62[Z].—J. A. P. HALL, Editor, *Computers in Education*, Pergamon Press, New York, 1962, xvi + 122 p., 23 cm. Price $7.50.

In September 1959, Hatfield Technical College—now Hatfield College of Technology in Hertfordshire County, England—set up a department of mathematics, which at the same time was expected to organize and run a computing laboratory. In order to gain and exchange ideas with other colleges on "the purpose, equipment and use of a computing laboratory in a technical college, with particular reference to the effect of computing machines on mathematics today," the department organized a two-day conference on May 27 and 28, 1960. Of the 22 papers read at that conference 20 have been collected into this book, most of them in a revised and updated version. In addition, there is an "Introduction" and a "Conclusion," both written by the editor, J. A. P. Hall.

The papers can be divided into essentially three groups. One group, comprising nine papers, is concerned with the educational aspects of computation. The second group, also of nine papers, could be entitled "the organization of a computing laboratory and the selection of its equipment." Finally, the third group contains two papers, a general lecture on "Applied Mathematics and Computing Machines" and a list of "Bibliographies for Numerical Analysis."

In general, the presentation reflects very strongly the special problems of the small institutes of technology in England. There is apparently no program in Britain similar to that of the National Science Foundation in this country, which provides a certain source of funds for the establishment of computing facilities in such colleges. As a result, a number of the papers discuss the advantages and disadvantages of self-built computers, joint computer installations with local industries or even the local community, and, of course, of self-supporting centers, selling time to outside users. At the same time, the over-all discussion is centered around small computers, and this includes all the emotional arguments in favor of the "simple", and "robust" machine which gives the student the proper "feel" for debugging, and so on. Evidently related to this problem is the comparatively strong case made for desk-calculator laboratories; this includes a very thorough article on the selection of the appropriate desk calculator.

Throughout all the papers there is agreement between the conferees that "computation", as they call it, is now a vital part of engineering education. Accordingly, they recommend that every technical college should have a computing laboratory. And this is unquestionably a very modern and excellent recommendation. However, there seemed to be a general understanding here that computation stands primarily for numerical analysis, and to some extent for statistics. This is particularly evident in the papers recommending the inclusion of computation in the requirements of the Diploma in Technology and Degree Courses and in those of the National Certificate and Diploma Courses, as well as in the papers outlining various computer-related courses for colleges. Somehow, all through the book, computation is viewed as the laboratory science of mathematics; in fact, in the Conclusion that is stated in just this way. In line with this, no mention is made of non-numerical problems, not to speak of a recognition of computer science as a field in its own right. Neither is there any mention made of computer use in such areas as industrial management or industrial control, while operations research receives only fleeting mention in some articles.

Summing it up, we might say that this book essentially makes a case for more and stronger education in applied and numerical mathematics, education which must include the direct and intensive use of computers and modern computing methods. In fact, in his paper Sir Graham Sutton makes a statement which might almost be said to capsule the general tone of the entire conference:

"It is sometimes said that the applied mathematician has not the care for rigor that characterizes the work of the pure mathematician. To some extent this is true, but it is not an excuse for mediocrity or slapdash methods. In many ways the computer is a dangerous instrument, and there is every need for the best brains in its use. It is up to the teachers to see that this need is met." Indeed, and that is not just a British problem!

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63[Z].—ROBERT S. LEDLEY, *Programming and Utilizing Digital Computers*, McGraw-Hill Book Company, Inc., New York, 1962, xxi + 568 p., 23 cm. Price $12.50.

There is a long list of books on the current market which provide an introduction to computer programming and the application of computers. These books proceed along a variety of lines: in addition to those concerned with programming one specific computer, there are those which introduce the details of programming from a more general viewpoint by discussing a fictitious machine. Still others deal with a specific area of computer applications and discuss programming problems in connection with these applications. This particular book by R. S. Ledley contains elements of all of these types, and yet it is fundamentally different from all of them in a number of ways. Two very striking aspects are a well-written introduction to automatic programming, including a chapter each on ALGOL and COBOL, and the almost startlingly far-ranging list of topics discussed in the book.

In his introduction the author specifies his aims as follows: "This book was written as a college text in programming digital computers; it can be used on various levels, ranging from sophomore to first year graduate. This book is intended to fill the great need for an up-to-date, comprehensive text to provide an introduction to the many aspects of the digital computer-programming field . . . of course, an introductory exposition of a field as large and rapidly advancing as this can never hope to treat all subjects exhaustively . . . hence, each chapter is designed primarily to introduce the student to certain fundamental concepts and techniques of development."

The book comprises three roughly equal parts, entitled, respectively, Machine Languages, Automatic-Programming Techniques, and Data-Processing Techniques.

The first part begins with some descriptions of computer applications, including such topics as: process control, simulations, and aids to medical diagnosis. Then follows the usual block-diagram and functional description of computers. Chapter 2 contains an introduction to number systems, flow-charting, and the principles of machine languages. These principles are explained using a four-address instruction format. Chapter 3 then reduces the four-address format successively to three-,