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## ETHICAL ASPECTS OF THE DEVELOPMENT OF ATOMIC ENERGY

TO promote an understanding of the aims of the United Nations Educational, Scientific and Cultural Organisation, the Chicago Section of the American Chemical Society arranged a banquet in connexion with the National Chemical Exposition at which the theme was the role of the scientific worker in promoting world peace. Dr. W. A. Noyes, jun., in a broadcast address, emphasized that, for peaceful progress, we cannot rely on the control of specific weapons, atomic or otherwise, because weapons themselves are not the cause of war. He appealed to chemists, who must bear their full share of responsibility for enabling war to be made more and more awful, to give their best support to the subsidiary organisations, such as the Educational, Scientific and Cultural Organisation, which are endeavouring to promote understanding between peoples and to make the world a better place in which to live. Dr. Noyes urged the importance of the objective of raising the level of scientific work throughout the world, and of eventually securing great scientific institutions in all countries. Indeed, his realistic address was in essence yet another plea for full freedom of scientific and cultural intercourse.

Dr. Noyes announced the appropriation by the American Chemical Society of 25,000 dollars to promote international understanding and goodwill by enabling foreign chemists and chemical engineers to pursue advanced study in the United States. Dr. T. H. Hogness in turn stressed the particular qualifications of the scientific worker which enable him to assist in promoting world peace, especially in undertaking certain phases of the task of educating public opinion, through his special knowledge and insight into the implications of scientific progress. The most interesting passage in Dr. Hogness's address is, however, his quotation from a report of scientific men transmitted on June 11, 1945, to the Secretary of War. The justification for the concern of men of science with political issues could not be better put than in this report, written before the atomic bomb was first used.

"The only reason to treat nuclear power differently from all the other developments in the field of physics is the possibility of its use as a means of political pressure in peace and sudden destruction in war. All present plans for the organisation of research, scientific and industrial development and publication in the field of nucleonics are conditioned by the political and military climate in which one expects those plans to be carried out. Therefore in making suggestions for the post-war organisation of nucleonics, a discussion of political problems cannot be avoided."

The report goes on to urge that the political problems arising from the mastering of nuclear power should be recognized in all their gravity, and that appropriate steps should be taken for their study and for the preparation of the necessary decisions. The existence of nuclear weapons is regarded as the most compelling argument calling for an efficient



international organisation for peace. The quotation from the report shows that, before the world at large was aware of the dangers, the fundamental factual knowledge of men of science had led them to urge the governments concerned to take the appropriate measures to deal with the situation. Dr. Hogness points out that in such educational work, however, the man of science needs the assistance of such a movement as the United Nations Educational, Scientific and Cultural Organisation, and he adduces the international heritage and outlook of the man of science as a further qualification in promoting the organisation of peace.

Quoting appropriately from Edmund Burke's "Reflections on the Revolution in France" that "society is indeed a contract" and that the State "is not a partnership in things subservient only to the gross animal existence of a temporary and perishable nature; it is a partnership in all science; a partnership in all art; a partnership in every virtue and in all perfection", Dr. Hogness concludes with the exhortation that the scientific worker's contract with society includes taking his place among those who are particularly qualified to give leadership in the great effort towards world peace; and there can be no doubt that, if U.N.E.S.C.O. is to achieve its real purpose of furthering international exchange and understanding, scientific men must make a very real contribution to its proceedings. Something of the realism they have already shown in dealing with the problem of atomic energy and its control will be required. The programme before the General Conference in Paris included more than seventy projects, some of which can scarcely be regarded as possessing the urgency of the restoration of education and cultural activities in the devastated countries.

It may well be that the most important contribution of the United Nations Educational, Scientific and Cultural Organisation to the solution of the problem of control of atomic energy will be in bringing about a more favourable 'climate' of political opinion. Meanwhile, it is interesting to note that, just as much in the report from which Dr. Hogness quotes has stood the test of the last eighteen months, so also much of Prof. Lewis Mumford's latest book, "Programme for Survival"\*, written in August 1945, is as pertinent and relevant to-day as when it was written. Few readers will dissent from Mumford's comment in his preface that his conclusions would have been unchanged had he written in the spring of 1946. The book, in fact, is a continuation of the final chapters of "The Condition of Man", and is an urgent penetrating study of the tendencies now dominant in modern society, and an unmistakable warning as to the catastrophe they involve if unchecked.

Prof. Mumford urges that the vital question before us is whether mankind has imagination enough to mobilize, on behalf of peace and co-operation, forces that men have hitherto conscripted only for war and destruction. It is a question of dynamic will-power and time; Prof. Mumford is as insistent as scientific men themselves that we have only a limited time in

which to learn the art of control and to prevent the suicidal misuse of scientific knowledge. To do this is, in fact, to outlive the atomic age itself, the age of unqualified indiscriminate power, and it is at least encouraging to find in this book the recognition that we must be prepared, as part of the price of the safety and continued development of mankind, to scrap any part of the modern world. Preconceived ideas and political prejudices are in fact the gravest danger to which mankind is exposed, and nothing less than the same clear, fearless thinking at the political level, which in the scientific and technical field has placed at man's disposal nuclear energy, is likely to avert disaster.

Unconditional co-operation, Prof. Mumford holds, is the price of mankind's survival; and he sets that as the objective, urgent and imperative, but not to be attained unilaterally or forthwith as Mr. Lionel Curtis is inclined to suggest. He makes, incidentally, a powerful case for some attempt to redress the lopsidedness of scientific advance: appropriations like those for the development of nuclear energy should be matched by commensurate appropriations for the promotion of the social knowledge and technique which would facilitate the control of such weapons. Advances in the human and social sciences must be kept more and more in step with advances in the physical sciences.

The first step toward control of atomic energy, Prof. Mumford agrees, must be an international one. No one country can establish adequate controls. Moreover, military control must precede industrial exploitation: to foster the industrial uses of atomic energy and to widen the processes of creating it, without first establishing world government, is to cause chaos. He even argues that there is no pressing need for the rapid extension and exploitation of atomic energy for peaceful purposes. Here he parts company with the report of the Lilienthal Board, on which the proposals presented by Mr. Baruch to the Atomic Energy Commission are based, and states that he would be willing to urge the relinquishment of the use of atomic power for the next decade or so while we perfect the system of international control. From this point of view he argues quite logically that freedom of research, for the present, should not apply to this field, nor should the control of research be left even to the most responsible group of scientific workers. Prof. Mumford might thus be expected to approve the appointments made by President Truman for the Atomic Energy Commission: headed by Mr. David Lilienthal, supported by Mr. Robert Bacher, who was second in command of the Los Alamos Laboratory during the War, the members designated for the Commission are, with one exception, intelligent laymen rather than the scientific men and engineers who were concerned with the plants of the Manhattan Project.

Neither Dr. Hogness, Dr. Noyes, nor Mr. Lilienthal himself, who also addressed the American Chemical Society at Chicago, advocated that the scientific man as such should enter the political field. What they urged was the introduction of the fact-finding method of science into the political sphere as a step towards

\* Programme for Survival. By Lewis Mumford. Pp. iv+67. (London: Martin Secker and Warburg, Ltd., 1946.) 3s. 6d. net.



the elucidation of policy and measures, and while Prof. Mumford points out, as Dr. A. MacLeish has done before him, that the reactions of the intellectual classes to the Second World War show how little their special discipline is to be trusted in the appraisal of realities, he finds in the response of the physical scientists to the human threat of their most significant single advance in science and technology one of the few encouraging signs in the present situation. His tribute to the capacity for personal re-integration which such men of science have shown in order to deal unreservedly with this emergency is generous and deserved; and the scientific world should not dismiss too lightly Prof. Mumford's pleas that at the moment the issue of freedom in nuclear research is not the decisive factor, and that the world can afford to wait a decade if need be before the harnessing of atomic energy to peaceful purposes proceeds apace.

We are, in fact, concerned here with a problem in the relation of science to ethics and the restrictions which ethics may place upon the use of the scientific method to which the Bishop of Durham directed attention in his Fisson Lecture. "Scientific method," said Bishop Henson, "is ethically conditioned in three respects. First, there are the moral obligations which attach to the scientific student by virtue of his manhood, and which cannot be cancelled by any scientific interest. Next, there are the restrictions on the methods of research which are imposed by the claims of those whom they affect. Thirdly, there are limitations on scientific research imposed by the quality of the results which they are designed to secure." Bishop Henson's lecture received nothing like the attention it deserved, for he was concerned rather to provoke thought about such issues than to enunciate answers to the questions he raised.

The formulation of an international code of ethics for scientific men may yet be distant; still more the political conditions under which it could be implemented effectively. But none the less, it must be remembered that the atomic bomb itself is the product of international scientific co-operation, and only international control can avert its widespread use. The future of humanity depends, as Prof. Mumford asserts, on the three Great Powers, not less than others, placing themselves strictly under the judgment and the surveillance of the rest of the world. To take the initiative in this matter is not merely their responsibility but also an act of prudence. Unless national sovereignty can be liquidated to that extent, the world organisation we have created will lack the authority to give security even to the United States, the U.S.S.R. or Great Britain.

"The authority of the United Nations must be unqualified and universal: every last laboratory and factory must be open to investigation by authorised international agents, responsible to the central world authority. The power to spread, limit or even outlaw scientific investigation must reside in such a body no less than the power to outlaw completely all national armies. Privacy, secrecy, sovereignty must be unconditionally surrendered to a common body whose prescribed powers must override all local administrative organs at every point that is necessary to

ensure freedom from fear and freedom from unlawful aggression." This is Prof. Mumford's minimum price of security, and he recognizes clearly the great psychological change involved, rather than further knowledge; though he points to the value of developing further the sciences and arts relating to human institutions and biology. He asks of the man of science that he transfer to wider areas of knowledge and activity his capacity for self-abnegation, his well-trained inhibitions, his rigorous respect for controls. Religion, too, Mr. Mumford would mobilize in the cause, for institutional change will be insufficient unless we bring to it a fully awakened and constantly renewed personality; and he recognizes the high demand for self-discipline involved in the extension of the very processes of democracy to world organisation.

There are, in fact, questions here to which the United Nations Educational, Scientific and Cultural Organisation might well turn its attention at a later date. Meanwhile, apart from the particular problems of conduct which individual men of science may meet, it would be well for the scientific world to face the ethical considerations which are involved in the control of atomic energy, and indeed in the very prosecution of nuclear research.

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## "CANST THOU DRAW OUT LEVIATHAN WITH AN HOOK?"\*

The Role of the Aged in Primitive Society

By Prof. Leo W. Simmons. Pp. viii + 317. (New Haven, Conn.: Yale University Press; London: Oxford University Press, 1945.) 26s. 6d. net.

THIS study by Prof. Simmons of the treatment of the aged collects into a single volume, from a number of sources widely distributed in geography and representing varying types and stages of culture, a very large assortment of examples of the way in which old age is treated by primitive peoples. The author states in his introductory matter that a preliminary analysis of his comparative material revealed significant contrasts on the basis of sex, and that marked difference in the treatment of the aged appeared to be correlated to varying factors in the environment, economics, kinship system, or religion of the group treated. Correlations between the physical and cultural traits described, and the environmental or other circumstances apparently determining or affecting them, are examined accordingly, and an analysis is made of the traits examined: the relative importance of each trait in its culture setting is estimated and the results indicated by a coefficient of plus or minus to two decimal points.

In effect, all this is an attempt to apply the methods of an exact science to material which, as it exists at present, is not really of a proper nature to be so treated, and if Prof. Simmons's book had no other merit, it would be of importance as a demonstration that material collected by the most careful ethnographers is not really susceptible of this sort of treatment. It is perhaps unlikely that this method of dealing with sociological phenomena will ever become satisfactory, but its application to data

\* Job xli, 1.