THE THEORY OF SUBSTITUTIONS.

The Theory of Substitutions and its Applications to Algebra.
By Dr. EUGEN NETTO, Professor of Mathematics in the University of Giessen. Revised by the Author and translated with his permission by F. N. COLE, Ph.D., Assistant Professor of Mathematics in the University of Michigan. Ann Arbor, Mich., The Register Publishing Company, 1892. 8vo, pp. xii. + 301.

NETTO's "Substitutionentheorie und ihre Anwendungen auf die Algebra" appeared for the first time in 1882 ; it was followed, in 1885, by an Italian edition, and now we have the pleasure of welcoming an English edition, revised by the author and translated into English by Dr. Cole.

The mathematical public at large, and the English-speaking part of it in particular, are greatly indebted to Dr. Cole for his careful and expert translation. Mastering the subject as well as both languages in full extent, Dr. Cole has transformed the sometimes rather tough material into clear and fluent English. We are especially obliged to him for the fortunate choice of many technical terms, alien so far to the English mathematical language.

We are equally indebted to the author for the numerous valuable additions by which this new edition has been enlarged and improved.

The great merit of Netto's book consists in the skilful and highly pedagogical presentation of the theory of substitutions, given in the first part of the book. The reader is gradually led from the most elementary considerations on symmetric and alternating functions to the general theory of unsymmetric functions of n independent elements, out of which the theory of substitutions is step by step evolved, the unsymmetric functions serving all the while as a concrete substratum for the abstract conclusions of the theory of substitutions. By this means an easy and attractive entrance into the theory of substitutions is gained, accessible even to the beginner, and it may fairly be said that Netto's book has largely contributed to spread the knowledge of this important branch of mathematics.

While thus fully acknowledging the high and lasting merits of the first part of Netto's book, we cannot withhold our opinion that the author has not been equally successful in his attempt to simplify Galois' theory of the algebraic solution of equations, which forms the principal subject of the second part. The great difficulties which are contained in Galois' theory, are, it seems to us, not sufficiently considered, and the comparative simplicity of the deductions is only obtained at the cost of rigor.