REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

1 **[C, D, E, L, X]**.—C. W. CLENSHAW, *Chebyshev Series for Mathematical Functions*, Mathematical Tables, v. 5, National Physics Laboratory, Her Majesty's Stationery Office, London, 1962, iv + 36 p., 27.5 cm. Price 12s.6d.

In an introductory section the author states the two-fold purpose of this volume, namely, to present tables, mostly to 20 decimal places, of the coefficients in the Chebyshev expansions of a number of the more common mathematical functions, and to set forth the basic techniques for evaluating and manipulating such series.

The remaining text consists of sections devoted to: the fundamental properties of Chevyshev polynomials (with particular reference to a discussion by Lanczos [1]); the alternative methods used in the calculation of Chebyshev coefficients (use of the orthogonal properties of integration and of summation, rearrangement of series, and solution of differential equations); a description of the tables and their preparation, mainly by solving the appropriate differential equations; the application of the tables and the use of Chebyshev series; and a critical comparison of Chebyshev series with alternative forms of storing a table-equivalent in a computer (these forms include explicit polynomials, "best" polynomials, and rational functions).

A bibliography of 28 books and papers is included, followed by two appendixes: one on the spelling of "Chebyshev," and the other on the normalization of Chebyshev polynomials.

The body of this work consists of seventeen tables of Chebyshev coefficients, given to 20 decimal places except for the last table, which gives 14 places. The functions considered include the trigonometric functions sine, cosine, and tangent; the inverse functions $\sin^{-1}x$, $\tan^{-1}x$; the exponential function; the logarithmic function $\ln(1 + x)$; the inverse hyperbolic sine; the Gamma function: the error function; the exponential integral; and both regular and modified Bessel functions of orders 0 and 1, together with auxiliary functions.

The numerous summation checks of the Chebyshev coefficients that are included in the tables inspire confidence in the accuracy of these extensive results. This reviewer has, moreover, found that Clenshaw's values of $J_{2k}(n\pi/2)$ agree with similar data of Owen R. Mock deposited in the UMT file (see Review 118, *MTAC*, v. 9, 1955, p. 223).

This excellent set of tables appears to be the most extensive and elaborate compilation of such coefficients that has yet been published.

J. W. W.

1. NATIONAL BUREAU OF STANDARDS, *Tables of Chebyshev Polynomials*, Applied Mathematics Series No. 9, U. S. Government Printing Office, Washington, D. C., 1952.

2 **[F]**.—J. C. P. MILLER, *Table of Least Primitive Roots*, 3000-page manuscript in possession of the author at The University Mathematical Laboratory, Cambridge, England; one copy thereof deposited with the Royal Society of London;