

SPECIAL STUDIES ON THE CURRENT STATUS OF SCIENCE

The Foundation is interested both in the long-range development of knowledge in broad fields of science and in short-range studies of science, urgent from the standpoint of national defense, the general welfare, or progress in science itself.

In considering the subject matter and progress of science as opposed to its organization, financing, and manpower utilization, the Foundation believes that the scientists themselves must make the major contribution. There are dangers in self-analysis but these can be guarded against. An evaluation of the development and status of a domain of science attempted by individuals unfamiliar with the current state of knowledge in that science would be of little value.

To test the merits of self-appraisal the Foundation has supported three general long-range surveys of fields of science—physiology, psychology, and applied mathematics. As presently planned these studies will require up to three years to complete. None has been completed to date but the progress reports below show the methods of attack that have been decided upon.

SURVEY OF PHYSIOLOGY

The survey of physiological science, being conducted by the American Physiological Society, is under the general direction of a central committee of physiologists representative of the several subdisciplines of physiology. Specific segments of the survey are guided by subcommittees of physiologists who will evaluate those data pertinent to their special areas of cognizance and, on the basis of these data, will formulate individual reports and conclusions. The subcommittees, with the central committee, will then prepare the final report which is expected to be published during the autumn of 1954.

One of the most important information gathering phases of the study is the use of questionnaires, supplemented by data from existing rosters of the scientific population. The information will be checked by a limited number of interviews. The questionnaire, to be submitted to

all American physiologists (estimated to number between 4,000 and 5,000) is designed to obtain information about the profession of physiology, of what and whom it is constituted, why persons enter and leave the field, what are the motivations and the attitudes of these persons toward the profession and the problems encountered in practicing it. Information is being obtained about research, teaching, and administrative activities. The educational, social, economic, and geographic backgrounds of physiologists will be investigated.

Another part of the study has to do with the function of scientific literature in physiological science. Analysis of the data will show past and present interests in physiological science, the interweaving of other disciplines into physiological research, the development of concepts and the effects thereof on progress in the field.

Correlative studies are being made of college course offerings, content of such courses and methods used in teaching them, textbook and monograph analyses, student populations and factors related to recruiting of physiologists. Special studies designed to evaluate the presentation of physiological science to the lay public are also being made. An evaluation of the usefulness of physiology and of its contributions to society and the general welfare are being undertaken. For comparative purposes, a brief examination of the general status of physiology in selected foreign countries is being made.

The effects of the physiological survey are already being felt. As a result of discussion surrounding the formulation and development of the survey and also as a result of several meetings held by the survey at national scientific meetings, it is apparent that physiologists are individually and collectively beginning to take an introspective look at themselves, their relation to society and the contributions they and their science are making to our culture and well-being.

DEVELOPMENT AND STATUS OF PSYCHOLOGY

On October 1, 1952, the American Psychological Association entered into a contract with the National Science Foundation to conduct a study of the development and status of psychology in the United States. The need for such a study was perhaps more acute in psychology than in some older sciences. Psychology in recent years has shown a very rapid rate of change and increasing diversity of functions. Spanning the broad gap between the natural and social sciences, its relations with other sciences are growing in volume and in complexity. Such relationships are not limited to the strictly scientific domain. During and since World

War II the various fields of applied psychology have undergone rapid expansion. This has led to closer relationships with other professions in the fields of health, welfare, education, industry, military service, and Government.

The study of the development and status of psychology has been divided into two major parts:

Project A, an evaluation of the status of psychological knowledge with special reference to general scientific methodology, development of theory, and dependence upon empirical laws.

Project B, an analysis of occupations in psychology, including supply, demand, and utilization of scientific manpower in the various branches of the science. This part of the study is oriented toward the individual psychologist, his characteristics, interests, values, and social origins, the nature of his training, his output, and the cultural factors that influence him in his research and professional work.

APPLIED MATHEMATICS SURVEY

The survey of applied mathematics is being conducted under the direction of the National Research Council Committee on Training and Research in Applied Mathematics in cooperation with the Defense Department. A questionnaire has been sent to approximately fifty university departments with interest in applied mathematics to obtain factual data. Two national meetings were also scheduled for the fall of 1953 in conjunction with regular meetings of the American Mathematical Society. The first was devoted to the philosophy of and the training in applied mathematics, and the second to selected topics in applied mathematics.

Fifty years ago applied mathematics consisted essentially of the treatment of physical problems involving calculus and analysis. Today, quantum mechanics, statistical mechanics, numerical analysis, and the creation of biological and economic models have advanced applied mathematics to a state far beyond conventional analysis. Although this specialization is taking place on the pure side of mathematics as well as the applied, there is considerable risk of a drifting apart between the two categories of mathematicians. Practical techniques must be found for encouraging and facilitating cooperation between pure and applied mathematicians. Periodic revision of undergraduate curricula to take advantage of both empiricism and postulational mathematics is a possible approach to the problem.

The final report of the survey group will attempt to chart the principal factors involved in the training for and practice of applied mathematics. One fact is already clear. The applied mathematicians of the future will need deeper understanding of pure mathematics as well as an open mind toward the experimental sciences.