

able experience in the training of mechanics, and he remarks on the surprising number of cases where their knowledge of mathematics is limited to the first four rules. This naturally leads to an unintelligent use of formulæ and a marked inability to make applications to practical problems as they arise. The plan of this book is designed to meet these cases. It starts with the use of fractions and decimals, and includes chapters on percentage, mensuration, constructions, trigonometry, and some of a more technical character on lathes, threads, machines, gears, and business organisation.

(4) This small book includes the principal theorems of the first three books of Euclid. It is intended to be used after the ordinary introductory graphical course, and aims at giving the reader a bird's-eye view of a subject to be covered in more detail at a second reading. Those who are familiar with Dr. Davison's larger work will recognise a similarity of treatment in these pages. It would be an improvement if answers to the numerical exercises were given.

APPRENTICE TRAINING.

The Principles of Apprentice Training, with Special Reference to the Engineering Industry. By A. P. M. Fleming and J. G. Pearce. Pp. xiii + 202. (London: Longmans, Green and Co., 1916.) Price 3s. 6d. net.

MANY interesting opinions are expressed in this book, but the same thing is repeated too often under different headings. The authors give particulars of the mode of selecting and training apprentices which was begun in 1913 at the British Westinghouse Company's works at Manchester; all the lecturers are either engineers or foremen, and many of the former are graduates in engineering. Men so chosen are not always good teachers, though they may be excellent as practical men; so future lecturers are being trained from among the apprentices under the supervision of the authors. So far the scheme seems to promise success. In October, 1915, there were 309 apprentices out of a total of 1348 youths in the works; the number of apprenticed boys is increasing. The course, while thoroughly practical, makes reasonable demands on the pupils' intelligence.

On the general question the authors give details as to the present inadequate methods of preparing for work in life both "specialists"—by which term they indicate repetition workers using automatic or semi-automatic machinery—and craftsmen, who need wider experience, skill, and intelligence. They point out that in the elementary schools book-learning is predominant; they show how inadequate is the time spent in manual training and other forms of "doing." They indicate that in the secondary schools most of the pupils are trained as though their main object in life was to pass the entrance examination to a university—although the percentage of such children who become undergraduates is small.

All this is but too true, and there is little likelihood that it will be changed so long as practically all the higher officers in the Board of Education and in the Civil Service generally are selected from those who have had a literary training. For science, modern languages, and manual work are regarded as forms of improper educational "specialisation," and Latin and Greek as the sole means for developing the character and intelligence of British youth; and this although our naval officers, whose characters and intelligence most of us admire, are trained by means of mathematics and science, and have been deprived of the supposed indispensable benefits of classical training.

J. W.

OUR BOOKSHELF.

A Bibliography of British Ornithology, from the Earliest Times to the End of 1912. By W. H. Mullens and H. Kirke Swann. Part i. Pp. 112. (London: Macmillan and Co., Ltd., 1916.) Price 6s. net.

WE have not hitherto had an adequate bibliography of British ornithology, for the one by Elliott Coues begun thirty-six years ago was never, we believe, completed, and, excellent as was the first instalment so far as it went, it is, of course, now out of date. The bibliography upon which Major Mullens (who has already done work which may be considered as the basis of the present book) and Mr. Swann have embarked is of an ambitious and comprehensive nature. The aim of the authors has been to give a biographical account of each author of a separately-published work, followed by a bibliography of their works and of their papers contributed to journals bearing on British ornithology. Collations are given and spaced titles of books published before 1850; critical notes also on many books are included.

The first part of the book (of which there are to be six) has now been issued, and fully comes up to the promise of the prospectus. Even in this one part we meet with many books and authors with which few book-loving birdmen were probably previously acquainted. Under the heading "Anonymous" alone there are more than eighty items, and the present biographers have been very successful in hunting down the authors of these. The biographical notices are sufficiently full and, especially in the case of the older writers, very interesting. In fact, the book promises to be not only a very useful work of reference for British ornithologists, but also, what at first sight we might not expect, a very readable and entertaining book. It is well printed on very good paper.

An Elementary Manual of Radiotelegraphy and Radiotelephony for Students and Operators. By Prof. J. A. Fleming. Third edition. Pp. xiv + 360. (London: Longmans, Green and Co., 1916.) Price 7s. 6d. net.

It is unnecessary to do more than refer very briefly to the third edition of Prof. Fleming's