

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.

* * *

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

and citizens' groups organized to act effectively."

Paul Sears, president of the AAAS, and Detlev W. Bronk, president of the National Academy of Sciences, are two of the 17 representatives of education, the professions, foundations, industry, and labor that make up the new committee. Howard L. Bevis, president of Ohio State University, is chairman of the committee, and Eric A. Walker, dean of the College of Engineering and Architecture at Pennsylvania State University, is vice-chairman.

In a letter to Bevis, the President said he hoped the new committee would:

"1) Assist the Federal Government in identifying the problems associated with the development of more highly qualified scientists and engineers.

"2) Enlist the cooperation of all interested individuals and groups in analyzing the problem and developing programs to deal with it, and to take the lead in coordination of interested organizations outside the Federal Government.

"3) Make available to all interested organizations information on effective ways of overcoming the obstacles to the training of more qualified scientists and engineers.

"4) Publicize the problem and possible solutions in order to stimulate widespread public understanding and support.

"5) Provide the President, from time to time, with a report of progress."

Transmission-Type Photomultiplier

A new-type photomultiplier tube, which obtains its electron multiplication by the use of thin, plane-parallel, non-metallic films instead of conventional metal dynodes, has been developed by E. J. Sternglass and M. M. Wachtel of the Westinghouse Research Laboratories. The tube is finding particular application in high-speed pulse counting. Preliminary measurements indicate it should be capable of timing atomic events, such as the time of flight of a proton or neutron over a fixed distance, down to 10^{-10} second—a fiftyfold gain in speed over conventional photomultipliers.

In a conventional tube, the secondary electrons—which give photomultipliers their amplifying effect—are obtained from thick metal plates. An electron, striking the front surface of the plate, ejects several secondary electrons from that surface. These electrons must be directed through complicated paths of varying lengths to additional stages composed of such plates. Because of this, the electrons tend to "straggle" through the tube as they progress from stage to stage and do not give as sharp an amplified electron pulse at the output of the tube as is required for studying physical phe-

nomena that take place in less than one-hundredth of a microsecond.

In contrast, the new photomultiplier obtains its secondary electrons from the rear surfaces of thin films composed of alkaline earth oxides or alkali halides. The tube has a straight-through construction, with the films placed parallel to one another. The secondary electrons, therefore, always move straight ahead as they are accelerated from stage to stage. This shortens their transit time through the tube, minimizes electron "straggling," and produces a sharp output pulse with exceedingly short rise time.

By using nonmetallic films, such as KCl, the new photomultiplier also takes advantage of the fact that such materials have a secondary electron yield many times larger than those from any known metal.

The nonmetallic films used in the transmission photomultiplier are about two-millionths of an inch in thickness. The films are evaporated in a vacuum onto a film of SiO that is five times thinner, which helps give strength to the KCl. Between these two films is deposited a third film of gold that is only a few atomic layers thick. The whole three-layer "sandwich" is supported on an electroformed metal screen of 100–200 holes per linear inch and 50 percent open area.

Measurement of the pulse amplifying characteristics have been carried out with a transmission photomultiplier of seven stages. The total transit time of the electron pulse through the tube was found to be only 3×10^{-9} second. The agreement of measured and calculated values for the transit time indicates no intrinsic delay in secondary emission beyond 10^{-10} second. Thus, an extension of time interval measurements down to this figure appears feasible.

News Briefs

■ A subcommittee of the National Committee on Radiation Protection has been appointed to deal with problems of protection against high-intensity electron radiation produced by accelerators. Members will solicit data and prepare recommendations for installations where radiation-producing machines, such as betatrons, Van de Graaf generators, and linear accelerators, are used. This activity will be an extension of the earlier work of the NCRP in related fields.

Lester Skaggs, Argonne Cancer Research Hospital, Chicago, is chairman. The members are E. A. Burrill, High Voltage Engineering Corporation, Cambridge, Mass.; H. W. Koch, Betatron Laboratory, National Bureau of Standards, Washington, D.C.; J. S. Laughlin, Memorial Hospital, New York; R. F.

Post, Radiation Laboratory, University of California, Livermore; and E. D. Trout, X-ray Department, General Electric Company, Milwaukee, Wis.

■ By changing its tools—a matter that requires a few hours—a new automatic assembly machine, the Multra Machine, designed and built by the Multra Corporation, a subsidiary of Barnes Engineering Company, can be used to assemble a variety of products. Usually, assembly machines are built to do specific jobs.

An example of true automation, Multra has a feedback system. The machine feeds, sorts, sizes, forms, orients and inspects the parts to be assembled. If a part should fail to be inserted into a subassembly, then no further parts are fed into that subassembly and it is rejected at a late station.

A Multra machine is now in use assembling mercury batteries for P.R. Mallory and Company. The machine performs all of the battery assembly operations that formerly required a human operator, turning out between 15,000 and 20,000 batteries per 8-hour shift.

■ The use of an experimental heart-lung machine to reduce the risk of at least one serious heart operation has been reported by a group of Rochester, Minn., researchers. The machine shunts the blood past the heart and lungs, supplying it with oxygen before returning it to the body.

The physicians used the machine during surgery on 20 patients who had congenital defects in the wall of one heart chamber, complicated by high blood pressure in the lungs. Sixteen of the patients, including 15 children under 12 years and one 29-year-old man, survived and showed pronounced improvement. Four children died of pulmonary complications.

According to the group making the report, the results of the operations show that the surgical risk to the patient is "acceptably low, considering the severity of the condition." The risk depends on the age, general health, and the presence or absence of cardiac failure and pulmonary complications.

Mayo Clinic and Mayo Foundation staff members who made the report are James W. DuShane, John W. Kirklin, Robert T. Patrick, David E. Donald, Howard R. Terry, Jr., Howard B. Burchell, and Earl H. Wood.

■ The latest financial report of the Atomic Energy Commission states that appropriations for fiscal years 1940 through 1955 amounted to \$14.4 billion. Assets amount to \$9.1 billion as of 30 June. These figures are not complete, however, because for security reasons inventories of stockpiles are not included.