first and higher orders and concludes with applications to elasticity, hydrodynamics and electromagnetism. The fourth chapter which is about 300 pages in length deals with boundary value problems; about half of it is devoted to elliptic equations and the remainder to parabolic and hyperbolic equations.

The whole book is a veritable mine of information and anyone browsing through it at random is almost certain to find something interesting that he did not know of before.

D. MARTIN

BRUCKHEIMER, M., GOWAR, N. W., AND SCRATON, R. E., *Mathematics for Technology: A New Approach* (Chatto and Windus, London, 1968), xiv+558 pp., 48s.

This is a very ambitious book. It seeks to reform the teaching of mathematics to engineers and scientists to give them not just a collection of techniques which may or may not be relevant to their subsequent career, but rather a grasp of the basic concepts. The subject matter is not revolutionary, but the method of presentation is new and fundamentally sound. With the one bold stroke of relating the whole to the basic mathematical structure, the authors have succeeded in presenting mathematics as a unified subject rather than as a disjointed collection of intellectual tricks. The material covered is appropriate to a first year course: Sets and Binary Operations; Mappings; Accuracy and Errors; Vectors; Matrices; Complex Numbers; Limits; Differentiation; Infinite Series; Integration; Differential and Difference Equations; Probability and Statistics.

Not content with the reforming of the teaching of " technical " mathematics, the authors have succeeded in breaking through the barrier of traditional text-book jargon and style. The text itself is lighthearted (it is occasionally helped by a cartoon) and intellectually honest. There is no attempt to gloss over the difficulties; indeed many of the sources of confusion to students are eliminated by using special notations and symbols. Each topic is dealt with in four chapters. Firstly there is a chapter of theory (lecture material), followed by a chapter on the associated techniques (tutorial material). Then at the " back " of the book there are two chapters which attempt to fill in some of the details for readers unfamiliar with the " New Maths ". Solutions are given to many of the problems.

There will be some who will feel that mathematics taught in this way is too formal for our engineering colleagues. I, for my part, am convinced that the authors have a true assessment of the teaching situation. I would disagree with some details of the text. I would have liked to have seen more numerical mathematics to emphasise the unity of the subject; indeed I would have omitted the chapters on Differential and Difference Equations and interpolated numerical analysis as appropriate throughout the book.

The authors have set themselves the target of producing mathematically literate technologists. Their book has made the achievement of that goal closer.

J. W. SEARL

TREVES, F. *Locally Convex Spaces and Linear Partial Differential Equations* (Springer-Verlag, Berlin, 1967), xii+121 pp., DM 36.

This book gives an account of some fundamental existence and approximation theorems relating to linear partial differential equations after first providing the necessary functional analytic tools. It is divided into two parts: Part I, entitled the spectrum of a locally convex space, is particularly interesting since it provides the basic functional analysis in a way tailor-made for the needs of partial differential equations. The author's point of view is that the profusion of topologies which are commonly used on the same underlying space acts as a deterrent to the student attempting to learn topological vector space theory with a view to using its results in partial differential equations. He focuses attention on the set spec $E$ of all continuous seminorms on a given locally convex space $E$, and by a systematic use of notions related to spec $E$ is able to avoid all mention of any topologies on $E$ save the initial one. A particular virtue of this approach is that the theorems which thus naturally emerge are rather close to the concrete theorems needed in partial differential equations, this correspondence being a good deal more marked than that commonly obtained by standard techniques. Part II consists of an application of these results to prove fairly well known results in partial differential equations, culminating with two chapters on the existence and approximation of solutions, for both the constant and non-constant coefficient case. This section of the book is not entirely self-contained, and depends partly on the book by Hormander.

The approach given in Part I seems an attractive one, and will no doubt become more widely used in time. The book is rather tersely written and readers meeting locally convex space theory for the first time may wish to consult books auch as those by Bourbaki and Köthe to gain a more rounded view of the subject. There are a number of rather obvious misprints and a few linguistic oddities; there is no index, but to compensate there is a summary of the main results in Part I and a glossary of terms used in partial differential equations. D. E. EDMUNDS

COPSON, E. T., *Metric Spaces*, Cambridge Tracts in Mathematics and Mathematical Physics No. 57 (Cambridge University Press, 1968), 30s.

The author's aim is to provide a more leisurely approach to the theory of the topology of metric spaces than is normally given in textbooks on functional analysis. In this he has been eminently successful and has produced a very readable book, which could be used by undergraduates either as a text for a course of lectures or for private study. A minimum of classical analysis is assumed and the subjects studied include complete metric spaces, connected and compact sets. Applications to spaces of functions are given, such as Arzelà's theorem and Tietze's extension theorem.

Perhaps the most interesting chapter in the book is the one dealing with fixed point theorems and their applications to systems of linear equations, differential equations, integral equations, the implicit function theorem and other topics. This is a very valuable collection of results and illustrates admirably the power and use of abstract theorems on metric spaces. There is a short final chapter on Banach and Hilbert spaces. Numerous example for the student are included at the ends of the first eight chapters. R. A. RANKIN

SCHAFER, RICHARD D., *An Introduction to Nonassociative Algebras* (Academic Press Inc., New York and London, 1966), x+166 pp., 64s.

This is an expanded version of the lectures given in Oklahoma State University in the summer of 1961. The author disclaims any intention of writing a comprehensive treatise on the subject. "Instead," he says, "I have tried to present here in an elementary way some topics which have been of interest to me, and which will be helpful to graduate students who are encountering nonassociative algebras for the first time." He is kind to such students by his sensible practice of quoting, with substantiating references, certain "known" results which the student may profitably take for granted on a first reading. A conscientious reader would require to do a certain amount of background reading, and suggestions regarding this are included in the Preface.

Some previous acquaintance with abstract and linear algebra is assumed. The Introduction surveys very briefly, without proofs, the structure theory for finite-