Need for a Meaningful B.S. Degree

Advisory Committee on Scientific Personnel

Scientific groups have been much disturbed by the official interpretation of the Starnes-Scrugham Act of 1944, the so-called "Veterans Preference Act." This Act provides that:

> No minimum educational requirements will be prescribed in any civil-service examination except for such scientific, technical, or professional positions the duties of which the Civil Service Commission decides cannot be performed by a person who does not have such education. The Commission shall make a part of its public records its reasons for such decisions.

Before the passage of this Act the Civil Service Commission had automatically prescribed a four-year college education or its equivalent as the basic educational requirement for examinations for probational appointment in the P-1 and P-2 grades in the professional and scientific services of the Government. The restrictions in this Act on the use of minimum educational requirements, therefore, appeared a clear-cut case of the reduction of standards in the Federal scientific Civil Service. Recently the sentiment among scientists against such apparent lowering of standards became so strong that the National Academy of Sciences and the National Research Council became interested in the problem, and letters signed by Dr. Frank B. Jewett for the Academy and Dr. Ross G. Harrison for the Council were written to many scientific societies. They suggested that the scientific societies consider the matter and express their opinions in formal communications to the government officials dealing with the subject. As a result, a great number of letters have come to the National Academy of Sciences and the National Research Council, expressing the deepest concern over this problem.

The Advisory Committee on Scientific Personnel has given much time to the consideration of the Veterans Preference Act as it bears upon the matter of educational requirements for Federal positions. It has discussed the matter with the CSC and with veterans' organizations. In all these discussions it has been recognized by everyone that it is to the best interest of neither the government service nor the veteran to place any but the most highly qualified persons in the scientific staff of the Federal Government. The only point at issue, therefore, has been the long-time effect of the given clause on the quality of the scientific Civil Service.

Perhaps the most important single point raised in the Congressional discussions preceding the passage of the Starnes-Scrugham Act was the reliability of the Bachelor of Science degree as a measure of academic accomplishment. It was pointed out frequently that the standard for the B.S. degree in American colleges and universities is a highly variable quantity. In some cases a stiff professional curriculum is required, while in others, work in the major subject is extremely limited and much of that work may, in fact, consist of courses in the teaching of the subject and may therefore yield little in professional training of the type required for scientific work in the Government. There is also considerable variability as to nature and number of collateral courses prescribed. If the B.S. degree is to be demanded as a requirement and strictly adhered to, it might result in such absurd cases, for example, as that where a near graduate of a highly technical institution with a large percentage of required courses in the field would be turned aside, while the holder of a degree from an institution which required only the weakest major could be accepted. The point made by the veterans' organizations and many in Congress was that a criterion such as the B.S. degree could be demanded with consistency only when it was, in itself, a consistent measure of accomplishment or when it at least could be depended upon as the best available guarantee of a minimum level of preparation.

The ACSP believes the situation to be highly unfortunate, because it seems quite clear that a first line of defense against dilution has been lost by the removal from Civil Service entrance provisions of the requirement of a B.S. degree. It is possible to retreat to a second line of defense, which would mean the setting up of particular credit requirements such as, for example, 30 credit hours in the major subject and strongly contributing minor subjects. The obvious disadvantages of such a requirement need hardly be emphasized. It may be pointed out, however, that if only the credit requirements in chemistry, for example, be stated (e.g. 30 credits) and, as is required by law, posted in public places throughout the land, this may well act as an incentive to candidates to confine their training to the base minimum of such courses without collateral courses. And if additional collateral courses in neighboring fields be specified, it may in the long run serve to set up the CSC as a curriculum influence of importance in American college practice. It would be better if curricula were established by departments in the interest of a sound training rather than in the interest of meeting some particular formula laid down by the CSC.

This problem might not be deemed so important if employment by the Federal Government were a minor factor in the whole scientific employment pattern. It is already a major factor in certain fields, and its importance may extend to other fields as time goes on. Furthermore, the problem of meaningful B.S. degrees extends far beyond the Civil Service. The weakness of this degree as a criterion has frequently been embarrassing throughout the war period. It was a big factor in the Selective Service situation. Had professional B.S. curricula existed, it is possible that the Selective Service System would have been able to use them as criteria of minimum preparation for use in screening out those who should be given special consideration as scientists, thus obviating some of the cases of flagrant misassignments of scientific personnel. In assigning Federal fellowships or Federal monies for students in the early part of the war, the lack of such a recognized curriculum, or at least of some recognized standard of minimum preparation in the fields of interest, was felt.

Discussions on the proper type of organization for the mobilization of scientific personnel in wartime have been numerous during the war and since V-J Day, many of these have taken place among military personnel. Perhaps some type of organization similar to the Medical Corps will arise in time. If so, scientists will need to be commissioned from civil life on the basis of accomplishment. Again, a meaningful B.S. degree is necessary.

The present National Research Foundation Bill, sponsored by Senators Magnuson, Kilgore, *et al.*, (S. 1850), calls for the establishment of fellowships for advanced study. The same problem of threshold preparation for applicants will arise, and the existence of a meaningful B.S. degree would again be useful. The dominant role of American scientific education in the world today will mean that foreign students will come here more and more and that our students will go abroad. The American degree will then become to a greater and greater extent world currency in this field. It would be better in this connection, too, if a more uniform measure of accomplishment were represented by our B.S. degree.

These are indications that the Federal Government is being called on more and more frequently to deal with persons on the basis of their academic accomplishments. The law and regulations based on the law require the existence of definable terms. The B.S. degree at the present time is frankly not a sharply definable term. The ACSP is not presuming to suggest any particular action, but does feel a responsibility to present to the scientific population a situation which seems worth describing and which does seem to merit most thoughtful consideration.

Canadian Researches on BAL (British Anti-Lewisite)

Leslie Young

Department of Biochemistry, University of Toronto

ONE OF THE OUTSTANDING ACHIEVEMENTS in the field of chemical warfare research in World War II was the discovery by Peters, Stocken, and Thompson of the antidotal action of 2,3-dimercapto-propanol (BAL, British anti-lewisite) to lewisite and other arsenical compounds. Two reviews of work on BAL have been published recently. The first of these was by Peters, Stocken, and Thompson (*3*), and the second, which dealt particularly with researches on BAL in the United States, was by Waters and Stock (*11*). The purpose of the present article is to review briefly some researches on BAL conducted on behalf of the Directorate of Chemical Warfare, Department of National Defence, Ottawa.

Work on BAL was started in Canada late in 1941. The first investigation undertaken was a comparison of the antidotal activity and toxicity of BAL with those of a series of related compounds. In the course of this work the following thiols were synthesized (*4, 12*): 1,2-dimercapto-ethane, 1,2-dimercapto-propane, 1,3-dimercapto-propane, 1,2,3-trimercapto-propane, 1,2-dimercapto-n-butane, 1,3-dimercapto-2-propanol, 2,2′-dimercapto-diethyl ether, 3,3′-dimercapto-dipropyl ether, and 2,2′-dimercapto-diisopropyl ether. These compounds, together with 1- and 2-mercapto-propane and 2-mercapto-ethanol, were tested for antidotal activity to lewisite and toxicity when applied to the skin of the rat (*6, 12*). None of the compounds tested was found to be superior to BAL as an antidote to lewisite. Although none of the monothiols tested showed antidotal activity under the above conditions, all the dithiols and the trithiol studied gave evidence of some antidotal activity. Only in the case of 1,3-dimercapto-2-propanol did this activity approach that of BAL, however, and this compound proved to be much more toxic than BAL.

Rats usually die within 24 hours after the application of lethal amounts of lewisite ($2 \times LD_{50}$) to the skin. Almost invariably, however, the lives of the