MATHEMATICS FOR THE ACCOUNTANT

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SECOND EDITION

NEW YORK
BIDDLE BUSINESS PUBLICATIONS, Inc.
1921

37461

PREFACE

This book is the outgrowth of a course which has been given for several years in the School of Commerce and Finance of Northeastern College. It has always been the policy of the School to give its students a thorough training in all phases of accountancy, and annuity studies have been considered a part of the training for that profession. While the course is forming in the early part of the year, it has seemed well to treat some elementary subjects which frequently appear in C. P. A. examinations, such as averaging of accounts and foreign exchange, and at the end of the year it has seemed practical to include a few lectures on the slide rule

A new impetus was given to tne work by an editorial which appeared in the "Journal of Accountancy" for August, 1918. By that editorial the American Institute of Accountants committed itself definitely to the policy of requiring certain annuity studies of all candidates for its examinations. The editorial read in part as follows: "The scope of the examination in Actuarial Science is to include certain problems relative to interest and annuities, certain sinking funds, loans repayable by instalments, and so forth, and also the construction and use of tables relating thereto. In other words, the candidate will be expected to answer questions based upon a knowledge which will have been obtained in the study of algebra.

Any candidate who has an intelligent conception of algebra should have no difficulty in answering the questions which will be propounded in actuarial science. . . .

"There is a great deal to be said in favor of the inclusion of actuarial problems and we believe that the need for knowledge of this kind will increase as time goes on. Heretofore there have been many accountants who have had practically no need to exercise any knowledge which they have possessed of actuarial matters, but with the growth of accounting work and the broadening of its scope, there must be many problems which can be solved at a great saving of time and effort if the accountant be able to deal with them with the advantage of actuarial knowledge."

This requirement seems to imply a general study of compound interest and its application to those problems which are commonly solved by simple interest. It is axiomatic that every dollar in the business world is at work; it is earning other dollars either for its owner or for someone else. At the end of every fiscal period all these earnings, after deduction of expenses, should become capital, and the same or a larger income rate should be earned on this increased capital. Such studies are compound interest and present worth, with the various aspects of interest rates: annuities, immediate, due or deferred; their amount and present worth; sinking funds and various related problems in valuation of assets; amortization; bond valuation in its many aspects.

It is obvious that the accountant has no time for algebraic studies, unless he has attended a good high school or college. To prepare a book for those who have not had these advantages and who nevertheless are promising students of accountancy, all the work must be reduced to

a basis of arithmetic and common sense. Formulae there must be, and they are numerous and sometimes complicated; yet there is no reason why any man who is fitted mentally for high grade accounting practise should have difficulty with any formulae which are germane to his profession. The interest rates are so varied and so seldom common enough to be included in annuity tables that a study of logarithms is absolutely necessary. This study should be pursued no further than is demanded by the formulae for compound amount and the simpler formulae for the time and rate involved in a transaction. In short, the difficulty has been to take several highly technical books on actuarial science and reduce them to a content and method which will give the accountant a maximum of training in a minimum of time. Some actuarial works are suitable for the student who knows some algebra and likes to read mathematics. Such are Todhunter's "Textbook of the Institute of Actuaries, Book I", King's "Theory of Finance", and Mackenzie's "Interest and Bond Values". For the student who knew algebra once and desires to renew his knowledge there are the Wentworth-Smith "Commercial Algebra, Book 2", and Skinner's "Mathematical Theory of Investment". For the student who has no algebra there is only the Sprague-Perrine "Accountancy of Investment", which is written from the standpoint of the savings bank man or trustee, and does not treat some important phases of general accounting knowledge. These are all excellent books, and have been of great service to the author.

The most convenient tables for the student are those in Skinner's "Mathematical Theory of Investment", and reprinted separately by the publishers, Ginn and Company.

This book, then, is for the use of the accountant who desires to prepare for the examinations of the American Institute of Accountants or for the Certified Public Accountants' examinations of the various states; for the accountant who will be required to handle sinking fund or bond accounts in a scientific way; for the accountant who may be called upon to audit the accounts of an insurance company, savings bank, brokerage house, or any concern which operates its bond accounts scientifically; and finally for the accountant who believes that the broadest training is best for the professional man.

The book ends with a chapter in which the fundamentals of actuarial science are treated in a different manner, as a quiz for candidates for examinations. In this chapter the treatment is wholly arithmetical, and no logarithmic or algebraic knowledge is required. Problems from the recent examinations of the American Institute of Accountants and from some recent C. P. A. examinations are solved and discussed. Since no books or tables are allowed in any of these examinations, the rules are presented in such form as makes them easy to remember and apply.

Inasmuch as this book is written for the benefit of accountants, their co-operation is requested and will be gratefully accepted. Any suggestions as to content, method, or problems will be acknowledged and considered seriously. Any formulae which accountants have found useful are particularly welcome. It is planned that if the book goes through a revision a collection of formulae shall appear as a separate chapter, a reference list such as engineers find so useful. Any C. P. A. problems will also be especially welcome, because the aspects of the subject which appear important to examiners are so varied that the most complete collection which can be put to-

gether will be none too complete for the prospective candidate to study.

In closing, I wish to express my sincere appreciation of the help and inspiration I have received from Professor Charles F. Rittenhouse, C. P. A. He first brought the subject to my attention as suitable matter for a college course, and has in many ways inspired the writing of this book.

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