to (2). This same approach has been used by Lotka in his work on renewal theory.

The remaining four chapters deal with special problems such as determination of marriage rates, fertility rates and other indices and measures of natural increases in a population; determination of number of maternal, paternal and complete orphans; calculation of probabilities of extinction of a given line of descent and similar problems. The solution of the last problem, which has also been treated by R. A. Fisher, is extremely ingenious. A generation function $f(x)=\sum_{i=0}^{k}\pi_i x^i$ ($\sum_{i=0}^{k}\pi_i=1$) is set up, where π_i is the probability that a male will have exactly i sons. $f(x)$ has many remarkable properties which enable the author to deal with the problem of descendance. For example $\partial f/\partial x]_{x=0}$ yields the average number of sons per male; the coefficient of x^s in $f^r(x)$ yields the probability that r males will have a total of s sons; the coefficient of x^s in $\pi_r f^r(x)$ which is a general term in $f(f(x))=f_2(x)$ say, is the probability that a man will have r sons and s grandsons. Similar interpretations can be placed on coefficients of x in the iterated function

$$f\{f(f[\cdots])\} = f_n(x).$$

The second monograph is well illustrated throughout by applications of the theory to actual census data taken from the United States, England, France, Germany, and several other countries. Numerous charts and tables are given for comparing theory with facts. The monograph is an excellent account of results which have been obtained during the past quarter of a century in the theory of population dynamics. Most of the results are due to the author himself. Lotka has shown a great deal of ingenuity in formulating the problems mathematically and in reaching practical solutions of the problems. Those interested in applied mathematics in the field of biology will find these monographs well worth reading.

S. S. WILKS

The Variate Difference Method. By Gerhard Tintner. (Cowles Commission for Research in Economics Monograph, no. 5). Bloomington, Indiana, Principia Press, 1940. 13+175 pp.

Various mathematical statistical methods have been proposed during recent years in attempts to describe, analyze and interpret economic time series. Regression analysis and its extension to harmonic analysis, moving averages, and the variate difference method are some of the techniques which have been used. The fundamental