not only to nuclear physicists, but also it forms excellent supplementary material for a course in quantum mechanics. It will be helpful collateral reading for a course in elementary particles, because of its thorough discussion of Coulomb symmetry.

* * *

E. Guth, who did some of the early theoretical work on Coulomb excitation, is technical advisor to the Director of the Oak Ridge National Laboratory.

Getting at the "physics"

EXPERIMENTS IN MODERN PHYSICS. By Adrian C. Melissinos. 559 pp. Academic Press, New York, 1966. $11.75

by Fay Ajzenberg-Selove

This is an excellent and much needed book. It describes the one-year junior-senior level course in experimental atomic and nuclear physics given at the University of Rochester. The Rochester course is one of the most interesting and sophisticated of the laboratory courses given in this country and Melissinos's book will be a boon to teachers attempting to set up similar courses elsewhere. The arrangement of the material is very good; each section discusses the general theory of the phenomenon to be investigated, describes the apparatus, comments on pitfalls and finally shows and analyzes typical data obtained by a student experimenter (who is credited in a footnote). The equipment used is commercial whenever possible; home-built apparatus is described in some detail. The emphasis in the course is to get at the "physics" of the experiments using modern techniques and research-grade equipment. The experiments at Rochester are performed over a three-term period. Many of the experiments can be done in one afternoon. Most take no longer than two or three weeks. This means that over the three-term period a considerable number of different experiments can be performed. The variety of the experimental work is great. It ranges from the standard experiments on the measurement of e, h/e and ionization potentials to very modern experiments on time-coincidence techniques. The experiments include studies of atomic spectra, some solid-state experiments, scattering experiments (Rutherford, Compton, Mössbauer), and magnetic-resonance experiments. In addition to a description of these, the book includes "background" chapters dealing with general experimental techniques (electronic, vacuum, radiation), with detectors of photons and particles and with statistical problems. There are also eight appendices dealing with standard physical data and with relativistic transformations. One of the appendices shows a typical Fortran program for least-squares fitting.

Each instructor would probably have a somewhat different view of the most useful collection of experiments to be performed by his own students. My own tastes would run to replacing some of the experiments by ones dealing with x-ray crystallography, lasers, the analysis of bubble-chamber film (e.g. to determine the mass of the Λ°) or of photographic emulsions (e.g. to determine the π mass from a study of π-μ decays), and most of all I would emphasize computer techniques more in analyzing the data. But Melissinos's selection is entirely reasonable and the range of his book is such that it will be an extremely useful book to most physics professors and to their students also, both undergraduate and graduate.

* * *

Fay Ajzenberg-Selove is professor of physics at Haverford College, Haverford, Pennsylvania.

Vital functions

GENERALIZED HYPERGEOMETRIC FUNCTIONS. By Lucy Joan Slater. 273 pp. Cambridge University Press, Cambridge, England, 1966. $13.50

by Werner C. Rheinboldt

The theory of the Gauss hypergeometric series began some time in the 18th century, and by now the great importance of these functions in the applications of mathematics to physics is certainly undisputed—if only for the well known fact that a large number of the functions used in mathematical physics are special cases of the hypergeometric functions or their confluent forms.

Throughout the past 150 years various generalizations of these series have been investigated. These include the so-called generalized Gauss series ${}_AF_B(a_1, \ldots, a_A; b_1, \ldots, b_B; z)$ of which the ordinary Gauss series is the special case $A = 2$, $B = 1$, the bilateral series first investigated by Dougall in which the summation extends from $-\infty$ to $+\infty$, and the double and multiple series named after Appell and Lauricella. A generalization of a somewhat different type was given by Heine who introduced the so-called basic numbers, defined by $a_q = (1-q^a)/(1-q)$ so that in the limit as $q \to 1$, $a_q = a$, and considered series, called basic hypergeometric series, which for $q \to 1$ ($|q| < 1$), converge to ${}_2F_1(z)$. For each of the mentioned generalizations a corresponding definition of a generalized basic series can be given.

In 1936, Bailey wrote a Cambridge tract entitled *Generalized Hypergeometric Series,* which has by now become a classic and which gave, for the first time in book form, an account of the results then known about these generalizations. Since then the research in this field has continued steadily and considerable advances have been made, with the result that the need for an up-to-date comprehensive work on these generalized functions has become very apparent. Already fifteen years ago, Bailey, with the assistance of the author of this book, planned such a comprehensive book, and after Bailey's death the author continued this plan singlehandedly. This book represents the fruits of these efforts.

Following an introductory chapter 1 on the ordinary Gauss series, the generalized Gauss functions ${}_AF_B(z)$ are introduced in chapter 2, and then the various summation and transformation theorems connected with such names as Gauss, Kummer, Saalschutz, Dixon and Dougall, are presented.

Throughout the book, the theory of the standard and of the basic generalizations are developed in parallel, and each chapter is followed by a corresponding chapter on the basic series. Accordingly, chapter 3 is followed by chapter 3 on the basic hypergeometric (Gauss) series. Here the infinite product $\Pi_{n=0}^{\infty}(1-aq^n)$ the inverse of the Euler partition function, plays a role similar to that of the gamma