Die gewöhnlichen und partiellen Differenzengleichungen der Baustatik. By F. Bleich and E. Melan. Berlin, Springer, 1927. vii+350 pp.

Linear difference equations made their first appearance in the statics of framed structures with Clapeyron's discovery of the relation between the bending moments at three consecutive supports of a continuous beam. More complicated types appear in connection with framed girders, and in recent years, even linear partial difference equations have become of importance for calculating the stresses in the lattice arrangement of columns and beams in buildings. The present book, which contains a number of original investigations by the authors, gives a very clear and readable presentation of the entire subject, profusely illustrated by diagrams, numerical examples and tables.

The further development of the questions treated in the fourth section should provide a number of interesting problems to the mathematician.

The contents of the book is the following: the first section gives the elementary properties of differences and sums, including the Euler summation formula. Section 2 deals with linear difference equations and the boundary and expansion problems which are the exact counterpart of the well known problems in differential equations. Special attention is given to equations with constant and linear coefficients, the latter case being solved by a Laplace transformation. Section 3 contains various applications to stress calculations and stability problems, and Section 4 deals with corresponding questions in partial difference equations.

T. H. GRONWALL

New Methods in Geometrical Optics. By C. S. Hastings. New York, Macmillan, 1927. 103+vi pp.

In the opening chapter of this volume the author develops the general equations in first-order theory of centered optical systems in terms of incident and emergent wave surfaces, surface curvatures, and wave-velocities, in place of the quantities usually used. It is claimed that this method leads to simpler forms for the derivatives of the general equations, in terms of which the aberrations are to be expressed. In the chapters that follow there are examples of the application of these equations to the theory of the telescope and of the microscope, and to certain specific problems in the designing of optical systems.

The discussion of chromatic aberration is interesting in that a number of special types of color adjustment, not usually specifically treated, are discussed. Here one finds terms such as "orthokumatic," "ioskumatic," "iosdynamic," each with a well defined meaning. Spherical aberration and the errors of oblique pencils are discussed rather briefly, and the book closes with an appendix in which is found some interesting material on mirages. Most of the illustrative material has apparently been drawn from the author's experience as technical advisor to makers of astronomical instruments, and the volume contains some well taken criticisms of some past practices in this particular field of instrument making.

G. W. MOFFITT