would be greatly improved by adding some more bibliographical remarks. In particular it would be desirable to add to the names of authors of recent significant results the bibliographical data of their work.

G. Bruns, McMaster University

Introduction to Field Theory, by Iain T. Adamson, Oliver and Boyd, Edinburgh, and J. Wiley and Sons Publ., New York, 1965. viii + 180 pages. $2.75.

The inexpensive and compact series of monographs known as "University Mathematical Texts" have won themselves a high reputation among university students, and this volume will certainly add thereto. It can fairly be described as a monograph on Galois theory. This theory constitutes the third chapter of the book, and its classical applications constitute the fourth and last chapter. The first half of the book contains the necessary theory for the second - the groundwork, starting from the definition of a field, and including good treatments of vector-spaces and of polynomials occupies the first chapter; the theory of extensions of fields occupies the second.

The writing is extremely clear and pleasant to read, striking just the right balance between chattiness and the coldly efficient style which fills a book with nothing but definitions and theorems. The book is modern in spirit, but not aggressively so: commutative diagrams appear, and the author makes much use of ordered sets (example: an extension of a field F is an ordered pair consisting of a field E and a monomorphism of F into E) but these sophistications appear only where they contribute to clarity, elegance, or both.

H. A. Thurston, University of British Columbia

Elements of Abstract Algebra, by Richard A. Dean. Wiley and Sons, New York, N.Y., 1966. xiv + 324 pages. $7.95.

This introductory text for an undergraduate course in abstract algebra is a considerably expanded version of mimeographed notes which the author has used for several years for a first course in algebra given to sophomores at the California Institute of Technology. It is a sound, carefully written, and often rather personal, book.

After a brief introduction to a little set theory, the book proper begins with a long chapter on group theory, and it is on this theme that the rest of the book is based. The topics covered are: groups, rings, the integers, fields, Euclidean domains, polynomials, vector spaces, field extensions and finite fields, finite groups, and Galois theory. The group theoretic thread runs through them all.

Such an approach has both advantages and disadvantages. The author exploits many of the advantages to unify the book and by the end a student should understand and appreciate the value of the approach. On the other hand, there is the chance that the approach may discourage a weaker student so that he never reaches the point where he can appreciate it. The reviewer's own experience of teaching from the earlier notes to students who were of a high general standard was that the first part of the course was always a serious difficulty for nearly all students; once the first chapter on group theory was covered, however, there was an obvious benefit in the rest of the course.

To overcome some of the disadvantages of starting from the abstract, the author has taken great pains to include a great many examples, and he emphasizes proofs which are concrete rather than elegant. This emphasis is very much a matter of personal taste, but occasionally it seems to get out of hand such as in his proof that the rationals less than $\sqrt{2}$ have no least upper bound, and his use of P.M. Cohn's 'cancellation law' for the proof of the unicity of the decomposition of finitely generated abelian groups.

Finally a few comments on the material included. There is no attempt to include a course in linear algebra, but the chapter on vector spaces is sufficient for applications in field theory. The chapter on the integers leads into a definition of the integers as an ordered integral domain whose positive elements are well-ordered, and essential uniqueness is established. The Witt proof of the Wedderburn theorem on finite divisionrings appears, and the chapter on finite groups includes the Sylow theorems and a detailed account of finitely generated abelian groups. The fundamental theorems of Galois theory are proved (for fields of characteristic 0), and these lead to the solution of equations by radicals and the symmetric function theorem. A nice surprise in this chapter is the theorem (due to Galois?) that the group of a polynomial irreducible over the rationals, with exactly 2 complex roots and of prime degree p, is the symmetric group S_p. In each chapter there are plenty of good exercises, some historical notes and a short bibliography for wider reading.

At present there is a flood of new texts in abstract algebra, but I think that this book stands up well to the competition. It would be a useful (and solid) text for a year course with above average students.

John D. Dixon, University of New South Wales

Hel Braun und Max Koecher, Jordan-Algebren. (Grundlehren der Math. Wissenschaften 128). Springer-Verlag, Berlin, 1966. xiv + 357 pages. Price DM.48.

Lorsqu'en 1932 P. Jordan introduisit, comme instrument des quanta, les algèbres qui portent son nom, (JA), il ne se doutait pas de l'extension que prendrait vingt ans plus tard l'étude de ces structures. Après ses prèmieres communications, son travail d'ensemble avec