The book is written chiefly for specialists working in problems of stellar atmospheres. Even for them, reading is rendered unnecessarily difficult by the absence of a list of notations; instead of words, the text uses a great variety of mathematical symbols throughout, and the reader, if not of phenomenal memory, has to search for the only definition of a symbol, some 200 pages back from the passage he is just concerned with. Also, regular explanatory captions to figures and tables are completely missing, being substituted by symbols or other cryptic expressions, the meaning of which has to be found from dispersed portions of the text. This prevents an immediate access to the material; it is virtually impossible, even for a competent reader, to make direct use at inspection of the numerical data or formulae without a thorough study of the entire text, despite the straightforward nature of the data which could have been made easily accessible by a few simple captions. Confusing misprints in the very symbols often add to the difficulty.

Despite this, the monograph is an important contribution to the study of stellar atmospheres, especially from the standpoint of detailed balance in the distribution of the excited and ionized atomic states, their radiative output into discrete levels and continuum, with a non-zero source of mechanical energy which causes specific departures from local thermodynamic equilibrium without, however, departures from hydrostatic equilibrium being considered.

Advances in Catalysis and Related Subjects, Volume 12. D. D. Eley, P. W. Selwood, Paul B. Weisz, eds. 324 pp. Academic Press Inc., New York, 1960. $11.00. *Reviewed by Henry Wise, Stanford Research Institute.*

FOR twelve consecutive years, specialists in various fields of catalysis and related subjects have contributed to the *Advances*. Each volume has served both as a source book of scientific information and as a measure of scientific progress. As in the past, the editors have carefully balanced the six contributions contained in this volume. For the exploration of the physical properties of solid catalysts the reader is treated to an exposition of the application of magnetic resonance techniques (D. E. O'Reilly), and of the spectroscopy of the fine structure of x-ray absorption edges (R. A. Van Nordstrand). A more general review by D. J. C. Yates deals with the perturbations introduced into the solid surface as a result of physical adsorption, and the methods employed in the study of such phenomena. The empirical approach to an important and highly complex problem is demonstrated by Pines and Schaap in their chapter on "Base-Catalyzed Reactions of Hydrocarbons". The unique role of the carbanion intermediate is employed in the synthesis of mechanisms to explain the observed reaction products. The theoretical aspects of heterogeneous catalysis are presented in a chapter on "The Wave Mechanics of the Surface Bond in Chemisorption" by T. B. Grimley, and one on "The Electron Theory of Catalysis on Semiconductors" by Th. Wolkenstein. These two contributions differ widely in their approach. While one author attempts to apply molecular orbital theory to the problem of chemisorption on solids and points out the fundamental information yet lacking, the other erects a "building from which the scaffolding has not yet been removed". The foundation of this edifice is the concept that a chemisorbed particle may be treated as a structural defect of the semiconductor surface associated with localization of a free electron or hole. The qualitative conclusions derived from this theoretical development demonstrate the stimulating influence that the solid-state physicist has provided for a field of research which too long has been considered the province of the chemist.

An Introduction to Relativistic Quantum Field Theory. By Silvan S. Schweber. 905 pp. Row, Peterson and Co., Evanston, Ill., 1961. $13.75. *Reviewed by J. C. Polkinghorne, University of Cambridge.*

QUANTUM field theory displays a recurrent vitality which is the dismay of its obituary writers. Its birth was auspicious. Here was the formalism which synthesized waves and particles without a taint of paradox. In the late thirties, difficulties with infinities caused the subject to languish, until the postwar invention of covariant techniques of calculation and renormalization theory led to the triumphs of quantum electrodynamics. An inevitable aftermath of these triumphs was the appearance of several textbooks expounding them, among which Professor Schweber's earlier volume *Fields* has an honorable place. Since then, the discovery of the complex plane and the invention of dispersion relations have led to an even more widespread, feverish, and (so far) less completely successful activity, which continues to this day.

While the exploitation of these analytic methods is not complete and most of the problems of strong interactions theory remain unsolved, it is not inappropriate that a new crop of texts expounding these methods should begin to appear. The present volume serves two purposes: as a digest of the older ideas, and as an introduction to the new. It devotes most of its space to the former (the first 645 pages) and is understandably much more unreservedly successful in this part of its task.

Professor Schweber's treatment of field theory up to renormalization is very clear and thorough. This reviewer's only regret is that he only mentions in passing the use of counter-terms for charge renormalization. There is an excellent chapter discussing model theories such as those invented by Lee, and by Chew and Low, an important subject which has been missing from other texts. Altogether this part of the book forms a distinguished contribution to the exposition of field theory.

The account of modern developments begins with a