42[F].—A. Gloden, *Table des Solutions de la Congruence* $x^4 + 1 \equiv 0$ (*mod p*) *pour* $800\,000 \leqq p \leqq 1\,000\,000$, published by the author, rue Jean Jaurès, 11, Luxembourg, 1959, 22p., 30 cm., mimeographed. Price 150 Belgian francs.

This volume represents the culmination of independent efforts of table-makers such as Cunningham, Hoppenot, Delfeld, and the author, extending over a period of several decades. The foreword contains an extensive list of references to earlier publications of this type, which combined with the tables under review give the two least positive solutions of the congruence $x^4 + 1 \equiv 0 \pmod p$ for all admissible primes less than one million. [See RMT **109,** *MTAC*, v. 11, 1957, p. 274 for a similar list of references.]

Professor Gloden has used such congruence tables in the construction of manuscript factor tables of integers $N^4 + 1$, which now extend to $N = 40\,000$, with certain omissions. The bibliography in the present set of tables also contains references to this work. Numerous references to these factor tables are also listed in RMT **2,** *MTAC*, v. 12, 1958, p. 63.

J. W. W.

43[G, X].—F. R. Gantmacher, *Applications of the Theory of Matrices*, translated by J. L. Brenner, Interscience Pub., New York, 1959, ix + 317 p., 24 cm. Price $9.00.

This is a remarkable book containing material, not easily available elsewhere, related to the analysis of matrices as opposed to the algebra of matrices. In this I use the word analysis to mean broadly that part of mathematics largely dependent upon inequalities (and limits) as opposed to algebra, which depends largely on equalities.

In particular, the material in this book is directed largely toward studies of stability of solution of linear differential equations (in Chapters IV and V) and of matrices with nonnegative elements (in Chapter III).

Several aspects of the book will be useful to numerical analysts. These include some parts of the chapter on matrices with nonnegative elements, the implications of the chapters on stability of solutions of differential equations to the stability of numerical methods of solving differential equations, and (as the author points out) a numerically feasible method of finding the roots of polynomials.

Many topics included in this text are not easily available elsewhere. For example, product integration is expounded; this is an amusing version of Euler's method applied to the solution of linear first-order homogeneous differential equations. Most of the other exposition is unique in one way or another, and on the whole the book is a valuable contribution to literature.

This is a translation, augmented to some extent by bibliographic and other notes, of the second part of a successful Russian book. It is interesting to note that another publisher has announced the impending publication of translations of both parts.

The printing is good, and the reviewer noticed no serious errors. There are four