There are supplementary remarks after some papers, especially the more important ones, indicating briefly further developments and some of the individuals who have built upon and expanded the material of the original publication.

Although an offset process has been used in the publication of this volume, the papers included have all been retyped, leading to a uniform typography, but introducing occasional unimportant misprints.

T. H. HILDEBRANDT

Trattato di analisi matematica. Vol. 1. By M. Picone and G. Fichera. Rome, Tuminelli. 5700 Lire ($9.20).

This volume is the first of three which will be devoted to introducing the young student to classical analysis. Into it, Professor Picone, with the very able assistance of Professor Fichera, has poured all the knowledge and experience derived from forty-five years of teaching and some twenty-five as director of Italy's chief computing laboratory. And "poured" is but a meager word to indicate the enormous enthusiasm and energy which have been lavished on the undertaking. The discussion is very detailed and the material elaborate. The book will serve ably not only the budding mathematician but the future physicist and engineer as well. Indeed, being written by men who are outspoken adherents of the "applied school" of mathematics, this treatise is especially recommended to those beginning scientists who frequently complain that most mathematicians ignore their needs.

The present volume treats in its five chapters: matrices and determinants; sets, functions, and continuity; differentiation; integration; and the beginnings of complex analytic functions. The treatment varies from what in the United States would be considered elementary to the level, roughly, of our advanced calculus courses. A principal difference is that the amount of material is more extensive than that which we usually cover. According to the American method, this material is taught twice, once in a general and intuitive fashion to undergraduates, and again in a strictly rigorous fashion for serious or graduate students. The European system (if there is one such) seems to steer an intermediate course of teaching the material once, more thoroughly than we do it the first time and lacking the rigor which we deploy in the second. The superiority of one method over another, we leave for discussion to some more relaxed moment and less public place. National systems of education being what they are, no suggestion is being made that we should adopt this or another similar treatise for teaching our students. However, we would advise the inquiring mind to turn to a book such as this in order to derive some ideas

as to the training of students in another land and to learn to appreciate the Latin mind. Here the lesson is rich and the knowledge it imparts adds to the stature of a human being. One might add that the lesson is never learned, being too extensive. We look forward to the appearance of volumes 2 and 3, which we are certain will reveal once more all the personal warmth and all the pedagogical cunning of these two authors.

E. R. LORCH

Mathematical aspects of the quantum theory of fields. By K. O. Friedrichs. New York, Interscience, 1953. 8+272 pp. $5.00.

Attempting a mathematical treatment of quantum fields may be a bit like trying to run a cross-country mile in 4 minutes. One of the main obstacles is the psychological one arising from the prevailing opinion that it can't really be done. This book is one of the first serious attempts to get in training for a successful run, and is the only one of such scope. A number of shorter stretches are run in good enough time to be encouraging, and some of the longer practice runs show interesting technique and suggest novel possibilities. If at times the pace slows down almost to a fast walk and if not all of the mile is covered, the degree of success is still greater than one had a right to expect at this stage of the enterprise.

The subject does not at present admit a systematic or rigorous presentation. To a considerable extent it is not even so much a subject in the mathematical sense as a set of techniques for dealing with specific problems with various elements in common. The most incisive of these techniques, and in particular the renormalization approach developed within the past ten years, look just as firmly mathematically unrigorizable now as did the theory of *interacting* quantum fields when it was initiated over 25 years ago. It is even a significant accomplishment to present, as this book does, a quasi-rigorous treatment of selected parts of the theory of an individual quantum field.

The material is presented in a relatively mathematical language and style. It is thereby more readable for most mathematicians than most of the corresponding articles in the physical literature, even if definitions and statements are not always mathematically precise and if proofs of some of the more technical statements are omitted. The author apparently intends to give a more mathematical description to some of the simpler parts of the existing theory, and the only substantial really novel feature is the treatment of quantum statistics. The basic annihilation and creation operators of conventional physics exist only in a formal sense, but smoothed-out versions of them can be