BOOK REVIEWS

ENDLER, O., *Valuation Theory* (Springer-Verlag, Berlin–Heidelberg–New York, 1972), xii+243 pp., soft cover DM 25, US $8.00.

This book was based on a graduate course given at the University of Rochester during 1969-70. Chapter I contains a survey of the standard work on absolute values (archimedian and non-archimedian) normally given for applications in algebraic number theory. Adequate references are given for proofs of the results that are merely stated. Chapter II is entitled " Valuation Rings " and generalises valuations to Krull valuations. The idea of a " place " is introduced and the connections between places and valuation rings developed. The chapter introduces usual terms such as integrally closed rings, Prüfer rings, Krull rings and Dedekind rings, discusses their interrelations, and describes a variety of results like the Chinese remainder theorem and the approximation theorems. In Chapter III, the main chapter of the book, the important subject of extensions of valuation rings is covered. This involves the usual work on algebraic and normal field extensions, gives a clear presentation of henselian valuation rings and related work, and contains infinite ramification theory. In the final chapter, Chapter IV, the author includes work of his own in discussing fields with prescribed valuations; the work admits archimedian valuations and generalises results of Krull. At the end of the book there is an interesting set of exercises listed under the four chapter headings and a useful bibliography. Like all books based directly on a set of lectures and seminars it reflects to some extent the personal interests of the author. However the selection and presentation of material are excellent and the book is a welcome addition to the literature on valuation theory.

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SHARPE & VAMOS, *Injective Modules* (Cambridge Tract in Mathematics, Cambridge University Press, 1972), 143 pp., £5·00.

The aim of this book is to demonstrate how injective modules can be used to obtain many standard results of commutative ring theory. In particular the Lasker-Noether decomposition for submodules of a Noetherian module over a commutative ring is studied from this point of view. Localisation of rings and completion of local rings are treated by considering the ring of endomorphisms of an indecomposable injective module (but quotient rings are not dealt with). A theory of duality between Artinian and Noetherian modules is developed for complete local rings. Left Noetherian rings, left Artinian rings and Dedekind domains are all characterised in terms of injective modules and are fairly extensively studied. On the other hand, categories are not introduced, and there is no mention of the Ext functor nor of homological dimension.

The book has an ample supply of exercises and at the end of each chapter there are notes giving details of sources and suggestions for further reading. The presentation is lucid and attractive. This tract is not intended primarily for beginners and perhaps D. G. Northcott's tract " Ideal theory " (Number 42 in the same series) is a suitable prerequisite.

P. F. SMITH