these are obvious but those in Definition 5.6 (wrong sign) and Theorem 5.7 (C_2 traversed in the wrong direction) will cause trouble.

The main criticism, however, concerns the cost. Certainly the book is beautifully produced. But when one considers that the main body of the text occupies 106 pages (the rest being appendices, bibliography, indices, etc.), £4·50 seems a tall order even in this day and age. Since books covering essentially the same material are available at under half the price, the high cost may well militate against the recommendation of the book as a text for students.

ADAM C. MCBRIDE

ANDERSON, F. W. AND FULLER, K. R., *Rings and Categories of Modules* (Graduate Texts in Mathematics, vol. 13, Springer-Verlag, 1974), ix+339 pp., DM.36.30, $14.80.

Beginning with the definition, rings are studied from the standpoint of their categories of modules. Care is taken not to become more involved than necessary in general category theory, and categorical ideas are introduced only when they are needed. For example, natural transformations of functors are discussed in § 20 and Morita equivalence in § 21.

Of course one would expect the Morita theorems to be included in such a book, and so they are, but there is much more besides, as the following summary of the contents shows: §§ 1-8, rings, modules and homomorphisms; endomorphism rings; direct sums and products; essential and superfluous submodules; generators and cogenerators; trace and reject: §§ 9-15, semisimple modules; finitely generated, finitely cogenerated (i.e. finitely embedded), artinian and noetherian modules; modules with finite length; indecomposable decompositions; semisimple artinian rings and primitive rings: §§ 16-19, hom and tensor functors; projective, injective and flat modules; projective covers and injective envelopes: §§ 20-24, natural transformations; Morita equivalence and duality: §§ 25-26, direct sums of projective, injective and countably generated modules; characterisations of noetherian rings: §§ 27-29, semiperfect and perfect rings; modules with perfect endomorphism rings.

This is not a book for the expert only, although he will find it a worthwhile addition to his library. The beginner will find this an attractive, well-motivated and informative introduction and account of quite a substantial part of the theory of rings and modules. It is particularly well suited to an M.Sc. course as the presentation is clear and at the end of each section there is a wide selection of exercises to test the understanding.

P. F. SMITH

BERBERIAN, S. K., *Lectures in Functional Analysis and Operator Theory* (Graduate Texts in Mathematics Vol. 15, Springer-Verlag, 1974), ix+345 pp., DM38.50, $15.70.

This is the fifth textbook in analysis that Professor Berberian has written, and it is of the high standard which we have come to expect from the author. In Chapter 1, the basic theory of topological groups is developed up to but excluding the introduction of Haar measure. Topics discussed include neighbourhoods of the identity, subgroups and quotient groups, uniformity in topological groups and metrisability of topological groups. Chapter 2 is devoted to the basic theory of topological vector spaces over the real and complex fields. There are sections on metrisable topological vector spaces, spaces of type (F), normed spaces, Banach spaces, hyperplanes and linear forms, finite-dimensional topological vector spaces and Riesz's theorem. Chapter 3 is entitled " Convexity ". There are sections on convex sets, Kolmogorov's normability criterion, the Hahn-Banach theorem, invariant means, generalised limits, ordered vector spaces, extension of positive linear forms, locally convex topological vector spaces, separation of convex sets in a locally convex topological vector space, compact convex sets, the Krein-Milman theorem, seminorms and duality in topological vector spaces. In Chapter 4, the basic theory of normed linear spaces, Banach spaces, Hilbert spaces and linear mappings between such spaces is presented. In Chapter 5, the Baire Category theorem, uniform boundedness principle, open mapping and closed graph theorems are proved. Chapter 6 is entitled " Banach algebras ". It contains elementary spectral theory and Gelfand theory. Only the rational functional calculus is introduced in this chapter. In Chapter 7, the theory of C^*-algebras, up to and including the Gelfand-Naimark theorem, is presented. The final chapter contains a miscellany of applications of results in earlier chapters. There are sections on Wiener's theorem on reciprocals of non-vanishing absolutely convergent trigonometric series, the Stone-Čech compactification, the spectral theorem for a normal operator, spectral sets, irreducible representations, von Neumann algebras, group representations and the character group of a locally compact abelian group.

The prerequisites for reading the book are elementary abstract algebra, general topology, complex analysis and measure theory. Throughout the text there are numerous exercises, many of them very difficult, but which serve to indicate further developments of the theory. There is a section entitled " Hints, Notes and References ", a comprehensive bibliography and an index. To conclude, this book has been carefully and concisely written. It should prove invaluable to the research student in functional analysis.

H. R. DOWSON

WEIR, A. J., *General Integration and Measure* (Cambridge University Press, 1974), xi+298 pp., £5·70.

This is a sequel to Dr Weir's undergraduate textbook on *Lebesgue Integration and Measure* (C.U.P., 1973) in which he provided a concrete approach to the Lebesgue integral in terms of step functions and then deduced the abstract concept of Lebesgue measure. This volume is considerably more abstract than the first, and is pitched at the level of an elementary graduate course. In Chapter 8 the Daniell integral is introduced and Stone's theorem is proved. Chapter 9 is devoted to the study of Lebesgue-Stieltjes integrals and measures. In Chapter 10 the complex case of the Riesz Representation theorem is proved. The extension of a measure defined on a ring of sets is studied in Chapter 11. In Chapter 12 the theory developed so far is compared with the classical approach in which a measure is defined, then the class of measurable functions is introduced and finally the idea of integration with respect to the measure is given. Chapter 13 is devoted to uniqueness and approximation theorems and Chapter 14 to product measures. In Chapter 15, Baire and Borel measures are studied. Chapter 16 is devoted to complex measures and in the final chapter the Radon-Nikodym theorem and its consequences are studied. There are numerous exercises throughout which serve to illustrate the theory and to indicate further developments of the subject. Fifty pages of the book are devoted to the solutions of these exercises. This book is clearly and carefully written. It should prove invaluable to a research student in functional analysis who wishes to become acquainted with the Daniell approach to integration and the important applications of the theory.

H. R. DOWSON

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