Margenau-Murphy, Frank-von Mises, and the like. The present textbook is quite elementary. Written for students who have studied algebra, trigonometry, and analytic geometry, it includes calculus, some ordinary differential equations, vector algebra and analysis, complex variables, matrices, Fourier series, special functions, and probability. There is little more than mention of partial differential equations and tensor analysis, and no treatment whatsoever of integral equations, calculus of variations, group theory, graph theory, numerical analysis, or other modern tools. In a word, the title is misleading; an adequate treatment of that field would assume knowledge of calculus, and some allied material, and not attempt to teach it.

Mathematically, the book is not always adequate, and sometimes is incorrect. On page 609 it purports to prove a proposition known to be false, namely, that the Fourier series of a continuous $f(x)$ converges to $f(x)$. This is accomplished by generous interchange of limiting processes and sets the theory back 130 years.

D. S.

36[S, X].—JON MATHEWS & R. L. WALKER, *Mathematical Methods of Physics*, W. A. Benjamin, Inc., New York, 1964, x + 475 pp., 24 cm. Price $12.50.

As the authors point out in the preface, this book evolved from the notes of a course which they have taught at the California Institute of Technology for the last fourteen years. That course was intended primarily for first-year physics graduate students. The book thus assumes, as far as physics is concerned, that the reader has been exposed to the standard undergraduate physics curriculum: mechanics, electricity and magnetism, introductory quantum mechanics, etc. To quote further from the preface: "It is assumed that the student has become acquainted with the following mathematical subjects:

1. Simultaneous linear equations and determinants
2. Vector analysis, including differential operations in curvilinear coordinates
3. Elementary differential equations
4. Complex variables, through Cauchy's theorem."

The book has an Appendix for a review of some topics in the theory of a complex variable. But even after studying this Appendix, the reader who studied complex variable theory only through Cauchy's theorem will find that Section 3 of Chapter 3 (Contour Integration) and Chapter 5 (Further Application of Complex Variables) call for more intensive preparation.

The stated prerequisites make it clear that the book is not another "Mathematics for Engineers and Physicists." It assumes that the reader either completed a course of such or similar title, or, even better, that he has taken individually the several courses which are often telescoped into one course of Mathematics for Engineers and Physicists.

In the presentation of the various subjects elementary topics are, therefore, only briefly summarized. For instance, the first chapter (Ordinary Differential Equations) gives only a cursory description of solutions in closed form, with the understanding that the reader is familiar with the subject and needs only to be reminded of it briefly. The rest of the first chapter is then devoted to a section on Power-Series Solutions, introducing the concept of regular singular point, a section on Miscellaneous Approximate Methods, and one on the WKB Method.

There are altogether sixteen chapters and one Appendix, each followed by a section of problems, usually of a widely varying level of difficulty. Each section is followed by references to the quite extensive bibliography.

Since the book is intended to be as the preface says, "a book about mathematics, for physicists," the level of rigor is governed by this consideration. At frequent occasions the reader is referred to the bibliography for a more rigorous treatment of the subject. There are occasions when the deemphasis of rigor is carried too far, for example, when Problem 3-2 calls for evaluation of the integral $\int_0^\infty \sin bx\, dx$, followed by the hint: "apply a convergence factor; do integral; remove the convergence factor."

Numerous cross references from one chapter to another appear, and the relatedness of subjects treated in different chapters is frequently brought out. An example for such a frequent cross reference is the subject of eigenvalues, which is part of Chapter 6 (Vectors and Matrices), Chapter 9 (Eigenfunctions, Eigenvalues, and Green's Functions) and Chapter 11 (Integral Equations). The authors point out in the preface, "there is deliberate nonuniformity in the depth of presentation. Some subjects are skimmed, while very detailed applications are worked out in other areas." The reader may well be surprised that in Chapter 16 (Introduction to Groups and Group Representation) the presentation is quite elaborate on the subject of group representations, while Chapter 14 (Probability and Statistics) does not mention at all the modern approach to probability.

In addition to the topics mentioned, the book deals with Infinite Series, Evaluation of Integrals, Integral Transforms (Chapters 2, 3, 4), Special Functions, Partial Differential Equations (Chapters 7, 8), Perturbation Theory (Chapter 10), Calculus of Variations, Numerical Methods (Chapters 12, 13), and Tensor Analysis and Differential Geometry (Chapter 15).

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37[V, X, Z].—BERNI ALDER, SIDNEY FERNBACH & MANUEL ROTENBERG, Editors, *Methods in Computational Physics*, Volume 3: *Fundamental Methods in Hydrodynamics*, Academic Press, New York, 1964, xii + 386 pp., 24 cm. Price $13.50.

A large number of very complex hydrodynamic computer codes have been in existence for several years, particularly at the various A.E.C. Laboratories. These codes were designed to solve unsteady-flow problems in one and two space dimensions and included provisions for handling multiple shocks. Some unclassified reports have been written describing the numerical techniques used, but these reports usually had limited circulation. Relatively little has appeared in journal or book form which describes in detail how these numerical procedures are carried out.

This volume contains ten papers describing either general difference methods for unsteady hydrodynamics or giving details of particular codes. A list of the contributions is as follows:

"Two-Dimensional Lagrangian Hydrodynamic Difference Equations," by William D. Schulz.

"Mixed Eulerian-Lagrangian Method," by R. M. Frank and R. B. Lazarus.