

# NATURE

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## CULTURAL AND SPIRITUAL PROGRESS OF MANKIND

MUCH of the Lambeth Conference report\* deals with matters which are not the immediate concern of men of science as such; but two of the committee reports and certain passages in the Encyclical Letter are of interest in view of the increasing concern of the scientific world with the ethical aspects of atomic warfare, and of the attempts being made to formulate a professional code on the lines of the Hippocratic Oath. Moreover, a number of men of science have taken a prominent part in the movement to formulate a declaration of human rights, and on this also the report has something of interest to say. Thus even if their interest is indirect and by virtue of their citizenship rather than their professional activities, scientific workers cannot be altogether indifferent to any document that in any degree helps to clarify thought on the moral and spiritual values that form the real foundation for any attempt at union of the Western democracies. The frankness, clarity and logic of the whole report will indeed commend it to many outside the Anglican Communion, even if they do not always accept its premises or draw the same conclusions, at least without some reservations. The final invitation to all men and women to join in the war against the evils which wreck man's life and against the false creeds which debase it will be welcomed by many men of science.

The Encyclical Letter is noteworthy for a lucid restatement of the Christian doctrine of man as opposed both to Communism and nation worship. The claim for freedom is put in terms which many men of science will support, as they will welcome the insistence that rights imply duties which must be faithfully discharged. The Letter welcomes the great expansion of man's understanding of himself and of the world; but points out that knowledge may be used by man for self-destruction, and his greatest inventions turned to his ruin unless he learns to discipline his own nature and his powers. In forthright terms the claim that man should give himself entirely in obedience and service to the nation or group of which he is a member is rejected. Society exists to serve the needs of its members, not to enslave and possess them wholly, and the Letter maintains uncompromisingly that Christians must reject the Marxian Communism which exalts atheism and puts supreme confidence in material progress, and must condemn the cruelties, injustice and false propaganda inherent in it.

Neither the Letter nor the report as a whole fails to recognize that Communism to many people appears as a protest against social injustice, and it is urged in the report that it is the special duty of the Christian Church to oppose the Marxian challenge by sound teaching and the example of a better way. Firm support is also given to the work of the Commission of the United Nations on Human Rights. The Letter

\* Lambeth Conference, 1948: The Encyclical Letter from the Bishops, together with Resolutions and Reports. Pp. v+53+iv+120. (London: Society for the Propagation of Christian Knowledge, 1948.) 5s.

also calls on all nations collectively to control the manufacture and use of atomic power, and to pledge themselves never to use it for the purposes of war; and it calls upon the nations even at the price of limiting their own sovereignty to work together to remove the causes of war and to promote human culture and welfare.

In one of its resolutions on the Church and war, the Lambeth Conference affirms that it is the duty of governments to work for the general reduction and control of armaments of every kind and for their final elimination, except those which may be necessary for international police protection. Nevertheless, it recognizes that in the meantime there are occasions when both nations and individuals may be obliged to resort to war as the lesser of two evils, though the present report adds little to what was said on this subject earlier this year in "The Church and the Atom", which was prepared by a commission appointed by the Archbishops of Canterbury and York. The report of the Committee on the Church and the Modern World shows that the thought of the Conference ran on similar lines to that of the Commission; although the report presents not so much a challenge to thought, as did that of the Commission, as a call to action to combat the present disastrous trend towards another world war. It rightly points to the danger in the growing fatalism on this subject, and reminds us we can have either war or civilization—not both.

The value of the United Nations Organisation is recognized; but it is pointed out that any such organisation must be permeated with moral and spiritual power. Again the report calls for endeavour to remove the causes of war by striving for greater economic well-being throughout the world, greater emphasis on social welfare, better observance of human rights in every sphere, and more constant use of international negotiation and conversation. Equally, the inherent danger of unbridled arrogant nationalism is faced. In the sections on the Church and the modern State, the challenge of dictatorship is repudiated as inconsistent with the Christian way of life and as offering an absolute conflict of values whether the basis of the dictatorship is a secular or a religious view of life; but it is not claimed that a parliamentary democracy is the only alternative to dictatorship in the modern world. On the contrary, a contribution is offered towards thinking out afresh the terms of co-operation, and towards a fresh experiment in co-operation, which merits the attention of all concerned with the problem of active democracy and the preservation of individuality and initiative under the present conditions of industry, commerce and society.

In a further section, there is a dignified and searching analysis of Communism which recognizes that Communism cannot be overcome by argument alone. It has to be outlived, not merely outfought. The positive suggestions made here should command approval and support far outside the Anglican Communion. To proclaim human rights without equivocation and respect them in practice; to do full justice to the truth in Communism; to recognize that the

acceptance of an economic theory of Communism as distinct from Marxian atheism does not involve exclusion from the fellowship of the Christian Church; and to appreciate fully the immense contribution which science and technology have made to human welfare, and the dedicated lives of countless men of science and technicians—these are means which commend themselves to men and women of goodwill, and are already the basis of constructive contributions to human welfare and new experiments in communal living.

In the sphere of education, although there is little in the report that is new, there is much that will be welcomed. The most pressing need here, it is urged, is a *rapprochement* between religion and science, and the harnessing of scientific means to Christian ends. The Conference affirmed its belief that a fresh understanding of the nature and function of universities is greatly needed, and in that reassessment the place of theology in its full meaning must be fully considered.

Clearly it lay outside the scope of the Lambeth Conference to offer suggestions for dealing with such dangers as excessive specialization and the consequent lack of integration; but the report offers a real contribution towards supplying that clear sense of purpose the absence of which it regrets. The central problem of the relation of knowledge and power is fairly and squarely faced.

Through the new discoveries and inventions of our own time, man has gained power for the better ordering of the world. Those possessions now necessitate new forms of social organisation and the transcendence of outworn experiments in our ways of living and social institutions as the very condition of our survival. The over-riding task when all human values are threatened and man is being reduced to insignificance by forces beyond the individual's control is the vindication of man against all that cheapens or degrades him, and the rebuilding of a culture in which personal life holds the acknowledged primacy.

Whether or not they follow the argument of the report in its further searching and often stimulating analysis of man and his nature, scientific workers could scarcely wish for a fairer statement of the main issue. The Conference welcomed the great advance in scientific discovery characteristic of our age and repudiated the suggestion that any check should be placed upon it. Men of science, on their part, have also recognized that the consequent growth of man's knowledge increases his moral responsibility for the use and misuse of it. They will note with appreciation, also, the welcoming without reserve of the findings of scientific investigation into man's psycho-physical constitution, and the respect for the vocation of the man of science as a service to the God of truth. They, too, admit the desperate need for bringing technical discovery into true line with ethical direction, and that political freedom is everywhere in imminent danger because men shirk the price that must be paid for it and are prone to evade that responsibility, whether intellectual, civic or moral, by which alone it can be main-

tained. They, too, recognize that the hope that free institutions can be safeguarded on a secular basis must prove self-defeating, and some at least repudiate a determinist theory of history. If some cannot accept in their entirety the premises and conclusions of Christian thought even as displayed in the Lambeth Report, they may, none the less, be grateful for the evidence it affords of powerful support for many of the policies which they would wish to see pursued. The resolutions of the Conference may well lead to action and to the mobilization of moral and spiritual power behind the measures necessary no less for the furtherance of science than for the preservation of society and its highest cultural and spiritual values.

## THE EINSTEIN ENIGMA

Einstein

His Life and Times. By Philipp Frank. Pp. 367. (London: Jonathan Cape, Ltd., 1948.) 16s. net.

THOSE who, like the present reviewer, are personally unacquainted with Einstein, will read this book with a shock of surprise. While Dr. Frank's sympathies are all with Einstein, the portrait presented to us is not altogether a pleasant one. We see a man developing early into the traditional type of nineteenth-century 'professor'. He regards himself as free to develop any eccentricity of behaviour, whether those about him like it or not, and to talk shop in season or out of season, a characteristic illustrated (p. 144) by the description of a courtesy visit to a non-mathematical colleague in Berlin, in which, after subjecting his hosts to a forty-minutes discourse on relativity, Einstein left abruptly. This lack of appreciation of the fact that ideas and interests which did not happen to interest him might still be as valuable as those that did may well explain Einstein's difficulties in the Berlin Academy, or his failings as a teacher. Always, apparently, ready to lecture on his researches of the moment or to deliver popular discourses, Einstein was not prepared to teach his students systematically what they had need to learn. An attitude of this kind is not incompatible with a deep concern for abstract causes such as pacifism or Zionism, and his lack of human contacts had one good result: it turned Einstein in the early 1920's from becoming a political leader of the Zionist movement. But there is another side to the picture: an impulsive kindness made him only too ready to help refugee scholars after 1933, or to aid by correspondence a student in Prague (p. 331), or to instruct in arithmetic, at her own suggestion, a little girl of ten who lived near him in Princeton (p. 356).

Dr. Frank does not, of course, aim at an exposition of relativity theory; but he does describe Einstein's philosophical views in some detail (pp. 259 and 336). Einstein adopts a logical positivist view on the basic theoretical laws of Nature, which are for him free creations of the imagination confirmed by observation. Logically, this should lead to the acceptance of Newtonian mechanics as an equally good alternative to relativistic mechanics when we reflect on the enormous body of observational confirmation the former receive in engineering and astronomy, for example. At the same time, Einstein holds a realist view on electromagnetic and gravitational fields,

light, atoms, electrons, etc. They are 'physical realities' and not concepts freely created for the purpose of interpreting observations. Nor is it easy to see how a belief in the rationality—almost the mathematical character—of Nature (p. 340) can be reconciled with his view of the character of scientific law. If Nature is rational, surely its laws are there to be discovered, and not created, by the man of science?

Dr. Frank's account of the times in which Einstein lived is written from the point of view of a Central European who sees Germany and her immediate geographical neighbours as the world-focus of scientific activities. Many quotations illustrate the strange vagaries of the totalitarian mind: in Nazi Germany relativity theory is the expression of Jewish physics, in Russia the theory is at first contrary to and later in accordance with dialectical materialism. Dr. Frank's selection among Einstein's contemporaries of those worthy of mention is very odd indeed. The venomous ideological crank Philipp Lenard, is often referred to and freely quoted; but men who most nearly reached Einstein's intellectual stature and who developed and made known the theory of relativity receive scant attention. Hermann Weyl and de Sitter are not mentioned at all, and the three references to Eddington scarcely do justice to his contributions to the theory. Indeed, Einstein is credited (p. 326) with proving after 1933 that the geodesic principle is deducible from the field equations, though a proof of this theorem is to be found in the "Mathematical Theory of Relativity" written in 1923. Again, from pp. 346-351, we obtain the impression that the atom bomb was due to the scientific and political efforts of Einstein, O. Hahn, L. Meitner, E. Wigner, E. Fermi and L. Szilard. Even if Chadwick and Cockcroft are not worthy of mention, surely some native-born American physicists had a hand in the matter!

G. C. McVITTIE

## THE CAVITY MAGNETRON

Microwave Magnetrons

Edited by George B. Collins. (Massachusetts Institute of Technology; Radiation Laboratory Series, Vol. 6.) Pp. xviii + 806. (New York and London: McGraw-Hill Book Co., Inc., 1948.) 54s.

THE origin and excellence of the Radiation Laboratory Series of monographs is now well known, and can need little in the way of introduction to the physicists and engineers on both sides of the Atlantic who took part in the great war-time venture of radar. Without the cavity magnetron it is more than doubtful whether micro-wave radar could have become the decisive weapon it turned out to be. In this sense, therefore, the volume under review is perhaps the most important of the series, providing the central theme without which many of the other volumes could not have been written.

The cavity magnetron as a micro-wave generator of pulsed power of the order of a few kilowatts was taken to the United States by Sir Henry Tizard and Prof. J. D. Cockcroft in May, 1940, in a form entirely suited to manufacture; and this after only a few short months of work by those concerned. This early work, the later use of higher peak voltages and magnetic fields, the introduction of strapping in 1941, and the later achievements of peak powers of 2 or 3 × 10<sup>6</sup> watts at a frequency of 3 × 10<sup>9</sup> mc./sec.,