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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down to the subject at the level of first principles by explaining the concepts of function, limit, convergence and so on. Interleaved with this discussion are flashbacks to the work of Fourier's predecessors, in particular that of Bernoulli and D'Alembert. We are then taken through an elegant account of (amongst other topics) the Gibbs phenomenon, Fejer means, a comparison of Fourier and Taylor series and the application of Fourier functions to eigenvalue problems.

Chapter two of about 30 pages describes the use of Fourier series in approximation problems such as curve fitting, global integration, smoothing of 'noisy' data and methods of improving convergence.

The third and final chapter of 90 pages mainly discusses the Fourier Integral, the method of residues, Fourier and Laplace transforms including convolution theorems. This is perhaps more difficult to follow and the reader ought to be fairly well acquainted with such topics as the Cauchy Integral theorem, convergence of infinite integrals and so on.

The author's style is positive and refreshing and makes for pleasant, though not always easy, reading. The book is truly a discourse and the device of question and answer is used to present much of the material. It might be mentioned that although the questions are divinely inspired (that is to say not the sort that most students are likely to ask) your reviewer did not find this irksome. Summing up, this book is likely to have wide appeal and deserves to be read by all who really want to enrich their knowledge of the subject. RALPH JORDINSON

COLLINGWOOD, E. F. and LOHWATER, A. J., *The Theory of Cluster Sets* (Cambridge Tracts in Mathematics and Mathematical Physics No. 56, 1966), xi+211 pp., 50s.

If a complex valued function f is defined in a domain D of the complex plane, then relative to the functional values of f and a specified approach to the boundary of D various sets of complex numbers can be defined. The theory of cluster sets, in the main, deals with the relationships among such sets and the function theoretic properties of f. The present book is intended as an introduction to this theory and complements " Cluster Sets " by K. Noshiro in the " Ergebnisse " series.

Most analysts will be acquainted with a number of results which are fundamental in the theory of cluster sets, but in many cases the form in which these are known will not contain any direct reference to cluster sets. Such results are associated with Weierstrass, Picard, Fatou, Iversen, Gross, etc. Insofar as the theory of cluster sets relates to immediate developments of such classical results I feel it will be of interest to every complex analyst. On the other hand perhaps many will feel a little lukewarm towards some of the more specialised refinements of the theory.

The theory of cluster sets is too complicated for me to attempt any kind of summary of the contents of the book under review. However, I should like to emphasize that it contains a great deal of material of the highest general interest to the complex analyst as well as material on the more specialised aspects of the theory of cluster sets.

Unfortunately the book does have a number of defects. The attitude to more or less ancillary results is a bit illogical. It is not clear on what basis it was decided which of these results were to be proved and which of them were to be quoted. The presentation in a number of places will cause a lot of difficulty for many readers. Finally the book contains quite a large number of slips and errors. The above features together with the natural complexity of many arguments within the theory of cluster sets make the book rather difficult to read. J. CLUNIE