80[X, Z].—RICHARD V. ANDREE, *Computer Programming and Related Mathematics*, John Wiley & Sons, Inc., New York, 1967, 284 pp., 24 cm. Price $6.50.

Computer Programming and Related Mathematics by Professor Richard V. Andree introduces the reader to the basics of computer programming through a fundamental symbolic language called GOTRAN and its more sophisticated relative FORTRAN. Both these languages are suitable for processing on the IBM 1620, a computer which is quite common in educational establishments. Towards the end of the text the reader is introduced to both SPS and machine-language coding, although it should be stated that these are not emphasized and serve merely to whet the appetite of the ambitious reader.

It is refreshing to note that Professor Andree successfully resists the temptation to couch his ideas in overly technical language; even the examples he draws upon are explained simply and accurately. The mathematics he introduces is minimal and thus he is able to lead even an apprehensive student through the intricacies of programming in a somewhat painless fashion.

The text is replete with flow-charts, problems of a wide variety, and specimen programs to enable the student to follow the concepts with maximum ease. It is to the credit of the author that at no time does he "talk down" to the reader.

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81[Z].—MARTIN GREENBERGER, MALCOLM JONES, JAMES H. MORRIS, JR. & DAVID N. NESS, *On-Line Computation and Simulation: The OPS-3 System*, The M.I.T. Press, Cambridge, Mass., 1965, xi + 126 pp., 26 cm. Price: $4.95.

This book describes a conversational programming system which is being used on M.I.T.'s CTSS time sharing system. Although evidently written as a user's manual, it should also be of interest to those who will have no opportunity to use the system. It is written in a simple and readable style, introducing the various features gradually, so that a single reading produces a reasonable working knowledge.

OPS-3 provides facilities for input, editing, and execution of programs from a teletype-like terminal. The basic unit is the "operator," a pre-compiled subroutine written in FORTRAN, MAD, or FAP. The additional flexibility necessary for convenient on-line use is provided by a permanently-available symbol table, and flexible interpretation of operator parameters. Standard operators in the system include the usual numerical operators, statistical operations, operators for simulation and polynomial manipulation. In addition, there are facilities for creating compound operators, which are then available for interpretive execution or, if necessary, for compilation.

The language made available to the user by means of these operators is somewhat clumsy, in general using prefix notation without delimiters. Thus, while

$$\text{FIT } Y \text{ TO } X1 \ X2 \ X3$$

looks perfectly reasonable

PRINT A SUM I 2 DIFF J 3

does not. Prefix notation is not used for certain special operators, so that

$$\text{SET } A = B + \text{LOG} \cdot (C + D)$$

is a valid statement, and can be used to process either scalars, vectors, or arrays. This flexible treatment of arguments is the core of OPS-3, and details of its implementation are given. One interesting trick used by the system to determine whether an operator wants its arguments evaluated is to examine its transfer vector for certain routines, and to evaluate them if not found.

The over-all impression given is that OPS-3 evolved by addition of new facilities to earlier versions. The resulting system appears something of a patchwork, with very little structure. However, it does contain a number of features which will be useful in future systems.

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82[Z].—THE STAFF OF COMPUTER USAGE COMPANY, ASCHER OPLER, Editor, *Programming the IBM System*/360, John Wiley & Sons, Inc., New York, 1966, xii + 316 pp., 24 cm. Price $7.50.

This book is intended chiefly for experienced programmers who wish to program in assembly language. For the programmer who is thoroughly familiar with the System/360 assembly language instruction set, the book provides a concise, tightly written account of the applications of the instructions and provides techniques for the accomplishment of a large number of tasks. The book is thus an excellent reference.

The book contains very little explanation of the specific functions and effects of the instructions, and for this reason it is essential to have a publication such as *The IBM System*/360: *Principles of Operation* available, as the preface suggests.

For the programmer who is not familiar with the instruction set, much time is spent referring to *Principles of Operation*, and therefore the book is somewhat inefficient as a text.

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83[Z].—MARIO V. FARINA, *Fortran* IV *Self-Taught*, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1966, xi, 426 pp. 28 cm. Price $5.95.

Of the many Fortran IV instructional books which have recently appeared this self-educational introduction by Mario V. Farina is one of the best I have seen to date. It assumes no previous knowledge whatever on the part of the reader. He is exposed to the many facets of the Fortran IV language and repertoire in a gradual and well planned manner. There are over 400 pages to this work but the examples and explanations are carefully placed and spaced so that the reader does not have