sions, several topics useful in the analysis of the nuclear force problem, i.e. the properties of the nuclear 3 and 4 particle systems, are not treated and no mention is made of recent *L-S* and intermediate coupling attempts to describe the ground and low excited states of nuclei with *Z* between 3 and 10. In addition, some questions of interest in connection with the nuclear models, e.g., the bearing of the analysis of deuteron stripping reactions on the shell model, are not treated. Nor are certain fundamental matters associated in particular with the heavier nuclei discussed in any detail; thus only occasional remarks are made regarding the possible extent to which the properties of a single nucleon or the interaction between two nucleons are modified by the proximity of other nucleons, or, regarding the possible reasons for the general success of the shell model.

The above list of what the reviewer feels are the book's shortcomings should not however be permitted to throw the picture out of focus. On the whole, the presentation is clear and authoritative and contains many elegant physico-mathematical derivations and discussions; the four chapters on nucleon-nucleon scattering, the chapter on polarization of nucleons and the chapter on noncentral forces are especially lucid and informative. The book's friendly and unassuming style should make a strong appeal to readers engaged in studies preliminary to theoretical or experimental research or engaged in preparation for examinations.

Quantum Field Theory. H. Umezawa. 364 pp. (North-Holland, Holland) Interscience Publishers, Inc., New York, 1956. $9.75. *Reviewed by J. C. Polkinghorne, University of Edinburgh.*

In his preface Professor Rosenfeld explains how this book came to be written. In 1953 Dr. Umezawa arrived at Manchester with a small Japanese book that he had written. His colleagues were able to deduce from the formulae that it dealt with quantum electrodynamics. The present volume is in part a translation and in part a revision of that work. Its English style at times betrays its origin but in general it is lucid and readable.

The first twelve chapters deal with relativistic field equations and their quantization. A feature of this part of the book is its generality. The particular formalisms used to describe particles with spins 0, ½, and 1 are treated as examples of the general theory that is first developed. We are told on the dust cover that this procedure has been adopted because thus we can best "examine the inner homogeneity and consistency of quantum field theory by describing its scheme in a form independent of specialized cases of fields". However it seems to this reviewer that our difficulties in quantum field theory do not arise from an inadequate understanding of the formalism but from uncertainties about when these formal quantities make sense. If this is so our need is surely for the discovery and exploitation of specialized theories sufficiently complicated to be thought typical but not so complicated that they cannot be solved. The Lee model is a case in point. The gen-

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erality here adopted also has the disadvantage of making the book less suitable to be put in the hands of graduate students as their first introduction to the subject.

The concluding six chapters deal with modern developments. Renormalization is discussed using the original method by Dyson and Salam without recourse to the refinements introduced by Ward and Gupta. There is a chapter on damping theory, one on the *S* matrix, and in conclusion the theory of propagators developed by Umezawa and Visconti is discussed. This is one of several formulations of field theory in terms of renormalized quantities. The spirit of this section is that of "classical" quantum field theory. Little mention is made of path integrals, functional integrals, and the like. Perhaps these topics are not yet sufficiently understood for full treatment in a book but the picture is a little incomplete without them.

The book is carefully written and should serve as a useful reference work on the topics that it covers.

Elementary Differential Equations. By William Ted Martin and Eric Reissner. 260 pp. Addison-Wesley Publishing Co., Inc., Cambridge, Mass., 1956. $5.50. *Reviewed by T. Teichmann, Lockheed Aircraft Corporation.*

In these times when the abstract and formal approach in mathematics often seems to be the only respectable method of dealing with mathematical topics, it is most refreshing to come across a book like this one in which two first-rate mathematicians present an elementary approach to the subject of differential equations in which the student is allowed to attain a certain amount of feeling and intuition for the subject before being presented with the vast assemblage of formal theorems and facts.

This book is designed to be used by people who are interested in mathematics mainly for its application rather than for its intrinsic beauty but that does not mean that the mathematical niceties have been neglected. The treatment is correct throughout and is arranged in such a manner that simple problems and their solutions are given first and the student is allowed to understand what it is that exists before being confronted with an existence theorem.

After discussing the origin of differential equations and physical and geometrical problems and solving some of the simple first order ones which arise in this way, the authors go on to discuss the differential equation in the first order. Various methods of solution of such equations are presented and particular attention is paid to power series solution and to the problem of convergence of such solutions. Second order differential equations are then discussed including such techniques as series solutions, variation of parameters, and solutions around singular points. The Bessel function is used as a fairly extended example of the behavior of such solutions. A similar treatment is then given for higher order differential equations and in this case a short presentation of the Laplace transform method is given