dynamical stability necessary to produce the observed characteristics of these stars. Essential to any successful model is a satisfactory mechanism for generating the internal energy that escapes from the stars; for "in view of the high density and low luminosity very strict conditions have to be satisfied". In the final chapter are offered speculations on the origin and evolution of the white dwarfs—speculations that suggest the problems of future research rather than crystallize our ideas around any of the current hypotheses.

This book is obviously written for students of astrophysics who wish to know the role of modern physics in interpreting a class of stars which, thus far, has stood apart from the main-sequence stars. To read the book with understanding and appreciation the student must have a knowledge of atomic physics and a fair acquaintance with astrophysics. To aid him in further study of any of the problems discussed in the book he will find ample citations to original papers in the bibliographical references appended to each chapter. Owing to the slow rate at which observational data on the white dwarfs accumulates it probably will be a long time before this book is supplanted.

Théorie Synthétique de la Relativité Restreinte et des Quanta. By O. Costa de Beauregard. 200 pp. Gauthier-Villars, Paris, France, 1957. Paperbound $9.30. *Reviewed by Manuel Sandoval Vallarta, University of Mexico.*

The author is a distinguished member of Louis de Broglie's school of theoretical physicists. He belongs to that select—and altogether rare—group of physicists who demand consistency and a good measure of rigor in their work. Nowhere perhaps in the whole realm of theoretical physics is this approach more required and more appreciated than in the chapters which deal with the union of relativity and quantum field theory. The need for a satisfactory approach, emphasized by Tomonaga during the war years, is the main point of the book under review.

The reader will look in vain for such topics of paramount importance as a treatment of infinities, renormalization, or the self-consistency of quantum electrode names. Nor will he find calculations of effects arising essentially from field quantization, such as the theory of the Lamb shift or the anomalous magnetic moment of the electron. Nothing is said about the two-body equation of Bethe, Salpeter, Nambu, and Schwinger. No emphasis is given to the group-theoretical approach which has proved so fruitful in many instances in the past and which should be at the very core of any attempt to place the central problem dealt with in this book on a rigorous basis.

The main contribution of the author is the relativistic theory of reciprocal Fourier integrals, starting from the work of Marcel Riesz. A searching analysis is made of complementarity in Bohr's sense and of the paradoxes brought about by the probability interpretation of wave mechanics, underlined by the controversy between Ein-

stein and Bohr. A fairly good idea of the contents of the book may be gathered from the chapter headings: The Minkowski covariant form of the theory of complementarity, relativistic dynamics of a point charge, geometrical approximations of wave mechanics, free particle of unspecified spin, free particle with spin, particle in an external field, von Neumann's formalism, superquantization, field theory according to Tomonaga and Schwinger, derivation of Feynman's rules by Dyson's method, relativistic dynamics of systems of point charges, and microscopic symmetry and microscopic asymmetry of future and past. The book concludes with a bibliography with a better than average quota of misprints (Brilloin should read Brillouin, Gellmann should be Gell-Mann, Riez should be Riesz, etc.) and includes references, not usually found elsewhere, to papers of de Broglie's school.

The book is an interesting attempt to deal with one of the most difficult and fascinating problems of contemporary theoretical physics. Much more water will flow over the dam before it is finally solved with something like the thoroughness and rigor emphasized in Costa de Beauregard's book.

An Introduction to the Theory of Random Signals and Noise. By Wilbur B. Davenport, Jr. and William L. Root. 393 pp. McGraw-Hill Book Co., Inc., New York, 1958. $10.00. *Reviewed by George Weiss, University of Maryland.*

The second world war introduced into engineering many statistical problems that were virtually unknown to statisticians of that period. These problems of noise and related random phenomena were of acute importance in the design of radar and other fire control mechanisms. As in many other fields, there was a good deal of progress made in understanding and characterizing the main features of random noise during the war years. The wartime work on this subject was ably summarized in the classic papers of Rice and the book by Wiener. The research effort in the field has scarcely tapered off since the war and many new techniques, both theoretical and experimental, have been devised to handle noise problems. Much of recent progress in the development of transistors and masers has been made solely to counter the influence of random phenomena on communications. Hence a book on random signals and noise is indeed a pertinent addition to the literature of physics and engineering.

An Introduction to the Theory of Random Signals and Noise has been written as a text for graduate students of electrical engineering. As such it is undoubtedly quite successful. One might succinctly summarize the book as the papers of Rice brought up to date. Just as the papers of Rice had their faults in not being very rigorous and being occasionally superficial, so this book betrays those weaknesses by many references to other texts where a fuller discussion might be more helpful. Nevertheless the text also has the virtue of Rice's papers in giving a clear statement of noise problems and an indication of the techniques for their solution.

The book begins with five chapters on the elements of probability theory. These chapters are superfluous because they merely skim probability theory, whereas for a clear understanding of noise theory one must have a better background than can be gotten from these brief chapters. Nonetheless there is useful information given on the Karhunen-Loeve theory on the representation of noise by means of orthogonal functions (a generalization of a representation of noise given some 50 years before by Schuster and Einstein!) which are not yet known on the engineering level. Chapters on shot noise and Gaussian processes follow which are a good expository summary of work done in the 30's and early 40's. Then there is a chapter on the effects of linear systems on the characteristics of noise that gives the basic definitions, a brief, inadequate description of Nyquist noise, and a summary of the elegant work of Kac and Siegert and their followers. A chapter on optimum linear systems summarizes the work of Wiener et al., using the mean square error criterion. Succeeding chapters on nonlinear devices are an expanded version of several sections in one of Rice's papers. The last chapter on the statistical detection of signals is a once over lightly version of the overlapping fields of decision theory and noise theory. The chapter is well written and does not gloss over difficulties although, obviously, it does not give a penetrating analysis of the many subtleties involved. It covers tests based on Baye's theorem (with an excellent discussion of the pitfalls involved), maximum likelihood estimators, and the Neyman-Pearson theory.

One shortcoming of this book is the lack of any reference to Markoffian processes or of any work via the Fokker-Planck equation.

In summary, the book is an excellent introduction for engineers and physicists to recent progress in this field. That it is not as mathematically rigorous as it might be, is not a valid criticism since rigor is not a usual virtue of engineering texts. Nonetheless, the book will serve an excellent purpose for more demanding readers by at least pointing them in the right direction.

La Dynamique Relativiste et ses Applications. By Henri Arzeliès. 304 pp. Gauthier-Villars, Paris, France, 1957. Paperbound $11.71. *Reviewed by R. Bruce Lindsay, Brown University.*

This is the second volume in a series of treatises on relativity projected by the author, who is on the faculty of sciences at the University of Rennes. The first volume, already published, dealt with the kinematics of relativity while those to follow will continue the treatment of dynamics begun in the volume under review. In a rather lengthy preface the author, who has an agreeable discursive style, complains about the neglect which he thinks relativity is receiving at the present time and suggests the establishment of a center of relativistic studies in France. He points out with per-