SHORTER NOTICES

Vorlesungen über die Theorie der Algebraischen Zahlen. By E. Hecke. Leipzig, Akademische Verlagsgesellschaft, 1923. 264 pp.

This book had its origin in lectures delivered by the author in Basel, Göttingen, and Hamburg. As stated in the preface the aim of the book is to bring the reader to a comprehension of the questions which at present form the summit of the theory of algebraic number fields, without presupposing any knowledge of the theory of numbers. In reading the book the reviewer was particularly impressed by its richness in content. By the skillful coordination of important notions, the author gives, in the 264 pages, an elegant and comprehensive account of the modern theory of algebraic numbers.

The first chapter contains an introductory account of the theory of rational numbers. This is followed by a chapter of 28 pages on the theory of groups with special consideration of abelian groups, both finite and infinite. The purpose of this chapter is to familiarize the reader with those properties of abelian groups which may be advantageously used in the further development of the theory of rational numbers as well as the theory of algebraic numbers.

In the third chapter the group properties developed in the second chapter are used in the further study of the rational numbers. The chapter contains the theory of solutions of congruences; the theory of power residues; and in particular that of quadratic residues leading up to a statement of the law of quadratic reciprocity. The proof of this law is, however, deferred to Chapter eight, which contains the author's proof of the general law of quadratic reciprocity in a general algebraic number field.

Chapter four contains the algebraic development of the theory of algebraic numbers, and the algebraic properties of fields defined by the roots of algebraic equations.

Chapter five is the longest chapter of the book and contains a very comprehensive account of the arithmetic of an algebraic number field. The general theory of ideals is developed and theorems regarding the factorization of rational primes are given for certain special types of fields. This is followed by Minkowski's theorem on linear forms, with its application to the study of the units of a field.

A brief discussion of rings is given, and by the use of fractional ideals the author develops that part of the theory which deals with differents and discriminants of fields, and conductors of rings.

The sixth chapter is an introduction to the use of transcendental methods in the theory of algebraic number fields. It contains the