SHORTER NOTICES

A Manual of Field Astronomy. By Andrew H. Holt. New York, Wiley, 1917. 10 + 128 pp.

This book is designed to meet the demand for something "less extensive than most texts on the subject and yet more complete than the usual chapters on the subject in books on surveying." It is "planned especially for engineers, rather than astronomers, the methods described being those for use with field instruments under ordinary field conditions."

After an introductory chapter, the various systems of coordinates and the astronomical triangle are explained. Then follow chapters on Measurement of Time, The American Ephemeris and the Nautical Almanac, Problems in Conversion of Time, Corrections to Observations, Observations for Latitude, Azimuth, Time and Longitude. The appendix contains the derivations of the necessary formulas in spherical trigonometry, a description of the solar attachment for transits, a set of tables, and a number of typical problems completely solved.

The treatment is eminently practical throughout. Under each topic there is given: first, the relations and theory on which the method depends, then the procedure is outlined, step by step, under the general headings: *Computation preceding field work, Field work,* and *Computation following field work.* This outline is supplemented by reference to the solution of a typical problem. Thus the student learns exactly what things he is to do, and exactly how, when, and in what order, he is to do them.

The diagrams are excellent, the book is attractive in make-up, and on the whole this is the best brief treatment of the subject that the writer has seen.

C. H. Currier

The Elements of Theoretical and Descriptive Astronomy. By the late Charles J. White. 8th edition, revised by Paul P. Blackburn. New York, Wiley, 1920. 11 + 309 pp.

Originally published in 1869 to meet the requirements of the U. S. Naval Academy, successive editions "have simply brought the treatment of the subject up to date without making material changes in its form." The book is largely a discussion of theoretical astronomy, descriptive astronomy being treated very briefly. Thus in the chapter on the planets, Mars is dismissed with a page, while two pages are devoted to a discussion of how to find the heliocentric longitude of the node of a planet. No exercises to be solved or questions to be answered by the student are inserted.

Some important topics are either left out altogether or treated briefly. Thus there is no mention whatever of standard time in the chapter on

time; the discussion of spectral types is incomplete, as is that of the form of the earth, while the problem of the source of the sun's heat is not considered at all. The discussion of longitude would be clearer if the chapter on time were placed earlier in the book.

For the most part the explanations are clearly given, and few errors have been noted. An annular eclipse is not limited to the point where the axis of the cone, prolonged, meets the earth (p. 154). A planet east of the sun does not always set after the sun has set (p. 176). Saturn is not usually credited with ten satellites (p. 196). The light of the planets, we are told (p. 204) produces only the ordinary spectrum of reflected solar light. The explanation of the method of numbering comets (p. 208, note) is not correct. We learn (p. 243) of a first magnitude star in Ursa Major.

The most valuable feature of the book is the series of diagrams, 84 in number, illustrating the more important terms and relations of theoretical astronomy. The diagrams are excellent, and the derivations of the formulas are clearly explained. The appendix contains a summary of the necessary mathematical definitions, theorems, and formulas from plane and spherical trigonometry, analytic geometry, and mechanics, as well as a brief chronological history of astronomy and navigation, tables summarizing the more important facts, and some excellent reproductions of Yerkes Observatory photographs of celestial objects.

C. H. CURRIER

Mathematische Bevölkerungstheorie, auf Grund von G. H. Knibbs' "The Mathematical Theory of Population", dargestellt von E. Czuber. Leipzig, B. G. Teubner, 1923. xvi + 357 pp.

Knibbs' *Theory of Population*, printed in 1917 in Australia, is one of those remarkable original works that we have from time to time from Englishmen. There are probably many things in it that will not stand the test of time, but the conception of the work is so large that its influence will remain for a long while. Czuber saw a notice by Knibbs in the first number of METRON, obtained a copy of the work through the kindness of the author, recognized at once, as Czuber would, the great importance of the work, and has given us a German reworking of it in somewhat condensed form. The reduction in total length is about 25%; the number of tables has been cut by 15%, and the list of serially numbered formulas by 40%. Yet a comparison of the German with the original version does not reveal any cuts or modifications so serious that the original author could well feel that he has not been adequately rendered, or that the reader to whom the German may be more accessible need feel the necessity of consulting the original text.

E. B. WILSON