In a covering letter one of the authors indicates that this table is the second [2] in a series of fourteen, or more, number-theoretic tables. While a few of these duplicate, at least in part, some known tables, the latter are often on magnetic tape, or cost money, or are otherwise inaccessible. The entire proposed series will certainly be welcome to mathematicians working in number theory.

D. S.

1. WILHELM PATZ, *Tafel der regelmässigen Kettenbrüche*, Berlin Akademie-Verlag, 1955.
2. The first is *A Table of Quadratic Residues for all Primes less than 2350*. See RMT 35, *Math. Comp.*, v. 15, 1961, p. 200.

31 [I].—HERBERT E. SALZER & CHARLES H. RICHARDS, *Tables for Non-linear Interpolation*, 11 + 500 p., 29 cm., 1961. Deposited in the UMT file.

These extensive unpublished tables present to eight decimal places the values of the functions $A(x) = x(1 - x)/2$ and $B(x) = x(1 - x)(2 - x)/6$, corresponding to $x = 0(10^{-5})1$. This subinterval of the argument is ten times smaller than that occurring in any previous table of these functions.

These tables can be used for either direct or inverse interpolation, employing either advancing or central differences. In the introductory text are listed, with appropriate error bounds, the Gregory-Newton formula and Everett's formula, for direct quadratic and cubic interpolation, and formulas for both quadratic and cubic inverse interpolation, employing advancing differences and central differences. Examples of the use of these formulas are included.

The convenience of these tables is enhanced by their compact arrangement, which is achieved by tabulating $B(1 - x)$ next to $B(x)$. This juxtaposition, in conjunction with the relation $A(1 - x) = A(x)$, permits the argument x to range from 0 to 0.50000 on the left of the tables, while the complement $1 - x$ is shown on the right.

The authors note the identity $A(x) - B(x) \equiv B(1 - x)$, which can be used as a check on interpolated values of $A(x)$, $B(x)$ and $B(1 - x)$, and also as a method of obviating interpolation for $B(1 - x)$, following interpolation for $A(x)$ and $B(x)$.

Criteria for the need of these interpolation tables are stated explicitly, with reference to both advancing and central differences.

A valuable list of references to tables treating higher-order interpolation is included.

The authors add a precautionary note that this table is a preliminary print-out, not yet fully checked.

J. W. W.

32 [I, X].—GEORGE E. FORSYTHE & WOLFGANG R. WASOW, *Finite-Difference Methods for Partial Differential Equations*, John Wiley & Sons, Inc., New York, 1960, x + 444 p., 23 cm. Price $11.50

The solution of partial differential equations by finite-difference methods constitutes one of the key areas in numerical analysis which have undergone rapid progress during the last decade. These advances have been accelerated largely by the availability of high-speed calculators. As a result, the numerical solution of many types of partial differential equations has been made feasible. This is a development of major significance in applied mathematics.

The authors of this book have made an important contribution in this area, by assembling and presenting in one volume some of the best known techniques currently being used in the solution of partial differential equations by finite-difference methods. This, I am certain, has not been an easy task, owing to the fluid state of many of the theories in this field. For the same reason it is not possible, at the present state of flux, to write a book on this subject which will successfully withstand the test of time. The authors well recognize this point when they state in their introduction: "The literature on difference methods for partial differential equations is growing rapidly. It is widely scattered and differs greatly in viewpoint and character. A definitive presentation of this field will have to wait until the present period of intense development has come to at least a temporary halt."

The book contains an introductory chapter in addition to four major chapters, as follows:

Introduction to Partial Differential Equations and Computers
1. Hyperbolic Equations in Two Independent Variables
2. Parabolic Equations
3. Elliptic Equations
4. Initial-Value Problems in More than Two Independent Variables.

Topics covered within these chapters include the concept of stability, the method of characteristics, the numerical solution of problems involving shock waves, the theory of Lax and Richtmeyer, the solution of eigenvalue problems, the Young-Frankel theory of successive over-relaxation, and the method of Peaceman and Rachford.

The phenomenon of instability, which frequently arises to plague and invalidate many solutions of partial differential equations by finite-difference methods, is discussed in detail. However, this reviewer cannot, in good conscience, agree with the method of approach used in presenting this important and fundamental concept. The authors begin their discussion by stating: "Although the stability of difference equations has been amply discussed in the literature, one rarely meets precise definitions. The subject is therefore in need of further clarification." Subsequently the authors proceed to develop their own definition of stability, which in the opinion of the reviewer, is neither precise nor especially illuminating. The definition of stability is unnecessarily complicated by its tie-in with the concept of convergence and with the "cumulative departure," whose order of magnitude can, in the words of the authors, "rarely be exactly determined."

Notwithstanding any differences of opinion concerning the method of treatment of specific topics, the book is highly recommended as an authoritative and timely exposition of some of the most significant techniques currently available for the solution of partial differential equations by finite-difference methods.

H. P.

33 [I, X].—CHARLES JORDAN, *Calculus of Finite Differences*, Second Edition, Chelsea Publishing Co., New York, 1960, xxi + 652, 21 cm. Price $6.00.

This is a reprint of the second edition of the well-known book by Charles Jordan. The republication of this excellent text on the calculus of finite differences and its