the primary text for a probability unit in National Science Foundation Institutes for secondary school mathematics teachers." Rather its merit seems to be a clear, pleasant, and non-standard presentation which will be of value to any student with high school mathematics trying to get a glimpse of the subject of probability.

H.A. David, University of North Carolina

Mathematische Statistik (Die Grundlehren der mathematischen Wissenschaften, Bd 87), by B.L. van der Waerden. Springer-Verlag, Berlin, Heidelberg, New York, 1965. xii + 360 pages. Price:DM 49,60.

This second edition of Professor van der Waerden's book is essentially a reprint of the first edition (Springer-Verlag, 1957), which has had a considerable success as an introductory text in statistics for the mathematically minded student with fair mathematical background, including some knowledge of complex function theory. However, knowledge of Lebesgue integration and of matrix theory is not assumed.

The chapters are written with the intention to be independent of one another. Proofs of some theorems, readily available elsewhere, are omitted. At the same time the book is a logical unity in the sense that it is based entirely upon the Kolmogorov axioms of probability given in the first chapter, and on the fundamental notions developed in the first two chapters.

The chapters are: general foundations; probability and frequency; mathematical tools; empirical determination of distribution, mean and variance; Fourier integrals and limit theorems; Gaussian variables and Student's test, least squares; estimation; evaluation of observed frequencies; bio-assay; tests of hypothesis; rank tests; correlation. A collection of frequently used tables is included and many examples of application are also given.

It is regrettable, though understandable, that important topics - such as sequential test, theory of statistical decision functions, stochastic processes - had to be left out from both editions of this introductory text.

The book is highly recommended as a logical, mathematically sound introduction to the classical chapters of mathematical statistics.

Miklos Csorgo, McGill University

The Theory of Sets and Transfinite Arithmetic, by Alexander Abian. W.B. Saunders Company, Philadelphia and London, 1965. ix + 406 pages. $10.80.

This seems to be an almost ideal textbook for a course which intends to provide the student on the one hand with the technical skill and necessary knowledge to handle sets, relations, functions, and to use the most important results about them and on the other hand with a good idea of the techniques used in a formal development of set theory. An essential feature of the book is the predominant role played by the notion of set theoretical model. This is defined as a mathematical theory based on first order functional calculus (without identity) with the ε-relation as only predicate symbol and arbitrarily many individual constants. Intuitive considerations of models precede and from time to time interrupt the development of set theory proper and give the motivation for the introduction of logical and set theoretical axioms. Set theory is then developed on the basis of the Zermelo-Fraenkel system in an axiomatic but informal (at times semi-formal) way. Equality of sets is defined by the axiom of extensionality and the equivalence of this with "Leibniz-equality" is postulated as an axiom. The axiom of regularity is mentioned, but nowhere used in the book. The following chapters treat algebra of sets, relations and functions, order and Zorn's lemma, equivalence relations and the real numbers in more or less the usual way. Different from the usual treatment is the chapter on equipollence of sets. Here the well-ordering theorem and ordinal numbers are avoided and the usual well-ordering arguments are replaced by applications of Zorn's lemma. This is for example true for the proof of the well-ordering of powers and the formulas $A \times 2 \simeq A$ and $A \times A \simeq A$ for infinite sets A. The remaining chapters on well-ordered sets and the elements of ordinal and cardinal arithmetic again follow the usual lines.

There are some minor points about which the reviewer had some misgivings. On page 170 a partial ordering is defined as usual as a reflexive, antisymmetric and transitive relation, but its irreflexive form is called an order (page 173). The definition of a lower cut of a partially ordered set (page 181) does not seem very useful since a given partially ordered set can in general not be embedded in the conditionally complete partially ordered set of its lower cuts. The usual notion of normal ideal does not have this disadvantage and yields all the applications the author has obviously in mind. The procedure of embedding the natural numbers into the integers, the integers into the rationals etc., seems somewhat vague and in a book which intends to make basic notions precise, statements like "the naturals can be identified with the non-negative integers" should be avoided. On page 258 the comparability of powers is proved by a nice argument involving Zorn's lemma. The same simple argument can be used (see J. Schmidt, Mathem. Zeitschrift 67) to prove the well-ordering of powers, thus avoiding the author's more complicated considerations on the following pages.

The book is very carefully written. There are only two minor errors (perhaps misprints) the reviewer was able to trace. In statement (72) on page 55 the formula "$(\exists X)P(X) \vee Q$" should be replaced by "$\sim(\exists X)P(X) \vee Q$". On page 57 the statement printed in italics does not express the same as the next formalized statement.

The usefulness of this excellent book as a basis for further studies 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