$$L^n x = \log L^{n-1}x; L^1 x = \log x.$$

The function $S(x, y; n)$ is of interest as a generalized arithmetic operation, since the values 0 and 1 of the parameter n yield $x + y$ and $x \cdot y$, respectively.

In a previous paper [1] tables for $S(x, y; n)$ were given for $x, y = 0(1)10; n = -1(1)3$, where $L^n x$ was defined in terms of logarithms to the base 2.

In the current paper non-integer values of the parameter n are introduced by putting $L^n x = H(Gx - 1)$, where the mutually inverse operators H and G are defined by $GLx = Gx - 1$ and $H(x - 1) = LHx$.

In this paper, where $L^n x$ is defined in terms of natural logarithms, the function $S(x, y; n)$ is tabulated for $x, y = 0(1)10; n = \frac{1}{2}, \sqrt{2}$, and for $x, y = 2(1)10; n = \pi$. All tabular entries are given to 5D.

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1. A. ZAVROTSKY, "Algunas generalizaciones del concepto de campo," Acad. Ciencias Fis. Mat. y Nat., Caracas, Venezuela, *Boletín*, No. 28, 1946, 1947, 23 p. [See **RMT** 494, *MTAC*, v. 3, 1948–1949, p. 97.]

64[F].—L. MCKEE, C. NICOL & J. SELFRIDGE, "Indices and power residues for all odd primes and powers less than 2000," an unpublished mathematical table stored on magnetic tape, January 18, 1961.

The computing center at the University of Oklahoma has recently computed a table of indices and power residues for all odd primes and powers thereof less than 2000. The computations were done on a modified IBM 650 and have been stored on magnetic tape. Anyone desiring any portion of this table should write to: Director, Computing Center, University of Oklahoma, Norman, Oklahoma.

AUTHORS' SUMMARY

65[G].—RICHARD BELLMAN & MARSHALL HALL, JR., Editors, *Proceedings of Symposia in Applied Mathematics*, Vol. X, "Combinatorial Analysis," American Mathematical Society, 1960, vi + 311 p., 26 cm. Price $7.70.

This book contains the following papers, presented at a symposium on applied mathematics sponsored by the American Mathematical Society and the Office of Ordnance Research three years ago (April 1958).

Marshall Hall, Jr.	Current Studies on Combinatorial Designs
R. H. Bruck	Quadratic Extensions of Cyclic Planes
D. R. Hughes	On Homomorphisms of Projective Planes
A. A. Albert	Finite Division Algebras and Finite Planes
L. J. Paige & C. B. Tompkins	The Size of the 10 x 10 Orthogonal Latin Square Problem
R. P. Dilworth	Some Combinatorial Problems on Partially Ordered Sets
R. J. Walker	An Enumerative Technique for a Class of Combinatorial Problems

A. L. Whiteman	The Cyclotomic Numbers of Order Ten
A. J. Hoffman	Some Recent Applications of the Theory of Linear Inequalities to Extremal Combinatorial Analysis
A. W. Tucker	A Combinatorial Equivalence of Matrices
H. W. Kuhn	Linear Inequalities and the Pauli Principle
H. J. Ryser	Compound and Induced Matrices in Combinatorial Analysis
Marvin Marcus & Morris Newman	Permanents of Doubly Stochastic Matrices
A. M. Gleason	A Search Problem in the n-cube
D. H. Lehmer	Teaching Combinatorial Tricks to a Computer
J. D. Swift	Isomorph Rejection in Exhaustive Search Techniques
Olga Taussky & John Todd	Some Discrete Variable Computations
R. E. Gomory	Solving Linear Programming Problems in Integers
Richard Bellman	Combinatorial Processes and Dynamic Programming
Murray Gerstenhaber	Solution of Large Scale Transportation Problems
Robert Kalaba	On Some Communication Network Problems
J. D. Foulkes	Directed Graphs and Assembly Schedules
E. N. Gilbert	A Problem in Binary Encoding
M. M. Flood	An Alternative Proof of a Theorem of König as an Algorithm for the Hitchcock Distribution Problem

Presumably the papers dealing with the application of computing equipment to attacks on combinatorial problems will be of most interest to readers of *Mathematics of Computation.* The editors list these as being the papers by Paige and Tompkins, Walker, Gerstenhaber, Flood, Gleason, Lehmer, Swift, Todd, and Gomory. Some of the papers listed are directly computational, that of Lehmer being an example, and some are more remote, Flood's being not concerned directly with any computing instrument but highly influenced by his work on coding the assignment problem for a computer.

The delay in publication has caused many of the papers to appear dated, but even these give some information not available in print elsewhere. The most spectacular example is the paper by Paige and Tompkins; this paper does not incorporate examples to be sought by methods of the paper, but obtained otherwise by work of several authors, R. C. Bose, S. S. Shirkhande, E. T. Parker, and others (mentioned in a footnote at the beginning of the paper). On the other hand, this paper outlines techniques which were then admittedly not feasibly applicable to the complete solution of the problem considered, but which are almost applicable on present day machines.

Other papers, all of which were prepared by well chosen experts in their fields, seem to have greater durability, and this volume is one in which readers will find a great deal of current and useful material concerning combinatorial problems. On the whole, the volume is well worth perusing both for its computational implications and for its general information concerning combinatorial problems. Marshall Hall's opening paper, for example, presents an excellent survey of the field, which is valuable to almost anyone not completely up to date in combinatorial design.

The reviewer would like to note two improvements which would have greatly increased the value of the book.

A unified bibliography at the end of the volume would be much handier than the separate bibliographies at the ends of the papers. Separate bibliographies are hard to find in the volume, and they are less useful for general reference to find a partially remembered work than a unified bibliography would be. Bibliographies associated with individual papers are somewhat more convenient to users of reprints, but only the most insistent authors seemed to be able to talk the Society into furnishing reprints from this volume. On the whole, the reviewer believes that an integrated bibliography is almost a necessity in such integrated volumes, and he is continually puzzled when they do not appear.

A more demanding task is the preparation of an instructive narrative summary of the type which has been produced in the *Annals of Mathematics Studies* devoted to games; [1] contains both a fine bibliography and a carefully written and highly lucid introduction. The editors of the present volume did make several interesting and instructive statements in their introduction, but they were not moved to shed the large amount of light they could have on the subject matter and its relevance.

One interesting statement from the introduction might be worth quoting: "What is very attractive about this field of research is that it combines both the most abstract and most nonquantitative parts of mathematics with the most arithmetic and numerical aspects. It shows very clearly that the discovery of a feasible solution of a particular problem may necessitate enormous theoretical advances. Perhaps the moral of the tale is that the division into pure and applied mathematics is certainly artificial and to the detriment of the enthusiasts on both sides. Furthermore, the way in which apparently simple problems require a complex medley of algebraic, geometric, analytic and numerical considerations shows that the traditional subdivisions of mathematics are themselves too rigidly labelled. There is one subject, mathematics, and one type of problem, a mathematical problem."

On the whole, the authors and the editors (the reviewer excepted) have done an excellent job of presenting the status of this rapidly developing field. The book is worth having if only for isolated papers: Lehmer's, for example, showing how to make a computer behave, or the beguiling paper by Taussky and Todd, which attacks problems that would cause any computer and its masters to shudder. The editors, the American Mathematical Society, and the Office of Ordnance Research are to be congratulated on this volume.

The reviewer, who usually shies away from reviewing his own work, undertook this review because of the difficulty of finding other non-contributing reviewers, and because of the dated and unimportant nature of the paper to which he contributed.

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1. A. W. Tucker & R. D. Luce, Editors, *Contributions to the Theory of Games*, Volume IV, *Ann. of Math.* No. 40, Princeton University Press, Princeton, N. J., 1959.