62[Z].—H. N. LADEN & T. R. GILDERSLEEVE, *System Design for Computer Applications*, John Wiley & Sons, Inc., New York, 1963, v + 330 p., 24 cm. Price $7.50.

This book is concerned with the systems analysis and design aspects of computer utilization in business data processing systems. The reader is assumed to have a general understanding of programming business problems on conventional high-speed computers. The major emphasis has been placed on batched processing techniques for magnetic tape computers with fixed word length and word-addressed memory.

The book is divided into three parts. Part one deals with the conventional data processing procedures; namely, file-maintenance operations, conversion runs, sort-merge runs, editing runs, and computation runs. Part two discusses the principles in the design of input and output documents; subjects covered include form design of source documents, encoding of information, card design, paper tape design, and optimal utilization of printer. Part three delineates the major steps entailed in the design and installation of a computer data-processing system. A glossary and a list of references are given at the end of the book.

The authors have provided an excellent synthesis and elucidation of practical guidelines, techniques, and examples. Notwithstanding the profusion of literature on the subject of business systems, this book will be of inestimable use to anyone interested in applications programming.

<div align="right">MILTON SIEGEL</div>

Applied Mathematics Laboratory
David Taylor Model Basin
Washington, D. C. 20007

63[Z].—D. M. MACKAY & M. E. FISHER, *Analogue Computing at Ultra-High Speed*, John Wiley & Sons, Inc., New York, 1962, xv + 395 p., 22 cm. Price $11.50.

Analogue Computing at Ultra-High Speed is a treatment of the development of a high-speed, iterative, analog computer. The use of analog computing machinery at very high repetitive rates provides fast solutions for partial differential equations and integral equations which, with more conventional computers, are laborious to obtain and require a great deal of time.

Part I of this book is a report on investigations which were pursued in an effort to show that the art of analog computation was only in its infancy rather than having its possibilities already exhausted. The design of these explorations was unique in that information-theory concepts were applied to a continuum, whereas the usual application of these theories is to a discrete system. Early in the report, the information content of existing analog computers was evaluated and compared with that of contemporary digital computers. The analog computers were found to be sadly lacking in information content; however, it was shown that theoretically it was possible for an analog computer to compare favorably with digital computers in information content. Requirements for such a computer were then advanced.

Part II of this report is devoted to descriptions of the characteristics and design of the computing elements, displays, and measurement techniques used in the experimental computer. Since communication across the man-machine interface is of

prime importance in making use of information, Chapter 9, which deals with multi-dimensional displays, is a particularly important and interesting one. The laboratory breadboard model of this computer has been constructed and its use has provided much knowledge which made it possible to organize and write Part III.

The third portion of the report is concerned primarily with the mathematical problems associated with using computers to solve equations. Nine chapters are devoted to mathematical problems of computation, and solutions to some of these problems are suggested. The treatment is thorough and quite practical—being restricted to the area of obtaining solutions rather than an analytical treatment of characteristics and behavior. The solution of partial differential equations is given the greatest attention and is extremely well done. Other areas of interest include ordinary linear and non-linear differential equations, integral and integro-differential equations.

This book might well be considered good study material for graduate students in mathematics, engineering, and the physical sciences, for it contains a great wealth of information concerning the equations which describe physical phenomena. However, it should not be considered a textbook in any sense of the word. It will be of some value to practicing computer design engineers and of great value to anyone who programs and operates analog computers. The treatment of partial differential equations may be of aid to digital programmers also, since truncation error and high order difference techniques are treated. The real value of the book to an individual can be determined only by reading it. This presents no chore, however, as it is written in a fluid style which is easily read and yet in which the concepts are precisely stated. The authors have indeed performed a great service to analog computation, even though the equipment which they designed and built is now obsolescent in many respects.

JAMES R. PARK

National Bureau of Standards
Washington, D. C.

64[Z].—JAMES A. SAXON & WILLIAM S. PLETTE, *Programming the IBM 1401*, Prentice Hall, Englewood Cliffs, New Jersey, 1962, 208 p., 24 cm. Price $9.00.

This book does quite well what it set out to do, i.e., to provide a self-instructional programming manual for the IBM 1401 data processing system. It is intended to be used by readers with no programming experience, and the material is explained in such detail that it should be effective in its purpose.

The material is organized in ten units, each subdivided into lessons. Student problems and answers are provided with each lesson, and a general quiz with answers appears at the end of each unit except the tenth, where a quiz with answers for the whole course is presented. One learns to program by doing, and the author implements this philosophy by the well graduated set of student problems throughout the book.

This manual starts off with basic machine language programming for a 1401 system limited to punched card input. The notion of symbolic programming is introduced in Unit V, and throughout the remainder of the book programming is discussed in these terms. Programming for a 1401 system utilizing magnetic-tape