McKenzie, R. N., McNulty, G. F. and Taylor, W. F., *Algebras, lattices, varieties*, Volume I (Wadsworth & Brooks/Cole, Monterey, California 1987) xii + 361 pp. 0 534 07651 3, $44.95.

This book is the first volume in a planned four volume survey of the theory of general algebras. A general algebra is a non-empty set equipped with a system of finitary operations. This is a very general concept and it has as special cases the theory of many familiar algebraic structures: groups, rings, fields, vector spaces, modules, near-rings, non-associative algebras etc. What is perhaps a bit surprising is how much can be done in this very general context. There have been several textbooks on this subject over the years, notably by G. Birkhoff, P. M. Cohn, G. Gratzer, A. G. Kurosh, B. Jonsson and A. I. Mal'tsev among others. This series of four volumes aims to provide a thorough survey of the present state of the theory, including many powerful new areas of research that have only recently been developed.

Volume I is the introductory work, providing the basic results and tools. The first chapter sets the scene and lays the foundations. The second chapter is concerned with lattices. This has been one of the key tools in general algebra right from the beginning and is a subject often neglected in the education of algebraists. Here there is a very good introduction to the subject. There follows a chapter on unary and binary operations, the ones which occur most commonly, and which turn out to have a special importance in the general theory. The next chapter, entitled Fundamental Algebraic Results, covers a wide variety of fundamental ideas and techniques, including some only recently developed such as commutator theory. Up to this point, we have the introductory text on general algebra. The last chapter is devoted to the study of unique factorization in algebras. The theme of this study is the question of how unique is a factorization of an algebra into a direct product of indecomposable algebras. Some very general results are presented which have as corollaries many known results about uniqueness of decompositions.

The most interesting aspect of this book is to see how so many familiar results are simply special cases of a much more general theorem. The latest example is the commutator theory developed for general algebras in chapter four. For anyone wishing to have a bird's eye view of algebra as a whole, and to get a feel for the exciting developments now taking place in general algebra, this book is a good starting point. It is well presented with a lot of exercises for the keen reader and the contents are well-organized. At times, it can be a bit dry and remote, but that is probably inevitable in this subject. It will be a very useful reference work, and I look forward to the remaining volumes in the series. The quality of production is very good and the price very reasonable for a book at this level.

J. D. P. MELDRUM

Patterson, S. J., *An introduction to the theory of the Riemann zeta-function* (Cambridge studies in advanced mathematics 14, Cambridge University Press 1988), 156 pp. 0 521 33535 3, £20.

During the last few years a number of books on the Riemann zeta-function have appeared, and it might be thought that there was little need for yet another text. However, Patterson's book differs from its predecessors in several interesting ways, and primarily in that in it a central role is played by the Poisson summation formula. The author stresses in his preface that the book *is* intended as an introduction to the theory of the zeta-function, suitable for a reader with a good undergraduate background in analysis and elementary number theory. Here analysis is the operative word, since the arguments presented demand considerable analytical expertise, and even, perhaps, maturity on the part of the reader.

The book contains six chapters, beginning with an illuminating historical introduction. After this the Poisson summation formula and the functional equation are derived. Next come the explicit formulae of prime number theory, a study of the zeros and the Prime Number Theorem,