harm from the reading, and may contrive a rare wan smile, but he will learn little or nothing. He will certainly wonder whether life is made notably easier by the simple device of calling an electron a duckling. If, on the other hand, he is the simple soul at or to whom the "wit and humour of the book" (guaranteed by the publishers) are directed, he may be deluded into feeling that he has "unconsciously acquired a real insight into the basic principles and practice of Wireless".

Mathematics

Differential and Integral Calculus, By R. Courant. Translated by E. F. McShane. Vol. 1. Pp. xiii + 568. (London, Glasgow and Bombay : Blackie and Son, Ltd., 1934.) 20*s*. net.

THIS volume is an English edition of the author's original work in German on the calculus which was briefly reviewed in 1928. Although the title-page announces it to be a translation, yet it is much more than this. Dr. McShane, in co-operation with the author, has considerably modified the treatment in order to adapt the book to the needs of English and American students. Among the principal divergencies from the original text, this edition contains (i) a sketch of the differentiation and integration of functions of several variables, and (ii) a collection of classified examples. Although the preface claims that a large number of exercises has been added, yet, compared with English textbooks, this number is somewhat small.

The course is intended for those who wish to pursue the study of the calculus and its applications as beginners. Much of the rigour demanded in establishing some of the more difficult fundamental theorems has therefore been taken out of the main discussion and given later in appendixes to the chapters. In this way, not only is the student enabled to pass rapidly to the practical applications, but also the presentation of the subject has been greatly enhanced, for too much rigour to a beginner is undoubtedly repellent.

The book is thoroughly well printed and the text is of a clarity which is not always possible in a purely literal translation.   F. G. W. B.

Higher Mathematics : for Engineers and Physicists. By Prof. Ivan S. Sokolnikoff and Dr. Elizabeth S. Sokolnikoff. Pp. xiii + 482. (New York and London : McGraw-Hill Book Co., Inc., 1934.) 24*s*. net.

THE text of this volume is based upon courses of lectures given annually to engineering students in the University of Wisconsin. The aim of the authors is to provide a textbook which may not only appeal to students of applied science, but may also serve as a stepping-stone to more advanced mathematical treatises. A wholly rigorous and purely formal presentation has therefore not been attempted, since, as the authors wisely point out, such a course of detailed analysis would tend to bewilder many practical students and thus stifle their interest in mathematics.

The calculus, beginning with elliptic integrals and leading on to those ordinary and partial differential equations most frequently met with, is thoughtfully developed. This is followed by some very practical chapters on vector analysis, probability and empirical formulæ, whilst the final chapter incorporates an interesting lecture on conformal representation by Dr. Warren Weaver. Examples are provided at the end of each chapter, and these are to be regarded as an integral part of the text, since they embody extensions and further developments of the subject matter.

A Shorter Trigonometry. By W. G. Borchardt and the Rev. A. D. Perrott. Pp. viii + 238 + xxxii + xxxi. (London : G. Bell and Sons, Ltd., 1934.) 4*s*. ; without Tables, 3*s*. 6*d*.

As the title suggests, all the trigonometry for the several school certificate examinations is here contained in a single volume. The authors have divided the text into two parts : the first is introductory and therefore mainly numerical, the second deals with the more formal trigonometry. The whole treatment is thoroughly sound, and every chapter contains a large number of exercises which are well designed to stimulate the pupil's interest and are not too difficult.

Objection might be taken to the statements on p. 86, where confusion is likely to arise in identifying $\cos A$ and $\sin A$, previously defined as ratios, with the *lengths* of OM and PM respectively. In spite of this small defect, however, the book may be confidently recommended, for the authors have carried out their purpose excellently.   F. G. W. B.

Miscellany

Three Philosophers (Lavoisier, Priestley and Cavendish). By W. R. Aykroyd. Pp. xi + 227 + 8 plates. (London : William Heinemann (Medical Books), Ltd., 1935.) 10*s*. 6*d*. net.

THIS is a rather charmingly written study : not too deep, not heavy, not coldly ordered, and humane. With the central figure Lavoisier are portrayed (with sound art in passing to and fro between the characters) Priestley and Cavendish, as complements and foils. Cavendish, by birth noble, by inheritance wealthy, by genius a metrical hermit ; and Priestley, the very opposite in each point, in whom an intolerable fluency in doctrine was joined with the happiest success in qualitative experimenting : these two men are quite indispensable to science, yet both humanly and scientifically they stand at antipodes. That third indispensable, Lavoisier, was equipped with a supremely lucid and systematising brain, and he commanded much of Cavendish's type of metrical skill, coupled (for scientific purposes) with Priestley's missionary instinct *minus* its naïvety. Hence, though he lacked their peculiar gifts for discovery *per se*, he was able with this triple combination of abilities to rise to a summit higher than either of theirs.