the library of any college or university that carries a computer science degree course.

PAUL JEFFREY

Fortran Programming

First Steps in Basic Fortran. By L. J. Slater. Pp. viii + 104. (Chapman and Hall: London, January 1971.) £1.

THERE are so many introductory texts for prospective computer users that the choice is more likely to confuse the newcomer to the field than to encourage him. In these circumstances any further addition to the ranks of beginners' guides needs some special merit before its publication can be justified. This slim volume has just such merit, fulfilling a basic need which has been inadequately dealt with by many larger and more expensive books.

Dr Lucy Slater worked on the development of the original high speed computers at Cambridge University, and her enthusiasm for the techniques which they make possible shows in her presentation of these first steps. Aimed at the nonscientific student who has only the most elementary knowledge of mathematics, but who wishes to use computers for his work in, say, economics or sociology, the book is simple to understand, but takes the reader (almost without him realizing it) rapidly to the stage where he can cope with subroutines and simple regression programs. Just as important for the beginner, it is also small enough to carry conveniently to the site where computations are carried out, and durable enough to stand up to the rough handling it is likely to receive from constant use.

For anyone without a mathematical background who needs to use Fortran, this seems the ideal choice of text, and it seems certain to find a large market among students of the social sciences.

JOHN GRIBBIN

Numerical Analysis

Introduction to Numerical Analysis and Applications. By Donald Greenspan. Pp. ix + 182. (Markham: Chicago, 1971.) \$9.50.

THIS book is the latest addition to the Markham Mathematics series and is designed to accompany a one semester introductory course in Numerical Analysis. Its scope is wide ranging, beginning with some of the more basic techniques of interpolation, numerical integration and differentiation, and going on to the solution of systems of equations by generalized Newton iteration. There is also a section on the approximation of ordinary differential equations by difference equations and the final chapter of the book is concerned with the application of interval arithmetic to the determination of error

bounds for the solution of certain classes of algebraic problems, the principal case considered being that of difference equations.

On the whole, the book is very clearly and concisely written and the text is well illustrated with numerous well-chosen explanatory examples. The material is generally well presented, although there are one or two places (such as in the proof of theorem 1.3) where a few more words of explanation would have considerably improved the understandability of the text. The principal drawback of the book is its rather modest size (despite its immodest price) which, coupled with its somewhat ambitious scope, results in much of the subject matter being only rather fleetingly touched on and not covered in any great depth. For example, no mention at all is made of the fact that, in general, Newton iteration is quadratically convergent. Nor is there any reference to the various pitfalls that this iterative method is subject to—pitfalls such as those that can arise when a second root is positioned close to, or even coincident with, the root that is being successively estimated. Another notable omission is an adequate discussion of the various techniques for the non-iterative solution of systems of linear equations. Gaussian elimination comes as something of an afterthought as an exercise at the end of a chapter that has been largely concerned with tridiagonal systems. Row interchanges are only very briefly touched on and the reasons behind performing such interchanges are not mentioned at all. It should, however, be stated that these omissions are made up for, at least in part, by means of comprehensive references to a very extensive bibliography, which will easily enable the serious reader to use this book as a basis for further study.

F. E. CLIFFORD

Elementary Solids

A Simplified Approach to Solid State Physics. By M. N. Rudden and J. Wilson. Pp. vii + 187. (Butterworth: London, February 1971.) £2.90.

THERE has been much talk recently of the need to refashion undergraduate science courses to provide students with material more directly relevant to the tasks that await them in the outside world. Similar views can also be heard concerning undergraduate textbooks in science, particularly in physics. The delights to be found in the rigour and natural elegance of the subject, the argument goes, seem sometimes to take precedence in the minds of authors over the more rudimentary requirements of the growing number of students not destined to be specialists in the field. The choice in solid state physics, for

example, is very much one between the advanced introductory text, in the vein of Kittel or Ziman, and the broad based collection of topics lumped together under the heading of "properties of matter".

Rudden and Wilson came up against this polarization of styles in their hunt for an elementary treatment of solids that does not dive into elaborate circumlocutions at the first hint of quantum mechanics. Faced with designing a course in solid state physics for students whose background was little higher than A-level, they have put together a short textbook which is avowedly utilitarian and which panders little to the needs of the specialist. Although lacking somewhat in both elegance and diagrammatic clarity, the book contains a sensible balance of topics for a first year course and the style of writing is easy and unpretentious.

About a fifth of the book is devoted to semiconductor devices with a quick dip into their manufacture and uses. The early chapters provide some insight into the origin of energy bands and crystal structure in a solid, and the authors have not been nervous of deploying quantum ideas where necessary. The remaining chapters deal with electrical, thermal, optical and magnetic properties of solids, and there is a short introductory section outlining the basic concepts of modern physics that bear on the later text.

Although the authors have suppressed the temptation to clutter up the book with too wide a range of topics, it is a pity that they could not have slotted in some worked or even unworked examples at the ends of chapters. It could also be argued that some mention of superconductivity would not have been out of place. But on the whole Rudden and Wilson have succeeded in preparing a fairly well rounded outline to the subject at a level below that at which it is usually attempted.

ANDREW MILLINGTON

Editorial and Publishing Offices of NATURE

MACMILLAN JOURNALS LIMITED
4 LITTLE ESSEX STREET, LONDON WC2R 3LF

Telephone Number: 01-836 6633
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