainment of this end, deserves a more critical scrutiny than it has yet received. Philip Murray, in his statement to the Senate Committee, made an incisive appraisal of its general spirit. Referring to the testimony of its sponsors and of certain sponsors of atomic legislation, he said:

> None of this testimony expresses faith in the democratic process. . . . None of it spells out partnership between scientists and the people of America. It is full of private fears, and an expression of tender anxiety about the profit system and its incentives, and the easily hurt feelings of professional scientists.

Science, the endless frontier, signally fails to rise to its great opportunity. It lacks any wide and bold

[1] The views expressed in this article are personal and unofficial.

vision of the role of science in modern civilization. It abdicates the social responsibility of science. So far from bringing science "to the center of the stage," as it proclaims, it would isolate it from the main current of human affairs. Despite its declaration of the "unity of science," it would dismember science by casting the social sciences into the outer darkness. Its "tender anxiety about the profit system" is indicated by its evasion of the immensely important patent issue and its complete faith in modern industrialism as the chief mode of applying science to human welfare.

The basic trouble with the Bush program is that, beneath the surface, its preoccupation is political rather than scientific. It sets up an intricate defense in depth against the well-worn bogeyman of "government intervention." There is no doubt that the creators of the Bush program profoundly believe that the least government is the best government.

Pertinent to this ideological stand is the fact that the Bush Committees had a considerable representation of large corporations, including Standard Oil and Du Pont, and of large private foundations. Most of its scientific membership was drawn from the Northeast, especially from the endowed universities. The smaller institutions and the underdeveloped regions were scantily represented. Equally striking was the fact that there were only two representatives of the immense array of government research agencies, and none whatever of the growing body of expert public administrators devoted to making democratic government socially efficient. There were no representatives of organized labor or of agriculture, both of which have an immense stake in the social application of technology. The insulation of the committees against social ideas is further indicated by the fact that there was no psychiatrist on the medical committee.

In essence, this natural science program is a system of government grants-in-aid to be administered by a virtually autonomous board of dollar-a-year men. The board's great disbursing powers are to be matched by equally great appointive powers: it would have unrestricted powers to appoint all its principal administrative and advisory officials, as well as all the state, regional, and national advisory boards required to assist it. A second dismemberment of science is proposed: the large number of government research activities are left entirely outside the scope of the Foundation. A separate Science Advisory Board, also composed of dollar-a-year scientists, is to be created to coordinate the activities of these agencies. Contrariwise, almost nothing is said about the outstanding need of coordination in nongovernmental science.

In its zeal to prevent government "regimentation," the Bush group has produced a plan that would prove unsatisfactory to the Government and to scientists. The dollar-a-year device has not won the confidence either of Congress or of the public. If the Government is going to give substantial support to research, it will want to safeguard the public interest by putting administration in the hands of accountable public servants, with undivided loyalty. Moreover, the Government will want to say something about the over-all social efficiency of a national science program based on public funds. On the other hand, the scientists who have been allured by the doctrinal theory of "freedom" set forth in the Bush program should note well that what actually emerges is a powerful scientific oligarchy, with a combination of appointive and disbursing powers that could, in practice, control science and scientists without any effective check either from government or the great body of scientific workers.

The undemocratic ideology of the Bush program is high-lighted by the arbitrary exclusion of the social sciences. *Science, the endless frontier* makes it appear that President Roosevelt's letter requesting the formulation of a national science program excluded the social sciences. That interpretation is highly dubious. But even if it were not, a representative committee with a real vision of the social responsibility of science would have warned the President that science could not be meaningfully organized by sinking without a trace all the sciences, from psychology and economics to law and administration, that pertain directly to organized human society.

In the recent letter addressed by the Committee Supporting the Bush Plan, of which Dr. Isaiah Bowman is chairman, to President Truman, an entirely different excuse for the exclusion is given:

> The Bush report was based upon factual studies showing the need and outlining a program for Federal support in the basic sciences. There are no comparable data and program for the social sciences.

Unwary readers not acquainted with the Bush report—including even scientists and other people with disciplined minds—have no way of knowing that this statement is a piece of artful legerdemain. The joker is that the Bush program from its inception deliberately excluded the social sciences. Thus, what sounds like innocent wonderment at the absence of a social science program merely conceals the fact that it was planned that way.

According to the naive social theories implicit in *Science, the endless frontier,* the natural sciences are supposedly innocuous and neutral, whereas the social sciences are "dangerous" because they explore social traditions and institutions. Both of these implications are false. The atom bomb once and for all explodes the "neutrality" of technology. And to

shelve the social sciences is sheer obscurantism. The modern world is inexorably confronted with change—swift, disruptive, and menacing. The ultimate question concerning the use of the social sciences is this: Shall we apply organized intelligence, in so far as possible, to understanding and directing change, or shall we leave change to the struggle of passion and factionalism?

The relatively youthful social sciences are, it is true, immature compared with the natural sciences. But their realism and usefulness have greatly increased in recent years as government has come to grips with depression, war, and reconstruction. If we are to have a national science program, we need a balanced all-science program, with the primacy lodged where it belongs, in the social sciences. If science is to make real sense in relation to human life, the natural and the social sciences must reinforce each other in a genuine partnership, for the natural sciences can function fully only as society is effectively organized. And both would be the gainers, in this partnership, for the natural sciences need to be humanized, the social sciences to improve their technical rigor.

The full use of all science, including social science, is indispensable for intelligent progress in all the great tangle of human problems that so compellingly confront modern government—for example, to cite only a few of them, full production and employment, social security, labor relations, race relations, public administration, public employment and relief, industrial monopolies, universal medical facilities, agricultural policy, the conservation of natural resources, regional development, the cause and cure of war, and the international allocation of raw materials and credit. At the best, without the full use of science, the vital decisions of government will have to be based largely on the inspired hunches of statesmen and administrators; and at the worst, on the quackery and factionalism of demagogues, supported by pressure groups.

In any national science program worthy of the name, the social sciences must be planted at the core of scientific effort, and especially at the core of government, which is their laboratory and testing ground. They must be planted there at the start, not at some hypothetical future time, as the Committee to Support the Bush Plan proposes. For, once the social sciences were put away in moth balls, they would be condemned to languish indefinitely in favor of an unlimited, planless, and socially irresponsible development of technology.

The recent statement by the Committee for a National Science Foundation, signed by more than two hundred scientists, mostly in the natural science field, disposes of the two main fears of the Bush program—the fear of government and the fear of social inquiry:

> The freedom of inquiry upon which science is dependent can be guaranteed for research under government no less than under private auspices.
>
> The government should support research in all fields of fundamental scientific inquiry relevant to national interest without arbitrary exclusion of any area.

Science can be democratically organized for far greater effectiveness and far greater real freedom than it can possibly achieve under an isolationist, laissez-faire regime. Nobody who believes in democracy wants government regimentation of science. But freedom itself must be consciously "organized," as the world is learning at the cost of two world wars and world depression.

There is a wide gap between disorganization and regimentation which it is the function of a dynamic democracy to fill with new forms of democratic, pluralistic, and efficient organization. The dramatic research that produced the atom bomb shows that skillful group-work can speed up scientific production enormously. Imagine, for example, a similar skill and energy—minus the war tension and the regimentation—applied to cancer, race prejudice, full production, or world peace. Science can be organized for full social efficiency without regimentation by providing scientists themselves with the cooperative tools of effective social workmanship.

Government can "intervene" to bring coherent purpose and united energy to bear on human affairs without assuming the role of managerial bureaucracy. It can do so by defining and delegating responsibility to given functional groups. Government can assist scientists in organizing science for full social efficiency without regimenting it. It can do so by putting the main (though not the exclusive) responsibility on the scientists themselves by giving them effective tools for cooperative action. To protect their freedom, the scientists themselves must be democratically represented in the National Science Foundation; and they must, moreover, work out democratic group methods for effectively organizing a much greater and more coherent scientific effort than anything hitherto visualized.

The National Science Foundation visualized by the Shapley–Urey Committee will require the active, democratic cooperation of state, regional, and national scientific bodies in formulating scientific programs and allocating scientific funds. Scientists themselves—and not government alone—must face the need of science, not merely for adequate financial resources, but for priorities and complete and adequate coverage of the whole scientific field, for cooperative research, for co-

ordination of effort, and for wholehearted democratic application of the results of research. Democratic process demands that all scientists have a responsible voice and part in this movement.

Public welfare demands also that government have a voice and part in this movement. We need a body of responsible public servants with adequate means, both financial and cooperative, to assist the organized scientists in making the most of our national scientific effort. Its role of promoting coordination would apply both to governmental and nongovernmental research agencies, but it would be facilitative rather than managerial.

In such a formula, we have a two-way, cooperative-bargaining arrangement between government and science. It would avoid the evil of the Government trying to dominate science and the equal evil of frittering away our scientific talent through fragmentation and financial inanition. It would preserve scientific freedom, but it would bring a vastly increased energy, order, and responsibility into our total scientific effort. If democracy is to function, it must be efficient; and it can be efficient without regimentation. Disorder is collective frustration. Orderly cooperation augments the power and freedom of the individual. The essence of freedom is that it can survive only if it is based on order.

Science can become the most important tool for democratic reorganization, but not if it remains half-heartedly used and socially irresponsible, and not if leading scientists sow distrust of government and remain squeamishly aloof from it. The Bush group, in effect, not only deny that government has the responsibility to assist in organizing science for human welfare, but they deny even that the scientists have that responsibility. For they would leave the laissez-faire tradition of science essentially intact and would perpetuate the isolation of science from the swirling current of human life. Above all, by debarring the full implementation of scientific method in democratic government, they would actually hasten what they most fear, namely, ill-considered, makeshift extension of government power.

In the age of the atom bomb, horse-and-buggy government is not merely an anachronism: it is a crime. To deprive government of the powerful tool of scientific method in reorganizing human relations, through law, administration, and cooperative social organization, would indeed condemn human society to remain in an "endless frontier" of force and chaos.

The Science Teacher and Legislative Proposals for the Promotion of Science

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THE NOTABLE SUCCESS of the Office of Scientific Research and Development in coordinating and originating scientific studies during our recent crisis has made our entire population conscious of the value of research. The report of the Director, Dr. Vannevar Bush, to President Truman, entitled *Science, the endless frontier,* has served as a framework of a bill (S. 1285) introduced by Senator Magnuson at the first session of the 79th Congress. The purpose of this bill and those of Senators Kilgore, Johnson (Colorado), and Pepper (S. 1298), Senator Fulbright (S. 1248),[1] Senator Byrd (S. 825), and Representative May (H. R. 3440) is to attempt to carry over to peacetime the advantages of a national research program. The National Research Council, organized during World War I, has announced the extension of its activities to the granting of Predoctoral Fellowships in the Natural Sciences while continuing its program of Postdoctoral Fellowships. The Research Corporation of New York will devote $2,500,000 during the next five years to support of research in chemistry, physics, mathematics, and their applications, such as engineering. The grants are to be made to institutions and are to be used to support the research work of persons of proven research ability who are desirous of entering, or re-entering, the faculties of institutions of learning. "Professional salary of the applicant must be borne by the institution as well as responsibility for continuation of the professional opportunity of the applicant beyond the terms of the grant."

Whereas all of the above programs should prove of great value to the stimulation of research, they fail to bring aid to the men under whom research is to be conducted. *No stream can rise higher than its source.* For many years the most competent research

[1] Since this was written these latter bills have been combined into one S. 1720 (see *Science,* 1946, **103**, 10; 39–44), but the cogency of Dr. Germann's comments is in no way weakened by this event. Ed.