Note. The following easy lemma practically reduces all problems concerning $A(R)$ to the corresponding problem for $A(T)$, and vice-versa:

A function f with support on $[\delta, 2\pi-\delta]$ belongs to $A(R)$ if and only if it belongs to $A(T)$.

(III) Nonspectral synthesis. The spectral synthesis hypothesis asserts that if $f, g \in A(G)$ (G a LCA group), and the zero-set of g contains that of f, then g lies in the closed ideal generated by f. It is false whenever G is not discrete (Malliavin (1959)). The author proves one case of Malliavin's theorem: for G equal to the "binary decimal group," $(Z_2)^\infty$ with the Tychonoff topology. This is probably not the case nearest to most reader's hearts! However, the construction is simpler than for $G=T$. [For $G=T$, one needs some lemma such as: As $N\to\infty$, the integral of the product $\int_0^{2\pi} f(t)g(Nt)dt$ approaches arbitrarily closely the product of the integrals $(\int_0^{2\pi} f)$ $(\int_0^{2\pi} g)$ (g being 2π-periodic, of course). For $G=(Z_2)^\infty$, Fubini's theorem does the whole trick.]

Thus it is remarkable that Malliavin's general theorem can be deduced from the "binary decimal" case. This is done by means of tensor products, an approach due to Varopoulos. What happens is that (G being given), a "very linearly independent" Cantor set $E\subset G$ is found, together with a many-to-one mapping ϕ of E onto $(Z_2)^\infty$, so that every non S (spectral synthesis) set in $(Z_2)^\infty$ is pulled back by ϕ onto a non S-set in G. Katznelson's book closes with an account of this recent and important theory.

J. IAN RICHARDS

An introduction to nonassociative algebras, by R. D. Schafer. Pure and Applied Mathematics, vol. 22, Academic Press, New York, 1966. x+166 pp. $7.95.

By ring or algebra is generally understood an associative ring or an associative algebra. This is a natural situation since, apart from a few books and expository articles dealing with a particular class of nonassociative algebras, this is the first book treating nonassociative algebras on a more general basis. These are algebras whose multiplication is not assumed to satisfy the associative law. It is easy to guess from our previous remark that a great part of the content of the book appears for the first time in book form, and those topics which have been already dealt with in other books are presented under a new light.

Besides organizing scattered material the author presents it in such a way that the reader can arrive at important theorems without a great amount of reading. This is partly achieved by omitting some details which can readily be found in other books, including, nevertheless, enough information so that the thread of the theory is never lost.

The book represents an important addition to the mathematical literature. When in the development of some special theories of a branch of mathematics these start to intertwine and show unsuspected relations with other branches, a book is needed where these theories are put together and organized. Then they can be studied or consulted without the difficult and time consuming task of reading the original papers.

"Since 1950 there has been considerable research activity on the relationships among Cayley algebras and Cayley planes, exceptional central simple Jordan algebras and the exceptional simple Lie algebras and groups." The relationships among Cayley, Jordan, and Lie algebras form an important part of the contents of the book and are completed with the inclusion without proof of a recent and "remarkable theorem of Tits which combines alternative and Jordan algebras in a very illuminating characterization of the exceptional simple Lie algebras."

In an introductory first chapter the background material is briefly described. "A number of basic concepts which are familiar from a study of associative algebras do not involve associativity in any way, and so may fruitfully be employed in the study of nonassociative algebras." Hence, in Chapter II, the book appropriately proceeds to explain these concepts and apply them to obtain a few general theorems for nonassociative algebras. Unfortunately, the number of such theorems is small.

On the contrary, a core of results on the structure of finite dimensional associative algebras has been generalized to alternative algebras (Chapter III), and analogs have been found for Jordan algebras (Chapter IV). These include the definition of a radical, the structure of semisimple algebras, the classification of simple algebras, Wedderburn principal theorem and its connection with Whitehead's second lemma (or cohomology group of second order). These two chapters contain as well the study of the relationships mentioned above. The exposition of this more advanced material will make the book interesting to a wider circle of mathematicians.

The author explains in the preface: "Alternative algebras are presented in some detail. I have treated Jordan algebras in a somewhat more cursory way, except for describing their relationships to the exceptional simple Lie algebras. A considerable deeper account of Jordan algebras will be found in the forthcoming book by Jacobson."

A final chapter presents some results on power-associative algebras. This class of algebras includes the Jordan and alternative algebras studied before.

As for the level of the presentation the author says: "I expect that any reader will be acquainted with the content of a beginning course in abstract algebra and linear algebra. Portions of six somewhat more advanced books are recommended for background reading, and at appropriate places reference is made to these books for results concerning quadratic forms, fields, associative algebras, and Lie algebras." The list of books is very good, but the portions which afford background material are in any case small and in some instances nil for the author only needs particular results mentioned there. The reader can forget this, for in the text reference is made to the page which, if need be, should be consulted. We think that the demands of the book for the conscientious reader come rather from the amount of identities which have to be established and the number of clever substitutions in, and manipulations of these identities. This seems unavoidable at the present state of the theory and we hope that this book will contribute to the finding of new results and more streamlined proofs.

The author seems to have been very careful in the preparation of the book. In spite of the amount of subindices and hundreds of equations which it includes, we have found only a couple of inessential misprints.

In our opinion the bibliography would have been more useful if at the end of each chapter there were an indication of the items which, besides the ones cited in the text, are connected with its content. This is only a very small objection to a book which contains very interesting results not available in other books; written in a plain and clear style it reads very smoothly if one is ready to skip the details of the proofs and the computations.

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Noncommutative rings, by I. N. Herstein. The Carus Mathematical Monographs, no. 15, Mathematical Association of America, 1968. xi+199 pp. $6.00.

This very beautiful book is the result of the author's wide and deep knowledge of the subject-matter combined with his gift for exposition.

The well-selected material is offered in an integrated presentation