BOOK REVIEWS

HALMOS, PAUL R., *Naive Set Theory* (Van Nostrand, Princeton, 1960), 26s. 6d.

This is an admirable account of those parts of set theory needed by the prospective pure mathematician. Although the title may suggest the contrary the treatment is abstract and axiomatic; but the axioms are regarded as a source from which facts are to be drawn as quickly as a logically clear exposition to the beginner will allow. To achieve this in such a small book (it consists of 25 short sections) some proofs are merely hinted at and many are left entirely as exercises. Thus many sections take on a predominantly descriptive character. Proofs are presented informally in the language and notation of ordinary mathematics and in this sense the account is naive.

In the first few sections the author introduces axioms for the basic set-constructing processes and deduces their consequences. Here, as in most of the later sections, he supplies a wealth of informal comment and explanation with which to ease the beginner's difficulties. For example he takes care on several occasions to allay possible suspicion of vacuous conditions; at another point he remarks that Burali-Forti was one man and not two. He describes a formal language for specifying subsets but soon replaces it in favour of ordinary usage and he makes no use of the special term " class ".

In the sections dealing with relations, families, mappings and order, he gives a straightforward account of practically all the standard terms and notations associated with these concepts. With the aid of the axiom of infinity he constructs the natural numbers as transitive sets, proves the recursion theorem and is then able to give inductive definitions of addition and multiplication followed by a brief sketch of arithmetic. The transfinite version of the recursion theorem is reached by way of the axiom of choice, Zorn's lemma and the well-ordering theorem. The properties of ordinal numbers and those of cardinal numbers are treated independently of each other and the subject of their inter-relation is left until the final section.

T. W. PARNABY

MCSHANE, E. J., AND BOTTS, T., *Real Analysis* (van Nostrand, 1959), 272 pp., 49s. 6d.

This book is an excellent introduction to certain parts of real analysis and functional analysis. Nevertheless the real analysis, as usually understood, does not begin until Chapter IV and, when I was reading through the book, this chapter came as a real pleasure to read after the close concentration required in the study of generalised convergence (in R. L. Moore's sense) followed by applications to continuous functions in a Hausdorff space in Chapter III. If the book is to appeal to beginning graduate students (and the chapters on *real* real analysis are excellent for this purpose) then surely it is a psychological error to begin with such abstract topics. By contrast, the measure theory in Chapter IV is restricted to subsets of Euclidean spaces, though a large number of important theorems in measure theory and functional analysis seem to have been included. One might mention the Hahn-Banach theorem, Hahn and Lebesgue decompositions, Parseval's formula, the Radon-Nikodym theorem and the Riez-Fischer theorem.

Chapter I, on fields, is not difficult, but it seems to include too much material of doubtful relevance to the rest of the book. For instance, what use can Theorem 1.10