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INTERDEPARTMENTAL CO-OPERATION IN RESEARCH

AN account of what is being done in America in the broad field of experimental human biology to promote co-operative research has been given in a recent paper on "General Aspects of Interdisciplinary Research in Experimental Human Biology" by Dr. Josef Brozek and Prof. Ancel Keys, of the University of Minnesota (*Science*, 100, 507; 1944). This paper, apart from its specialized interest, is of wide importance in that it indicates some of the fundamental problems of the most effective organization of research effort everywhere, and it is a valuable contribution to constructive thought on the unity of knowledge. It will be recalled that the Manchester Literary and Philosophical Society recently devoted a meeting to this subject, and to the means of redressing that progressive disintegration which, as Prof. T. W. Manson emphasized, is such a characteristic feature of our civilization.

Dr. Brozek and Prof. Keys direct attention to some of the implications of the attempt to develop in the academic field the co-operative attack on problems by whole groups of specialists such as physicists, biochemists, bacteriologists, nutritionists, pathologists, physiologists, histologists, and psychologists. At present, competition between university departments may create a barrier to interdepartmental work. Again, it is pointed out by Dr. M. A. May, director of the Yale Institute of Human Relations, that the departmental method tends to encourage individualism and to discourage the ambitious worker from participating in interdepartmental collaborative projects. A third barrier is formed by traditional attitudes and ideas, such as the belief that scientific discoveries are always the products of individual minds, or that the co-operative setting limits the freedom of the scientific worker to follow the dictates of his own intellectual curiosity. A fourth barrier results from university training in habits of individual work.

As a result, Dr. Brozek and Prof. Keys point out, the young scientific worker is poorly prepared to participate in the activities of a committee or a research team. He may have become skilful in gathering empirical data within his own narrow field, but his techniques of social interaction are undeveloped and ineffective in practice. The Yale Institute of Human Relations was created more than a decade ago to meet this need for bridging several anthropological disciplines. The purpose was to correlate knowledge and co-ordinate technique in related fields, so that greater progress may be made in the understanding of human life from the biological, psychological and sociological points of view. Since 1930 other university institutes have been organized on inter-disciplinary lines, and Dr. Brozek and Prof. Keys strongly urge that such developments should form a part of graduate schools and not be left to industrial organizations, which will rarely provide the time and personnel to carry out a training programme of high scientific standing.

There can be little doubt that Dr. Brozek and Prof. Keys are on firm ground in urging that more should be done to break down departmentalism and encourage the attack on fundamental problems by workers in different branches of science. That idea was clearly present in the discussions at the recent British Association Conference on Science and Industry, but industrial experience as a whole scarcely suggests that the average research worker finds it as difficult to fit into an interdisciplinary team as the present paper implies. Both the competitive and co-operative habits can be encouraged in the process of learning, but much also depends on the personality of the individual worker.

The real case for stimulating supervision of the type here suggested, with its consciousness of scientific and social responsibilities, is the spur it gives to creative thought at the borderline of the sciences concerned. That as well as the encouragement of habits of co-operation and understanding is the outcome of broadening the background of the student and integrating the discipline he primarily follows more closely with the field of knowledge as a whole. Dr. Brozek and Prof. Keys rightly point to the value in this respect of a course in the philosophy of science, and they stress particularly the importance of including the theory of meaning and the study of verbal and non-verbal symbols used in representing scientific concepts and their combinations, the logic of the scientific method which deals with experimental design, collection of data, analysis of the error of measurement, process of inference and testing of hypothesis, and the concrete logic or systematology of the sciences based on analysis of their subject-matter and methods used.

Much of course would depend on the way in which such philosophy is taught; but beyond this, stress is laid on the necessity of working facilities for getting acquainted with the problems and methods of neighbouring fields, and familiarity with current problems. These, in fact, rather than the development of social skills, are the essential factors for stimulating an effective scientific co-operation; but in actual practice the methods and organization developed at the Laboratory of Physiological Hygiene at the University of Minnesota do not appear to overstress the third factor, and they provide ample encouragement for individual initiative and personal responsibility. It is worth recalling that something of the same kind of plea for the teaching of philosophy was voiced in respect of engineering at a Conference on Industry and University Education held last December in London by the Vacation Work Committee of the Imperial College of Science and Technology (see *Nature*, March 31, p. 402); and the article on "The Churches and European Reconstruction" which the Bishop of Chichester contributed to a recent number of the *Contemporary Review* is important for the same emphasis that is laid on the need for a spiritual unifying force, to be found not merely in science, which will restore hope and purpose.

This emphasis on the importance of the unity of knowledge is to be found in other discussions which

have centred around the universities and their functions in the modern world. Prof. Manson's address, referred to above, was largely concerned with the part which the universities might play in restoring a measure of unity to civilization if they set their own house in order by clearing themselves of the charge which the late Archbishop of Canterbury once levelled against them in a sermon before the University of Oxford, that a university "is a place where a multitude of studies are conducted, with no relationship between them except those of simultaneity and juxtaposition". That is a problem which must be frankly faced in dealing with the reconstruction and expansion of the universities. It is germane to the fundamental questions as to the functions of the universities and their place in the society of to-day, and was indeed frankly faced by both Dr. Lowe in "The Universities in Transformation" and by F. R. Leavis in "Education and the University".

More recently, the whole question has been very concisely but admirably discussed by Prof. John Macmurray in his article "The Functions of a University" in the *Political Quarterly*. Prof. Macmurray, stressing the cultural function of a university as the key to its functions of research and of teaching, urges that the life of a university should be effectively bound up with that of society about it. This cultural function cannot be fulfilled decisively unless the university is a place where knowledge is unified and not merely a common house for disjointed specialisms, and unless this unification is in constant and vital relation to the cultural life in the community around the university. A university must be designed to encourage and facilitate the interchange of knowledge through which it can become a spiritual whole; but the departments of knowledge can only be unified in the active life of a human community.

It is in this cultural function that our universities are most conspicuously failing, and that is essentially the point of Mr. A. S. Nash's criticism in his more recent book "The University in the Modern World". Prof. Macmurray lays the responsibility for this failure rather on the disintegration of traditional culture than on the universities themselves, and although he makes no suggestions as to how these three functions can be effectively discharged under modern conditions, he looks forward with some confidence. The use of science for social ends demands a unity of purpose in society which must express itself in, and depend upon, the achievement of a cultural synthesis. Changes in social structure and social outlook are taking place which will alter the demands made upon all our educational and cultural institutions, and Prof. Macmurray looks to a period of social and cultural unification. His paper, no less than that of Dr. Brozek and Prof. Keys, is a challenge to the critical and constructive thinking on the ultimate functions of the university and its place in modern society which must precede the adaptation and re-organization of its structure and methods, so as to serve these aims and functions more effectively in the new age.