

to fashion. Attention is perhaps focused on the preparation of proteins possessing unique and specific biological properties, that is, enzymes, hormones, viruses and immune bodies. Phosphorus compounds receive a special section commensurate with the increasing recognition of the part they play in reactions *in vivo*. Last year, sapogenins and saponins were reviewed under the heading of steroids; this year's story is limited to recent work on bile acids, sterols and steroid hormones. These are most complex substances; they play an important and universal part in living tissues.

Metabolism is broken up into many sections. The painstaking accumulation of facts and their verification is step by step contributing to progress—the significance of what are called trace elements in mineral metabolism is becoming more and more clear. Apparently the land animal of to-day has not entirely forgotten that it was once in bygone ages a marine organism.

The subjects of hormones and vitamins attract as much interest as ever, though the number of references quoted is not so large. Great interest is attached to the reports on nutrition and on nutritional deficiencies in farm animals. The War has both focused attention on such questions and given added stimulus to their study.

There is a well-written section on alkaloids by R. H. F. Manske: there seems to be no end to these compounds, and it is to be hoped that before long their inter-relationships and meaning will become clear. Even more interesting is the chapter by F. F. Blicke on synthetic drugs. The spectacular progress of chemotherapy has attracted the attention of the public at large, who are benefiting to-day from the drugs very soon after their discovery. Naturally fungi also require a section, written by E. L. Tatum. The discovery of penicillin has raised popular hopes that other moulds may contain a host of other specifics; but this article is severely scientific and more interested in a tentative interpretation of the biogenetic relationships of the mould products. All must ultimately have come from sugar and they represent end-products of carbohydrate metabolism; they belong to a rather limited number of chemical groups.

Only a very cursory survey of some of the reviews has been attempted, with the object of showing how much there is in the volume, which even at the risk of repeating what has been said in other years is once more certainly indispensable.

E. F. ARMSTRONG.

## PHYSICS AND PHILOSOPHY

### Physics of the 20th Century

By Pascual Jordan. Translated by Eleanor Oshry. Pp. xii+185. (New York: Philosophical Library, Inc., 1944.) 4 dollars.

THE story of the rise and development of twentieth century physics has been told so often and by so many 'leading world authorities', that, fascinating as it is, one's first reaction to any further author who proposes to guide the footsteps of the 'layman' along the now well-worn and familiar track is to ask (perhaps a little ungraciously): "Is your journey *really* necessary? Have you some points of view of interest to disclose which your predecessors have missed, or some matters of moment to discuss which others have, perhaps, insufficiently considered?" It may be said at once that, in the case of Dr. Jordan, the

answer is definitely in the affirmative. While some authors have dealt more fully, and perhaps more clearly, with the experimental discoveries upon which the concepts of the new physics are based, and others have expatiated on the impact of these discoveries on industry, commerce and the social order, to Dr. Jordan the main interest of the story is in its intellectual content; to him it is primarily a spiritual adventure. "Our most wonderful moments of scientific evolution," he writes in his preface, "are experienced when it is shown that we must revise our ideas from the ground up to agree with a new concept. Modern physics effected many such changes; and in the most fundamental respects. That is what this book would like to tell about."

The 'layman' to whom Dr. Jordan addresses himself is thus not so much the scientist *manqué* as the philosopher, whether amateur or professional, who may wish to consider what bearing, if any, the new concepts of twentieth century physics may have on his own particular interests. It is true that philosophers have not so far shown quite as much interest in modern physics as some modern physicists have shown towards philosophy, and it may be readily admitted (as, in fact, the author does admit) that neither the methods nor the ultimate objectives of philosophy are those of physics. It is equally true, however, that even the most abstract philosopher can scarcely escape the intellectual atmosphere of the times in which he lives. There can be no doubt, for example, that the rise of dialectic materialism was largely aided and abetted by the existence of the 'mechanistic' school of physicists, who imagined (quite erroneously as it appears to us to-day) that, given the co-ordinates and momenta of all the atoms in the universe, it would be possible for a competent college of mathematicians to calculate all past and future history. The gradual abandonment by physics of the 'mechanistic' point of view, and the reasons which made this change of viewpoint inevitable, form the subject-matter of the present volume.

As far as may be, the author has endeavoured to present an unbiased and objective account both of the progress and the conclusions of modern physics, and has confined himself to indicating the particular points at which they appear to impact upon the conclusions of philosophy and theology. While it is, of course, well known that Dr. Jordan has his own ideas on the subject, he does not, in the present volume, intrude them upon the reader; or commit the tactical error of putting up the back of the philosopher by attempting to do his work for him.

It is unfortunate that the effect of the book in its English dress (it is a translation) should be marred by a rather involved style, and some infelicities and even obscurities in diction. How far this is due to the original manuscript, one cannot say; but only too often the translator appears to have been satisfied to transliterate the author rather than to try to present his ideas in current English; so that the unfortunate reader is left to wrestle simultaneously with unfamiliar ideas and a foreign idiom. The book, however, is one of real distinction; and readers interested in the fundamental problems and ideas of which it treats will be well advised to make the effort. Its appearance at the present time serves as a useful reminder that twentieth century physics is not solely, or even mainly, concerned with the gratification of the national animosities or material desires of mankind: it has a specific contribution to make to the ocean of universal learning.