

these recent developments could not be included does not appreciably mar the book or impair its usefulness.

The subject matter is divided into three parts of roughly equal prominence: low-energy pion physics, K -mesons and hyperons, and weak interactions. The emphasis in the latter section is on nuclear beta decay. The treatment, of course, is phenomenological with emphasis throughout on physical ideas and results and little detail of calculation is presented. In general, the style is reminiscent of *The Physical Review* or similar journals with a generous sprinkling of footnotes and references on almost every page. While it is true that there is a school of thought which decries this manner of writing, especially in the form of a book, it does seem appropriate in the present context. Any particular topic is sufficiently well documented as to permit the reader interested in further details to find them in the literature with no undue difficulty.

In the natural course of events, as time goes on and the field of elementary particle physics matures, there will certainly be further books on the subject. In the meantime this book does provide a well-written, handy compendium of experimental facts and theory and should prove to be quite useful.

Quantum Electrodynamics: Selected Papers. Edited by Julian Schwinger. 424 pp. Dover Publications, Inc., New York, 1958. Paperbound \$2.45. *Reviewed by J. C. Polkinghorne, University of Cambridge.*

Thirty-four original papers are reprinted, covering four hundred and twenty-four pages of often minute type, and all for \$2.45. The book starts with Dirac's original paper applying quantum mechanics to radiation problems, shows how the theory was elucidated during the thirties, and finally records the consummation of the wonderfully fertile postwar years when the troublesome infinities were spirited away by renormalization theory and unambiguous correct numerical predictions obtained for such subtle phenomena as the Lamb shift and the anomalous magnetic moment of the electron.

No anthropologist can please all his readers. This reviewer would have liked to have seen the account of renormalization rounded off by the reprinting of Salam's work on the isolation of divergencies and the elegant, if somewhat elliptic, papers of Ward. Perhaps the editor thought Källén's paper proving that at least one of the renormalization constants is infinite a sufficiently gloomy ending, but reference could also have been made to the questions of the convergence of the perturbation series and the possible existence of "ghost states".

Despite these omissions the book contains a great deal of material for its price, but for what purpose? Original expositions are seldom the most transparent so that it can hardly be intended as a means of learning the subject. Luther spoke of the relief with which he turned to Paul from his interpreters and it is no doubt good at times to study the masters. However, except for a few items, such as Solvay Conference reports, all

these papers are readily at hand in any scientific library. We are told that in this volume the history of quantum electrodynamics is "dramatically unfolded through the original words of its creators". Yet without some further guidance the reader who is not already an expert will find the drama as fashionably enigmatic as a play by Samuel Beckett. Unfortunately, we mostly cannot take our history raw but need it predigested. Schwinger has written a seventeen-page skeletal preface briefly indicating the contexts of the printed items. It is a pity that we have not been treated to a fuller interpretative and critical analysis from the pen of one who has played so distinguished a part in these fascinating developments.

An Introduction to Combinatorial Analysis. By John Riordan. 244 pp. John Wiley & Sons, Inc., New York, 1958. \$8.50. *Reviewed by T. Teichmann, Lockheed Missile Systems Division.*

Combinatorial analysis has a long and respected history going back to the work of Pascal, though it was first formalized by Leibniz. Its origin was in problems of probability though it has subsequently become important in algebra, topology, and number theory. It has, however, seemed to fall by the wayside in the growth of modern mathematics because of its intrinsically numerical nature and its unadaptability to the intense abstraction which has become so popular. Lately it has regained a more respected place, owing partly to pressure of applications and partly to consideration of highly complex systems in which determination of number of paths alone was of real value.

The present volume gives an account of this important topic in the light of the newer problems to which it is applied. The treatment given centers around generating functions and their applications to the variety of problems in which combinatorial analysis is important. The discussion ranges from comparatively simple permutations and combinations through some aspects of substitutional analysis, distribution analysis, and partitions to more profound topics of trees and graphs. These major topics are accompanied by substantial lists of references and by long sets of problems which complement the text and serve to test the understanding of the reader. The style is generally clear and the author has not hesitated to carry out the details of calculations in the text where it seemed to illuminate the argument. Nevertheless, the book does not make easy reading, at least for a newcomer, for the author manages to communicate a sense of sophistication which is not easy for an inexperienced reader to absorb even when all the details of the argument seem to be present. This work should probably be read in conjunction with or subsequent to the study of Netto's *Kombinatorik* in which case it will serve to give the reader an excellent command of the subject, both from the point of view of understanding and problem solving.