unduly contracted. In group theory the topics covered include the Sylow theorems, transitive permutation groups, the simplicity of A_n for $n \geqq 5$, automorphisms of finite symmetric groups, and the basis theorem for finitely generated abelian groups. An introductory chapter on ring theory then prepares the ground for a detailed study of modules over a commutative ring, which in turn leads naturally into a concise and (for a student's book) unusually sophisticated account of finite-dimensional linear algebra; this last part would certainly be found hard by a student approaching the subject for the first time. Chapters VII and VIII cover the theory of fields up to the proof of the insolubility of the quintic equation, while the final chapter is devoted to the already mentioned proof of the fundamental theorem of algebra.

Throughout the book the viewpoint is fairly sophisticated, or " modern ". Maturer mathematicians will enjoy the new look it gives to familiar topics. J. M. HOWIE

KRISHNAIAH, PARUCHURI, K. (Editor), *Multivariate Analysis* (Academic Press, 1966), xix+592 pp., 156s.

This is a well-produced book consisting of papers presented at the International Symposium on Multivariate Analysis held in Dayton, Ohio in June 1965. The list of contributors (thirty-nine in all) is formidable and contains a host of very well-known names.

Papers are divided in the book into eight different categories under the following headings: non-parametric methods, multivariate analysis of variance and related topics, classification, distribution theory, optimum properties of test procedures, estimation and prediction, ranking and selection procedures, applications. Thus the coverage of the field is very wide and the wealth of material in the book is such that few professional statisticians would find nothing of special interest in it. Moreover its organisation ensures that it provides an excellent reference book for both recent and past developments in multivariate analysis, so that it is a most useful, if somewhat expensive, addition to the literature in this field. S. D. SILVEY

LEHNER, JOSEPH, *A Short Course in Automorphic Functions* (Holt, Rinehart and Winston, London, 1966), vii+144 pp., 40s.

This is a short introduction to the theory of automorphic functions and discontinuous groups. It is primarily a text for beginners in the subject, although more mature mathematicians will find it an excellent place to learn the connection of the theory of Riemann surfaces with the theories of automorphic functions and discontinuous groups. In the past this has been a one way process, but lately there has been a marked increase in the application of the latter theories to the former. There are three chapters: Discontinuous groups, Automorphic Functions and Forms, and Riemann Surfaces. The first chapter develops the basic facts about linear fractional transformations, discontinuous groups and fundamental regions of discontinous groups. Poincaré's model of hyperbolic geometry is introduced and the existence of fundamental regions is proved by the normal polygon method. The lower bound for the hyperbolic area of a fundamental region is obtained. Chapter 2 starts with the development of Poincaré series and the existence of automorphic forms is thereby demonstrated. The Petersson inner product is introduced for the vector space of cusp forms and Hecke's beautiful theory of T_n operators is sketched. The last chapter develops the connection with Riemann Surface theory.

This book is not without defects. I noted several gaps in proofs which for the most part are easily filled. Most beginners will find that the material on fundamental regions requires careful reading. There is an unfortunate omission in the bibliography. On page 65 Professor A. M. Macbeath's lectures on Discontinuous Groups at the 1961 Summer School in Geometry and Topology at Dundee are mentioned but there is no corresponding entry in the bibliography. On the plus side is the inclusion of a good set of problems and notes at the end of each chapter giving directions to further study. I find this a welcome addition to the literature and recommend it to those interested in learning this area of mathematics.

J. R. SMART

SNEDDON, I. N., *Mixed Boundary Value Problems in Potential Theory* (North-Holland Publishing Company—Amsterdam, 1966), viii+282 pp., 80s.

The topic discussed in this book has flowered in the last few years. Of the 170 references given only 52 are dated earlier than 1950 and most of these are to standard general mathematical works or classical work of the nineteenth century. The author puts the start of the recent work down to Titchmarsh's study of dual integral equations in 1937. This may be so but the continuing work is largely due to the author, and his students and collaborators. There are those who say that with the advent of high speed computers the analytical work of the book is no longer necessary; this is often untrue as anybody who actually tries to solve some of the problems of the book *directly* by means of a computer will soon find out. The book discusses how a problem is put into a form which *can* be solved by a computer, usually as a Fredholm integral equation of the second kind.

Much recent work has been done in potential theory alone, as this book shows, though there is a good deal which has a wider application than that given. Much remains to be done, however, even in potential theory. For instance I have yet to see a solution to the simple-seeming problem of the field due to a torus of elliptic cross section charged to a constant potential.

In this book an operational method is exploited to great effect. The author is largely responsible for the development of this method though he is too modest to say so. By its judicious use much tedious analysis has only to be done once—a great advance over the laborious work so often repeated in slightly disguised forms by the earlier workers. The analysis has to be done once, however, and here it is done in a valuable chapter in the book called Mathematical Preliminaries, which comes in after an introductory descriptive chapter. The author says that most of it will be familiar but indeed there may be much that is not entirely so, and it is most useful to have all this collected together in a space of 37 pages.

After a chapter on the classical problem of the electrified disc there is one on dual integral equations, one on dual series equations and one on triple integral equations and series. Next comes a chapter on integral representations and a final chapter on applications to potential problems, where certain numerical results and approximate methods are discussed.

This is an eminently practical book, well designed to meet the needs of the people for whom it is written, namely students of applied mathematics, physics and engineering. The reader is given every help and nowhere is a proof " left to the reader ". As the topic is not an easy one this will be greatly appreciated by the workers in many fields who will no doubt use the book.

J. C. COOKE

LANCZOS, CORNELIUS, *Discourse on Fourier Series* (University Mathematical Monographs, Oliver and Boyd, 1966), viii+255 pp., 63s.

This excellent book is mainly intended for students of engineering, physics and mathematics at both senior undergraduate and postgraduate level. It is not quite a self-contained volume but it includes a wide range of material. The historical development of the subject is also given in a way which makes it alive and thoroughly absorbing.

In the first chapter of over 100 pages the author discusses the beginnings of Fourier's work, goes on to mention the different applications to physical problems and then gets

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