

## SHORTER NOTICES

*Mathematical Tables*. Volume 5. *Factor Table*. Prepared independently by J. Peters, A. Lodge and E. J. Ternouth, E. Gifford. London, British Association for the Advancement of Science, 1935. xv+291 pp.

This volume, the fifth in a series prepared under the direction of the British Association for the Advancement of Science, contains a tabulation of the decompositions into prime factors of *all* integers between 0 and 100,000. In this respect, that it lists all such integers, the present table differs from most existing factor tables, since it has been the practice in the formation of the more extensive tables to omit multiples of 2 and 5, and often of 3 and 7, also.

Conforming to custom, this volume contains an introduction comprising a description of the various methods employed in the construction of the three independent manuscripts upon which the table is based. In addition, there are given several lists of errata found in other tables upon comparison with the present one, as well as an enumeration of the more important tables.

As to the table proper, the printing is excellent and the arrangement commendable on account of its simplicity with a consequent accessibility of data. There is appended to the body of the work a table of reciprocals, to eight significant figures, of primes between 10 and 10,000. These data are well adapted to the factorization of integers that does not exceed  $10^8$ , by means of calculating machines.

In conclusion, the reviewer believes that for accuracy and utility the table under discussion supercedes all others covering a similar range.

J. W. WRENCH, JR.

Bauschinger's *Tafeln zur Theoretischen Astronomie*. Second edition, revised by Gustav Stracke. Leipzig, Engelmann, 1934. v+192 pp.

The first edition of this collection of tables has been one of the stand-bys of astronomers all over the world ever since its appearance in 1901. Although primarily intended to be useful to computers of planetary and cometary orbits, all but a few special tables have found application in a much wider field.

During the years that separated the publication of the two editions the computational tools of astronomers have passed through a period of rapid evolution. Modern calculating machines are now in general use, and have replaced logarithmic methods wherever this simplifies or reduces the work. Convenient tables giving the natural values of trigonometric functions are now available, and the sexagesimal division of the degree is gradually giving way to the decimal division.

Dr. Stracke, who is the head of the division of minor planets of the Recheninstitut at Berlin, is well qualified to appreciate the value of these modern methods. He has succeeded in presenting a new edition that is thoroughly up to date, without neglecting the needs of those that are still using the older methods.

Few of the tables have been retained without some change. Without ex-

ception those changes are decided improvements, especially where the decimal division of the degree has been introduced. Among the new material are auxiliary tables for numerical integration, tables for conversion of ecliptical into equatorial elements and vice versa, for precession in rectangular coordinates, and for differential correction of orbital elements.

Of especial interest to non-astronomical users are the ten pages at the end of the volume giving a collection of formulas for interpolation, numerical differentiation and integration, tables of coefficients in interpolation formulas, a table of the probability integral, a page of mathematical and astronomical constants, and a list of logarithmic and trigonometric tables.

It is, of course, possible to suggest additional material that might have been included. Within its scope it is an excellent volume, the value of which is much enhanced by its beautiful printing.

DIRK BROUWER

*Die Mathematischen Hilfsmittel des Physikers.* By E. Madelung. 3d edition. Berlin, Springer, 1936. 13+381 pp.

The second edition of Madelung's *Hilfsmittel*, published in 1925, but still widely popular among working physicists, was rapidly losing its utility as the complexity of the mathematical tools employed by the physicist increased. The third edition represents a thorough rejuvenation; it enlarges the usefulness of the book and is likely to win for it many new friends.

The material of the book has been rearranged, and important additions have been made. Numerous items on which the reader previously had to seek elucidation in Courant-Hilbert or Whittaker and Watson may now be found adequately treated in Madelung's book. Even a short section on group theory has been included. The section on quantum mechanics, completely rewritten, contains a good summary of the principal facts, as well as sets of formulas (such as commutation rules between various operators) which are valuable to have at hand. The size of the book has grown from 283 to 381 pages.

HENRY MARGENAU

*Das Grundgesetz der Wellenfortpflanzung aus bewegter Quelle in bewegten Mittel.* By Karl Uller. Munich and Berlin, R. Oldenbourg, 1935. 138 pp.

This is a book devoted to the phenomena (mainly electro-magnetic) of wave motion in moving media. The writer does not accept the ideas of relativity and the spirit of the book may be inferred from the fact that in an appendix there are given no less than seventeen "Gegenbeweise" (whose dates of original publication extend over the interval 1910-1932) which claim to demonstrate the lack of validity of Einstein's theory. The present reviewer does not find these "proofs"—either taken singly or collectively—convincing. A single example of his inability to "go along" will have to suffice. On page 31 the author "proves" the commutativity of "local" and "substantial" time differentiations, but an examination of the "proof" makes it clear that the local time-rate of change of velocity is not taken into account.

F. D. MURNAGHAN