BOOK REVIEWS

LEDERMANN, W., *Introduction to the Theory of Finite Groups* (University Mathematical Texts, Oliver and Boyd, 5th edition, Edinburgh, 1964), x + 174 pp., 10s. 6d.

The fifth edition of this well-known and popular textbook differs from the fourth edition of 1961 in a number of places in the last two chapters. The statement of the theorem (p. 143) on the generators of a subgroup of a finitely-generated free Abelian group has been strengthened slightly without requiring any change in the proof. There are other minor changes in the last two chapters and the theorem that a subgroup of a finitely-generated Abelian group is finitely generated has been added to the end of Chapter VI. Although *The Theory of Groups* by Marshall Hall (New York, 1959) is mentioned in a footnote in both the fourth and fifth editions, it still has not been added to the bibliography. The need for a new edition after only three years emphasises the book's popularity as the best short introduction to group theory available.

C. J. SHADDOCK

NOBLE, B., *Numerical Methods, 2: Differences, Integration and Differential Equations* (Edinburgh, Oliver and Boyd, 1964) 215 pp., 12s. 6d.

This is the second volume of a two-volume presentation of numerical analysis at a level appropriate to an undergraduate course up to honours degree standard. The expectation engendered by the first volume (reviewed on p. 174 of the *Proceedings* for December 1964) that together these would provide a suitable textbook for such a course is amply fulfilled.

The opening chapter deals with the use of finite differences in numerical work, with no previous knowledge assumed, and the criteria for best polynomial approximations, in particular the minimax criterion. The least squares norm receives only a brief mention but the Chebyshev polynomials and their application to polynomial approximation are discussed. The following chapter is devoted to the interpolating polynomial in its various forms, due attention being given to truncation errors and the practical use of these formulae in both hand and automatic computation.

The author has avoided the symbolic method but in the opinion of the reviewer the treatment of numerical integration and differentiation would have been facilitated and enhanced by its use. There is no mention of the Euler-Maclaurin formula and the reference to Gaussian quadrature is perfunctory.

The multiplicity of superficially different methods for solving differential equations numerically and the variety of error sources, to which they are subject, including the phenomenon of instability in its diverse forms, makes this topic one which is not readily amenable to a systematic elementary treatment. The account given here is one which will be appreciated by those who have attempted this difficult task and will help greatly those who have to teach the subject. The account of numerical techniques for solving partial differential equations is brief and orthodox.

Relatively few printing errors have been detected at a first reading. The low price and high quality production associated with the University Mathematical Texts series is maintained in this timely contribution to the literature on numerical analysis by Dr Noble.

JAMES FULTON

HUNTER, J., *Number Theory* (Oliver and Boyd, 1964), ix + 149 pp., 10s. 6d.

This book, in the well-known University Mathematical Texts series, provides an introduction to elementary Number Theory. From the outset the relation of the