NEWS and VIEWS

RESEARCH AND NATIONAL SECURITY

AAAS FORUM LOOKS AHEAD

The significance of science as an element in the national security has never before been felt so keenly nor on so widespread a level as it is today, a fact that is reflected in part by an ever present need for scientists to fill vacant or newly created positions in government agencies. At the same time it is recognized in scientific and government circles alike that progress demands a working climate favorable to the growth of fundamental ideas in all branches of science. To some extent these needs are in conflict, for the individuals whose services are most in demand for the carrying out of specific projects in the applied sciences are very often the ones who are also best prepared to contribute usefully to basic research.

This and related problems were discussed at length at an open forum arranged as a feature of the AAAS meetings in New York City on December 29. A panel of representatives of the government, including spokesmen for industry, the armed forces, and the Atomic Energy Commission, addressed the forum individually. The program was developed by Detlev W. Bronk, chairman of the National Research Council, and Alan T. Waterman, chief scientist of the Office of Naval Research.

The forum was well attended and there was lively participation in the discussion from the floor. Dr. Bronk, who acted as moderator, underlined the widely held feeling of reassurance on the part of scientists in observing the postwar emphasis placed on research and development by the armed services. No severe criticism of the current policies of the Department of Defense was presented at the forum.

R. F. Rinehart, acting chairman of the Research and Development Board, analyzed some of the reasons for the shortage of top flight scientists and why it has been difficult to find high-level scientists who would accept the considerable number of vacant top positions in government. He urged that scientists be educated to feel that they should be expected to "budget" several years of government service as a part of their lifetime contribution to the national welfare. The discussion from the floor indicated a general feeling of reluctance among scientists to cease active productive research in order to work in government as administrators of scientific research and development. Much sentiment was evident that there is entirely too much delay and red tape in connection with the personnel and security preliminaries to employment in government positions.

Roger Adams, president of the AAAS and the American Chemical Society, agreed with a number of others that research contracts involving *classified* projects should not be accepted by educational institutions (except when separate organizations are set up for this purpose as, for example, the Johns Hopkins Applied Physics Laboratory and the California Institute of Technology Jet Propulsion Laboratory). He urged that university administrators be discouraged from seeking research contracts primarily to assure a financial return to the university through the "overhead" features of such contracts.

Some sentiment was expressed favoring the creation of an overall agency in government to coordinate research policies. Everyone present was hopeful of the early establishment of a National Science Foundation.

Colonel Leslie E. Simon, chief of the research and development division of the Army Ordnance Department, pointed out several steps which might be taken to improve research in military establishments. Such research (not development) as is done should be confined to *fields* of science rather than being devoted to producing specific items (for example, in certain phases of metallurgy or in the thermodynamics of fuels and explosives or in supersonic ballistics). Furthermore, he said, scientists should be freed as much as possible from *design* problems, which are not *research,* and should be called in only when their efforts can be expected to produce results of general application as contributions to knowledge. And finally, he felt, research in military laboratories should be confined to fields of special interest which are inappropriate or not likely to be undertaken in the normal course of events by universities and research foundations.

Paul E. Klopsteg, director of research at the Northwestern University Institute of Technology, urged that basic research be done in nongovernment laboratories, supported by government agencies like the ONR, AEC, and the National Science Foundation, and that government laboratories confine their interests largely to development, testing, and standardization.

Dr. Waterman emphasized the fact that the armed services have interests far more specific than those likely to be supported by a National Science Foundation. Typical are such fields as underwater sound, acoustics, ballistics, ultrahigh frequency waves, and biological agents. He felt that the armed services must continue indefinitely to support basic research in fields of special interest to the Department of Defense. An advantage of this policy over that of doing the work in government laboratories is that contracts can be let to institutions employing specialist scientists whose services would not otherwise be available to the government. This results in keeping the armed services closely in touch with the best scientists in the country, who may be called upon whenever their services are required.

A. E. Lombard, Jr., scientific advisor to the research and development office of the Air Force, expressed the belief that the armed services must look largely to outside scientists for revolutionary new ideas. He expects that the Air Force will organize an Office of Air Research, similar to the ONR. He emphasized the generally accepted fact that it is often easier and more efficient to have classified work done by contract rather than in government laboratories. As an example Dr. Lombard pointed out that such laboratories can attract the best scientists, who can work under congenial conditions free

of irksome Civil Service Commission restrictions. He also indicated the practical advantages to universities in having such contracts.

Kenneth S. Pitzer, director of the division of research of the AEC, emphasized the virtues of having government-supported laboratories with facilities (such as nuclear reactors or high energy accelerators) which would be impossible under private auspices. While much classified work is done in such laboratories, many of these rare facilities are available to the general scientific public for research and training. He indicated the belief that the establishment of these large government-supported installations under the sponsorship of groups of educational institutions is a tendency likely to increase and become a permanent policy.

John T. Connor, of Merck and Company, described the work of the committee appointed by Vannevar Bush, then chairman of the Research and Development Board, in considering plans for the effective mobilization of science in times of emergency. This committee, headed by Irvin Stewart, has completed its report which is currently being studied by the Research and Development Board. Dr. Connor reviewed the history of the committee's work and outlined the alternative policies which might be utilized for directing civilian research and development in the event of another national emergency.

—Marsh W. White

GASEOUS ELECTRONICS

SECOND ANNUAL CONFERENCE REPORTED

Important progress has been reported toward identification and quantitative understanding of the many individual processes that make analysis of gaseous conduction so complicated. This was reported at the second of what promises to be an annual conference on gaseous electronics, held at the Mellon Institute, Pittsburgh, Pennsylvania November 3–5, 1949; approximately two hundred scientists attended representing 21 educational institutions, 27 industrial laboratories, and 15 other organizations. The forty-four papers presented demonstrated the same breadth of interest that was evident in the first conference, held at Brookhaven in October, 1948.

Excellent agreement between theory and experiment was reported by a number of researchers. Papers by A. D. MacDonald and B. Lax emphasized that consistent results are now being generally obtained in breakdown measurements on microwave discharges. Yet to be explained in this field is the orders-of-magnitude difference between theoretical and observed electron-ion recombination coefficients. Further progress was reported by J. P. Molnar in determining quantitatively the relative importance of ions, resonance photons, and metastable atoms as sources of secondary electron emission at the cathode in the Townsend discharge. These experiments also are in quantitative agreement with the theory of the Townsend discharge. A. O. McCoubrey, D. Alpert, and T. Holstein reported interesting results (and their interpretation) on the persistence of band fluorescence in mercury vapor. This molecular effect was observed during the course of experiments which confirmed Holstein's theory of the imprisonment of atomic resonance radiation in the same gas.

Such a satisfactory state of affairs was not reported universally. Isolation of and qualitative measurements on individual processes remain as yet unattained objectives in the attempt to understand many gas discharges. Illustrative of this were papers and discussion on two problems of major importance in gaseous electronics: the propagation mechanism of fast sparks near atmospheric pressure, and the mechanism of electron emission in the low-boiling-point metal vapor arc. G. L. Weissler discussed a vacuum ultraviolet absorption experiment that is a promising beginning towards evaluating the contribution of high energy photons to spark propagation by photo-ionization, the process postulated in the streamer breakdown mechanism but so far unsubstantiated by experiment. Measurements of formative time lags of sparks in air by L. H. Fisher and B. Bederson more sharply defined the spark breakdown problem and the observations to be explained by an adequate theory. The processes of electron emission from the cathode in the metal vapor arc have not been identified and therefore were, quite understandably, the subject of spirited discussion and speculation.

The "electronic torch," described by J. D. Cobine, was probably the most spectacular discharge reported on at the conference. This 1000 megacycle per second discharge gives a very intense flame capable of melting tungsten if the gas involved is a polyatomic gas such as N_2. In pure noble gases, however, one's hand can be placed momentarily in the "flame" without being burnt.

Several papers were devoted to a discussion of various aspects of the plasma. These included an interesting investigation of plasma electron oscillations by K. G. Emeleus, Queens University, Belfast (paper read by W. P. Allis), a clarifying discussion of double probe measurements by E. O. Johnson and L. Malter, and theoretical solutions of plasma-sheath potential distributions by L. P. Smith and by O. G. Harrold, Jr. and R. Murray.

Two evening lectures added variety to the program. At a joint session with the Pittsburgh Physical Society D. Alpert demonstrated the imprisonment of resonance radiation in gases. As main speaker at the social evening and dinner, held at the Pittsburgh Athletic Association, H. E. Edgerton of MIT gave an illustrated talk on his experiences with stroboscopes.

The conference committee of W. P. Allis, D. Alpert, T. Holstein, C. Kenty, and J. P. Molnar did an excellent job of arranging the conference program. The smooth functioning of the entire affair may be credited mostly to D. Alpert and the Westinghouse Research Laboratories, which acted as the genial though unofficial host. The committee selected to carry on in 1950 consists of W. P. Allis, D. Alpert, J. D. Cobine, and J. A. Hornbeck.

A few bound copies of abstracts of the papers presented are available for distribution through D. Alpert, Westinghouse Research Laboratories, East Pittsburgh, Pennsylvania.

—John A. Hornbeck

LAST DAYS OF ASXRED AND CSA

AMERICAN CRYSTALLOGRAPHIC ASSOCIATION FORMED

After more than a year's study and discussion the