While many teachers may not see their way to using the book as a text during the early part of the course, it will nevertheless commend itself for collateral reading from the very beginning, and its ultimate introduction as the sole or chief text-book of the latter part of the first course and of parts of the second course is a matter that teachers of calculus will do well carefully to consider.

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HARVARD UNIVERSITY, CAMBRIDGE, MASS.,
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SHORTER NOTICES.

Éléments de la Théorie des Nombres. Par E. CAHEN, Professeur de Mathématiques spéciales au Collège Rollin. Paris, Gauthier-Villars, 1900. 8vo, viii+ 403 pp. Price, 12 fr.

THE purpose of the author, as stated in his preface, is to supply the lack of a modern treatise in French on the theory of numbers. The works of Bachmann, Dirichlet-Dedekind, and Tchébyscheff are mentioned; but no reference is made to French books. But the second volume of Serret's Algèbre Supérieure treats of congruences, quadratic residues, Galois imaginaries, and the number of primes in a given interval. Of these topics, the latter two are not treated by Cahen. Again, chapters IV, V and XIV of Tannery's Leçons d'Arithmétique form a most excellent introduction to the ordinary theory of numbers, aside from quadratic forms.

Cahen treats not merely of the properties of integers, congruences and quadratic forms, but also of irrational numbers, particularly of algebraic numbers of the second degree. Fractions are introduced (on page 20) from the standpoint of pure analysis as symbols each defined by a system of two integers, called numerator and denominator. By definition

$$\frac{a}{b} \gtreqless \frac{c}{d} \quad \text{according as} \quad ad \gtreqless bc.$$

The usual results for the sum and product of two fractions are taken as the definitions of sum and product.

Irrational numbers and operators upon them are defined by means of Dedekind's *cut*.