this part of the handbook include a table of the summed Poisson distribution function and an extension of the range of the annuity tables to include higher interest rates.

A final new feature of the present edition is the inclusion of a valuable list of 29 references to relevant treatises, textbooks, tables, and general guides for table-users.

The author appears indeed to have taken great pains to make this edition an especially useful and reliable one.

J. W. W.

1. R. S. BURINGTON, *Handbook of Mathematical Tables and Formulas,* Fourth edition, McGraw-Hill, New York, 1965. (See *Math. Comp.*, v. 19, 1965, p. 503, RMT **72**.)

44 **[2.20]**.—H. P. ROBINSON, *Roots of* $\tan x = x$, Lawrence Berkeley Laboratory, University of California, Berkeley, California, December 1972, ms. of 10 typewritten pp. deposited in the UMT file.

This table consists of the first 500 nonnegative roots of the equation stated in the title, all to 40D. The underlying computations were performed on a Wang 720C programmable calculator, and a partial check was provided by a preliminary calculation of the first 300 roots to 40D by means of a different program.

The results of the present calculations clearly supersede in precision and extent those of all previous ones [1] of the roots of this important equation in applied mathematics.

As an example of the use of the table, the author has applied it to the evaluation of the DuBois Reymond constant C_3, using a formula originally developed by Watson [2].

J. W. W.

1. A. FLETCHER, J. C. P. MILLER, L. ROSENHEAD & L. J. COMRIE, *An Index of Mathematical Tables,* 2nd ed., Addison-Wesley, Reading, Mass., 1962, v. 1, p. 144.
2. G. N. WATSON, "DuBois Reymond constants," *Quart. J. Math.*, v. 4, 1933, pp. 140–146.

45 **[2.20, 3, 4]**.—M. P. CHERKASOVA, *Problems on Numerical Methods,* translated from the Russian by G. L. Thomas and R. S. Anderssen, Wolters-Noordhoff Publishing, Groningen, The Netherlands, 1972, vii + 210 pp., 23 cm. This book is available from International Scholarly Book Services, Inc., P. O. Box 4347, Portland, Oregon 97208. Price $8.50.

This book is intended to serve as an educational aid in elementary numerical analysis courses by providing the student with a comprehensive set of numerical problems (with answers) upon which he can cut his computational teeth. Chapter 1, "The approximate solution of nonlinear algebraic and transcendental equations," contains 301 problems; Chapter 2, "Numerical methods in linear algebra," contains 146 problems; and Chapter 3, "Numerical solution of ordinary differential equations," contains 28 problems, many containing 5 or 6 parts. Each chapter contains brief summaries of the methods intended for use on the problems.

The idea of such a book is a good one; carefully chosen illustrative problems could help experienced teachers of the area as well as those inexperienced in the area but called upon to teach such courses. Unfortunately, the present text falls far short of this ideal. Firstly, the choice of methods to be described is disappointing; one finds no mention, for example, of bisection, regula falsi (as opposed to the secant method), partial pivoting, QR, trapezoid rule, et cetera. Of course, the problems can be used independently of the explanatory material. Secondly, the problems are purely computational with no attempt to illustrate important aspects of theory such as convergence rates, error estimates, instability, ill-conditioning, et cetera; the typical problem is: "Use method M to solve problem P." Again, one can select the problems for these purposes oneself, but the question is how to find a particular problem to illustrate a particular point. It is just as easy to make up one's own problem.

Thus, the book probably can serve mainly as a source of numerical problems with numerical answers. It is almost as easy, however, to make up one's own problems for assignment and deduce the correct answer from students' computer output.

I cannot attest to the accuracy of the answers given. On four problems (31, 70, 72 from Chapter 2; 25 from Chapter 3) the answers appeared to be correctly rounded to all figures given, as compared at least to answers produced on the CDC 6600 at the University of Texas using some of the best methods available.

J. W. D.

46 [2.35, 3].—S. L. S. Jacoby, J. S. Kowalik & J. T. Pizzo, *Iterative Methods for Nonlinear Optimization*, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1972, xi + 274 pp., 24 cm. Price $17.30.

An introductory chapter contains examples, definitions of convexity, first-order optimality conditions, discussion of the meaning of rate of convergence, and the traditional test problems that algorithmists use to try out their optimization codes. Chapter 2 gives ways of transforming problems and variables to facilitate obtaining solutions. Chapter 3 discusses methods for optimizing along a line, concentrating on those methods requiring only function evaluations. The usual direct search methods for solving unconstrained problems are found in Chapter 4, and Chapter 5 contains discussions of steepest descent, conjugate directions, quasi-Newton, modified Newton, and other methods for minimizing unconstrained functions. Chapter 6 discusses how general constrained problems can be solved by solving unconstrained (or merely linearly constrained) problems. Chapter 7 discusses direct methods for constrained problems including MAP, the cutting plane method, the gradient projection method, and the reduced gradient method. A concluding appendix on auxiliary techniques, such as the SIMPLEX method, is followed by a useful glossary.

Most chapters have a "Computing Systems" section which is unique in books on optimization. It contains references to codes implementing the algorithms developed in the book. Another area of strength is the integration of the numerical analysis point of view into solving the systems of linear equations required by many of the algorithms. There is a lack of precision in the definitions, and some of the material should have been deleted or further explained (such as the suggestion to eliminate two