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