

SHORTER NOTICES

Die Theorie der Gruppen von endlicher Ordnung mit Anwendungen auf algebraische Zahlen und Gleichungen sowie auf die Kristallographie. By Andreas Speiser. Second edition, Berlin, Julius Springer, 1927. ix+254pp. Price 6.50 marks.

The first edition of this work appeared in 1923 and was reviewed in this Bulletin (vol. 29 (1923) p. 372). Hence it is only necessary to note here the improvements which the second edition presents. The fact that such an edition appeared so soon after the publication of the first tends to show that the work filled a real need. It is to be hoped that the new material which appears in the present edition will make the work still more useful and will tend to increase its popularity as an introduction to some of the most interesting and most modern developments of the large subjects to which it explicitly relates.

The size of the volume has been increased by more than one-fourth of its original extent, while the number of different authors to whom reference is given has been more than doubled, being now 77. No additional name of an American author appears in this list, but the number of page references to the five which appeared in the original list has been more than doubled, while the total number of such references was increased relatively much less. One name which appeared in the original list does not appear in the present one, viz., that of E. Netto, who was credited in the original edition with a material simplification of the proof of Frobenius's Theorem. No reference to such credit is made in the present edition.

The most striking feature of the new edition is the emphasis on plane symmetries and on the theory of ornamental figures. These subjects are here recommended as suitable first steps towards an understanding of abstract group theory. The present volume aims to provide three distinct entrances to this subject. The first of these starts from the postulates, the second begins with ornamental figures, while the third employs the classic theory of substitutions, which is here called the theory of permutations. The wide differences between these methods of entering into the same general field tend to interest the student and to exhibit at the outset the extensive range of applications of the general theory.

The present volume aims also to arouse a deep historical interest by referring to the fundamental question of the source and the nature of the earliest higher mathematics in ancient times. The view is expressed here that this source is found in architecture and in ornamental figures, and hence the earliest study of higher mathematics was inspired by a sense of beauty rather than by an interest in elementary geometry, which is necessarily a somewhat tedious subject. It thus appears that the history of higher mathematics may begin about 1000 years earlier than has been commonly assumed by mathematical historians (p. 3). We refer here to these historical remarks, some of which will probably not be accepted

without protest, to exhibit the attractive style in which the subject matter of the present volume has been presented. The fact that the author sometimes expresses general views which may possibly be challenged may tend to awaken interest and discussions on the part of the readers.

The number of chapters has been increased from 15 to 16 while the number of sections has been extended from 63 to 74. An "Einleitung" has been added, in which prehistoric group theory and the derivation of the group concept from permutations is considered. The heading of the last section has been changed from "Anwendung der Substitutionsgruppen" to "Die Kleinsche Gleichungstheorie," but besides the correction of slight errors and the addition of a foot-note no changes were made in this section. In the list of authors the name of *Owen Jones* appears under the letter *O* instead of under the letter *J*. The developments relating to abelian groups have been greatly extended but the ϕ -subgroups did not receive any attention. As in the first edition so in the present one the applications are especially stressed in accord with the expressed purpose of the valuable series of which the present volume is a worthy part.

G. A. MILLER

Das Rechnen der Naturvölker. By E. Fettweis. Leipzig, B. G. Teubner, 1927. iv+96 pp. Price 5 marks.

This is a compilation of the number words used by many savage races. Gestures for numbers and some of the extremely simple calculations which these races make, are also described. An extensive bibliography of nearly 300 titles is given. It does not include L. L. Conant's *Number Concept*, New York, 1896, though the author makes a second-hand allusion to Conant, (p. 54); and it has few titles in common with the bibliography prepared from the mathematical standpoint by David Eugene Smith, (*History of Mathematics*, vol. 1, p. 14). The work seems likely to be of more interest to the ethnologist, the linguist and, perhaps, the psychologist, than to the mathematician.

J. W. A. YOUNG

Ptolémée, Composition Mathématique, traduite pour la première fois du grec en français par M. Halma (avec le texte grec): et suivie des notes de M. Delambre. Paris, J. Hermann, Volumes 1, 2. Réimpression facsimilé. Price 210 fr.

The edition of Ptolemy's *Almagest*, in Greek and French, printed in parallel columns, which was prepared in 1813-16 by the noted French scholar l'Abbé Halma and supplied with notes by the astronomer Delambre, is generally regarded as the best in existence. Before that time a translation from Greek into Latin had appeared at Basel which was based on a less careful scrutiny of different manuscript texts. Halma made a searching comparison of manuscripts in the libraries in Paris, Venice, Florence and the Vatican. Now, more than a century after the first appearance of Halma's edition, a facsimile reimpression is placed within the reach of readers of our time. It is well that Ptolemy should be available to