subroutines". As before, there are many illustrative examples, and the number of exercises appears to be increased.

Altogether the second edition has brought the book more in line with the present-day computer environment, and, in balance, it will probably allow it to continue serving the needs to which it was addressed by the author.

WERNER C. RHEINBOLDT

University of Maryland
College Park, Maryland 20742

4[2, 12].—ALEXANDRA I. FORSYTHE, THOMAS A. KEENAN, ELLIOTT I. ORGANICK & WARREN STENBERG, *Computer Science: A First Course*, John Wiley & Sons, Inc., New York, 1969, xviii + 553 pp., 24 cm. Price $9.95.

This book is a development of the School Mathematics Study Group (SMSG) text *Algorithms, Computation and Mathematics*, designed for high school students. It is a carefully written introductory text, covering fully most of the topics suggested for Course B1: Introduction to Computing, of Curriculum 68, the report of the ACM Curriculum Committee on Computer Science. In this reviewer's opinion, it is very suitable for a beginning college or junior college course in Computer Science, and is one of the best among the many texts available for courses at this level.

The work is unusual for an elementary text in that it concentrates from the outset on abstract algorithms and flowcharts for them and uses no programming language other than the author's own "flowchart language." Three supplementary programming texts are available for FORTRAN, BASIC, and PL/1. This unique method of organizing the text allows the authors to concentrate on the essential ideas of computing and algorithms unencumbered by the technical details of a particular language, which the neophyte often finds the most difficult to learn. It also has the advantage of allowing the instructor to choose whichever programming language is available to him or which he considers best for beginning students.

The book is divided into three parts. Part I introduces the student to computing and covers algorithms and flowcharts. Part II covers elementary numerical analysis and applications to computing including quadrature, simultaneous linear equations, and linear regression. Part III covers some of the newer areas of Computer Science including trees, lists, strings, and compiling. A second version of the text, *Computer Science: A Primer*, contains Parts I and II only and may be more suitable for high school use. Also published with the text is *Computer Science: Teacher's Commentary*, a very detailed supplement which seems intended for mathematics teachers with no previous experience in Computer Science. It contains complete flowcharts with comments for all of the problems in the text and additional problems, explanations and suggestions for the teacher.

The book is mathematically oriented and pays particular attention to careful development of mathematical concepts. It is well coordinated with the SMSG mathematics texts.

This reviewer has only a few complaints about the book. One is the violation of the ANSI standard for flowcharts, somewhat disturbing in a book with over

300 flowcharts. Another is a rather strange use of the word 'round' to mean both round and truncate. The authors assume that the reader is familiar with binary arithmetic, not necessarily true in this reviewer's experience with college students. The explanation of computer hardware, especially on core storage, is confusing and sketchy. The book has several misprints which may confuse the beginner. However, these are all minor and should be corrected in the second printing.

The exercises are ample and excellent and should serve students with a wide range of aptitudes and interests. In combination with one of the programming supplements, or with any programming text, the book should be very successful in classroom use.

EMILE C. CHI

Courant Institute of Mathematical Sciences
New York University
New York, New York 10012

5[3].—ROBERT T. GREGORY & DAVID L. KARNEY, *A Collection of Matrices for Testing Computational Algorithms*, John Wiley & Sons, Inc., 1969, ix + 154 pp., 28 cm. Price $9.95.

A much needed collection of matrices for testing algorithms, which arise in numerical linear algebra, is provided by this book. The authors provide both well-conditioned and ill-conditioned test matrices for algorithms concerning: (1) inverses, systems of linear equations, determinants and (2) eigensystems of real symmetric, real nonsymmetric, complex, and tridiagonal matrices. The construction of test matrices is discussed, and a large number of references and a table of symbols is provided.

The authors do not discuss the perplexing problem concerning how a user must choose the appropriate test matrices. In particular, test matrices must be chosen so that all parts of the algorithm are tested. It may not be clear to a user by looking at the examples which matrix (if any) will go through a particular part of his algorithm. Then, he must construct his own examples by working backwards through his algorithm.

JAMES R. BUNCH

University of Chicago
Chicago, Illinois 60637

6[5].—DALE U. VON ROSENBERG, *Methods for the Numerical Solution of Partial Differential Equations*, American Elsevier Publishing Co., Inc., New York, 1969, xii + 128 pp. Price $9.50.

This book serves as a good introduction for anyone interested in finite difference methods. In the preface, the author states "This book is written so that a senior undergraduate or first-year graduate student in engineering or science can learn to use these methods in a single semester course, and so that an engineer in industry can learn them by self-study." The book succeeds admirably. The style is very readable