Meetings

Scientific Manpower

AAAS Conference in Philadelphia

One of the featured events of the Philadelphia meeting of the American Association for the Advancement of Science was a Conference on Scientific Manpower, held on December 28–30. The objective of this conference was to consider the crucial problems involving scientific and technical manpower in the fields of the natural sciences, engineering, and the social sciences. This conference was sponsored by the Engineers' Club of Philadelphia, the Engineers Council for Professional Development, Sections I (Psychology), K (Social and Economic Sciences), and M (Engineering) of the AAAS, and the Association's Cooperative Committee on the Teaching of Science and Mathematics. The program was arranged by a committee consisting of Ralph M. Hogan, ONR, T. A. Marshall, Engineering Manpower Commission, M. H. Trytten, Office of Scientific Personnel, and John A. Nagay, ONR.

At the session on the supply and demand for scientific personnel M. H. Trytten presided. D. Rodnick, of the Economic Cooperation Administration, spoke on "Scientific Manpower Behind the Iron Curtain", presenting some little-known material on the wide differences existing between the Soviet policies and those of the democracies in the selection, training, and utilization of technical personnel. His comparisons were not always to the credit of the non-Soviet countries in these fields. The policies of the National Science Foundation regarding the granting of fellowships for study in the graduate schools and the awarding of grants for basic research were discussed by Harry C. Kelly, of the Foundation's division of scientific personnel and education. Dr. Kelly invited suggestions from scientists during the current period when the policies of the Foundation are being formulated. A paper by J. F. Hilliard, of the Defense Manpower Administration, U. S. Department of Labor, called renewed attention to the growing shortage of scientists and engineers, who now number about 0.4% of the population of the nation. Dr. Hilliard pointed out the fact that democracy requires both political freedom and technological ability in a rising level of literacy and technical skill. Furthermore, Dr. Hilliard stated, democracy must be encouraged to grow in other nations, both through political and technological means, and it must be welded to our international enterprises and used as a major instrument of national policy. Manpower matters in the fields of the social sciences were outlined by E. Sibley, of the Social Science Research Council. He pointed out the fact that data concerning the supply and demand for social scientists are very inexact, since comparatively little attention has been given to the support of research and the training of professionally-qualified research workers in these fields. For example, Dr. Sibley stated that memberships in the professional societies in the social-science fields offer a poor index of the total number of those who are professionally competent, since the societies do not have strict requirements for entrance and membership. There is no unemployment in these fields, but the demand in academic institutions is now greatly reduced, while that of government agencies is growing.

In the conference session on post-baccalaureate training, the chairman was George B. Thom. G. Kleis, of the Westinghouse Electric Corporation, spoke on "Inservice Training of Engineers and Scientists in Industry". Mr. Kleis described the growing support given by industrial organizations to the inservice training of technical workers at the graduate level. Successful programs of this sort include well-balanced combinations of work assignments, orientation tours, and classroom-type instruction. These policies have long been established in a number of the large companies, but formally-organized programs are comparatively new in most small industries, although they are now rapidly increasing. This fact indicates the economic pay-off which hard-headed businessmen feel to be the fruits of such training. Inservice training programs in government laboratories were described by W. G. Torpey, personnel officer of the Naval Research Laboratory. His paper outlined efforts made by government agencies to upgrade their young workers by providing additional training and thus to increase the quality of engineering and scientific manpower which is now a limiting factor in attempts to expand research and development activities. Of especial interest to junior physicists are the summer employment opportunities available in several government laboratories. In many respects the inservice training programs in government agencies are similar to those of industrial firms. There is generally a tendency for the government-sponsored efforts to lean more heavily on nearby universities for off-campus extension courses, sometimes especially tailored to fit the needs of the particular laboratory sponsoring the training. Seminars and colloquia are common in the government research laboratories. The final paper in this session, presented by Herbert E. Longenecker, dean of the graduate school at the University of Pittsburgh, was on "The Unique Contribution of the Graduate School in the Development of Human Resources". Dean Longenecker's theory was that national security is a problem in human resources and that the further education of the graduate school is an immediate method of increasing the research potential of the country. Alarmingly reduced enrollments in graduate schools are in prospect; perhaps they may be decelerated by additional support from government and industry. A sig-

nificant trend in educational services is the steady extension of graduate study programs to off-campus locations. Also, in contrast with some professional schools, enrollment in graduate schools has always been open to all qualified students. Dr. Longenecker emphasized the relatively scant attention currently being devoted to the nontechnical fields in most graduate schools. For example, there is little study of Near and Middle East language and area subjects. A dangerous trend in graduate school enrollment is the disturbingly large number of college graduates who seek to do graduate work although they possess only the barest minimum of requirements for graduation at the bachelor's level. Dean Longenecker described the special examinations used at the University of Pittsburgh to test entering graduate students and thus to advise them more effectively concerning their aptitudes and potentialities. The papers presented at this session were summarized by Marsh W. White, of the Pennsylvania State College.

The final session of the conference, presided over by Dael Wolfle, was on "Selection Techniques: Psychological Background". Henry Chauncey, president of the Educational Testing Service, for the first time released data concerning the results of the Selective Service College Qualification Test. These results were highly significant and, in some instances, startling. Important differences in test performance were noted in the various geographical regions; the Middle Atlantic states ranked highest and the Southern states the lowest. By major fields of study the engineering and physical sciences ranked highest, followed in turn by the biological sciences, social sciences, humanities, arts, commerce, agriculture, and education. One finding of particular importance is the tremendous variability noticed among various colleges and universities, with some institutions having nearly 100% of their students receiving a passing score and some with as low as 35% passing. Technical schools ranked consistently higher than the arts colleges. The findings available to date amply confirm the original expectation that these tests, along with rank in class, would effectively serve the purpose of giving capable students an opportunity to qualify for deferment. A paper prepared by C. J. Lapp discussed "The Effectiveness of a Selection Program for Scientists". Dr. Lapp emphasized the benefits which fellowships yield to society as a whole, as well as to the individual fellow. There have been some 1000 fellowships previously handled through the National Research Council Fellowship Office. While these were largely supported from private funds the present tendency is strongly toward government grants, enabling the awarding of a much larger number of fellowships. Because of government regulations the techniques for selecting fellows have to be different in certain details from those used when private funds are supporting the fellowships. The last paper of the symposium was given by John C. Flanagan, director of the American Institute for Research at the University of Pittsburgh. Dr. Flanagan described some of the ambitious experiments under way to establish quantitative measures of the research effectiveness of individual workers. Techniques for these tests have been established and the individual test items are now in the process of validation. Attempts are being made to discover by the use of standard samples the effectiveness of the critical components of typical research jobs. While in the last analysis the supervisor must evaluate the effectiveness of his research colleagues, it is believed that his subjective judgments can substantially be improved in quantitative significance by the use of the instruments now being standardized. The addresses given in this session were summarized by C. W. Hawley, of the National Security Resources Board.

Henry H. Armsby, from the U. S. Office of Education, gave some preliminary figures concerning the enrollment of engineering students which were of great interest to the conference members. Dr. Armsby's data indicated an increase in enrollment in the current freshman year of about 15%, in comparison with the enrollment in the fall of 1950. There is a decrease of about 9% in the all-engineering enrollment this year. During the academic year 1950–51 there were about 42,000 bachelor's degrees granted, this being 10% higher than the previous estimates of 38,000.

Marsh W. White
The Pennsylvania State College

Society of Rheology

West Coast Section Meets at Berkeley

The West Coast Section of the Society of Rheology held its third annual meeting in cooperation with the Division of Mechanical Engineering of the University of California on the Berkeley Campus of the University of California on November 16, 1951. Several papers reflected the great influence of Henry Eyring's approach to the treatment of flow problems on the thinking of many rheologists. In a paper on the structure of the liquid state and the viscosity of hydrocarbons, R. J. Moore and Henry Eyring suggest that the molecules of normal paraffins are not only aligned parallel in the liquid state but experience hindered rotation up to temperatures substantially above their melting point. Discontinuities in the curves of volume, heat capacity, vapor pressure, and viscosity against temperature are shown to occur in many instances at points where geometrical considerations would just permit the onset of free rotation around the length axis of the n-paraffin chain.

Heats and entropies of activation for flow, in the Eyring sense, have been evaluated for various hydrocarbons in the respective ranges. On the basis of the observed values it is concluded that flow does not occur by evaporation, or "jumping" of individual molecules; instead, a new mechanism of flow analogous to that found in metals is proposed, involving movement of dislocations in the packed structure. Such flow involves cooperative movement of several molecules, the net energy of activation being the sum of the positive and negative energies involved in breaking and making