

# ANNOTATIONS

## LENGTH OF LIFE: A STUDY OF THE LIFE TABLE<sup>1</sup>

**T**HIS revised edition of *LENGTH OF LIFE* is an entirely new book, and not in any sense a mere revision of the first edition. Every chapter has been completely rewritten, and two new chapters have been added. Never has such a wealth of information concerning human mortality and longevity been assembled in a single publication; and this volume will be, for many years to come, an invaluable reference book for sociologists, demographers, public health workers, and statisticians. The first impression which its perusal has made on this reviewer is a sense of the prodigious amount of labor that must have gone into its preparation and the great saving in time and effort that this will represent for future users, who will find brought together in one place material from literally hundreds of sources. The rewriting of the various chapters has not been confined to bringing them up to date and adding new material. At the same time, the manner of presentation has been much improved, so as to render the book more readable, interesting, and usable. In particular, the addition of summaries at the end of a number of the chapters adds much to its usefulness.

An introductory chapter summarizes the available information concerning the maximum span of human life and explains the general plan and structure of the life table. This is followed by two historical chapters, of which the first traces the progress of human longevity up to the end of the 19th century, while the second describes the gain in longevity in the United States in recent years. Chapter 4 deals with geographic variations in longevity and mortality within the United States. Under the

<sup>1</sup> Dublin, Louis I.; Lotka, Alfred J.; and Spiegelman, Mortimer: *LENGTH OF LIFE: A STUDY OF THE LIFE TABLE* (Revised Edition). New York, the Ronald Press Company, 1949, xxv + 400 pp.

title "Biological Aspects of the Life Table" Chapter 5 is concerned with the analysis of the life table by causes of death. This includes a discussion of the distribution of deaths by cause and age, the range of incidence and concentration of ages at death for selected principal causes, the probability of eventually dying from a specified cause, and the number of years of life forfeited to individual causes. Chapter 6 describes all the important investigations bearing on the question of whether the tendency to be long-lived is inherited, and the relative importance of heredity and environment in connection with longevity.

This is followed by a new and especially valuable chapter dealing with "Biological Factors Influencing Longevity and Mortality." The factors considered include stillbirth, premature birth, age of parents and order of birth, interval between births, plural births, the Rh factor, risks associated with pregnancy and childbirth, sex differences in general mortality, and marital status. The unusually complete and thoughtful discussion of sex differences in mortality seems to the reviewer especially valuable. Chapter 8 outlines the development of medical and sanitary science, with particular reference to its effects on mortality and longevity. The next chapter is a new one entitled "Forecasts of Mortality and Longevity," which contains a commendably full discussion of hypothetical life tables, mortality forecasts for population projection, and generation life tables. Chapter 10, on "Mortality in Relation to Physical Condition," has been considerably enlarged to include data from clinical and other studies as well as those derived from the experience of life insurance companies. Chapter 11, on "Longevity in Relation to Occupation," has been brought up to date.

Chapter 12, "The Application of the Life Table to Population Problems," explains clearly and in considerable detail the traditional measures of reproductivity and natural increase of population and certain associated concepts. These include the true rate of natural increase, the net reproduction rate, the gross reproduction rate, the replacement index, and the stable age distribution. The time trend of rates of population growth and their geographic distribution—both within the United States and in the world as a whole—are described. Other sections of

this chapter deal with the characteristics of a population growing according to the logistic law, the aging of the population and the social consequences of increased longevity, the effects of changing age distribution on the national economy, and applications of the life table based on the survival of two or more persons, such as duration of marriage and orphanhood. The section on measures of reproductivity and natural increase has been rendered more useful by the addition of a detailed numerical illustration and a further discussion of the interrelation of the various measures. However, it would be more useful, in the opinion of the reviewer, if more prominence had been given in the text to the recent critiques of the traditional measures (now relegated to a footnote) and, in particular, if some reference had been made to the valuable work of Hajnal<sup>2</sup> in this connection.

Chapter 13 discusses the application of the life table to life insurance, the determination of the economic value of a wage earner, depreciation of physical property and other economic problems. Chapter 14 describes the more important life tables based on the experience of life insurance companies, and Chapter 15 deals with the construction of life tables. After some discussion of the data necessary for this purpose, and the limitations of such data, an abbreviated method for constructing an abridged life table is described, as well as a method of interpolation for supplying the values not given by the abridged process. An appendix gives a large number of expectation of life values and mortality rates at decennial ages for the United States and its subdivisions and for many foreign countries, according to life tables for both recent and past periods. A complete list of sources of these data is included, and, in addition, the American Experience table and the Commissioners 1941 Standard Ordinary Mortality table are given in full.

In a book covering such a wide field and dealing with so many topics which are matters of opinion and even of controversy it is inevitable that there will be statements with which some readers will not entirely agree. Without wishing to appear critical, the reviewer thinks it will be helpful to some users of

<sup>2</sup> Hajnal, J.: Aspects of Recent Trends in Marriage in England and Wales. *Population Studies*, June, 1947, pp. 72-98, Analysis of Birth Statistics in the Light of the Recent International Recovery of the Birth Rate. *Ibid.*, September, 1947, 1, pp. 137-164.

the book to mention certain of his own reservations concerning certain statements. In connection with the discussion of mortality by nativity on pages 57-8, it is not unlikely that there may be some tendency to conceal foreign birth in the census returns, which is not fully reflected in the reporting of deaths. This would result in overstatement of the mortality of the foreign-born. In the discussion of urban and rural life tables on pages 72-74 it is not clearly brought out that comparisons based on deaths by place of occurrence may be of little value because of the considerable number of deaths of rural residents which occur in urban hospitals. On page 97 it is stated that the figures given "do not give the complete picture of diabetes mellitus as a factor in curtailing life, since the death reports fail to indicate many of the diabetics who die from other causes, mainly cardiovascular-renal diseases." On the other hand, it might be pointed out that the system of assigning causes of death heretofore employed in the United States gives diabetes a high priority as compared with many other conditions which may be mentioned in the death certificate, and this may be thought to have resulted in attributing to this cause a number of deaths in which other conditions may have played a more important role. This is less true of the new system of assigning causes of deaths which is now coming into use, starting with the deaths of 1949. Table 48 on page 195 would be of more interest if the time period covered by the data were indicated. In Chapter 15, in explaining the method of interpolation to get values of the life table functions for single years of age, no indication is given of how to break up the age group 2-4. In order to interpret properly the discussion of "life insurances reserves for other types of policies" on page 274, it is necessary to bear in mind that the term "reserve fund" is always used by the authors in referring to the total reserve on a group of similar policies, while they refer to the reserve on an individual policy as the "reserve per survivor."

These criticisms and comments are all on minor points. This book is a monumental achievement, and its authors have earned the gratitude of all those who have need of data on the duration of human life.

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