traditional numerical analysis. There is a short ALGOL summary, but the text consists mainly of some fifty "worked examples". For all but a handful of these both a flowchart and an ALGOL program are given. Although an excellent way of improving one's programming skill is to dissect good examples of the form, a genuine 'course book' should lead the reader into situations without always providing explicit solutions. This feature does however make it an excellent volume for the reference library shelf, or as support material for the mathematics teacher who wants numeric applications but who lacks confidence in his own programming ability.

The second edition is virtually identical to the first for 200 pages, but is enlarged by the inclusion of two chapters which are presumably supposed to attract buyers who want a FORTRAN bias. No effort has been made to integrate this material into the rest of the book. A dreary example is chosen as a commercial application and the FORTRAN summary contains a number of oddities. Unlike the rest of the book, the layout of these two chapters is messy. It incorporates computer-produced output, some reduced in size, but most of which is disconcertingly large and 'furry', and has no advantage over the normal typeface. Another feature of my copy of the second edition is that the flowcharts (which were excellently crisp and well produced in the first edition) are often smudgy and occasionally unreadable. Also, someone has taken the trouble to incorporate some errors not present originally! These are heavy prices to pay for the replacement of the earlier 'sausage-shaped' decision boxes by the conventional diamonds.

It is unfortunate that, in the revision, the authors did not seize the opportunity of including some interesting non-numeric examples using the extended string-handling facilities of many modern ALGOL implementations. This might have compensated for the book's rather outdated view of the computer as principally a mathematical tool for effortless 'number-crunching'. The discrepancy between the book's stated aims and its considerable achievements does not make it any less useful in this somewhat limited sphere, and every computing library should have one. I strongly recommend the first edition (secondhand copies if necessary) unless you happen to be a FORTRAN fetishist with good eyesight!

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Computer science, by P. Harvey. Pp 184. £2. 1971 (Norman Price)

This book is designed for the A level City and Guilds Computer Science course. The major part of the work is concerned with computer hardware. Input/output devices, the central arithmetic unit and several types of storage are defined in some detail. This section is preceded by an introduction which describes different number systems and boolean algebra. Probably the best part of the book is an excellent survey of machines which were the forerunners of today's computers. The book concludes with a rather superficial description of computer programming. The book can be recommended as an introductory text on computer hardware.

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Computer handling of chemical structure information, by M. F. Lynch, J. M. Harrison, W. G. Town and J. E. Ash. Pp xii, 148. £3. 1971 (Macdonald/American Elsevier)

Optimum packing and depletion, by A. R. Brown. Pp vii, 107. £1·80. 1971 (Macdonald/American Elsevier)

These are two books in the excellent Macdonald series of computer monographs. They differ from the others in the series, which so far have all dealt with topics in what one may

call basic computer science, in that they deal with particular fields of computer applications. Both books deal with problems which are very difficult, but in both cases the mathematics used is quite simple.

Lynch *et al* are concerned with the problems of formalising, storing, retrieving and processing information about the structure of chemical molecules, mainly organic. The problems are difficult because of the vast and increasing number and variety of compounds of which the structures are known and which are of potential importance, the complexity of most structures and the need to describe each structure in full topological detail. The book gives an indication of the industrial importance of the problems and includes a summary of the main organised services (e.g. Chemical Abstract Service) which have been set up to provide information of this kind.

The "packing" and "depletion" problems which are the subject of Brown's book occur frequently, in a variety of forms, in highly practical situations. The fitting of advertisement features into the permitted breaks in commercial television programmes is an example of the first, school time-tabling is another. The "stock-cutting" problem is an example of the second—steel bars (say) are made in standard lengths, orders come in for a whole variety of lengths: how does one cut the stock sizes so as to fulfil the order with minimum wastage? Brown treats these and other examples, and includes an interesting chapter on heuristic methods.

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Numerical methods for nonlinear algebraic equations, edited by Philip Rabinowitz Pp xi, 199. £7·25 cloth, £2·50 paperback. 1971 (Gordon and Breach)

This consists of the papers given at a conference held at the University of Essex in January 1969, organised by the British Computer Society, plus one additional paper. All the principal modern methods of attacking nonlinear algebraic (including transcendental) equations are discussed, with investigations of the convergence of the various interactive processes which are used. The additional paper is a very full description by M. J. D. Powell of a FORTRAN program for a new and powerful method which he describes and analyses in the preceding paper; it includes a complete listing of the program and some examples of its use. A paper by the editor gives a valuable bibliography. Altogether a very useful reference book.

J. HOWLETT

Studies in applied mathematics: Volume 7, edited by A. H. Taub. Pp xv, 217. 1971 (Mathematical Association of America, distributed by Prentice-Hall)

"Applied mathematics is concerned with the understanding of scientific phenomena by means of the construction, analysis and interpretation of mathematical models." This is the opening sentence of the editor's preface. The book illustrates this in five papers covering problems in geophysics, gravitation theory, diffusion processes and hydrodynamics including wave motion. Another paper deals specifically with computer applications, showing how great an impact the machine has had on the development of applied mathematics. The remaining paper, on scattering theory, is largely pure mathematics and is concerned with the solution of the Schrödinger equation. The book is an extremely interesting presentation of modern methods, much of it self-contained but not particularly easy reading.

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