

Social and International Relations of Science

THE widespread interest in the social relations to science, which in Great Britain is witnessed, for example, by the founding of the new Nuffield College at Oxford, and of the National Institute of Economics and Social Research, London, and elsewhere by the institution last year of the Committee on Science and its Social Relations by the International Council of Scientific Unions, and which has since received striking manifestation at the Indianapolis meeting of the American Association for the Advancement of Science, has largely been stimulated by the growing anarchy in the international sphere, whether economic or political. The threat to freedom of thought inherent in the totalitarian States, the existence of which is indeed only possible through the application of scientific knowledge, provides one of the main stimulants. The profound concern engendered everywhere by the increasing scale on which national energies and resources are being devoted to preparations for warfare, even to the detriment of standards of living, however, provides another source of such interest, both in the ranks of scientific workers themselves and in the population generally.

It is, accordingly, appropriate that a portion of Lord Rayleigh's presidential address to the British Association should be devoted specifically to the question of science and warfare. Although he makes no claim to offer a positive contribution to the subject, at least his remarks should assist to dispel some of those misconceptions which impede that full contact and co-operation between scientific workers and their fellow citizens which are essential to effective study or action.

A right conception of the position and responsibility of science is a fundamental condition, and Lord Rayleigh's remarks should make it clear beyond question that the discoveries of science which have been utilized in warfare were made in no nefarious quest, and were indeed often laid aside by scientific men as of no practical value.

Dismissing, therefore, the idea that scientific men are specially responsible for the application of fundamental discoveries of science to purposes of war, we can face the essential and wider problem of assisting a world anxious to accept the gift of science to make wiser use of the knowledge and powers which science can bring. Lord Rayleigh, accordingly, referred to the proposal for the

establishment of a Division of the British Association to deal with the social and international relations of science.

The whole question has been dealt with very fully in NATURE in recent leading articles. The object of the suggested Division, which of course, like the various sections of the Association, would be responsible to the Council, would be to further the objective study of the social relations of science. The types of problems with which it might be called upon to deal would fall under the general headings of the effects of advances in science on the well-being of the community, and the effects of social conditions upon advances in science. The function of the committee organizing the Division would be to arrange meetings both at the annual meetings of the Association and elsewhere, to appoint speakers and to accept or reject communications. It would furnish material for the information of the public, co-ordinate work dealing with the social relations of science both at home and abroad, and be prepared to act in a consultative capacity, and to supply information. It would, accordingly, establish relations with organizations and persons engaged in practical administration, and set up sub-committees for executive purposes, or for research, inquiry or co-ordination.

If the Division is to make any significant contribution to the solution of these questions however, the committee will require the widespread and unwavering support of all scientific workers. Something more may be called for than the scientific investigation of social and international problems. A resolution of the American Association pointedly refers to the inroads being made upon intellectual freedom, and it should be unnecessary to emphasize that freedom of thought and discussion are essential if the new Division is to function effectively. Even if the organization of united action in that field falls outside the scope of the Division, it may at least serve to stimulate appropriate action or assist in bringing together professional associations both within and across national frontiers in defence of the most vital condition of the integrity and advancement of science itself.

It should be remembered indeed that this is a matter not so much of knowledge itself as of wisdom and values. The advancement of science demands

a certain immunity and tolerance to those engaged in scientific discovery and learning, and if the present threat to those liberties is to be resisted, scientific workers in their turn must recognize the normal conditions upon which such tolerance and immunity are accorded. Above all, they must be careful to maintain most scrupulously their intellectual honesty and independence of political pressure.

The wise use of science, however, involves especially questions of ethics and values, and is

linked up inextricably with the general conditions and standards of the society in which scientific workers are placed. In all such questions the new Division would offer a hope of corporate action in bringing the serious spirit of science to bear in fields and on problems too often the sport of political prejudice, and might well provide another vantage ground from which scientific workers might make their fitting contribution to the solution of the problems of modern society.

Ferns and Fern Allies

Manual of Pteridology

Edited by Dr. Fr. Verdoorn, in collaboration with A. H. G. Alston, I. Andersson-Kottö, L. R. Atkinson, H. Burgeff, H. G. du Buy, C. Christensen, W. Döpp, W. M. Docters van Leeuwen, H. Gams, M. J. F. Gregor, M. Hirmer, R. E. Holttum, R. Kräusel, E. L. Nuernbergk, J. C. Schoute, J. Walton, K. Wetzel, S. Williams, H. Winkler and W. Zimmermann. Pp. xx+640. (The Hague: Martinus Nijhoff, 1938.) 24 guilders.

THE prodigious weight of this volume creates a desire for a light paper suitable for the reproduction of photographs. It contains twenty-three chapters, varying much in length, a few in German, most of them well documented and illustrated, written by twenty authors. The book is "primarily, but by no means exclusively, designed for the taxonomist who is anxious to improve his methods and broaden his outlook. At the same time it offers to the general botanist working on the Pteridophytes the necessary fundamental facts about the group and a survey of the chief results of lines of investigation related to his own".

As Prof. Bower says in the foreword, the ferns and their allies on one hand and the mosses and liverworts on the other hand appear to be separated by a wide gap; no living plants supply connecting links. He goes on to say that recently acquired knowledge of the oldest land-plants from Silurian and Devonian rocks has furnished some indication of possible transitional forms in the early stages of evolution. It is none the less true that the Bryophyta and Pteridophyta, including both extinct and recent genera, are two sharply contrasted groups. One may go farther and express the opinion that the study of ancient plants as a whole has been disappointing to searchers after missing links.

The first two chapters are by J. C. Schoute of

Groningen, who contributes learned essays on morphology and anatomy which make severe demands upon the reader's power of concentration. In a concise historical introduction, Schoute pays a well-deserved tribute to the genius of Hofmeister, whose famous paper of 1851 had the effect of a 'flash of lightning'. We are reminded that Hofmeister expounded the theory of alternation of generations in three pages; he was master of a lost art! In an academic discussion of morphological conceptions, which contains much that is suggestive and provocative, due prominence is given to extinct types; the author's views on the stigmarian 'roots' of *Lepidodendron* and *Sigillaria*, and their comparison with the subterranean part of *Isoetes* (quillwort), will be regarded by some botanists as heterodox.

The chapter on anatomy is less satisfactory as an exposition likely to be informative and stimulating to taxonomists who wish to know more about the ancestors of plants which are their special concern. References to recent work on fossils are inadequate. One would like to have a clearly written essay on, for example, the anatomical structure of the arborescent lycopods and calamites of the forests of the Coal Age as contrasted with the much simpler construction of their living allies. This criticism is equally applicable to other chapters in the volume; authors, with few exceptions, seem to forget that they are supposed to address themselves to the general botanist. The chapter by S. Williams of Glasgow gives a well balanced and readable account of experimental morphology as an aid to the better understanding of form, development, and evolution. He adopts Prof. Lang's view that the individual development to adult structure is "the manifestation of the properties of the specific substance under certain conditions", and stresses the importance of more intensive research into the physico-chemical problems raised by the work of