

Statique et Résistance des Matériaux. By Paul Montel. Paris, Gauthier-Villars, 1924. vi + 273 pp.

The author states in the preface that the book represents a course given in the École des Beaux-Arts on statics and resistance of materials. The methods are almost wholly graphic and confined to problems in the plane. In the first one hundred and sixty-two pages, which are devoted to statics, the various methods for determining the stresses in a frame work are given and also graphical methods for the determination of the center of gravity and moments of inertia. In the chapters on resistance of materials, the main subjects considered are the theory of the beam, the buckling of a long thin rod under thrust, and arches.

The subject is approached in a neat way by calling attention to the difference between the theory of elasticity and the theory of the resistance of materials and the difference between the statically determinate and indeterminate problem is emphasized throughout. Before taking up frame works there is a chapter on reactions of the supports in which the different types of support are considered. The manner in which these things are done leaves the reader with the impression that the subjects treated have been presented more systematically than is generally the case in text books of this kind.

Two or three oversights may be noted. In connection with the discussion of the funicular polygon on page eighteen, the author speaks of two forces forming a couple but a couple is not defined till page thirty-nine. The stress diagram in Figure 64 should have the line df replaced by af . The statement at the bottom of page one hundred and seventy nine that both theory and practice lead to the value $(2/5)E$ for the shearing modulus is open to question.

PETER FIELD

Binomial Factorizations, giving extensive Congruence-Tables and Factorization-Tables. By Lt.-Col. Allan Cunningham. London, Francis Hodgson. 1923. Vol. I. 96 + 287 pp.

Binomial Factorizations. By Lt.-Col. Allan Cunningham. London, Francis Hodgson. 1923. Vol. IV. 6 + 160 pp. Supplement to vol. I.

These two volumes are part of the outcome of thirty years of labor of the veteran computer. There are seven volumes of the work and the greater part is already printed off. The war has delayed the appearance of much of it. The present volumes contain an extensive list of the smallest root of congruences of the type $y^n + 1 \equiv 0 \pmod{p^k}$ for various values of p , k and n . Thus there is a table, begun in the first volume and carried on into volume IV giving the smallest values of y satisfying the congruence $y^2 + 1 \equiv 0 \pmod{p}$ for available prime values

of p as high as the limit 99,989. Similar tables are also given for the smallest values of y satisfying the congruence

$$\frac{y^{2n}+1}{y^n+1} \equiv 0 \pmod{p}$$

for various values of n and various limits of p . Volume IV also contains tables of roots (x_1, x_2) of $x_1^n + x_2^n \equiv 0 \pmod{p}$ for various values of p and n .

The first volume contains also factorization tables giving the factors of a vast number of numbers of special forms. They will be found somewhat difficult to use on account of the new names that confront the reader on every page. One meets here not only "Pellians" with new and strange prefixes, but also "Aurifeullians" of various families. One stands a bit daunted before a "Dimorph-Bin-Aurifuellian". Out of this rather confusing mass of computation emerge, however, some usable tables giving values of y which make y^2+1 , $(y^2+1)/2$, $(y^3-1)/(y-1)$, etc. take on prime values. There are also tables giving values of x, y which make x^n+y^n a prime or twice a prime. These tables go much beyond the limits of available factor-tables.

There is no room for doubt that Lt.-Col. Cunningham has undertaken and carried out an immense task, of value in the problem of identifying large primes, and in the breaking down of numbers of special forms into their prime factors.

D. N. LEHMER

The Calculus of Observations. A Treatise on Numerical Mathematics.

By E. T. Whittaker and G. Robinson. London, Blackie and Son, Ltd., 1924. 16+395 pp.

"The present volume represents courses of lectures given at different times during the years 1913—1923, by Professor Whittaker to undergraduate and graduate students in the Mathematical Laboratory of the University of Edinburgh, and may be regarded as a manual of the teaching and practice of the Laboratory, complete save for the subject of Descriptive Geometry."

To the teacher of mathematics, in this country at least, a mathematical laboratory will be apt to suggest graphical and nomographical methods. In this book the work is almost entirely arithmetical, and we are told that in the University of Edinburgh graphical methods have almost all been abandoned "as their inferiority has become evident". This result of actual experience covering some ten years will perhaps come as a surprise to many teachers and practical computers to whom such methods appeal especially where great speed is very desirable and only rough approximations are necessary.

The first four chapters deal with the theory of interpolation, and are obtainable in a separate issue entitled *A Short Course in Inter-*