33[A–E, G–N, X, Z].—A. FLETCHER, J. C. P. MILLER, L. ROSENHEAD, & L. J. COMRIE, *An Index of Mathematical Tables*, Second edition (in two volumes), Addison-Wesley Publishing Company, Reading, Massachusetts, 1962, xi + iv + 994 p. (consecutively numbered), 25.5 cm. Price $42.00. [Published in England by Blackwell Scientific Publications, Oxford (for Scientific Computing Service, London).]

The continuing rapid increase in table-making, as one consequence of the extraordinary growth of automation, is graphically reflected in the comparative sizes of the first and second editions of this authoritative index of mathematical tables.

For example, the first main division, Part I: Index according to Functions (p. 21–608), although arranged as in the first edition, with 24 constituent sections, has been expanded from 355 to 588 pages. Furthermore, a large amount of new material has been added, constituting more than one hundred new articles in this division of the book. Representative of these numerous additions are the articles and subsections devoted to: harmonic means (2.47); coefficients in powers of Euler's product (3.7); symmetric functions (3.8); sums over lattice points (4.69); zeros of special sets of polynomials (5.67); segments of the Hilbert matrix (5.68); logarithms to base 2 (6.39); quantities related to the five convex regular polyhedra (7.88); repeated exponentials (10.39); natural logarithms of logarithms, exponential and hyperbolic functions (11.7); functions arising in problems of elasticity (12.95); exponential, sine and cosine integrals of complex argument (13.8); Sievert's integral (13.98); psi function of complex argument (14.66); tables for probit analysis (15.38); integrals related to order statistics (15.519); associated Legendre functions of non-integral degree (16.595); scattering functions for spherical particles (17.54); Airy functions of complex argument (20.25); transition curves (20.65); Fresnel integrals of complex argument (20.69); series involving Bessel functions (20.7); hyperelliptic integrals (21.9); the generalized zeta function (22.15); the Dirichlet L-functions (22.17); Mathieu functions of imaginary argument (22.235); Coulomb wave functions (22.59); Bose-Einstein functions (22.68); van der Pol's equation (22.895); miscellaneous indefinite integrals, infinite series, ordinary and partial differential equations (22.94–22.97); solutions of integral and integro-differential equations (22.98); partial derivatives at lattice points (23.49); Sard's quadrature formulas (23.512); osculatory quadrature formulas (23.67); and summation of slowly convergent series (23.695).

The references comprising the second main division, Part II: Bibliography (p. 609–780) have increased proportionately in number, from approximately 2000 to more than 4470, corresponding to an increment of 100 pages over the space devoted to that division in the first edition. References are made to publications dated as recently as 1960 and 1961, but the number of such is scanty, and the great majority of references are dated 1958 or earlier.

An innovation is the inclusion in the present edition of a division, Part III,

entitled Errors (p. 781–932), which presents information available to the authors concerning errors in mathematical tables up to 1954, when this part of the *Index* was sent to press. The first source of this information was the relevant material amassed at the Scientific Computing Service under the direction of Dr. Comrie. Following his death in 1950, the remaining authors of this edition performed a further examination of tables for errors. The remaining main source was the notices of table errata appearing regularly in *Mathematical Tables and other Aids to Computation*. The authors considered this division of the book subsidiary to their main objective, which was to discover what tables of a given function exist. Incomplete as Part III must necessarily be, inasmuch as errors are continually being discovered in tables, nevertheless, this division of the book should prove extremely valuable to users of tables.

The elaborate Introduction (p. 1–18) is most informative, and should be read carefully by all users of this index. Included therein are introductory historical remarks, a large amount of bibliographic information, and a detailed description of the arrangement of the material in the *Index*. Reference is made to previous general indexes, such as those by Davis, Davis & Fisher, Schütte, Lebedev & Fedorova, and Buronova. Collections of mathematical formulas are cited; these include compilations by Láska, Adams & Hippisley, Silberstein, Kamke, Tölke, Magnus & Oberhettinger, Erdélyi, and Ryshik & Gradstein. This information is supplemented by enumerations of: handbooks for physicists and engineers; tables of integrals; lists of Fourier transforms, Laplace transforms, and Mellin transforms; textbooks and treatises on numerical methods and related theory; publications relating to the numerical solution of differential equations and of integral equations; manuals on calculating machines and instruments; books on nomography; astronomical tables; nautical tables; financial tables; statistical tables; and standard references on probability and statistics. Tables in the theory of numbers are not cited to any appreciable extent, for it was felt by the authors that adequate coverage has been provided by relevant indexes prepared by A. Cayley and D. H. Lehmer and by notes and papers appearing regularly in *MTAC* and *Math. Comp.*

The book closes with Part IV: Index to Introduction and Part I (p. 933–994). One reference omitted is that to transport integrals (subsection 22.65).

It is difficult in this limited space to convey an adequate idea of the wealth of information available in this edition. The new *Index* certainly is pre-eminent among the books of its kind, and is a worthy successor to the first edition, which was elaborately reviewed in this journal by the late R. C. Archibald (*MTAC*, v. 2, 1946, p. 13–18).

In a work of this size errors must almost inevitably appear; a number of these are listed in the appropriate section of this issue of *Math. Comp.* These are relatively inconsequential flaws, and this monumental work can be most highly recommended as an indispensable accession to the library of every computation laboratory, and should be readily available to teachers, students, and practitioners in the field of numerical mathematics.

J. W. W.

34[A–F, K–N, Q].—Samuel M. Selby, Robert C. Weast, Robert S. Shankland, Charles D. Hodgman, Editors, *Handbook of Mathematical Tables*, Chemical