BOOK REVIEWS

Progress in Elementary Particle and Cosmic Ray Physics, Volume 5. Edited by J. G. Wilson and S. A. Wouthuysen. 461 pp. (North-Holland Publishing Co., Netherlands) Interscience Publishers, Inc., New York, 1960. $10.75. *Reviewed by D. Keefe, Lawrence Radiation Laboratory.*

THE fifth volume in this series adds five more excellent and well-produced review articles on topics in elementary particle physics. It is easy to deplore the long delay—about eighteen months—between the writing of the articles and their appearance in print, but comparable publication delays even of original papers and conference reports seem an inevitable feature of today. Whether by judicious editorial choice of matter or good fortune, the value of these reviews has not in any way been impaired by the time lapse.

A characteristic of this and the previous volumes is the extremely comprehensive bibliographies. On reading Arne Lundby's review of weak interactions one is again struck by the avalanche of experimental work triggered by Lee and Yang's paper of just four years ago. In the eighty or so pages allotted to him, Lundby has little space for the development of ideas but has contented himself with presenting all the important relevant formulas and summaries of the experimental results and techniques.

The various phenomenological theories of neutron-proton and proton-proton interactions in the energy region below 300 or 400 Mev are discussed in detail by J. L. Gammel and R. M. Thaler. This is a subject in which many precise and detailed comparisons can be made between theory and experiment and these are exhaustively treated, particularly the comparative predictions of the authors' and the Signell-Marshak theories.

Chapter 3 on the theory of antinucleons is by J. McConnell. His calculations some 13 years ago on the expected modes of production and annihilation of antiprotons led Rochester and Butler to make a cloud-chamber search for the predicted particles at mountain altitudes; if they failed in their primary aim, the discovery of V particles was no mean compensation. This is an opportune time for such a review in the breathing space, so to speak, before the intense antinucleon beams now available at the CERN proton synchrotron (and presumably soon at the Brookhaven AGS) are used to study the high-energy region. To date, virtually all the experimental data have been obtained from antinucleons produced at the Bevatron and are confined to energies below about 2 Bev. Despite the large body of theoretical work there is still no satisfactory theory with which to compare the results except at the lowest energies.

Probably the most needed review in this volume is that of D. H. Perkins on cosmic-ray "jets" in nuclear emulsions, corresponding to energies several orders of magnitude greater than those made available by accelerators. In the direct study of nuclear interactions at 10^{12} to 10^{14} ev the emulsion technique is pre-eminent. The improvement in the last few years of high-altitude balloon techniques so that giant stacks can be flown for long periods has led to a rapid increase in our knowledge of how particles behave at those energies. The amount of detailed work necessary to analyze each individual event found is nevertheless very great, and the accumulation of statistics is a painstaking business. Paradoxically or not, many aspects of nuclear theory become simpler in this ultra-relativistic region and there is here a full and instructive discussion of how the results may be compared with present theories.

Recently there have been several careful experiments on the interaction rate of μ^- mesons in various materials, particularly with a view to elucidating the suspected anomaly in the region of the transition elements. Although some of the experimental data presented by R. M. Tennent in the final chapter on μ^- decay and interaction has now been considerably improved upon, this is still a valuable survey of the main problems in a very much alive field and is designed to review progress since the fine summary of Sard and Crouch in Volume 2 of this series six years ago.

The editors draw attention to the dichotomy in the field of cosmic-ray physics which has emerged since the series was begun, and it is intended to devote succeeding volumes alternately to cosmic rays and to elementary particle physics. The next volume will be a cosmic-ray volume.

The Scientific Papers of Sir Geoffrey Ingram Taylor. Volume 2, Meteorology, Oceanography and Turbulent Flow. Edited by G. K. Batchelor. 515 pp. Cambridge U. Press, New York, 1960. $14.50. *Reviewed by R. E. Street, University of Washington.*

AT the turn of the century, with the introduction of the quantum theory by Planck and the principle of relativity by Einstein, the majority of research physicists turned to problems of the ultimate nature of matter which required the new laws of quantum theory and relativity, and neglected the still unsolved problems of classical mechanics which involve the properties of gases, liquids, and solids as