ferred to in the text cannot be found in the bibliography.

Aside from these minor criticisms, this book should be of great value to any pure or applied mathematician working with partial differential equations, and not only to those interested in numerical solutions. A person engaged in research in the field of partial differential equations will find it necessary to go beyond the theorems stated to the original literature. However, the material given in the book should be ample enough to prevent his overlooking major contributions to a problem he is interested in, and to facilitate the task of informing himself on progress made by other workers in the field.

FRITZ JOHN

The Farey series of order 1025, *displaying solutions of the diophantine equation* $bx-ay=1$. Designed and compiled by E. H. Neville. (Royal Society Mathematical Tables, vol. 1.) Cambridge University Press, 1950. 29+405 pp.+1 plate. $18.50.

The Farey series of order n is the table obtained if one arranges in order of magnitude the rational numbers having denominators not greater than n and lying between 0 and 1 inclusive; each rational number is understood to be written in its "lowest terms," the numbers 0 and 1 being given in the forms 0/1 and 1/1 respectively. The table under review is by far the largest of its kind ever published in full and probably will remain so for some time to come, since the Farey series of order 1025 consists of 319,765 fractions.

Even though the fractions a/b and $(b-a)/b$ are given together, the Farey series of order 1025 itself occupies 400 pages. Except for the last page, each page contains 400 pairs of fractions, arranged in lines of 20 each. Besides the main table there is an appendix containing the following smaller tables: (1) the Farey series of order 50 with decimal equivalents, (2) the Farey series of order 64, (3) the denominators of the Farey series of order 100. In addition there is a brief introduction in which the author discusses the background, construction, and use of the tables. (See also the author's article *The structure of Farey series*, Proc. London Math. Soc. (2) vol. 51 (1949) pp. 132–144 and the third chapter of Hardy and Wright's *Introduction to the theory of numbers*.)

The principal interest of such a table, aside from its obvious usefulness in finding rational approximations to irrational numbers, lies in the fact that if a/b and x/y are consecutive fractions in the Farey series of order n, then $bx-ay=1$. Thus the present table can be thought of as a table of solutions of the diophantine equation

$bx-ay=1$ for all pairs of integers a, b such that $1 \leqq a \leqq b \leqq 1025$ and $(a, b)=1$, where the entries are arranged in order of magnitude of the ratio a/b. Of course it is possible to extend the usefulness of the table well beyond its apparent range.

Since the main table of the work under review does not give the decimal equivalents of the fractions listed, there is considerable difficulty in locating a given fraction in the series or in fixing a given irrational number (or rational number with denominator greater than 1025) between two fractions of the series. While it would clearly be out of the question to give the decimal equivalent of every fraction listed, it seems to the reviewer that it would have been quite feasible to give at the end of each line of the table the decimal equivalents of the last pair of fractions in the line. This would have enhanced the value of the table considerably, for it would have made the location problem relatively easy. As it is, the user of the table is expected to locate a given fraction in the series (or to determine in what interval a number not in the series would fall) by appealing to the uniform distribution of the Farey fractions. (Cf. problem 189 of section II of Pólya and Szegö, *Aufgaben und Lehrsätze aus der Analysis*, vol. 1, Berlin, Springer, 1925.) To be sure, the author gives a table of the locations of the fractions equivalent to $k/1000$ ($k=0, 1, 2, \cdots, 500$), but between two consecutive such fractions there are on the average about 320 other fractions.

This work is the first volume in a series of mathematical tables which is to be published by the Royal Society and which is intended as a continuation of the well known series of tables published by the British Association. The format and printing of this first volume are very satisfactory. Although this work will be a mere curiosity to most mathematicians and will certainly not have widespread use, number-theoretic experimenters will find it of considerable interest.

P. T. BATEMAN

A theory of cross-spaces. By Robert Schatten. (Annals of Mathematics Studies, no. 26.) Princeton University Press, 1950. 7+153 pp. $2.50.

The subject of this book is the generalization to Banach spaces of the construction of the algebraic direct product of two finite-dimensional vector spaces. The main problems arise from the variety of possible norms which can be used in the algebraic product space and the resulting profusion of Banach spaces which have honest claim to the title of direct product space. The results, mostly due to the author and to J. von Neumann, are outlined in a long introductory chapter; in the next paragraphs we state briefly the argument of