The surface air itself contains radiostrontium due to the fallout from the stratosphere and corresponding to the average time between rainstorms in which it can collect. Filtration of air at sea level discloses radiostrontium on filters if the filters are fine enough, even in periods when bombs are not being tested; thus the only fallout is from the stratosphere reservoir from the high-yield weapons. Measurements in the antarctic on snow samples collected there show that the fallout rate in January and February 1955 was comparable with that observed in the middle latitudes.

Conclusion

Finally, although the main part of the radioactivity from high-yield weapons fortunately dissipates in the stratosphere, the small but very significant part that falls out within a few hundred miles of the site of the explosion for weapons fired on the surface constitutes a very real hazard and nothing I have said should be interpreted otherwise. The weapons tests are conducted with great attention to this and the other dangers and every effort made to protect against misadventure. What we have learned from the studies I have described—which by the way have been conducted under the name Project Sunshine—is that these local precautions should be entirely adequate and the worldwide health hazards from the present rate of testing are insignificant.

Loyalty and Research

Report of the Committee on Loyalty in Relation to Government Support of Unclassified Research

The Federal Government now sponsors a substantial part of the total research activities of the nation. The major portion of this sponsorship relates to military defense and leads to information which, were it loosely guarded, might to some degree jeopardize the security of the United States. To protect the national interest, the Government has instituted measures designed to exclude from all projects involving such information persons that may be suspected of secret subversion including espionage, of serious moral defects of character, of indiscretion, or of vulnerability to blackmail. These measures are imposed upon each contractor and accepted voluntarily by each individual worker as a condition of employment. They are bulwarked by the vast Federal machinery of investigation and moderated or controlled through boards of review. Projects of this character are referred to as "classified" or "sensitive" and both their prevalence and the conditions that govern them appear to be a reflection of the times in which we live.

But above and beyond its present huge commitment to classified research the Government invests also in research of a more fundamental character in the physical, biological and other sciences through grants and contracts to universities, hospitals and other nonprofit institutions. By their inherent nature the results of such investigations are unlikely to affect directly our immediate military security. Nevertheless, this great body of knowledge, when published, disseminated, and taught in our universities, becomes the basis upon which scientists and engineers will build the economic welfare and military strength of our country. This is the national investment in the future of science and the very life line of our continuing growth, and it is incumbent upon the Government to discover and maintain those conditions under which it will best thrive.

In the administration of grants and contracts for unclassified research, which by its very definition has no implication of secrecy, the government has refrained by and large from initiating inquiries into the personal character of those carrying on the research. There have, however, been incidents when doubts have been raised with respect to the loyalty of specific individuals. Such cases will in all probability continue to occur from time to time. The question then arises as to the extent to which the Government is obligated to ascertain the loyalty of a scientist—not in the employ of the Government—who utilizes public funds on a project that clearly requires no security classification.

To assist in the establishment of policy in these matters, Governor Sherman Adams on behalf of the President of the United States invited the National Academy of Sciences on January 11, 1955 to counsel with the Government. He pointed out in his letter that the Academy acts under Congressional charter "to advise the Government in the formulation of policy to the end that the scientific resources of our country may be fully and effectively utilized." Governor Adams stressed moreover the tremendous importance which he attached to the handling of this problem so as to avoid misunderstandings between scientists and the Government which might impair the cordial relationships which are so vital to the national welfare, and added that "it is equally important that people outside the scientific community understand the nature of the problem and that their confidence in the Government's handling of this important phase of the public trust be maintained."

On January 28, 1955 Dr. Detlev W. Bronk, President of the Academy, accepted the task on behalf of the Academy

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The Committee on Loyalty in Relation to Government Support of Unclassified Research was appointed by Detlev W. Bronk, president of the National Academy of Sciences, in response to a request for counsel about matters relating to loyalty made by The Assistant to the President, Sherman Adams, on 11 Jan. 1955 [*Science* 121, 7A (11 Feb. 1955)]. The report was dated 13 Mar. and released by the White House on 4 Apr. along with a letter of acceptance from Adams. Whether or not the report will lead to an Executive Order putting some or all of the recommendations into effect remains to be seen.

The members of the committee were Robert F. Bacher, professor of physics, California Institute of Technology; Laird Bell, attorney, Chicago, Ill.; Wallace O. Fenn, professor of physiology, University of Rochester; Robert F. Loeb, professor of medicine, Columbia University; E. Bright Wilson, Jr., professor of chemistry, Harvard University; Henry M. Wriston, former president of Brown University; and J. A. Stratton, *chairman*, vice president and provost, Massachusetts Institute of Technology.

and appointed the present Committee. . . . [Reference is made to appendixes A and B of the report, which contain the texts of Adam's request and Bronk's acknowledgment.]

The Committee has had the benefit of an extended discussion of policies and procedures with representatives of the principal Federal agencies concerned with the award of grants or contracts for unclassified research. . . . [Reference is made to appendix C of the report, which contains a more detailed account of the interviews.]

Setting of the Problem

The Committee confined its study to the question of alleged or confirmed disloyalty on the part of scientists, not employed by the Government, engaged in unclassified research under Government sponsorship in the private and State universities, hospitals, and laboratories of the country. It was not confronted, therefore, with the complex and difficult problems that surround the protection of "sensitive" projects and classified material.

Within the past several years the head of almost every Federal department and agency with a program of contracts or grants for unclassified research has been called upon to resolve in his own way the problem which is presented under the following circumstances:

When information reflecting on the loyalty of an individual who is employed on a Government-supported unclassified research project is brought to the attention of the head of the department or agency concerned and careful inquiry seems to indicate to his satisfaction that there is serious question of the individual's loyalty to the United States, what should be the course of action?

There appears to be no Act of Congress, including the appropriation Acts relating to awards for unclassified research, which provides guidance regarding the manner in which this question should be answered. Consequently, departments and agencies supporting unclassified research have pursued somewhat varying courses. This indicates that among responsible officials there is varying opinion as to what procedures should be applied in arriving at reasonable decisions. As a result there has been a growing concern on the part of the scientific community at large lest administrative practices that were developed for the handling of sensitive projects might gradually prevail over a larger domain and by slow diffusion from one department or agency to another ultimately affect the activities of all men and women engaged in scientific investigations under Government sponsorship.

The Role of Government in Unclassified Research

The part played by research in the advancement of science, and the contributions of science to the public welfare as well as to the national defense are now so widely understood that it seems hardly necessary to dwell upon the subject in the present report. Thus in a preamble to an Executive Order issued March 17, 1954, President Eisenhower stated that: ". . . the security and welfare of the United States depend increasingly upon the advancement of knowledge in the sciences; and . . . useful applications of science to defense, humanitarian and other purposes in the nation require a strong foundation in basic scientific knowledge and trained scientific manpower."

In a similar vein, the preface to a report on research and development in the Government presented to the Congress in May 1955 by the Hoover Commission contains the following statement: ". . . the foundation of the greatest sector of human advancement in modern times is basic research into nature's laws and materials. It is from these sources that come the raw materials of applied science. We owe to basic research the fabulous improvement in the health of the Nation; the greatest industrial productivity known to man; the weapons of defense which have protected our independence; and our knowledge of the laws which govern the Universe.

"There is no tribute great enough to express the Nation's obligations to its scientists, engineers, and military personnel, for their contributions to our constantly increasing productivity and the strengthening of our national defense. And there can be no relaxation in this effort."

The Government has now made clear that it has a vital concern in the promotion of unclassified scientific research, and that this concern extends to research at the most basic level. By this loose and often ambiguous word *basic* we designate research designed to elucidate the fundamental natural laws of the universe—to explore the innermost structure of the stars, to resolve the mystery of cosmic rays, to penetrate the atomic nucleus, to comprehend the forms and reactions that underlie chemical structure and biological phenomena, and to press forward the investigation of those complex molecules whose properties resemble life itself. Such research is the very foundation of efforts to develop materials and tools of our technological civilization, to improve communications among the peoples of the world, to master the genetics of corn, to produce food and shelter for an expanding population, to prevent or minimize heart disease, and to conquer cancer. If one believes in the beneficent uses of science for the welfare of our nation and of mankind, then one must also believe in the essential need for progress in basic research.

A fundamental contribution leading ultimately to the cure of cancer, providing it were made generally available, would be no less beneficial to all humanity for having been made by a communist. Authentic scientific progress carries with it no ideological flavor from its source. A major advancement in protein chemistry or a significant step in understanding the nature of growth must be judged on its intrinsic scientific merits; and it is of the utmost importance both to science and to humanity that such knowledge be widely and promptly disseminated in order that it may be reviewed, and subsequently confirmed, modified or extended by other scientists, the more readily to find application in the public interest.

Yet the idea persists that the Government in granting funds for research confers a favor upon scientists as individuals. We consider this contrary to the fact. In appropriating funds for the support of research, we believe the Congress to have been motivated by an urgent national need. The administration of these funds must be viewed in the perspective both of the intrinsic character of basic research and of its overriding importance in our age to the public welfare. The Committee believes that the Congress has acted wisely in making funds available to nongovernmental institutions free of encumbering regulations.

The responsibility of carrying out policies of the Government with respect to scientific research has been delegated to many agencies—among the foremost the National Institutes of Health, the National Science Foundation, the Atomic Energy Commission, the Department of Agriculture, and the Department of Defense. These agencies have drawn upon our material resources for the advancement of science in the private and State universities, hospitals and laboratories of the country. At an earlier period research in such institutions was maintained almost wholly from private endowment, State appropriations and grants-in-aid from charitable foundations. Private giving for the advancement of knowledge continues to play a crucial role in our society. But the magnitude of our present efforts and the cost of systematic attacks on the great unresolved problems of sicence are such that within the past decade it has become imperative to draw heavily upon public funds.

Through such grants and contracts the Government does not take upon itself the mantle of a charitable foundation on a grand scale, nor do scientists have any claim on public funds as the privilege of

a special class of citizens. The Government is engaged not in philanthropy, but in the procurement of the "raw materials of applied science" in the words of the Hoover Commission.

Protection of the Public Interest

In questioning the wisdom of some aspects of the loyalty program as applied to unclassified research conducted by persons not employed by the Federal Government, no member of this Committee condones disloyalty or suggests that the Government ignore evidence of the disloyalty of any citizen. We do believe that the proper objectives of Government in sponsoring basic research will be best served by concentration on scientific competence alone. The substance of unclassified research entails no secrecy and involves no danger to national security. Thus loyalty should have no special relevance to unclassified research, and there is no reason for singling out research for the application of loyalty requirements which set it apart from the multitude of other unclassified activities engaged in by the Government through contracts and grants.

The primary objective of a national research program is to serve the public interest by advancing knowledge in science as rapidly as possible. The only conceivable way by which a disloyal scientist doing unclassified research could sabotage this objective is by destruction of the scientific integrity of his own work. But the surest protection of the public interest against this kind of risk is the very process by which science protects itself from lack of objectivity. This process is the continuing scrutiny of the work of a scientist by his colleagues, in his own institution, his professional societies, the editorial boards of the journals in which he seeks to record his findings, and also in the reviewing bodies that examine both his past accomplishments and his proposed program if he is to be considered for a grant or contract. This critical scrutiny is well designed to assess the competence of the individual and to detect lack of scientific objectivity or integrity whatever may be the cause.

Nonetheless the Government should no more ignore criminal disloyalty in a scientist than in any other citizen. If there is evidence of criminal disloyalty or of any other crime under the law, it should be dealt with through the channels legally provided for the examination and disposition of such evidence—not through the administration of research grants.

Thus we maintain that serious allegations of disloyalty on the part of *any* individual indicating a violation of criminal statutes should continue to be promptly referred to the Department of Justice.

This is the positive action that every official of the Government or any other citizen can and should take when he comes into possession of evidence which in his opinion indicates the possible existence of disloyalty. It is our belief that in placing all such information in the hands of the Federal agencies of law enforcement established to deal with such matters he properly fulfills his responsibilities of office and of citizenship.

The Committee believes that when the maintenance of secrecy is contrary to the public interest, as is clearly the case with respect to unclassified research, irresponsible allegations reflecting upon the loyalty of individuals engaged in the program should be ignored. We are confident that formal confirmation of such a policy by the Federal Government would have a vastly reassuring effect upon the scientific community at large and would contribute much to the effective utilization of our national resources for the public interest through the advancement of science. On these grounds we think it sound public policy.

News of Science

Two Education Committees Established by the President

President Eisenhower announced on 28 Mar. the establishment of the President's Committee on Education Beyond the High School. Devereux Josephs, the chairman, is chairman of the board of directors of the New York Life Insurance Company, a member of the board of overseers of Harvard University, and a former president of the Carnegie Corporation of New York. The vice-chairman is David Dodds Henry, president of the University of Illinois.

The President indicated the need for this committee in his message to Congress on 12 Jan. when he said:

"Our vision would be limited if we failed at this time to give special thought to education beyond the high school. Certain problems exist now in this field, and already we can foresee other needs and problems shaping up in the future. Higher education is and must remain the responsibility of the States, localities, and private groups and institutions. But to lay before us all the problems of education beyond high school, and to encourage active and systematic attack on them, I shall appoint a distinguished group of educators and citizens to develop this year, through studies and conferences, proposals in this educational field. Through the leadership and counsel of this group, beneficial results can be expected to flow to education and to the Nation, in the years ahead."

In addition to studying the problems of providing good teaching and housing for the expected major increase in college enrollment during the next 10 years, the committee will consider possible recommendations for steps to meet the shortage of scientists and engineers. It will also be concerned with the waste of talent because students fail to continue their education in high school or college until they develop their fullest capacities.

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The establishment of another committee, the National Committee for the Development of Scientists and Engineers, was announced by the President on 3 Apr. This committee was named at the recommendation of a special interdepartmental Government study group that was headed by Arthur S. Flemming, director of the Office of Defense Mobilization.

In his announcement the President commented that the study group had recognized "that although the Government has a responsibility for increasing the supply and improving the quality of our technological personnel, the basic responsibility for solution of the problem lies in the concerted action of citizens