In the Preface to these tables we are referred to a comparable, unpublished table of the sine and cosine to 15D prepared by Bower [1], which is available in listed and punched-card form.

The present tables were photographically composed from digital-computer tape records. The typography was prepared by a commercial printer on a conventional photocomposition unit controlled by perforated paper tapes produced by a converter designed to process magnetic-tape records in a form suitable for general-purpose phototypesetting machines.

The resulting typography is uniformly excellent and the arrangement of the data is attractive. This compilation constitutes a valuable contribution to the limited existing literature [2] of trigonometric tables based on the decimal subdivision of the circle.

J. W. W.

1. E. C. Bower, *Natural Circular Functions for Decimals of a Circle*, ms., 1948. Listed and punched-card copies available at nominal cost from The Rand Corporation, Santa Monica, California. [For a review, see *MTAC*, v. 3, 1949, p. 425–426, UMT **77**.]

2. *MTAC*, v. 1, 1943, p. 40; also, A. Fletcher, J. C. P. Miller, L. Rosenhead & L. J. Comrie, *An Index of Mathematical Tables*, 2nd ed., Addison-Wesley Publishing Co., Reading, Mass., 1962, v. I, p. 177–178.

3[G, X].—Marvin Marcus & Henryk Minc, *A Survey of Matrix Theory and Matrix Inequalities*, Allyn and Bacon, Inc., 1964, xvi + 180 p., 24 cm. Price $9.75.

This book is a compendium of many important facts about matrices. Moreover, it starts out, as the authors state, "with the assumption that the reader has never seen a matrix before." It proceeds then, in a logical sequence and in condensed, systematic notation, to state definitions and theorems, the latter generally without proof. Since the purpose is evidently to condense as much material as possible in a short space, "certain proofs that can be found in any of a very considerable list of books have been left out."

It would be indicative of the extent of the coverage to say that if one needed to look up all of the missing proofs, he would have to consult all of a by no means inconsiderable list of books. This was, of course, not the expectation, but the instructor who considers adopting the book as a class text would be well advised to make sure that he can himself supply the proofs that are not readily available to him.

There are three chapters, the first, Survey of Matrix Theory, comprising slightly more than half of the book. Here one finds the expected topics: determinants, linear dependence, normal forms, etc. In addition, one finds somewhat nonstandard material such as permanent, compound and induced matrices, incidence matrices, property L, among others. The next chapter, Convexity and Matrices, develops such inequalities as those of Hölder, Minkowski, Weyl, Kantorovich, and also discusses the Perron-Frobenius theorem, and Birkhoff's theorem on doubly stochastic matrices. The final chapter, Localization of Characteristic Roots, deals almost exclusively with what the reviewer calls exclusion theorems, by contrast with inclusion (e.g., theorems of Temple, of D. H. Weinstein, and of Wielandt). Other topics briefly dealt with are the minimax theorems for Hermitian matrices, and the field of values (one of the omitted proofs is that of the convexity of the field of values).

The few algorithms presented are given solely as constructive existence proofs, and not as computational techniques. Nevertheless, the numerical analyst would find it a handy reference book, with much information condensed into a very small volume. The student will find many challenges, and the careful documentation will permit him to look up the proofs, when necessary, if his library is adequate. The proofreading seems to have been very carefully done, for which the reader can be doubly grateful in view of the compactness.

A. S. H.

4[H, X].—J. F. Traub, *Iterative Methods for the Solution of Equations*, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1964, xviii + 310 p., 24 cm. Price $12.50.

As "iterative methods," the author includes Newton's and the method of false position, but he excludes Graefe's, and even Bernoulli's. By "equations," he means nonlinear equations, no consideration being given to linear systems.

There is a wealth of literature buried in journals on the subject of the numerical solution of equations, but remarkably little in books. In this book there is a fourteen-page bibliography, but only five items, or possibly six, are books devoted exclusively or primarily to the numerical solution of nonlinear equations. Of these, perhaps the best known, and the earliest one to appear in English, is by Ostrowski, published in 1960. Books on numerical methods in general usually do no more than summarize three or four of the standard methods, and sometimes not even that.

The author attempts to develop a general theory of the particular class of methods under consideration. Accordingly, the initial chapters present rather general theorems on convergence, and outline methods of constructing functions for iteration. Subsequent chapters deal with particular types (e.g., one-point), or with particular complexities (e.g., multiple roots). One short chapter deals with systems, and a final chapter gives a compilation of particular functions. Several appendices give background material (e.g., on interpolation), some extensions (e.g., "acceleration"), and discussion of some numerical examples. But except for this, very little is said about computational error.

The author has attempted to trace the methods of their sources, and references can be found in the bibliography to Halley (1694) and Lambert (1770), though not to Newton! An interesting feature of the bibliography is the listing with each item of each page in the text where reference is made to this item.

The rather elaborate systematic notation permits greater compactness, but may seem a bit forbidding to the casual reader who wishes to use the book mainly for reference. As a text, its value could have been enhanced by the addition of some problems. But as a systematic development of a large and important class of methods, the book is by far the most complete of anything now to be found in the literature.

A. S. H.

5[I].—D. S. Mitrinović & R. S. Mitrinović, *Tableaux d'une classe de nombres reliés aux nombres de Stirling*, (a) II. *Publ. Fac. Elect. Univ. Belgrade* (*Serie*: *Math. et*