be modified, adapted to the new point of view. It is true that just this fact makes perhaps the theory of relativity more important and fruitful in the application to mechanics; but both esthetically and didactically it is so much more satisfactory to deduce the general principles on the example of electricity and then to apply them to gravitation.

Aside from that hardly any general criticism can be directed against Levi-Civita's exposition of relativity; it is original, complete (with the above exception) and elegant; of the many departures from the usual presentation perhaps Palatini's introduction of centro-symmetric curved space deserves to be particularly commended. A surprising fact is that Levi-Civita does not use in physical applications the notion of parallel displacement which plays such a fundamental role in the theoretical part and which could help to unify the exposition further if it were used in the discussion of the motion of material particles and of the propagation of light.

Throughout the book the author draws freely on the rich material of Italian works which is scarcely used (with few important exceptions) in other text-books. The result is an increased elegance of exposition.

The style is that of theoretical physics. The author comes very close, in the opinion of the reviewer, to striking the happy mean between the Scilla of the epsilon-delta symbolism and the Charibdis of loose reasoning. A pure mathematician would probably prefer a less careful avoidance of the Scilla; it sometimes becomes hard to form a clear idea of what is being neglected and why, but in view of the character of the material treated it is seldom possible to blame the author or to suggest a better course.

G. Y. RAINICH

KENT ON FINANCE

Mathematical Principles of Finance. By Frederick Charles Kent. Second Edition. xiii+177 pp. *Compound Interest and Annuity Tables.* By Frederick C. Kent and Maud E. Kent. viii+214 pp. New York, McGraw-Hill Book Company, 1927. Bound in one volume.

The second edition of Professor Kent's text differs from the first published in 1924 only by the insertion of six pages on interpolation, made possible by the abbreviation of the chapter on logarithms, now entitled "Interpolation and Logarithms," together with a few plate corrections and changes in the remainder of the book. The problem lists are unchanged.

The text appeals to the reviewer as an average book, neither better nor worse than many that have appeared in the same field in the last fifteen years. The conventional topics are covered in the conventional way. Rather more attention is given to the work of the Federal Farm Loan Board than is usual, but there the increase in material is due rather to the description of the administrative processes of the Board than to additional mathematical material.

The book is intended for college freshmen with only high school mathematics as a prerequisite. The result is the introduction of an amount of detail that seems at times excessive. For the student with a knowledge of geometric progressions it would not be necessary each time one is encountered to go through the whole process of finding the sum.

The definition of amortization as "the extinction of an interest bearing debt, principal and interest, in a series of equal periodical payments" is scarcely warranted either by the etymology of the word or by current usage; nor is it adhered to by the author himself when he comes to consider the amortization of the premium on a bond. A debt may be amortized by payments that are neither equal nor periodical. The definition of the equation of value as the relation which gives the value of the unknown quantity in a definite problem (expressed in general terms to be sure) is misleading to say the least. An equation of value arises wherever sums are accumulated or discounted to the same date and any definition should be broad enough to cover all cases.

As a piece of writing, the book is not above criticism. It is sometimes difficult, when long reductions are made, or when a number of related formulas are presented, to tie text and formulas into a good paragraph, but it is not impossible. The most flagrant illustrations of failure in this respect are found on pages 53 and 54 where, in presenting the problem of finding the term of an annuity from the equations for the amount and the present value, the author has little regard for the rules of grammar, punctuation, or sentence structure. A certain amount of neglect of the rules for good writing may be permitted in blackboard work that is to be supplemented by oral explanation, but such neglect has no place in the pages of a textbook. One may go further and say that the author who writes for freshmen is under peculiar obligation to present his material in the best possible form.

The real contribution of the book lies in the fine ten-place tables which have been worked out by Professor Kent and his wife since the publication of the first edition. The three principal functions of the mathematics of finance and their reciprocals are tabulated for thirty-six different rates for times to 300 years for rates from $\frac{1}{4}$ to $\frac{3}{4}$ per cent, to 200 years for rates from $\frac{7}{8}$ to $1\frac{1}{4}$ per cent, and to 100 years for rates from $1\frac{3}{8}$ to $10\frac{1}{2}$ per cent. The auxiliary functions $(1+i)^{1/p}$, $j_{(p)}$, and $i/j_{(p)}$ for the same rates are given for $p=2, 4, 6, 12$. The values of $(1+i)^n$ are given to fifteen decimal places for twelve fractional rates for one-year intervals to 10 years, 10-year intervals from 10 to 100 years and for 200 years. A few column sums taken at random indicate that the work is reasonably accurate. In one case the column sum differed from the computed value by 45 tenth place units but in all other cases the agreement was much closer.

These admirably arranged tables will form a useful addition to existing tables, and for their patient work in computing them Professor and Mrs. Kent deserve much credit.

E. B. Skinner