clear that it uses all the information in the sample in Fisher's sense of having minimum standard error. Once this problem of obtaining a consistent statistic with minimum standard error is understood, its solution should not be outside the range of reasonably possible straightforward mathematical research; and it is just possible that the solution might turn out to be that given. A related point is that the "least square" criterion on page 115 might well be replaced by minimizing another quadratic form whose matrix is the inverse of the covariance matrix of the triads.

The achievements of factor analysis so far seem to be in the nature of promise, and of challenge to further research in mathematical statistics. Complete methods have not yet been achieved which can be recommended to workers in the empirical sciences without reservation, or with the expectation that they will permanently be regarded as the best possible. Empirical problems, especially in psychology and neighboring fields, will certainly play a part in shaping the direction of the research necessary to put the required methods into final form. But the research will necessarily be a matter of mathematical statistics, for which no combination of psychology and matrix algebra, even with the addition of the other subjects conventionally taught in university mathematics departments, can be adequate unless the progress already made in mathematical statistics itself is utilized.

HAROLD HOTELLING

COLUMBIA UNIVERSITY

SOCIETIES AND MEETINGS

BIOLOGY AND MEDICINE IN THE WAR[1]

IN conjunction with the meetings of the Federation of American Societies for Experimental Biology, the Boston and Cambridge Branch of the American Association of Scientific Workers presented a symposium entitled "Biology and Medicine in the War."

Dr. Maurice B. Visscher, of the department of physiology of the University of Minnesota, discussed the problem of organizing biological research in wartime. Despite the general belief that the present war is the province of the physicists alone, biologists have the opportunity, he said, of making important contributions to the national effort. Not only may biological research aid in lessening the effects of war, but on the offensive side it may assist in solving the problems of combat in desert, tropical or arctic conditions, as well as in determining the factors necessary to elicit maximal performance of fighting men. Dr. Visscher pointed out that while biologists might be inducted into service and assembled in huge central laboratories, such action would delay research while laboratories were being constructed and would seriously deplete the teaching staffs of the universities. He described as short-sighted the view that practical problems should not be attacked until projects have been assigned and contracts drawn up. He emphasized that devotees of pure science should not insist on "research as usual"; on the contrary, scientists as enlightened individuals have a greater responsibility for the national welfare than have other members of the community.

Dr. Carl W. Walter, of the Harvard Medical School, defined six major concerns of war medicine: the control of epidemic disease, the care of the wounded, the organization of civilian preparedness, the acceleration of medical education, the maintenance of adequate nutrition and the coordination of research. The problems of the epidemiologist have been increased by the possibility of rapid transport of the vectors carrying communicable disease from one geographic point to another. War of movement has made necessary a new concept of military medical service, since the surgeon must now follow the mobile forces instead of remaining behind the lines in a base hospital. Other changes in military surgical practice include the insistence upon expert treatment of minor injuries and the emphasis now placed upon methods of treatment which yield ambulatory convalescents. The accelerated program of medical education presents serious problems because it not only requires a return to the strictly didactic type of instruction, but also deprives the student of time in which to mature.

Dr. Lucien Brouha, of the Harvard Fatigue Laboratory and formerly of the University of Liège, discussed the lessons which must be drawn from the attempts to organize biological and medical research in France during the first months of the war. There "secrecy" was imposed to such an extent that no scientist knew exactly what problem he had to solve, nor what progress was being made by other workers engaged in similar research. Lack of liaison between the various laboratories and between scientists and the armed forces was a fatal mistake, repetition of which must be avoided in this country at all costs. Dr. Brouha stressed the necessity of utilizing the scientific power of the nation to the utmost. Quality of the war material and of the soldiers who use it is as important, if not more important, than quantity. While the quality of the material depends upon technical achievements, the quality of the men depends upon the wise use of biological and medical knowledge in their selection, nutrition and care.

[1] Symposium at a meeting of the Boston and Cambridge Branch of the American Association of Scientific Workers, April 3, 1942.

Dr. Harry Grundfest, of the Rockefeller Institute for Medical Research, called for a cooperative effort on the part of scientists in working out and submitting plans for war research projects. Such an effort by the members of the New York Branch of the association has already brought most satisfactory results. Of these projects the first two to be submitted have already been approved and work has been begun under OSRD authorization. He reported the suggestion that college courses in organic chemistry be reorganized to permit the synthesis by students of chemicals which are likely to become scarce. This project and the scheme for lease-lend of scientific apparatus which has been worked out by the Purdue Branch of the association are other excellent examples of the work which can be accomplished by collective planning.

The discussion which followed served only to emphasize the fact that biologists as a group are dissatisfied with their present relatively inactive part in the war effort. The view that biological and medical research should be "frozen" for the duration was severely criticized; on the contrary, the importance of forming groups for the immediate purpose of planning and organizing war research was repeatedly stressed.

J. E. HAWKINS, JR.

HARVARD MEDICAL SCHOOL

REPORTS

FIRST REPORT OF THE WAR POLICY COMMITTEE OF THE AMERICAN INSTITUTE OF PHYSICS

REPRESENTATIVES of U. S. Government agencies, institutions of learning, the press and various national associations are turning more and more frequently to the American Institute of Physics for information, advice and cooperation from physicists as a national group. These appeals present opportunities for national service. It falls within the designated scope of the institute to grasp such opportunities, but in order to do so it must first clearly understand the place of the science and the profession in the affairs of the nation and the world. Then it must accept the responsibility of speaking with authority about physics, of reflecting truly the wise consensus of physicists.

The war has brought new problems and rapid changes. It has placed physics in an important position; in fact, its present and potential contributions may well have a profound effect on the course if not the outcome of the war. The institute has thereby acquired the responsibility of keeping abreast of changes, and of presenting to those concerned with the applications of physics and the use of physicists in the war effort a currently valid and accurate portrayal of the science and the profession.

To meet these necessities the institute established a War Policy Committee for Physics, with power to direct the "external" activities in which the institute engages on behalf of the profession. The members of the committee are: Dr. Oliver E. Buckley, president of the Bell Telephone Laboratories; Dr. Karl T. Compton, president of the Massachusetts Institute of Technology; Dr. Homer L. Dodge, dean of the Graduate College, University of Oklahoma; Dr. R. C. Gibbs, chairman of the department of physics, Cornell University, and Dr. Paul E. Klopsteg, president of the Central Scientific Company, *chairman*. Dr. Henry A. Barton, director of the institute, is secretary of the committee.

There follows a report of certain conclusions and recommendations of the committee:

(1) PROFESSIONAL STATUS OF PHYSICISTS

Recent developments in technical and industrial trends have brought physicists into a position of importance in industry not heretofore existing. The present situation requires a more clear-cut definition of "physicist." The War Policy Committee has adopted the following definitions as a basis and guide for its work, and they are recommended to the Founder Societies for adoption:

(a) A *physicist* is one whose training and experience lie in the study and applications of the interactions between matter and energy in the fields of mechanics, acoustics, optics, heat, electricity, magnetism, radiation, atomic structure and nuclear phenomena.

(b) To qualify as a *professional physicist* one must have had at least eight years of training and experience in physics. Toward this experience four years of formal collegiate education with major emphasis on physics may be credited, year for year, if it leads to a bachelor's degree, five years if it leads to a master's degree, and seven years if it leads to a doctor's degree, from a recognized institution. Years of teaching of physics in a recognized institution may be credited as years of experience in physics. By a *recognized institution* is meant one which appears in the list of institutions approved by the Association of American Universities.

(2) TRAINING IN PHYSICS FOR THE WAR

New tools of war have been devised which can swing the tide of victory. They utilize results of research in electronics, electric waves, acoustics, mechanics and optics. Physicists have devised these new tools, engineers have shaped them for manufacture, and manu-