added conditions indicate which boundaries are to form part of the fundamental region [Klein, Ausgewählte Kapitel der Zahlentheorie I, p. 216].

A simplification is made by Cahen by employing as roots of a form the reciprocals of the values used by Dirichlet. Then, in Cahen's notation, a substitution which transforms a form into a second transforms the roots of the second into the roots of the first form.

On page 301, sixth line from bottom, and on page 306, first line of §376, the word impropre should read propre.

The concluding pages (316–400) are devoted to notes and tables, the latter being borrowed from Tchébyscheff. There is a note on prime numbers in which are proved special cases of Dirichlet's theorem on an arithmetical progression. A note on the decomposition of numbers into prime factors shows how the problem can be solved by finding a quadratic form $x^2 + Dy^2$ which represents the given number, using the tables on pages 391–400. In the headlines to pages 397–400, $x^2 + 4y^2$ should read $x^2 - 4y^2$. There is a note on the calculation of primitive roots of prime numbers and tables (pages 375–390) giving the primitive roots and indices for all prime numbers < 200. The final note gives Gauss's theory of complex integers $a + bi$, their geometrical representation being emphasized.

Cahen's book will prove of special interest to those students who desire numerous illustrative examples and numerical applications of the general theorems. The amount of detail, which has added considerably to the size of the book, can not fail to allure the reader to the fascinations of number theory.

L. E. DICKSON.

Essays on the Theory of Numbers: I. *Continuity and Irrational Numbers.* II. *The Nature and Meaning of Numbers.* By RICHARD DEDEKIND. Authorized translation by W. W. Beman. Chicago, The Open Court Publishing Company, 1901. 115 pages.

THE essays of Dedekind, Stetigkeit und irrationale Zahlen (Braunschweig, 1872), and Was sind und was sollen die Zahlen? (Braunschweig, 1888) have already become classics in the literature of mathematics. In giving a fairly literal translation of them, Professor Beman performs a service for which one must feel grateful, especially as one needs whatever advantage one's own language gives in attempting to master the abstruse second essay.

The word Abbildung is translated transformation (page