comparison with Miksa's table. Apparently the editing routine consistently neglected later figures, so that the inaccurate published data invariably err in defect.

With this realization that the last figure is unreliable by as much as a unit, the table-user can still derive useful information from these tables, especially for values of $n$ exceeding those in previous publications.

J. W. W.

1. C. H. RICHARDSON, *An Introduction to the Calculus of Finite Differences*, D. Van Nostrand Company, Inc., New York, 1954.
2. JOHN RIORDAN, *An Introduction to Combinatorial Analysis*, John Wiley & Sons, Inc., New York, 1958.
3. H. GUPTA, *East Panjab University Research Bulletin*, No. 2, 1950, p. 13–44.
4. FRANCIS L. MIKSA, *Table of Stirling Numbers of the Second Kind*, ms. deposited in UMT File. See RMT **85**, *MTAC*, v. 9, 1955, p. 198.
5. A. FLETCHER, J. C. P. MILLER, L. ROSENHEAD & L. J. COMRIE, *An Index of Mathematical Tables*, Second edition, Addison-Wesley Publishing Co., Inc., Reading, Massachusetts, 1962, p. 106–107.

**72[F].**—C. A. NICHOL, JOHN L. SELFRIDGE, & LOWRY MCKEE, under the direction of RICHARD V. ANDREE, *A Table of Indices and Power Residues for All Primes and Prime Powers Below 2000*, W. W. Norton & Co., New York, 1962, 20 + approx. 700 unnumbered pages, 22 cm. Price $10.00.

This is the published form of the tables [1] previously available on magnetic tape. They list, for each of the 302 odd primes $p < 2000$, and $i = 0(1)p - 2$, the *power residues*,

$$n \equiv g^i \pmod{p}, \tag{1}$$

where $g$ is the smallest positive primitive root of $p$. In parallel tables are listed the *indices* $i$ that satisfy (1) for every $n = 1(1)\ p - 1$. Following these 302 pairs of tables are 22 more pairs corresponding to the odd prime powers $p^a (a > 1)$ from $9 = 3^2$ to $1849 = 43^2$, inclusive. In these latter tables the $g$ chosen is again the smallest and also is that corresponding to $p$. (This would not always remain possible if these tables were to be much extended. Thus, in Miller's table [2] one finds that 5 is the least positive primitive root of $p = 40487$, while Hans Riesel has determined that $5^{p-1} \equiv 1 \pmod{p^2}$ for this prime. But such instances, where the smallest positive primitive root of $p$ is *not* also a primitive root of $p^2$, are no doubt very rare; this is the only example known to this reviewer.)

Jacobi's famous *Canon Arithmeticus* [3] (usually mentioned with the adjective "monumental") gave similar tables for $p$ and $p^a < 1000$, but did not generally use the smallest positive $g$.

This volume includes an historical and theoretical introduction by H. S. Vandiver and a shorter, unsigned preface. In the latter we learn that the tables were computed on an IBM 650–653. Checking was accomplished by sum checks, echo-checking of the printer, re-printing, and spot checks.

These tables are highly useful in many number-theoretic computations and are the best of their kind available. The figures are clear and legible, but exhibit the usual variations in darkness so common in photographically reproduced tables.

There is an assortment of minor inelegancies in the format and printing, including: no space between the headings and the arguments; faulty zero suppression, so that some blanks appear instead as 0 or 0000; failure of the page eject on the primes $p = 1531$ and 1543; listing of the prime powers as $p = 9, 25$, etc.; and the continued listing of the arguments in some power-residue tables after the table has ended. However, these are demerits in aesthetics, and while they should have been corrected, they do not nullify the high utility of the tables.

D. S.

1. L. McKee, C. Nichol & J. Selfridge, *Indices and Power Residues for all Primes and Powers Less than 2000*; reviewed in RMT **64**, *Math. Comp.*, v. 15, 1961, p. 300.
2. J. C. P. Miller, *Table of Least Primitive Roots*; one copy deposited in UMT File. (See *Math. Comp.*, v. 17, 1963, p. 88–89, RMT **2**.)
3. K. G. J. Jacobi, *Canon Arithmeticus, sive tabulae quibus exhibentur pro singulis numeris primis vel primorum potestatibus infra 1000 numeri ad datos indices et indices ad datos numeros pertinentes*, Berlin, 1839.

**73[F].**—Daniel Shanks, *Solved and Unsolved Problems in Number Theory*, Vol. 1, Spartan Books, Washington, D.C., 1962, ix + 229 p., 24 cm. Price $7.50.

This book is an excellent introduction to number theory, well motivated by an entertaining and instructive account of the origin and history of the classical problems connected with perfect numbers, primes, quadratic residues, Fermat's Last Theorem, and other topics.

Superb in every respect, as an introductory account, as a history of number theory, as an essay in mathematical and scientific philosophy, this volume can be used either as a textbook in high school or college, as a book for self-study, or as a gift to the educated layman with the perennial query, "What does a mathematician do?"

This delightful and stimulating book should be on the shelf of anyone interested in mathematics.

Richard Bellman

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**74[G].**—I. M. Gel'fand, *Lectures on Linear Algebra*, Interscience Publishers, Inc., New York. 1961 ix + 185 p., 23 cm. Price $6.00.

The author presents in this book a very clearly written shorter text on linear algebra which would generally be suitable for a one-semester course at the junior level in the United States. The contents consist of four chapters (Chapter 1, $n$-Dimensional Spaces; Chapter 2, Linear Transformations; Chapter 3, The Canonical Form of an Arbitrary Linear Transformation; and Chapter 4, Introduction to Tensors), the first two chapters comprising about three-fourths of the book. The author is to be congratulated for his lucid discussions and proofs. The notation and the printing are excellent.

For those who wish to use this as a text, it should be mentioned that the author frequently assumes knowledge of results from matrix theory that American students, as opposed to Russian students, do not possess at this level.

R. S. V.

**75[I, L].**—F. W. J. Olver, *Tables for Bessel Functions of Moderate or Large Orders* (National Physical Laboratory, *Mathematical Tables*, v. 6), Her Majesty's Stationery Office, London, 1962, iii + 51 p., 28 cm. Price 17s. 6d. (In U.S.A.: