

NATURE

No. 4022 SATURDAY, NOVEMBER 30, 1946 Vol. 158

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INTERNATIONAL CONTROL OF NUCLEAR ENERGY 626

THE report on Scientific and Technical Aspects of the Control of Atomic Energy, which has been issued by the Scientific and Technical Committee of the Atomic Energy Commission*, is in some ways rather disappointing. Ignoring the possibilities of distributing departed atomic fuel discussed by the Lilienthal Board, the report merely concludes that there is an intimate relation between the activities required for peaceful purposes and those leading to the production of atomic weapons; most of the stages which are needed for the former are also needed for the latter. Safeguards are not regarded as too difficult for the mining operations which are of special significance as the first step in these activities. Particular attention should be paid to the installations in which concentrated nuclear fuel is produced, since the product lends itself immediately to the production of bombs. Unless appropriate safeguards are taken at each of these stages, it will be difficult to ensure that no diversion of material or installation takes place.

Nevertheless, the Committee does not find any basis in the available facts for supposing that effective control is not technologically feasible; but the report does not discuss the political feasibility of control or recommend any system or systems by which effective control can be achieved. Compared with Lord Cherwell's statesman-like speech in the House of Lords on October 23, the report is strangely diffident and disappointing. There is lacking that sense of the vital necessity of reaching some working agreement to prevent the use of the atomic bomb in war which pervaded Lord Cherwell's address, like that of the utterances of so many other men of science on this subject. Lord Cherwell regards the Baruch plan as indicating a perfectly feasible approach, and he does not flinch from the difficulty that any workable scheme inevitably involves a certain surrender of that complete sovereignty which some nations are so insistent to preserve. Without international inspection, there can be no security against individual countries developing, producing and perfecting these bombs. A mere undertaking to refrain from their use will give no more security against their being used than the Kellogg Pact undertaking to refrain from war prevented the outbreak of war in 1939. Nor will a mere exchange of such information as a country chooses to divulge suffice. Either an international authority with the powers and the will to act in the case of recalcitrance must be allowed to inspect all the countries of the world, and to insist on the cessation of any obnoxious activities concerned with nuclear weapons, or we must make up our minds to an international arms race culminating almost certainly in disaster.

This central issue was very clearly put by Lord Cherwell. It is the essence of the problem which the Atomic Energy Commission has to face, and it is a.

* Scientific and Technical Aspects of the Control of Atomic Energy. Pp. v+42. (Lake Success, N.Y.: United Nations Department of Public Information; London: H.M. Stationery Office, 1946.) 25 cents; 1s.

fundamental reason for the Atomic Energy Act, which provides for the national control and regulation necessary for international control. That much needs to be remembered, for the attention rightly given in the debates, both in the House of Lords and in the House of Commons, to certain aspects of control as it reflects research and development, may tend to cause that fundamental purpose and reason for the Act to be overlooked.

Lord Addison's remarks in regard to research and the importance of not doing anything to prevent men of science exchanging ideas and developing scientific experiments on sound lines were in line with the Prime Minister's speech in moving the second reading of the Bill, and the undertakings which the Minister of Supply gave at the Committee stage, more particularly that a system of advisory panels of men of science would be an integral part of the administration of the Act, and that the ordinary tools of the nuclear physicist should be made exempt from its secrecy provisions. Lord Cherwell, however, was looking for constructive proposals rather than at the restrictions: he was concerned with the positive methods the Minister would use to promote research and development, and rightly warned the House of the difficulty of prosecuting research under Treasury auspices. It had been universally agreed, he said, that nuclear research could only be handled effectively on university lines, giving the head of the department the same freedom that a university professor enjoys in engaging his own staff, determining their salaries within reasonable limits, and directing their activities according to their particular aptitudes and interests.

Lord Cherwell's concluding observations were once again in line with those of American men of science. He thought it reasonable for Parliament to impose restrictions on physicists for the sake of saving humanity, but he distrusted Clause 11 as it stood as appearing to inhibit discussion even among *bona fide* colleagues, except in so far as particular topics exempted by the Minister are concerned. Finally, opposing the suggestion for a special advisory committee, he remarked that while it is important that the Ministers and Civil servants responsible for governing the country should have some knowledge of science, it is not for the man of science as such to rule, and he was confident that there were sufficient people in Parliament with scientific knowledge to make a Minister's life a burden to him if he took a line in any scientific and technical matter which is repugnant to scientific opinion.

What Lord Cherwell urged regarding the positive promotion of the development of atomic energy was even more strongly supported by Lord Samuel, who inclined to an optimistic view on early developments, and urged further its value for research both in physics and medicine. While, however, what was said in the House of Commons regarding the importance of freedom for the exchange of scientific knowledge as an essential part of scientific progress without which science will languish and die, even if in the present state of the world that condition conflicts with the interests of national and international security, was fully endorsed in the House of

Lords, as already suggested, this may not be the first issue at the moment. The essence of scientific progress is, as Lord Samuel observed, freedom of communication and the interchange of ideas. It is equally important to remember, as Lord Cherwell indicated, that ethical considerations may impose some limits on the use of the scientific method, and while scientific men rightly stress the imperative necessity of an early solution of the political problem of control, there is an equal duty upon them to consider the ethical issues involved, and whether in the wider interests of science itself no less than of humanity, a halt could not wisely be called in the development of atomic energy for any purposes until the governments of the world have been sufficiently wise and realistic to work out an effective system of control.

The minimum of control is that represented by the proposals of the United States, and so long as the U.S.S.R. refuses to agree to effective international inspection, suspicion will arise. Whether the U.S.S.R. agrees or not, if the scientific and technical committee decides that control can be worked from the technical point of view, the remaining governments must see that a political body with adequate powers of inspection is established. If, for example, a world commission of experts were given the proper status by selection from all nations, with appointments irremovable except for misconduct as is the rule for judges, and the special diplomatic status which would enable them to move freely in all countries, it might be no long task for the Commission to establish full confidence in its integrity, impartiality and ability even among such nations as are at present reluctant to agree.

Meanwhile Russian opposition to the idea of an international inspectorate and to the demand for sanctions, unimpeded by any veto procedure, against any nation violating the system of control, which is a highly important part of the Baruch proposals, should not lead us to overlook that the Lilienthal plan on which those proposals were broadly based may be more limited than at first appeared. The Lilienthal Board was cautious in the claims which it made for denaturing as a safeguard, and Mr. Baruch, in presenting the American proposals, said that the public had over-estimated the value of denaturing as a safety measure, and that the use of denatured materials would always require suitable safeguards. Safe activities will, in fact, probably be limited to scientific research, including the operation of low-energy piles and the use of radioactive material as tracers, in which the quantities of active material used are so small as not to be dangerous. If atomic energy is to be developed on a large scale as a source of industrial power, some fairly close system of supervision by the international authority will be essential to ensure that the denatured material which it has supplied for those economic uses is not being 're-natured' so as to make it suitable for use in a bomb.

The difficulties in providing such a system are considerable, and even a sense of urgency and a clear political field would not make it easy for the Atomic

Energy Commission to reach a rapid conclusion. The formidable extent of the task which will face the new authority will be apparent on the most cursory consideration ; and while it has been freely recognized in Great Britain and in the United States that the method of carrying out the control entails some sacrifice of national sovereignty, and it is already clear that the Government would have the support of all parties in Britain in agreeing to accept such limitations, that is not yet universal. Nor is the generous gesture which the United States has made in making its proposals been fully appreciated.

It is here that the ethical question may well arise. The United States Government is entitled to urge that such a plan cannot be put into force in a day, that it can only succeed in an atmosphere of confidence, and that that confidence must be built up gradually ; nor is it reasonable to expect the United States to destroy its existing stock of weapons until such confidence exists and the system is seen to be working effectively. On the other hand, it is a reasonable claim that so long as the United States retains its freedom to produce and possess bombs, other countries cannot be bound not to produce them. That in itself makes it difficult, if not impossible, for scientific men to formulate any practical code of ethics which would proscribe further work in this field until an effective scheme of control had been formulated and was working effectively.

It is significant that at the international conference of atomic scientists held at Oxford last July, Prof. J. M. Burgers expressed the hope that an international body could be formed which would emphasize that nuclear studies should be undertaken only for peaceful ends. There can be no doubt as to the value of the pressure which a united front on the part of scientific men could exert in this matter ; but at the present time their professional organisations are very far from being sufficiently comprehensive and strong enough to afford the man of science the anchorage he needs to exercise such influence. None the less, to retard the development of atomic energy even for peaceful ends for a few years might well be a small price for mankind to pay if it stimulated or accelerated the elimination of the menace which the existence of the atomic bomb will represent until a system of control has begun to function smoothly.

The Oxford conference decided that the main function of an international body at this time should be to facilitate the rapid and accurate exchange of information ; and there can be no question that even if such a moratorium were feasible, one condition would be that there should be no interruption of fundamental scientific research. It would be inherent in the formulation of any code of ethics for scientific men that there must be the utmost freedom of investigation and of communication, in the printed book or periodical and in personal contact. The expenditure on the improvement of scientific communications in some of the ways considered at the Empire Scientific Conference last June, or outlined in proposals before the United Nations Educational and Scientific Organisation, of a tithe of the sums at present earmarked for the development of atomic

energy, might in itself make no mean contribution to the establishment of the confidence and goodwill and the general political 'climate' in which effective control of atomic energy or of other forms of warfare can function. Prof. Mumford's recent book, "Programme for Survival", and Lord Cherwell's wise speech in the House of Lords should stir men of science in general to fresh thinking on the whole problem, and to fresh endeavour in practical leadership.

A SOUTH AMERICAN ANTHROPOLOGICAL SYMPOSIUM 18/6

Handbook of South American Indians

Edited by Julian H. Steward. (Smithsonian Institution : Bureau of American Ethnology, Bulletin 143.) Vol. 1 : The Marginal Tribes. Pp. xix+624+112 plates. Vol. 2 : The Andean Civilizations. Pp. xxxiii+1035+192 plates. (Washington, D.C. : Government Printing Office, 1946.) Vol. 1, 2.75 dollars ; Vol. 2, 4.25 dollars.

MORE than a hundred contributors, all from the Americas have undertaken the task of producing the five volumes of this Handbook, of which the two under review are the first to appear ; a volume will be devoted to each of four cultural divisions into which South America and certain regions to the north have been divided : marginal and hunting tribes from Terra del Fuego up to north-eastern Brazil ; the Andean civilizations to the west ; the tribes of tropical forests and savannah in the great central areas of the sub-continent and on the east coast ; and the circum-Caribbean cultures to the north and up the Isthmus to Honduras and along the Antilles to Cuba. The fifth volume, designated the comparative anthropology of the South American Indians, will contain general summaries and comparisons of the various aspects of the cultures previously detailed. An arbitrary outline, arranged to a standard sequence, has been followed by the contributors of each article, to assure proportionate brevity and facility of reference.

For each tribe there is an introductory passage, often illustrated and including a geographical sketch, followed by an account of tribal divisions and history, and sections detailing the particulars of all the activities and organisation of the tribe. The work, well described in a foreword as monumental, is intended to serve as a standard work of reference to the scholar, a text-book for students and a guide to the general reader ; these aims are fulfilled by the employment of specialists in each field, who combine a certain amount of new material with a revaluation of much old.

Each article presents chronologically, in the form outlined above, the data available from earliest times onwards through four hundred years of contact with White civilization : to these archaeological and historical horizons is added a foreground of ethnographical description, and in consequence post-contact change and the absorption of the tribes into European civilization are revealed and traced in as much detail as possible. Where information from these three sources is more complete, and the scale of tribal existence more considerable, such as in the Andean area, it has been found possible to sketch