Voigt's theory of the diffraction of polarized light by a black half-plane. The method of many-valued wave-functions and Riemann surfaces is employed.

The standard of knowledge expected of the reader of this work is that of a graduate student who has completed the usual courses in analysis and electromagnetic field theory. Twenty-three exercises are provided in the first three chapters. The text is replete with footnote references to papers that have appeared in the literature up to 1939. By rigor of logical treatment and careful attention to detail the authors have produced a critical treatise which will undoubtedly become a standard reference work.

W. E. BLEICK

Modern Elementary Theory of Numbers. By Leonard Eugene Dickson. Chicago, University Press, 1939. 305 pp.

The first few chapters of this book contain, with minor exceptions, the same material as the corresponding chapters of Dickson's *Introduction to the Theory of Numbers.* This may lead those familiar with the earlier book to think that this is a new edition of that book. It is much more than that. Where the topics are the same the explanations are lengthened, more proofs included, examples worked to give clarity to the text and the number of exercises increased. Beginning with the fifth chapter the book is almost completely rewritten. New material and modern topics are introduced. Here Dickson has been able to offer more simply some of the work in theory of numbers that has been in the literature in recent years and to obtain some new results.

Chapters I through IV deal with divisibility, congruences and their solutions, quadratic residues and binary quadratic forms. Dickson states in his preface that these with a few chosen topics from the chapters on indefinite ternary quadratic forms and Diophantine equations would provide a brief elementary course.

Quadratic forms are the subject of several of the later chapters. In Chapter V a study is made of the numbers represented by various ternary quadratic forms with numerical coefficients. A table is given consisting of 102 regular forms and all positive integers not represented by each form. Chapter VIII treats of indefinite ternary quadratic forms, universal and zero forms. Here the problem of representation of integers by indefinite forms whose coefficients involve parameters is studied. The necessary and sufficient conditions for integral solutions of indefinite quadratic forms in four or more variables where the form equals zero are found in Chapter IX. And Chapter

XIII gives a brief discussion of positive quadratic forms in n variables.

In Chapters VI and VII Dickson has considered universal theorems involving cubes and sums of nine values of a cubic function. He says that "simplifications are made in the present exposition which also obtains more than 6000 universal forms, each a sum of 9 products of a cube by a positive integer." Here and in Chapter XII are proved particular cases of Waring's problem.

The conditions for the solution of a quadratic and linear function in 4, 5, 6, 7 and 8 variables are found in Chapter X and theorems on polygonal numbers.

Chapter IX gives a general theory of homogeneous, quadratic diophantine equations. This is a new topic and many exercises are given.

In the appendix, after a brief study of infinite series is a proof of the infinitude of primes in an arithmetical progression. This theorem is assumed in some of the earlier chapters.

CAROLINE A. LESTER

Principles of the Mathematical Theory of Correlation. By A. A. Tschuprow. Translated by M. Kantorowitsch. London, Hodge; New York, Nordemann, 1939. 10+194 pp.

In 1925 Tschuprow published his *Grundbegriffe und Grundprobleme der Korrelationstheorie.* The foundation of the book was a series of lectures given in the insurance seminar of the University of Christiania (now Oslo). It was not intended to be a guide to the calculation of measures of relationship but to provide a logical foundation for the theory of correlation, to clarify fundamental notions and assumptions and to link up the theory of correlation with the theory of probability.

This German edition, which has since become a very well known work, was reviewed in the Bulletin in 1926 (vol. 32, p. 561), so we are concerned here only with the translation into English. It is a straightforward translation with the exception of the "Notes and Bibliography." Here the translator substituted a survey of contemporary English literature on correlation for the author's introductory notes. One may question the advisability of a translation of a 15 year old book on a statistical subject, but the modern student after reading a random sample of the chapters on correlation in our recent text books will find the reading of Tschuprow's book a real tonic. The translation is very well done, accurate but not too literal. Though it is regrettable that the translation was so long in coming, the book will fill a real need, even if it does not contain more recent developments.

A. R. CRATHORNE