release states flatly: "Every subject of mathematics is covered in the encyclopedia, from absolute value (the first listing) to zero (the last)." While that makes it evident that *abacus* and *Zorn's Lemma* are not covered, the reader should know that other terms, more in the mainstream, such as *derivative*, are also missing.

D. S.

43[X, Z].—RALPH H. PENNINGTON, *Introductory Computer Methods and Numerical Analysis*, The Macmillan Company, New York, 1965, xi + 452 pp., 24 cm. Price $9.00.

This book is written for students of engineering or science with a mathematical background through integral calculus, but who have little or no acquaintance with digital computers. In the author's words, the book attempts "to give usable computer methods for solving the more elementary problems in applied mathematics and to give some perspective as to how easy or difficult these problems are to solve on a computer."

In line with these aims, about one half of the book is devoted to an elementary introduction to digital computers and to programming (primarily in FORTRAN), and the remaining half contains a slightly more advanced discussion of standard introductory topics of numerical analysis, with a view toward the application of computers.

The discussion on computers and programming begins with a very elementary presentation of number systems, followed by a description of the basic structure of digital computers and a discussion of the elements of machine-language coding for a simple hypothetical computer. Then the principal features of standard FORTRAN II are introduced, including FORTRAN functions and subroutines. An additional chapter presents some comments on computer running times and on de-bugging. The role of errors in numerical calculations is emphasized already very early in the book, this is followed later by a chapter on problems of error accumulation and loss of significance.

The second half of the book on numerical analysis covers the traditional topics expected in any text of this type: Simple quadrature methods, the iterative solution of algebraic and transcendental equations, the application of these methods to polynomial equations (including nice sections on the manipulation of polynomials and on Sturm sequences), the evaluation of determinants and the solution of linear systems of equations by elimination techniques, the Gauss-Seidel iteration, an introduction to matrices (including the solvability of m equations in n unknowns, eigenvalues and their determination using the Leverrier-Faddeev method), least squares, difference tables, polynomial interpolation and numerical differentiation, and finally a brief chapter on ordinary differential equations presenting some material on explicit linear, first-order systems as well as the Runge-Kutta and Milne method. Throughout these chapters a general discussion is followed by flow charts and frequently by complete FORTRAN programs. The text is interspersed with detailed numerical examples, and each chapter ends in a list of exercises, most of which ask the student to write particular FORTRAN programs or to apply some method to specific cases.

The mathematical presentation of the books stays on the indicated level, except in the first half of the book where it is decidedly lower. The exposition is clear and the style lucid, and, all in all, the book appears to satisfy the particular aims set for it by the author.

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44[Z].—N. G. BRUYEVICH, Editor, *Problems of the Design and Accuracy of Complex Continuous Action Devices and Computer Mechanisms*, Pergamon Press, Inc., New York, 1964, xi + 264 pp., 24 cm. Price $10.00.

This collection of papers by Russian experts in the design of precision mechanisms is probably the most thorough treatment to be found in textbook form. The art has received its greatest development in military analogue computers and, therefore, the knowledge of the techniques and methods has been confined, until recently, to classified documents. The most complete exposition of these techniques appeared in the *Proceedings of the Seminar on the Theory of Machines and Mechanisms* sponsored by the USSR Academy of Sciences (1950–1955). This book is, essentially, a selection of material from these *Proceedings*.

Several of the papers deal with the mathematical analysis of the reduction of errors in making the computation from the continuous inputs to the continuous outputs. This includes the design of automatic-control devices (servos). Other papers deal with detailed studies of errors in special mechanisms like universal joints, toothed gearing, three-dimensional cams, variable-speed mechanisms and friction drives (like mechanical integrators). Many of these studies are based on experimental testing of actual mechanisms.

There are extensive references, mostly to Russian papers and books.

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45[Z].—MARTIN DAVIS, Editor, *The Undecidable: Basic Papers on Undecidable Propositions, Unsolvable Problems and Computable Functions*, Raven Press, Hewlett, New York, 1965, 440 pp., 24 cm. Price $8.95.

This book is an anthology of fundamental papers in the area of undecidability, unsolvability and computability. It is much more than a mere collection of papers, however. By means of well-chosen editorial remarks which precede most papers, the editor facilitates the correlation of these early papers with modern work in the area. For example, he calls attention to changes in terminology, points of view, and errors in technical detail (without pinpointing them). Some important papers of Gödel originally published in German have been rendered into English for this volume. In addition, Gödel has made available to the editor, a Postscriptum of his 1934 lecture notes on "Undecidable Propositions . . ." as well as corrections and emendations. These notes are published here for the first time. Another interesting paper appearing here for the first time is one by E. L. Post, "Absolutely Unsolvable