

NATURE

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PHYSICAL SCIENCE AND HUMAN VALUES

IN 1946, Princeton University celebrated its bicentenary by a number of conferences at which leading figures in the world of learning met to discuss progress in their particular fields. One of the groups which met in this way consisted of physicists, and on the first and third days of this gathering the topic for discussion was the relationship of physical science and human values—a welcome recognition that both can influence profoundly the work of a university. The papers read at the conference have now been published in book form*.

The papers themselves, as Prof. E. P. Wigner points out in his preface, fall into two groups: those concerned broadly with the way in which the organisation of the society of which the man of science is a member can influence the growth and the trend of science, and those concerned with the influence of the man of science and his work and thought upon that society. The distinction is not sharply drawn, the field covered is very wide, and more than a title is needed to give unity between such diverse themes as Mr. F. T. Spaulding's discussion of scholarship in the secondary school, Dr. L. A. DuBridge on the large laboratory in nuclear research, Prof. F. S. C. Northrop on the physical sciences, philosophy and human values, and Prof. P. W. Bridgman on new vistas for intelligence.

The common bond is to be found rather in the evidence which the book provides that physical scientists are thinking, and thinking deeply, about all the interactions of science and society. The British reader will note that American thought runs on very similar lines to that of men of science in Britain; and the book, with Prof. H. N. Russell's approval, in the concluding paper, of the suggestion that a new Hippocratic code is needed to-day for all who deal with nuclear energy, and that the powers of life and death which are in our hands must be used soberly, and so far as in us lies, in the fear of God, supports the recent statement issued by the Committee on Science and its Social Relations set up by the International Council of Scientific Unions (see *Nature*, October 2, p. 507).

The papers in this volume, which cover subjects like the relation of research in universities to government and commercial laboratories, seldom contribute anything very novel; but points are stressed which are commonly overlooked or ignored in current debate in Britain. There is the same concern lest the university laboratories should be diverted from the advancement of science to the solving of commercial problems. In the United States, as in Britain, that would be regarded as a disaster of the first magnitude, and Dr. I. I. Rabi's suggestion that in the university research is to some extent secondary to, or parasitic on, teaching, at once drew the counter-attack that the advancement of knowledge is the

* Physical Science and Human Values. A Symposium by P. W. Bridgman, F. S. C. Northrop, H. Shapley, I. I. Rabi, H. N. Russell, M. Polanyi, F. T. Spaulding and L. A. DuBridge. With a Foreword by E. P. Wigner. Pp. vii+181. (Princeton, N.J.: Princeton University Press; London: Oxford University Press, 1947.) 16s. net.

first function of a university and that industry is really dependent upon the universities. Nevertheless, while industry's dependence not only upon new knowledge but also upon the development of new technologies was recognized, there was not in this discussion any tendency to exalt the divergent research typical of the university at the expense of the convergent research in industry. Both are required, and each would suffer if the other were cramped. The emphasis was rather on the need for co-operation, the way in which industry reacts on science, science on industry, and also one science on another, providing the means whereby advances are made in other fields.

What stands out from the discussion is the recognition that the conditions favouring creative work are essentially the same in industry and in the universities, and that the spirit of freedom which enables an individual to work by his own method will become increasingly characteristic of the industrial research laboratory, as it already is of the university laboratory. Again, Dr. DuBridge stresses that the dominating factor in any research laboratory is the attitude of the workers themselves; and he points out rightly that without the tremendous emotional stimulus to co-operative effort which the War provided, any laboratory built along the lines of the large war laboratories is bound to collapse. The point is one to be kept in mind in considering the possibilities of applying what is known as the technique of operational research in peace-time. The question of incentives has as yet not received anything like the attention it merits where the man of science is concerned, and Dr. DuBridge's paper should stimulate further thought about the question and the psychological conditions conducive to collaboration in creative work. His confidence that the essential freedom of inquiry and time for thought can be secured even in the presence of great new techniques of physical science and organisation presents a challenge which the conference was not slow to meet, and Prof. M. Polanyi directed attention in this connexion to the importance of public opinion. Where public opinion respects the autonomy of science and the freedom of those charged with scientific work, he believes that the form of organisation matters little.

Another important factor is that to which Prof. Wigner directed attention, namely, the value of mobility and interchange of scientific staff, which is commonly recognized, but still rather the exception. Prof. Wigner suggested that in large institutions a reasonably rapid turnover of the personnel both at the top and at the bottom might well help to foster the sense of adventure and the lively atmosphere which is one of the big advantages of the university. Dr. Harlow Shapley's paper on the uses and hopes of scientific societies is of interest as indicating the way in which learned and professional societies could both counter the tendency to specialization and assist in the formulation of national policy. As an example of inter-science activity, he referred to the Society of the Sigma Xi; but he looked further to the Science Division of the United Nations Educational, Scientific

and Cultural Organisation, urging especially the foundation by that body of great international institutions for scientific exploration and development in those fields where research is normally so expensive that small institutions or even small countries cannot easily undertake them on a national basis, and also the establishment and operation of travelling panels, each composed of specialists of different nationalities and adjacent fields of specialization.

When the conference entered upon the influence of science on society, its thought was vaguer and less constructive. Prof. Northrop emphasized that if the atomic bomb was ever used to destroy civilization, it would be because men could not get together sufficiently, on account of their ideologies, to agree upon the social controls that are necessary to meet the situation. Although he argued that the ideological conflicts between different conceptions of economic and political theory and human values are due to philosophical differences connected with scientific theory concerning Nature and the methods of scientific verification in natural science, he did not entirely convince the conference as to the probability of a philosophical basis of agreement between the U.S.S.R. and the Western democracies; and such scepticism will be encouraged by the recent fulsome adulation of 'Michurin science'. Science may well provide a rational basis for ethics; but it is the method rather than the content which, as Prof. H. Margenau suggests, forms the link; and in these latest manifestations Russia appears to reject the values both of science and of ethics, and to undermine the coherence which Polanyi regards as the real basis of freedom in science.

Doubtless greater precision in the choice of words used to describe situations could remove some common and potent causes of conflict; but nothing in this symposium of papers warrants any optimism regarding the clash between the U.S.S.R. and the West. Admittedly it is imperative that other effective controls shall be evolved in such fields as that of nuclear energy before those imposed by military security are relaxed, and these papers shatter any false ideas of absolute and irresponsible freedom of work or communication for the individual scientific worker. Equally they make it manifest that the rejection by the U.S.S.R. of the tradition and discipline of science at all points where they conflict with a particular political ideology betokens a difference in values which makes almost impossible at present her participation in the elaboration of the controls necessary to safeguard society. Where the transcendent character of scientific objective which recognizes no limitations or national boundaries is not admitted, there can be no such co-operation. Indeed, the dominant impression left by these papers is that the scientific workers of those countries in which scientific values are respected must themselves elaborate the means by which the world can safeguard itself to-day, hoping that the task of education and persuasion will secure the acceptance by others of those values in time to avoid a catastrophe.