summation, approximate integration, pure endowments, life annuities, premiums on various kinds of life insurance, joint life and survivorship problems, loading of premiums. This is all done in much the usual way, but more attention is paid to the elegance of the mathematical arguments and the calculus is used more freely than in many books on actuarial mathematics. A feature of the book is the discussion of the errors involved in the calculation of endowments, annuities, policy premiums, and so on. Along with average rates he computes a sort of safe rate which will cover all but one percent of the possible cases which may arise. In places, the methods used in the book will lead to much more arithmetic drudgery then is necessary, but on the whole it is a thoroughly readable and scholarly book on that part of actuarial mathematics which it covers.

A. R. CRATHORNE

Leitfaden zum Graphischen Rechnen. By Rudolf Mehmke. 2d edition. Leipzig and Vienna, Franz Deuticke, 1924. viii + 183 pp.

Whether one does or does not believe in the practical value of graphic methods one must take seriously this guide to the subject. It is a mine of ingenious devices. Here are not only the usual graphic constructions for expressions of the form $\sum ab/c$ together with solutions of linear equations in two, three, four and more unknowns, with logarithmic scales for the more complicated functions, but exhaustive discussion of methods for integrating differential equations and the determination of moments of various sorts. In connection with logarithmic methods is a description of a "logarithmic compass" devised by Professor E. A. Brauer which has three points, the distance between two of which is a function of the distance between any other pair. Interesting use is made of this device.

As to the practical use of graphical methods one may be permitted to have serious doubts. Professor E. T. Whittaker, in his preface to his *Calculus of Observations*, remarks: "When the Edinburgh Laboratory was established in 1913 a trial was made, as far as possible, of every method which had been proposed for the solution of the problems under consideration, and many of these methods were graphic. During the ten years which have elapsed since then, the graphic methods have almost all been abandoned, as their inferiority has become evident, and at the present time the work of the Laboratory is almost exclusively arithmetic. A rough sketch on squared paper is often useful, but (except in descriptive geometry) graphic work performed carefully with instruments on a drawing-board is generally less rapid and less accurate than the arithmetic solution of the same problem."