

*Die mechanischen Beweise für die Bewegung der Erde.* By R. Grammel. Berlin, Julius Springer, 1922. IV + 71 pp.

The author states in the preface that his reason for writing the book is to make the material accessible to students who have only an elementary knowledge of mathematics and mechanics. His plan is to describe the experiment, state the law of the motion mathematically, and put the derivation of the formulas in small print. The experiments are grouped into (a) those depending on the principle of the motion of the centroid, (b) those depending on the principle of angular momentum.

Such subjects as Foucault's pendulum experiment, the gyroscopic compass, and the effect of the earth's rotation on a projectile and also on a freely falling particle are familiar to students who have had a course in mechanics. Nevertheless a systematic presentation which gives numerous references and also some experiments not so generally known, makes interesting reading. The material is well arranged and the figures are good.

In connection with Fig. 16, which gives the trajectories of two projectiles fired in vacuo with equal velocity and elevation, one toward the east and the other toward the west, one would naturally wonder if numerical data were used in constructing the diagram, or if it is simply a figure drawn with the idea of bringing out certain general properties.

PETER FIELD

*Calculus and Probability for Actuarial Students.* By Alfred Henry.

Published by the authority of the Institute of Actuaries of Great Britain. London, C. and E. Layton, 1922. 152 pp.

The scope of this book is outlined in its introduction.

"Actuarial science is essentially practical in that, whilst it is based on the processes of pure mathematics, the object of the worker must be to produce a numerical result."

"For this reason it is necessary for considerable prominence to be given, in the curriculum of the actuarial student, to the subject of Finite Differences, and it thus becomes convenient, in the study of those subjects not included under the heading of Algebra, to deal with this part of the syllabus first and, notwithstanding certain theoretical objections, to treat the fundamental propositions of the Differential and the Integral Calculus as being, substantially, special cases of similar propositions in Finite Differences. The subjects enumerated cover so wide a field that it has been necessary to exercise considerable compression."

A chapter on the theory of probability is also added. This book undoubtedly will be the standard introduction to mathematics necessary for a preparation to actuarial science although it may be found rather difficult reading to many students, as graduated exercises and a fuller

discussion of difficulties and of fundamental principles, especially those involving the interrelations between formulas, would clarify the subject. This book coordinates much material that has never been conveniently arranged and should be valuable to students in any field of applied mathematics where interpolation is used or where it is necessary to obtain the approximate summation of the actual data where only typical individual values are known.

J. S. ELSTON

*Handbuch der angewandten Mathematik.* Herausgegeben von H. E. Timerding. Vol. I. *Praktische Analysis*, von H. von Sanden. Zweite verbesserte Auflage. Leipzig and Berlin, B. G. Teubner, 1923. 195 pp.

The first edition of this book appeared in 1914, and was reviewed in this BULLETIN (vol. 15 (1914-15), pp. 256-259). In the present edition numerous small changes have been made throughout; proofs have been simplified and algebraic work arranged in a manner more easy to follow. A few new sections have been added, in particular: graphical methods now include a discussion of nomography and a larger number of examples, differentiation and integration are derived in connection with formulas for interpolation, expressions for the limit of error in analytic functions are obtained, and a much fuller treatment of numerical integration is added. As in the former edition, both press-work and proof-reading have been well done. Unfortunately the quality of paper used is such that the page has a less pleasing appearance than in the first edition.

VIRGIL SNYDER

*Life Contingencies.* By E. F. Spurgeon. Published by the authority of the Institute of Actuaries. London, C. and E. Layton, 1922. XXVI + 477 pp.

This book replaces the old Institute of Actuaries Text Book, Part II, which has been the fountain head of knowledge on this subject for thirty-five years in America and England and to some extent in Europe. Of course the new book is more comprehensive, as some additional material is added, the most important being that dealing with functions depending on select lives. The main difference in treatment is that a knowledge of the mathematics covered in the previously reviewed book is assumed throughout, whereas the old book was so arranged that a large part of it could be read without such knowledge. This work will be indispensable to actuaries. As to others, it will be most valuable to anyone interested in statistical subjects connected with the mortality rate.

J. S. ELSTON