

NATURE

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FREEDOM OF SCIENTIFIC INTERCOURSE

SPECULATIONS as to the implications for material progress no less than for destructive purposes of the immense co-operative scientific effort that went to the evolution of the atomic bomb may tend to distract attention from some important issues relating to the progress of science itself. The profound secrecy in which this effort has been enveloped should emphasize the fact that for some six years the normal channels of communication between scientific men have been interrupted, and to restore such intercourse across national frontiers is the first step to stimulate the creative thought and exchange of knowledge and ideas upon which the progress of science finally depends. Sir Henry Dale has been prompt to point out, in a letter in *The Times*, that the preservation of civilization itself may now well depend on the fullest freedom of scientific intercourse. The abandonment of any national claim to secrecy about scientific discoveries, he suggests, must be a pre-requisite for any kind of international control such as will be indispensable if we are to use atomic energy to its full value and avoid the final disaster which its misuse might bring.

There may be no immediate opportunity for a national, still less for an international, exchange of scientific opinion, but the magnificent loyalty with which scientific workers have kept this greatest of war secrets cannot disguise the fact that those concerned, and their colleagues in science everywhere, are increasingly impatient for the revival of the world community of science to which Sir Henry referred. The importance of removing the restrictions on the scientists' liberty "to know, to utter, and to argue freely according to conscience" has already been stressed in the discussions on the development of scientific and industrial research in Britain, and has been emphatically endorsed in the report which Dr. Vannebar Bush recently presented to President Truman under the title "Science: the Endless Frontier". That report showed unmistakably that authoritative scientific opinion in the United States has come to recognize the need for more official methods of carrying on international scientific activity. Not merely the removal of war-time restrictions and hindrances, but also the positive encouragement of the exchange of knowledge and ideas by means of international scientific congresses, international fellowships and the like is strongly advocated.

Similar ideas have previously found expression in the report of the British Commonwealth Science Committee (see *Nature*, 152, 29; 1943) and Dr. Joseph Needham's proposals for an International Science Co-operation Service (*Nature*, 154, 657; 1944). They have been strongly emphasized in Britain, in the U.S.S.R. and in the United States in connexion with the recent visit of scientific workers to the Soviet Union to celebrate the two hundred and twentieth anniversary of the Academy of Sciences of the U.S.S.R. Co-operation with Russian men of science, said Sir Robert Robinson, in addressing the

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Parliamentary and Scientific Committee, is absolutely necessary. Prof. E. N. da C. Andrade commented on the complete absence of suspicion, and on the value of personal contacts, particularly in view of the existing postal delays. With the opening of the Baltic and increased air service, an improvement in the postal services and in means of communication in general may be expected, but even so, as Sir Lawrence Bragg has emphasized elsewhere, it is often impossible to judge the value of a new theory or technique without personal visits or discussions. An interchange of advanced students would do much to increase understanding and to promote collaboration, and Prof. D. M. S. Watson on this same occasion referred to the evident desire of Russian scientific workers to keep in touch with scientific work and progress in the world also and for such interchange of young men of science and research students.

Several of the British visitors have surveyed very briefly their general impressions of Russian progress in the various branches of science, and elsewhere in this issue of *Nature* we are publishing some of these articles. From these it seems clear that Russian men of science and their Government desire such a two-way traffic. Prof. Andrade writes of the abiding impression made by the spirit of cordiality and co-operation in which the delegates were everywhere received. Prof. Watson refers to the real need for closer contact with workers in other countries, and especially of travel, and of the dependence of satisfactory work on such free association of workers in all lands. Prof. E. D. Adrian makes the same point even more emphatically in respect of physiology. Until the war-time restrictions on travel are removed, we shall not properly appreciate all that Russian physiologists are doing, and they will have no first-hand experience of our methods and ideas. We and they both need an exchange of students in addition to the exchange of journals.

Everyone is so aware of this, and the delegates were so cordially received, that it is hard to believe that the restrictions will remain, particularly in view of the speech of Kapitzka on June 23, which showed that the U.S.S.R. recognizes the importance of international co-operation and that the Academy intends to promote international co-operation by these measures, all of which have been urged on the Government of the United States in Dr. Vannebar Bush's report. When Prof. Adrian concludes that the British delegates will only complain if they are not allowed to repay some of the kindness shown to them by their hosts, he is clearly expressing a common sentiment. It may be a further hopeful sign that there should since have been published the draft proposals for an educational and cultural organization of the United Nations, to be established, according to the preamble, in recognition that "co-operation in education and the furtherance of cultural interchange in the arts, the humanities and the sciences will promote the freedom, the dignity and the well being of all and thereby assist the attainment of understanding, confidence, security and peace among the peoples of the world"; and in dedication to the proposition "that the free and unrestricted education

of the people of the world and the free and unrestricted exchange among them of ideas and knowledge are essential to the advancement of human welfare and to the preservation of security and peace."

But for the effective promotion of scientific intercourse across national frontiers, something more than organization is required; and the point has been uncomfortably emphasized in connexion with this very visit to the Academy of Sciences of the U.S.S.R. The appointment of scientific attachés might indeed do something to increase the flexibility of organization, to promote more informal and intimate contacts, as well as to remove causes of misunderstanding. Such a system may become imperative to the building up of the confidence essential for framing a system of co-operation in handling and harnessing to constructive purposes the new powers disclosed in the release of atomic energy; but so far, apart from Great Britain's agricultural attaché in Washington and Prof. E. Ashby's appointment to the Australian Legation in Moscow earlier this year, no practical steps have been taken to give effect to an idea which has already been widely discussed among scientific workers.

If the recommendations of Dr. Vannebar Bush's report are accepted, we may expect to see the United States also experiment with scientific attachés in certain embassies, and Dr. Bowman's Committee had the U.S.S.R. specially in mind in making the suggestion. No system of scientific attachés, however, can obviate the need for the handling of scientific co-operation and communications with more understanding, not to say courtesy, by Government departments and officials generally.

The readiness with which scientific workers have accepted the restrictions on their freedom of communication does not mean that such restrictions should be imposed unreasonably or without regard to the common courtesies of civilized life.

It is on this ground that men of science in Britain have a right to protest firmly against the circumstances in which the exit permits of eight of their colleagues invited to attend the anniversary celebrations of the Academy of Sciences of the Soviet Union were cancelled at the last moment by the Government. We may leave the Foreign Office to deal with the discourtesy to the Soviet Government implied in such a cancellation; but however substantial may have been the reasons which decided the Government to withhold permission for these eight men to proceed to the U.S.S.R., we cannot reasonably be expected to believe that such a decision could not have been reached at a much earlier stage. The complete disregard of all personal considerations has undoubtedly roused strong resentment, and scientific workers owe it to themselves to protest emphatically against what appears to be a piece of bureaucratic incompetency or tyranny.

The right of the Government to impose restrictions on international scientific intercourse, at any rate in war-time, or to lay down conditions to which such intercourse must conform, is not challenged; though scientific men have a perfect right to consider for themselves whether it is worth proceeding with a

particular foreign visit under particular conditions. Even with the improvement of communications through air transport, however, a visit to such a country as the U.S.S.R. is not to be undertaken without a certain amount of personal inconvenience. Responsible scientific men may have to obtain leave of absence and to arrange for deputies during their absence; private arrangements have to be made regarding homes or families; and in these days, in addition to passports and visas, there is usually inoculation against typhus or other diseases likely to be encountered, with all the physical discomfort or even incapacitation that is involved. No one complains if for some urgent and unexpected reason it is necessary to cancel at the last minute arrangements made in good faith, but common decency should forbid any one being put to the inconvenience involved in the preparations unless there is every reason to believe that he or she will make the journey.

Nor is it merely in regard to scientific workers leaving Britain that there are strong grounds for complaint of official slackness and discourtesy. The treatment of distinguished scientific visitors to Great Britain leaves a great deal to be desired. Both in entering and in leaving the country, such distinguished visitors, possibly invited by a scientific society of standing, may be obliged to spend the better part of a day awaiting their turn at government offices completing various formalities. There should be some mechanism whereby distinguished men of science entering or leaving Britain could be given the privileges accorded to those of ambassadorial status, for truly they are ambassadors of science. An intermediary is evidently required, able to keep in touch with learned societies on one hand and Government departments on the other. Such a body would be a centre to which those desiring to entertain foreign visitors would hand over all formalities; it might equally act for British men of science visiting foreign countries. Something on these lines is being done by the British Council, but more comprehensive action is required; the Council, however, if suitably strengthened, might be an appropriate body to undertake such activities.

Sir Henry Dale has pointed to some of the implications of the atomic bomb and the control of atomic energy for the full freedom of scientific intercourse; and the importance of full scientific intercourse across national frontiers, as already indicated, has never been more widely recognized. While the improvement of scientific communications is urgently required, and the relaxation so far as possible of the war-time controls over publication, it may still be necessary to retain some measure of Government control. Such restraint should be reasonable, however, and the minimum consistent with the national interests regarded from the broadest point of view. Scientific workers have a right to expect and to insist that Government departments to which the framing of the necessary regulations is entrusted are staffed with those competent to do their work with imagination and understanding of the real issues—constructively and not obstructively—and to administer and interpret them with common sense and courtesy.

METHOD IN METAPHYSICS

The Nature of Metaphysical Thinking

By Dorothy M. Emmet. Pp. xi+238. (London: Macmillan and Co., Ltd., 1945.) 10s. *fd.* net.

MISS EMMET describes metaphysical statements as statements about the real which transcends experience. Her view in brief is as follows: There is a real world of which we are part and to which in our living we are responsive, but of the nature of which we have no direct experience. Nor have we any means of characterizing it as it is in itself, since in all our awareness, whether through sensing or through reasoning, what is displayed is rather our responses to it than its own nature. In this sense the real transcends experience.

But since we feel ourselves responsive to it, we can describe it indirectly in terms of our responses. We need not, however, confine ourselves to simple statements such as that 'the real is that to which we respond in such and such ways'. We want to tell a connected story about it, to make it out as having a structure which seems intelligible to us. Miss Emmet is concerned with the question of the ways by which we do this, what justification there is for doing it, and in what sense, if at all, the accounts we give in this way can be true.

The fundamental method on which she lays stress is that of analogy. This is used in science, in the building up of any theory. Some experienced arrangement which seems intelligible is taken as a model for the description of a situation the details of which cannot be experienced. Such a model is valuable not merely for predictions, but also as giving an intelligible co-ordination of various observed facts, and as a means toward the forming of more complex models in relation to wider situations; and while it cannot be taken as a literal representation of the situation as it is in itself, it can be taken as corresponding in some way to the situation, even though we cannot say directly how.

In religion, theology and metaphysics, analogies are used in the same way as in science. But there are certain fundamental differences. The former are concerned with what, following Prof. Stocks, Miss Emmet calls total assertions: assertions about the nature of the real considered as a whole, and therefore qualitative, whereas assertions in science are concerned with features from which quantitative relations can be derived. The basis of this difference is her view that some of our responses to the world are responses of our whole being to some feature of the world considered as an individual whole, while others are responses of part of ourselves to some partial feature of the world: somewhat as, for example, I may stand on tiptoe to help my tall friend to put on his overcoat (partial response to a partial feature), whereas my whole being goes out to him in admiration when he shows some special excellence of character (total response to a total feature).

I have no space to deal with Miss Emmet's interesting and careful account of analogies in religion and theology. A metaphysical system takes its rise in total responses. As a starting point, we can say that the world has such a nature as to rouse these responses in us. The next step is to seek for some further account of it which will enable us to link our various total assertions into an intelligible system. Analogy is fundamental here, as in science. Some type of situation is felt by a particular thinker to be