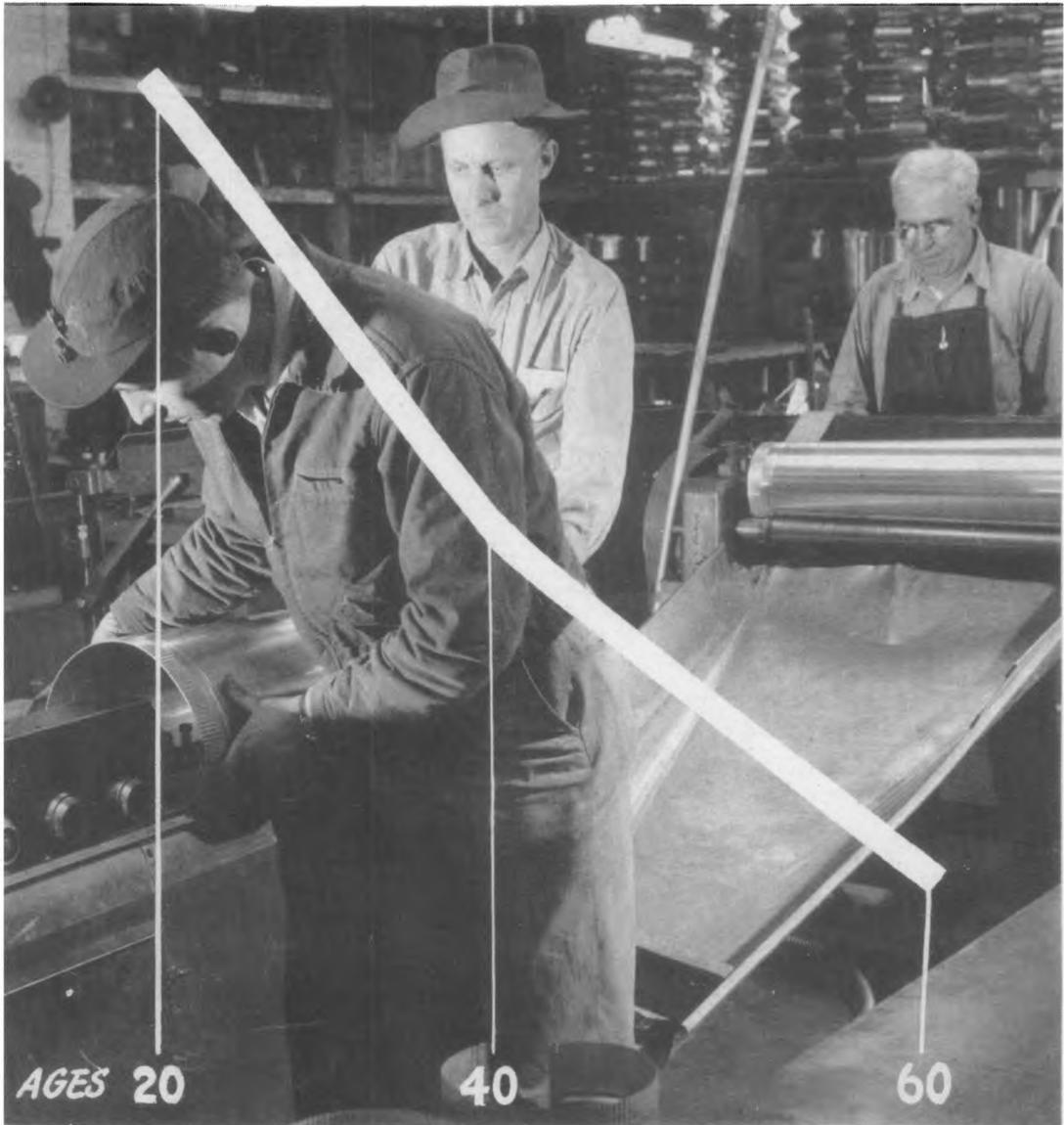


Tables of Working Life

LENGTH OF WORKING LIFE FOR MEN



Bulletin No. 1001

August 1950

UNITED STATES DEPARTMENT OF LABOR
Maurice J. Tobin, Secretary

Bureau of Labor Statistics
Ewan Clague, Commissioner

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LETTER OF TRANSMITTAL

UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS,
Washington, D. C., July 5, 1950

THE SECRETARY OF LABOR:

I have the honor to transmit herewith a report on the length of working life of men. This is the first of a series of studies, planned by the Bureau of Labor Statistics, of the length and pattern of working life of men and women in the United States, and of related problems of employment opportunities for older workers.

This report describes a significant and pioneering development in the techniques for analyzing the dynamics of the labor force. The research project upon which it is based was planned and directed by Seymour L. Wolfbein, Chief of the Bureau's Manpower and Productivity Division. The report was written by Harold Wool, Chief of the Branch of Manpower Studies in that division. The following staff members (and former staff members) also participated in the planning and development of the statistical materials included in this report: Irving Gedanken, Lester Pearlman, Leonard Eskin, and Stuart Garfinkle.

Prior to publication, the report was reviewed by a number of technicians, who made many helpful suggestions and criticisms. Included were actuaries, demographers, and statisticians, both in other Federal agencies and in private industry. Acknowledgments are due, in particular, to staff members of the National Office of Vital Statistics; Office of the Actuary, Social Security Administration; United States Bureau of the Census; Bureau of Agricultural Economics; Railroad Retirement Board; and of the Statistical Department of the Metropolitan Life Insurance Co.

Ewan Clague, Commissioner.

Hon. Maurice J. Tobin,
Secretary of Labor.

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TABLES OF WORKING LIFE

INTRODUCTION

The average expectation of life has for many years been recognized as a valuable tool for the public health specialist, the life insurance actuary, the demographer, and for others interested in measuring the progress of man in his control over his biological environment. In similar fashion, the average length of working life--and the ages at which men begin and end their work careers--are of vital interest to all those concerned with the working population and with problems of economic welfare.

Since the 18th century, at least, scholars have been aware of the close relationship between man's life expectancy and his potential earning capacity. Thus Adam Smith, in discussing the higher wages paid to skilled workmen, indicated that a highly trained worker should receive a reward, over and above the usual wages of common labor, "which would replace to him the whole expense of his education, with at least the ordinary profits of an equally valuable capital. It must do this, too, in a reasonable time, regard being had to the uncertain duration of human life . . ." ^{1/}

In a period when life expectancy was relatively short, when living standards were low and when the great majority of workers were still farmers or small handicraftsmen, it could be safely assumed that all but a handful would continue in gainful activity until stricken by death or serious disability. For most men, a distinction between the prospective physiological life span and the length of working life would therefore have been meaningless.

However, the emergence of a large aged and dependent group in the population has made evident the need for separate measurement of the duration of working life. ^{2/} The spectacular advances in medical science, in public-health services, and in general living standards during the past century have brought a steady lengthening of the average expectation of life of American workmen. But industrialization and related social and economic trends have progressively limited the possibilities of gainful employment for those workers attaining advanced ages. Thus a growing gap has emerged between the working life and total life expectancy of the average worker. The existing size of this gap and future changes in this relationship will be extremely important in determining the relative economic burden of public and private programs for supporting the dependent aged.

^{1/} The Wealth of Nations, Book II, chap. 1 (p. 228). (This and other historical references are cited by Louis I. Dublin and Alfred J. Lotka, The Money Value of a Man, Ronald Press, 1930.)

^{2/} In this context, estimates of the "expected period of work" for gainful workers were published by W. S. Woytinsky in Labor in the United States, Social Science Research Council, 1938 (pp. 261-263). More recently, estimates of "average number of years in the labor force" were presented by John D. Durand in The Labor Force in the United States, 1890-1960, Social Science Research Council, 1948 (p. 56).

The present report contains a brief description of the pattern of working life, differentials by color and residence, and the application of the tables to problems of old-age dependency, labor force analysis, and occupational outlook. A technical appendix is also included containing a detailed description of methodology.

THE TABLE OF WORKING LIFE: MALES, 1940

A standard life table is a statistical device for summarizing the mortality experience of the population during a calendar year or similar brief period. For this purpose, a hypothetical population is constructed, starting with a given number of persons (usually 100,000) assumed to be born at the same time. This initial group is then reduced at successive ages on the basis of the prevailing mortality rates, until the last individual has been accounted for. The resulting population is called the "stationary population" because the number of assumed births each year exactly equals the number of deaths. From the stationary population, a number of related variables are computed. The most significant of these is the average number of years of life remaining after each specified year of age, commonly referred to as the "average expectation of life" or the "average life expectancy." ^{3/}

A table of working life (like a standard life table) follows, through successive ages, the experience of an initial cohort of 100,000 at birth. In addition to showing the attrition caused by mortality, the working-life table shows the number and proportion of persons in the stationary population who may be expected to work or seek work over the life span, i.e., the "stationary labor force." From this stationary labor force, are derived, in turn, the rates of entry into the labor force, the rates of labor force separation, and the average expectation of working life, at successive years of age.

The pattern of labor force participation over age described by the table of working life is based on observed experience at a particular time. It shows what might be expected for men of a given age, if the prevailing rates of mortality and of labor force participation should remain unchanged over their life span. Like the standard life table, it is not a forecast of future trends.

^{3/} The standard life table normally shows two "population" columns: the number of survivors at each exact year of age (l_x) and the stationary population (L_x) which is also identified as the number of man-years lived by the cohort from one exact age interval to the following one. For detailed descriptions of the standard life table, see Dublin, Lotka, and Spiegelman, *The Length of Life*, Roland Press, 1949, and Thomas N. E. Greville, *United States Life and Actuarial Tables, 1939-41*, (Sixteenth Census of the United States: 1940).

The other major assumptions underlying the table of working life and the definitions of the functions shown are discussed in the following sections, which describe the table for total males, based on 1940 experience. (See table 1.) In addition, a more detailed table showing all of the pertinent functions appears in the Appendix on pages 59-60.

Stationary Population (Column 2)

The number of men who would survive at each year of age, of an initial group of 100,000 births under 1940 mortality conditions, appears in column 2. As shown in chart 1, the stationary population declines fairly sharply in the first few years of life, owing to the toll of mortality in infancy and early childhood. Thereafter, attrition is slow, gradually increasing during the period of youth and middle age. After the fifties, the decline becomes progressively more rapid.

Since the emphasis of this study is on the period of working age, the stationary population is actually shown in the tables beginning with the age of 14 years, at which age, measurement of labor force status begins under current Census definitions. Prior to attaining age 14, the original cohort of 100,000 has already been reduced to about 92,000. By age 52, the stationary population has dropped below the three-quarter mark; by age 67, to only about half of the original group; and by age 78, it has been reduced to less than a fourth.

Stationary Labor Force (Columns 3 and 4)

Figures in columns 3 and 4 show the number and percent of men in the stationary population who are in the labor force, in each year of age, under conditions of labor force participation similar to those prevailing in 1940. In accordance with Bureau of Census definitions, the labor force includes, in general, all persons 14 years of age or over (not in institutions) who are employed or who are seeking work. ^{4/} In its classification of the population, labor force activity thus defined takes priority over other types of activity or status (such as student or retired). Thus the labor force, at any time, may include a certain proportion of part-time or irregular workers

^{4/} Included also are members of the Armed Forces. Persons on public emergency work projects, except NYA student workers, were classified as unemployed, in the labor force, in 1940 and other periods when such projects were being conducted. For detailed definitions, see the publications of the 16th Census of Population and for current periods, the Census Bureau's Monthly Report on the Labor Force.

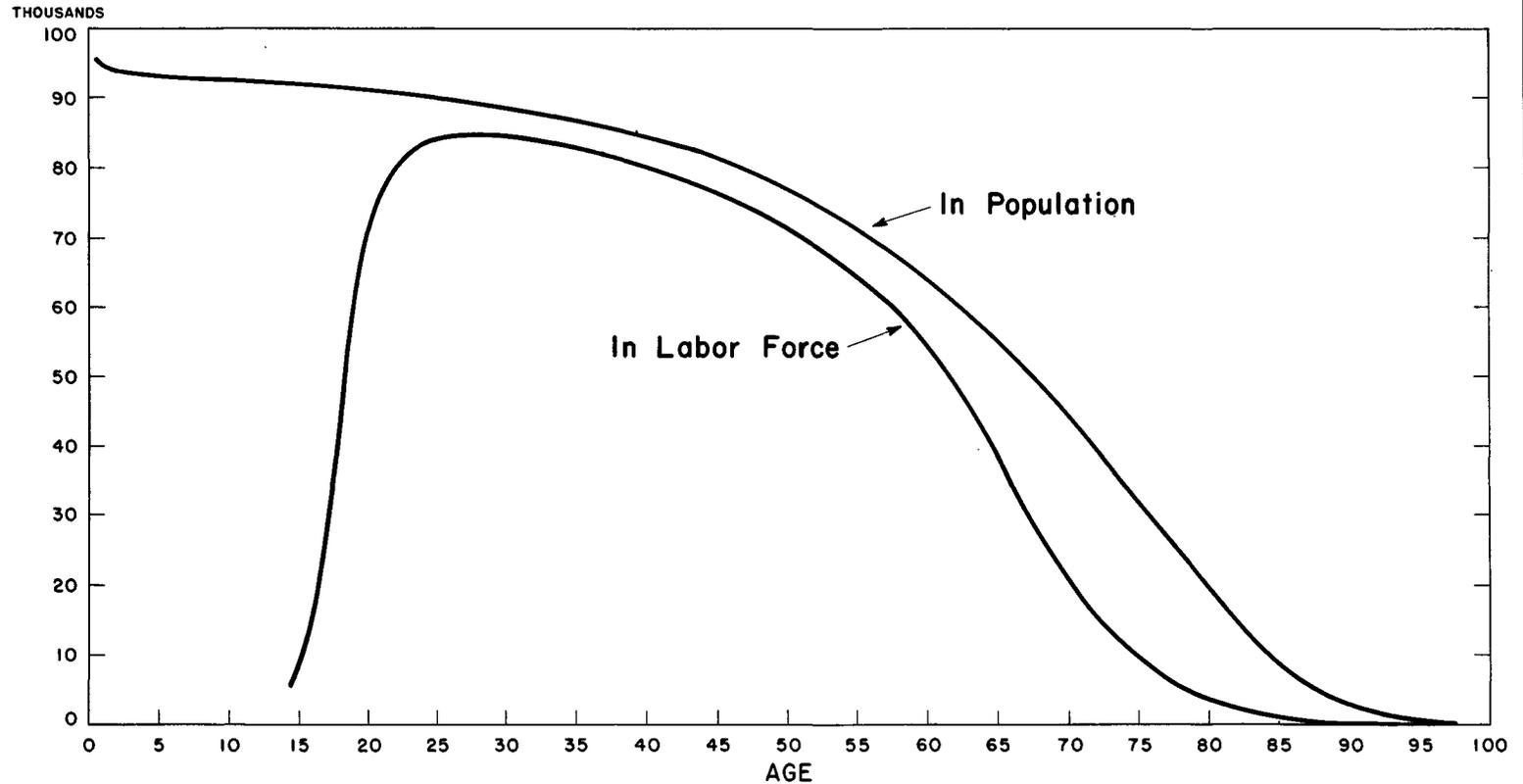
Table 1. - Table of working life: males, 1940

Year of age x to x + 1	(3) Number living of 100,000 born alive			(4) In labor force of population	(5) Accessions to the labor force (per 1,000 in population)	(6) Separations from the labor force (per 1,000 in labor force)			(7) Average number of years of life	(8) Average number of years of labor force participation
	(1) In population	(2) Number	(3) Percent of population			(6) Due to				
						(6) all causes	(7) death	(8) retirement		
	L_x	L_w	w_x	$1000 A_x$	$1000 Q_x^1$	$1000 Q_x^2$	$1000 Q_x^3$	e_x	w_x	
	(In year of age)			(Between years of age)			(At beginning of year of age)			
14-15	92,115	5,610	6.1	60.7	1.6	1.6	--	52.2	46.6	
15-16	91,968	11,192	12.2	108.5	1.7	1.7	--	51.3	45.7	
16-17	91,812	21,152	23.0	198.8	1.9	1.9	--	50.4	44.8	
17-18	91,698	35,692	38.9	181.4	2.1	2.1	--	49.5	43.8	
18-19	91,446	52,240	57.1	147.7	2.3	2.3	--	48.6	42.9	
19-20	91,236	65,626	71.9	86.5	2.5	2.5	--	47.7	42.0	
20-21	91,008	73,354	80.6	49.7	2.6	2.6	--	46.8	41.1	
21-22	90,771	77,686	85.6	35.4	2.7	2.7	--	45.9	40.2	
22-23	90,526	80,690	89.1	24.1	2.8	2.8	--	45.0	39.3	
23-24	90,273	82,646	91.6	15.7	2.9	2.9	--	44.1	38.4	
24-25	90,011	83,824	93.1	9.0	3.0	3.0	--	43.3	37.6	
25-26	89,741	84,383	94.0	6.5	3.1	3.1	--	42.4	36.7	
26-27	89,463	84,705	94.7	4.4	3.2	3.2	--	41.5	35.8	
27-28	89,177	84,828	95.1	2.7	3.3	3.3	--	40.6	34.9	
28-29	88,883	84,789	95.4	1.6	3.4	3.4	--	39.8	34.0	
29-30	88,581	84,643	95.6	.7	3.5	3.5	--	38.9	33.1	
30-31	88,271	84,409	95.6	.3	3.6	3.6	--	38.0	32.2	
31-32	87,953	84,132	95.7	--	3.8	3.8	--	37.2	31.3	
32-33	87,619	83,812	95.7	--	4.3	4.0	.3	36.3	30.5	
33-34	87,269	83,452	95.6	--	4.7	4.2	.5	35.5	29.6	
34-35	86,902	83,060	95.6	--	5.1	4.4	.7	34.6	28.7	
35-36	86,520	82,636	95.5	--	5.6	4.6	1.0	33.7	27.8	
36-37	86,122	82,173	95.4	--	6.2	4.9	1.3	32.9	27.0	
37-38	85,700	81,664	95.3	--	6.8	5.2	1.6	32.0	26.1	
38-39	85,254	81,109	95.1	--	7.5	5.6	1.9	31.2	25.3	
39-40	84,777	80,501	95.0	--	8.1	6.0	2.1	30.4	24.5	
40-41	84,268	79,849	94.8	--	8.6	6.4	2.2	29.5	23.7	
41-42	83,729	79,162	94.5	--	9.1	6.8	2.3	28.7	22.9	
42-43	83,160	78,442	94.3	--	9.7	7.3	2.4	27.9	22.1	
43-44	82,553	77,681	94.1	--	10.5	7.9	2.6	27.1	21.3	
44-45	81,901	76,885	93.9	--	11.3	8.5	2.8	26.3	20.5	
45-46	81,205	75,996	93.6	--	12.2	9.2	3.0	25.5	19.7	
46-47	80,458	75,069	93.3	--	13.2	9.9	3.3	24.8	18.9	
47-48	79,661	74,078	93.0	--	14.2	10.7	3.5	24.0	18.2	
48-49	78,809	73,026	92.7	--	15.3	11.6	3.7	23.2	17.4	
49-50	77,895	71,909	92.3	--	16.5	12.5	4.0	22.5	16.7	
50-51	76,921	70,723	91.9	--	17.7	13.5	4.2	21.8	15.9	
51-52	75,883	69,471	91.6	--	19.1	14.5	4.6	21.0	15.2	
52-53	74,783	68,144	91.1	--	20.7	15.6	5.1	20.3	14.5	
53-54	73,616	66,733	90.7	--	22.6	16.8	5.8	19.6	13.8	
54-55	72,379	65,225	90.1	--	24.6	17.9	6.7	18.9	13.1	
55-56	71,076	63,620	89.5	--	27.0	19.2	7.8	18.3	12.4	
56-57	69,704	61,902	88.8	--	29.8	20.6	9.2	17.6	11.7	
57-58	68,261	60,077	88.0	--	33.4	22.0	11.4	17.0	11.0	
58-59	66,752	58,051	87.0	--	38.3	23.4	14.9	16.3	10.3	
59-60	65,177	55,828	85.7	--	46.8	25.0	21.8	15.7	9.7	
60-61	63,528	53,215	83.8	--	51.6	26.9	24.7	15.1	9.1	
61-62	61,800	50,469	81.7	--	58.6	28.9	29.7	14.5	8.6	
62-63	59,989	47,512	79.2	--	68.2	30.9	37.3	13.9	8.0	
63-64	58,099	44,272	76.2	--	80.6	33.1	47.5	13.3	7.5	
64-65	56,129	40,704	72.5	--	105.1	35.2	69.9	12.7	7.1	
65-66	54,080	36,426	67.4	--	111.8	37.8	74.0	12.2	6.8	
66-67	51,955	32,354	62.3	--	115.9	40.7	75.2	11.6	6.5	
67-68	49,797	28,604	57.5	--	119.8	43.8	76.0	11.1	6.3	
68-69	47,493	25,177	53.0	--	123.9	47.0	76.9	10.6	6.1	
69-70	45,171	22,098	48.8	--	128.8	50.3	78.5	10.1	5.8	
70-71	42,804	19,217	44.9	--	133.5	54.2	79.3	9.6	5.6	
71-72	40,390	16,652	41.2	--	138.8	58.1	80.7	9.1	5.4	
72-73	37,946	14,341	37.8	--	144.7	62.5	82.2	8.6	5.2	
73-74	35,472	12,266	34.6	--	151.3	67.5	83.8	8.2	4.9	
74-75	32,971	10,410	31.6	--	158.7	73.3	85.4	7.7	4.7	
75-76	30,445	8,758	28.8	--	166.9	79.8	87.1	7.3	4.5	
76-77	27,906	7,296	26.1	--	175.9	86.9	89.0	6.9	4.3	
77-78	25,369	6,013	23.7	--	185.7	94.6	91.1	6.5	4.1	
78-79	22,835	4,896	21.4	--	196.3	102.8	93.5	6.1	3.8	
79-80	20,391	3,935	19.3	--	207.7	111.4	96.3	5.8	3.6	
80-81	18,005	3,118	17.3	--	219.9	120.4	99.5	5.5	3.5	
81-82	15,724	2,432	15.5	--	232.9	129.8	103.1	5.2	3.3	
82-83	13,571	1,866	13.7	--	246.7	139.7	107.0	4.9	3.1	
83-84	11,566	1,406	12.2	--	261.3	149.9	111.4	4.6	2.9	
84-85	9,732	1,039	10.7	--	276.7	160.3	116.4	4.3	2.7	
85-86	8,076	752	9.3	--	292.9	171.0	121.9	4.1	2.6	
86-87	6,605	532	8.1	--	309.9	182.0	127.9	3.8	2.4	
87-88	5,321	367	6.9	--	327.7	193.0	134.7	3.6	2.3	
88-89	4,220	247	5.9	--	346.3	203.9	142.4	3.4	2.1	
89-90	3,294	161	4.9	--	365.7	214.7	151.0	3.2	2.0	
90-91	2,529	102	4.0	--	385.9	225.2	160.7	3.0	1.9	
91-92	1,910	63	3.3	--	406.9	235.5	171.4	2.8	1.7	
92-93	1,418	37	2.6	--	428.7	245.7	183.0	2.6	1.6	
93-94	1,035	21	2.0	--	451.3	255.7	195.6	2.4	1.5	
94-95	742	12	1.6	--	474.7	265.6	209.1	2.1	1.4	
95-96	522	6	1.1	--	498.9	275.3	223.6	1.8	1.1	
96-97	360	3	.8	--	524.9	284.7	240.2	1.4	1.0	
97-98	244	1	.5	--	552.7	293.7	299.0	.8	.5	

CHART 1

STATIONARY POPULATION AND LABOR FORCE TOTAL MALES, 1940

Number Living, of 100,000 Born Alive



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in addition to those who normally engage in full-time work during the entire year. 5/

Unlike the stationary population, the stationary labor force starts at a very low initial level at age 14 and then rises rapidly during the late teens and early twenties, when most young men normally begin their work careers. The stationary labor force reaches its peak in the late twenties, when about 85,000 of the initial group of 100,000 males at birth may be expected to be in the labor force. Between the mid-twenties and the mid-fifties, the labor force curve follows that of the population closely. During this age span (the "prime" of working life) nearly all men are normally in the labor force; the remainder consists largely of those unable to work or of persons confined in institutions.

After the mid-fifties, the labor force curve descends much more rapidly than does the stationary population, as an increasing proportion of men withdraw from gainful activity. The percentage of men in the labor force (column 3) thus drops sharply, from over 90 percent at age 50 to less than 70 percent at age 65. By age 75, less than 30 percent of the men remaining in the stationary population are also in the labor force.

Labor Force Accessions (Column 5)

In column 5, the rate of entry into the labor force between successive years of age is shown per 1,000 persons in the stationary population. It was impossible to determine this rate directly from available data, because precise measures are not available of the number of young people who start work each year. Many youth pass through a transitional phase when their attachment to the labor force is casual and ill-defined: For example, high school students may work occasionally after school hours or during school vacation periods, but do not regard themselves as "workers" until they enter on a year-round work career.

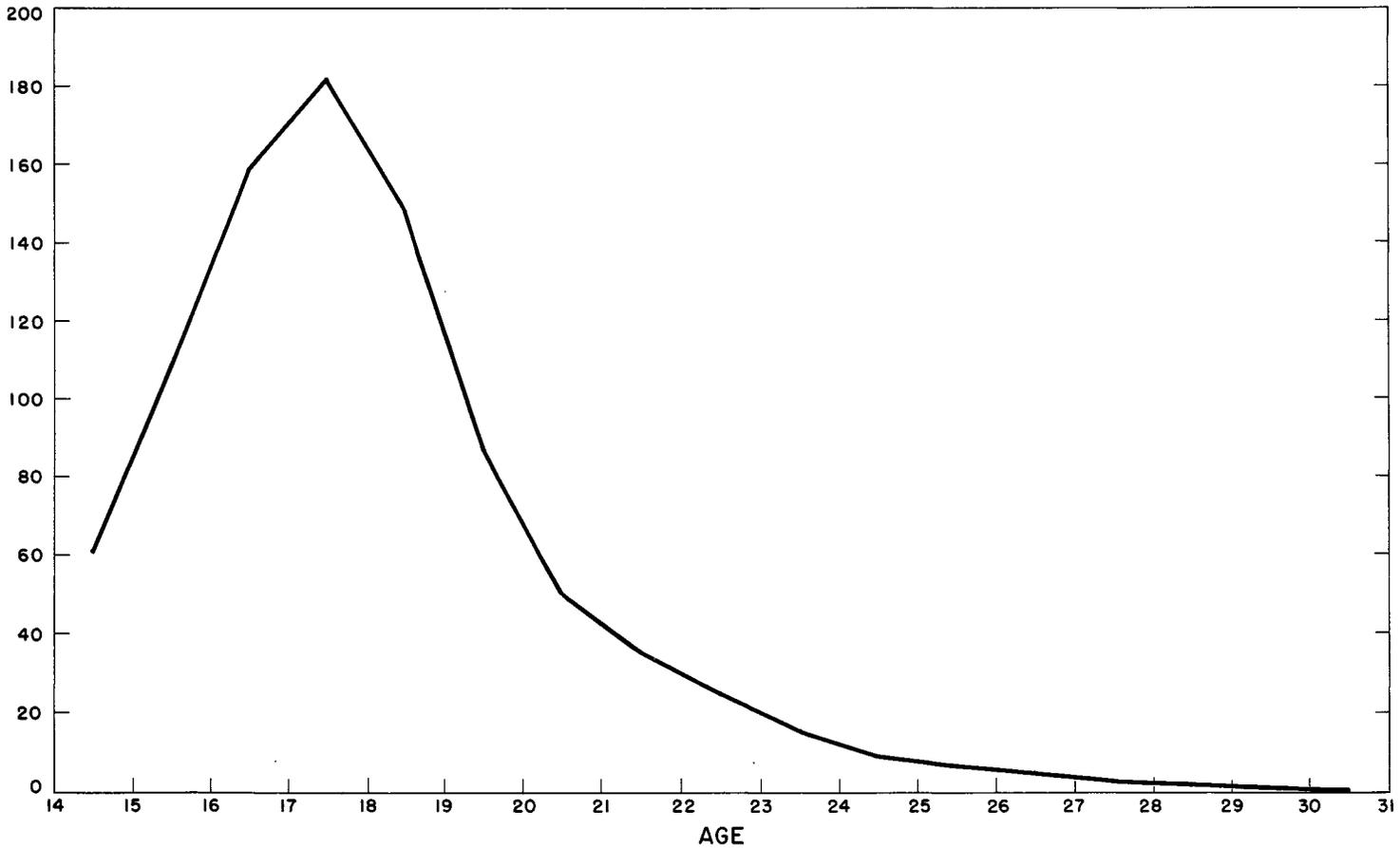
The rate of labor force accessions was therefore determined from the net increases in the percentage of population in the labor force between successive years of age. Of course, to the extent that some young men shift intermittently between worker and nonworker status, these figures understate the gross rates of labor force entry. Since these rates are based on April labor force activity, they also exclude youths who initially work during the summer school-vacation period.

5/ Moreover, the stationary labor force is based on a particular seasonal level of activity, i.e., that of early April, when the 1940 Census was taken. However, the April seasonal level is fairly typical of the annual average level of labor force participation for men in different age groups, except for school-age youth, whose labor force participation rises sharply during the summer vacation period. In 1947, for example, differences between the April and the annual average level of worker rates for men in various age groups, were 1 percent or less, except for the age group 14-19, whose worker rate in April 1947 was about 8 percent below the 1947 annual average.

ANNUAL RATE OF LABOR FORCE ACCESSION*

TOTAL MALES, 1940

PER 1000 IN POPULATION



UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

* After age 14

Most young men enter the labor force in their late teens (chart 2), but net additions to the working force continue until the late twenties. At age 14, only 6 percent of all males were in the stationary labor force, under 1940 conditions. The annual rate of entry rose sharply thereafter to a peak of 181 per 1,000 between attained ages 17 and 18, when many youths completed their high school education. After the 18th year of age, the entry rate dropped rapidly to less than 10 per 1,000 by age 24.

Labor Force Separations (Columns 6-8)

Separations from the labor force are classified as: (1) due to death and (2) due to "retirement." Separations due to death also include persons who leave the labor force because of illness followed by death in an interval of less than 1 year. Separations due to "retirement" cover all other withdrawals from the labor force, whether because of disability, old age, eligibility for a pension, prolonged unemployment, or other factors. As in the accession rate, the separation rate—and, specifically, the retirement rate—represents a net figure after allowance for any reentries into the labor force between successive years of age.

During the age span when the proportion of men in the labor force is rising (between ages 14 and 31) it is assumed that separations from the labor force are due entirely to death, and that retirements are statistically insignificant. For ages 32 and over, both the rate and number of separations are derived directly from the year-to-year changes in the stationary labor force, and include both the losses due to death and to retirement.

Separation rates per 1,000 men in the labor force, as shown in chart 3, remain fairly low until the late fifties, although they rise gradually. Between the ages of 55 and 65, they accelerate rapidly, rising from an annual rate of 27 per 1,000 workers for age 55-56 to 105 per 1,000 workers for age 64-65. In the interval between attained ages 64 and 65 (which includes separations at the 65th birthday) the separation rate increases most sharply. After age 65, for those persons remaining in the labor force, the rate of separations continues upward, but at a slower rate.

The pattern of labor force separations in relation to age can be explained by the separate probabilities of death and retirement. Mortality rises fairly evenly over the life span, although at a progressively greater rate. However, the probability of retirement remains quite low between the thirties and mid-fifties, and then rises abruptly between the late fifties and the mid-sixties. Between ages 58 and 59, the probability of retirements is at an annual rate of 15 per 1,000 workers; by age 64-65, it is almost 70 per 1,000. The retirement curve continues to rise after age 65, but at a much slower rate.

In turn, this contrasting pattern of deaths and retirements means that their relative importance as factors in labor force separations differs quite markedly with age. At the younger ages, death causes the large majority of losses from the labor force. During the sixties and early seventies, however, retirement is much more important in labor force separations. After

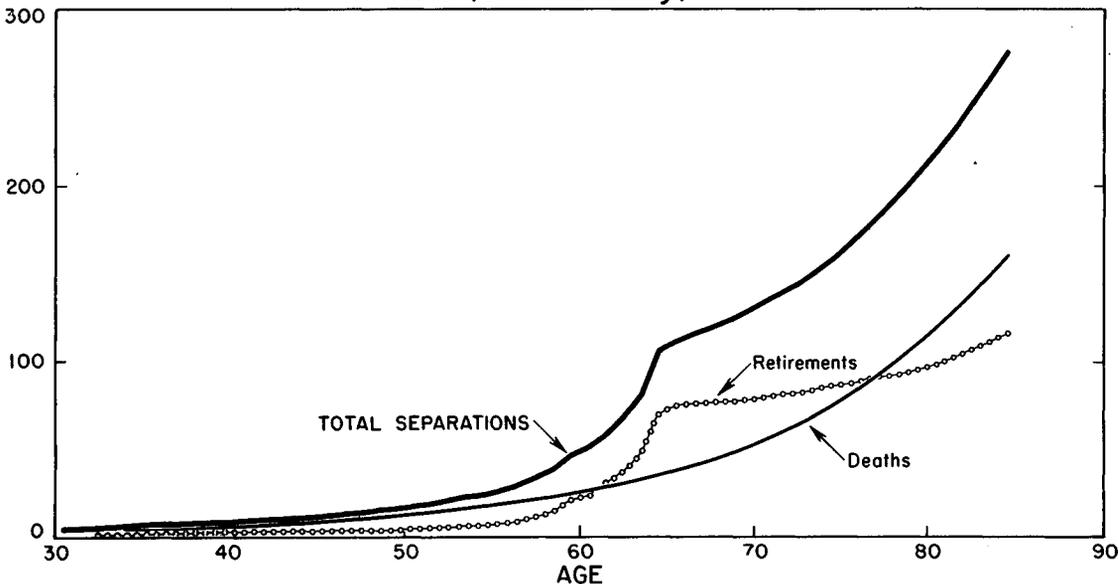
CHART 3

ANNUAL LABOR FORCE SEPARATIONS DUE TO DEATH AND RETIREMENT

TOTAL MALES, 1940

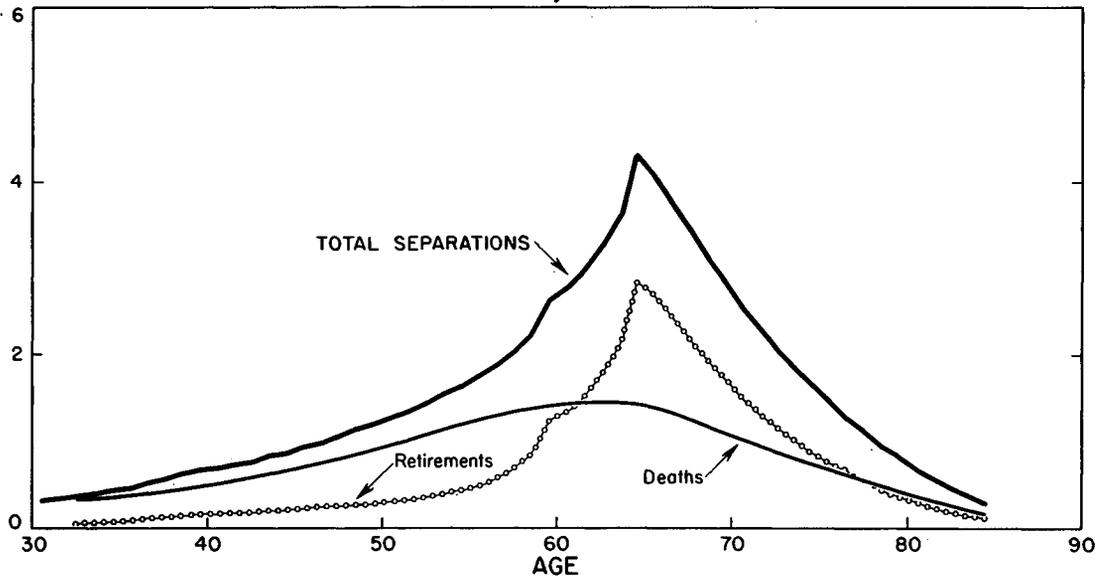
PER 1000 IN
LABOR FORCE

Rate (or Probability)



THOUSANDS

Number, of 100,000 Born Alive



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the mid-seventies, mortality again is the main factor for the relatively few men remaining in the labor force beyond this age.

The concentration of labor force separations, particularly of retirements, within a relatively short age span is also indicated in chart 3. ^{6/} In terms of numbers, annual losses from the labor force due to death and retirement are at their maximum in the mid-sixties, but the retirement peak is much more pronounced. During the age span of the sixties, over half of the retirements of men from the stationary labor force occur, as contrasted to only about a fourth of the deaths.

The sharp rise in retirements during the sixties is due in part to the progressive increase in the proportion of men no longer physically or mentally able to continue in regular employment. Thus, in the 1940 Census, the percentage of men reported as unable to work rose from 6.4 percent in the age group 55-59 years, to 12.1 percent among men 60-64 years of age, and to 31.5 percent in the group 65 to 74 years of age. ^{7/}

The increased incidence of disability only partially explains the abrupt rise in the retirement curve during the sixties. Available evidence indicates that the process of industrial superannuation is not identified with any fixed chronological age span; it varies with the individual worker and the nature of his occupation. The above Census data suggest that a curve showing the proportion of men who actually become disabled for gainful employment at successive ages would probably reveal an inherently smooth pattern of increase, similar to that of mortality.

In considerable part, the actual ages at which men withdraw from the labor force, in our modern industrial society, are determined by a variety of social and economic factors in addition to the physiological pattern of aging alone. The age span of the sixties, and particularly age 65, has come to be accepted as the conventional retirement age for men in many fields of employment. Provisions of public and private pension and old-age assistance programs have reinforced this practice. For example, State old-age assistance laws, which antedated the Federal social security program in many States, generally established age 65 as the minimum for assistance grants to the needy

^{6/} The number of separations from the stationary labor force is shown in Appendix table 1a.

^{7/} Source: 16th Census of the United States, 1940, Population, Characteristics of Persons Not in the Labor Force, table 1. The classification of workers as "unable to work" in the 1940 Census was based on responses to the Census enumerators by individual workers or members of their household, rather than on any independent medical determination. A considerable proportion of workers who regarded themselves as "unable to work" under the relatively depressed labor market conditions existing in the spring of 1940 probably could have engaged in some gainful employment under more favorable circumstances; it is likely that many of them reentered civilian employment during World War II.

aged. This age was subsequently adopted under two major Federal old-age security systems, the Old-Age and Survivors Insurance program, and the Railroad Retirement Act. 8/ An overwhelming majority of pension plans in private industry likewise establish age 65 as the initial age of eligibility for a full annuity, exclusive of disability. 9/

Prevailing employer attitudes and policies towards employment of aging workers are probably even more significant in determining the ages at which workers retire. Even under relatively favorable labor market conditions, some employers are reluctant to hire workers above certain ages, such as age 45, and observe formal or informal maximum age limits in hiring. As a result, older men, once out of work, often experience difficulty in finding new jobs, and some of them, after prolonged unemployment, cease to look for work.

This is illustrated by 1940 Census returns. Following a decade marked by severe depression, partial recovery, and the sharp recession of 1937-38, about 8 million workers were unemployed in the spring of 1940. Long-term unemployment (as measured by the proportion of wage and salary workers seeking work for 6 months or more) was almost twice as severe among men 55 years of age and over as among younger adult workers. 10/ Lack of job opportunities probably had led many older men to abandon the search for work, although still capable of working, and they were therefore reported as "not in the labor force" in the 1940 Census.

8/ The Social Security Act establishes age 65 as the minimum age of eligibility for a primary old-age insurance benefit. Under the Railroad Retirement Act, age 65 is the minimum age for a full annuity; however, the act also provides for disability retirements prior to age 65 and for the retirement of long-service employees between ages 60 and 65 at a reduced annuity.

9/ Of 376 group annuity plans surveyed by the Social Security Administration, 363 establish age 65 as the "normal retirement age" for men. However, optional retirement at an earlier age, under certain conditions, is provided for under most of the plans. Weltha van Eenam, Analysis of Recent Group Annuities Supplementing Retirement Benefits under Old-Age and Survivors Insurance, Actuarial Study No. 25, Social Security Administration, February 1948.

10/ Of all experienced wage or salary workers, excluding those on public emergency work projects, the following proportions in each age group had been seeking work for 6 months or more in March 1940:

<u>Age group</u>	<u>Percent</u>
14-24	7.0
25-34	4.5
35-44	4.7
45-54	6.2
55-64	9.1
65 years and over	9.2

Source: Sixteenth Census of the United States, 1940, Population, The Labor Force (Sample Statistics), Employment and Personal Characteristics, table 35.

Life Expectancy and Work-life Expectancy (Columns 9 and 10)

The "average number of years of life remaining" as shown in column 9 of the table of working life, measures the average, or mean, life expectancy of men at a given exact age, on the assumption that they will be subject in all subsequent years to the mortality conditions prevailing in 1940. Similarly, the "average number of years remaining in the labor force" (column 10) represents the average working-life expectation of workers, on the assumption that they will be subject through their lifetime to the prevailing rates of labor force separation 11/ (chart 4).

By comparison of the two averages, at different ages, a number of conclusions are possible regarding the duration of working life. Under 1940 conditions, a young man beginning his work career at his 18th birthday could typically expect to live for an additional 48 1/2 years, or to age 66 1/2. However, he could expect to continue working for slightly under 43 years, or until age 61, before being separated from the labor force. He could, therefore, anticipate an average gap of about 5 1/2 years between his period of working life and his total, or biological, life expectancy. 12/ This absolute difference remained fairly stable, and even widened slightly until the early sixties, reflecting the relatively greater probability, at these more advanced ages, of survival past the conventional retirement age. At age 60, for example, the average male worker had an average life expectancy of 15 years, and could expect to continue working for an average of 9 years. After age 65, the gap narrowed rapidly, partly because a greater proportion of the men who continue in the labor force past this age are likely to remain "in the saddle" until they die.

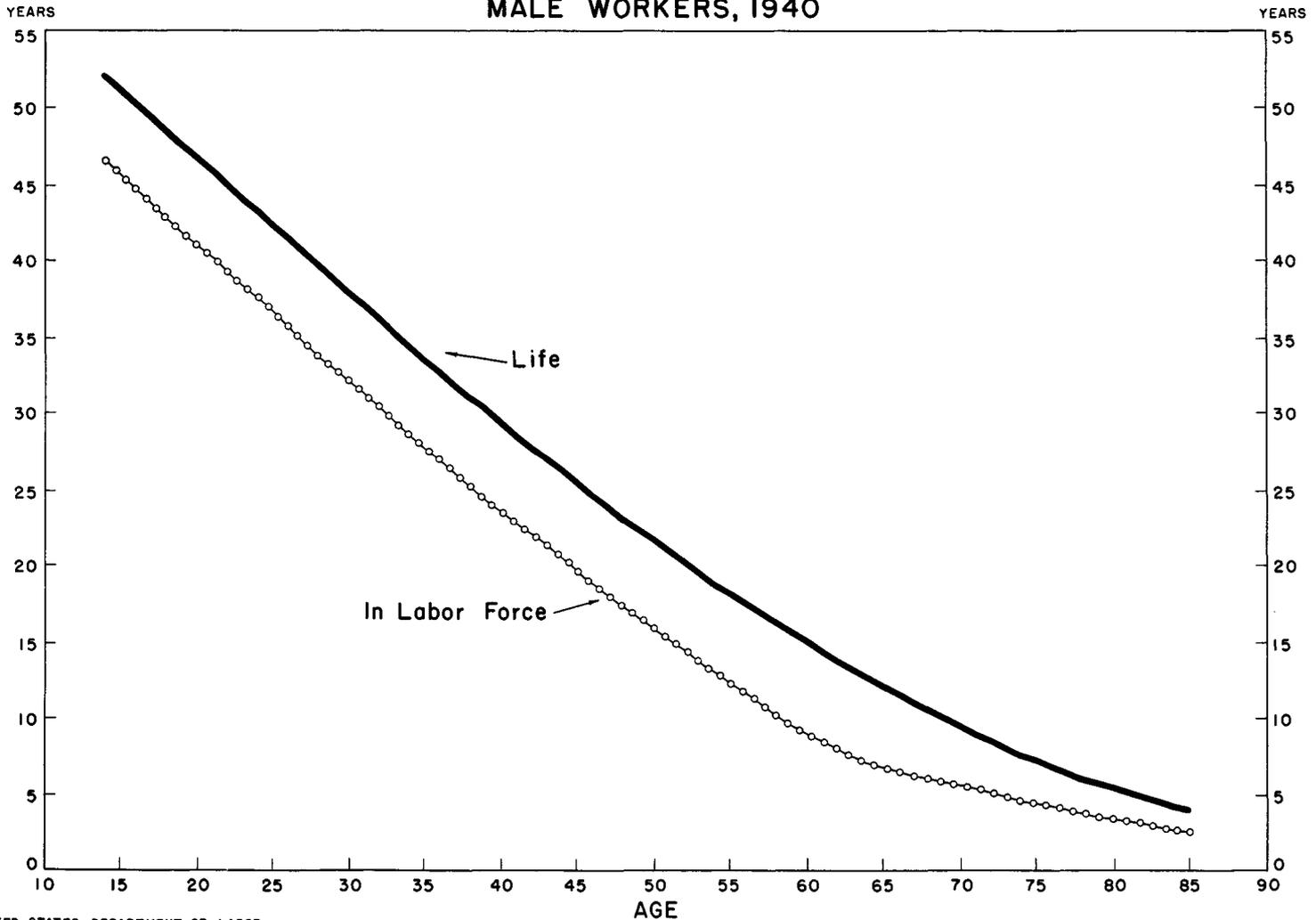
Both estimates of life and work-life expectancy, it should be emphasized, are meaningful only as averages for large population groups. Some small percentage of 18-year-olds, for example, are likely to die before attaining age 19; others survive and may continue working into extreme old age. Similarly, the gap between the total life expectancy and working-life expectancy is for an average situation. This difference, which may be defined as the "average retirement-life expectancy," includes cases of men who are separated from the labor force because of death (i.e., with zero years in retirement), as well

11/ Since the average working-life expectation is computed only for men in the labor force at a given year of age, rather than all men in the population at that age, it is determined solely by the pattern of labor force separations, and is not affected by the ages of labor force entry. For a discussion of alternative methods of measuring this function, see pp. 53-55.

12/ In this and subsequent comparisons between the average life expectancy and the average working-life expectancy, it has been assumed that the life expectancy of workers, at any given age, is identical with that of all persons alive at that age. This assumption is believed to be reasonably valid for ages where almost all men are either workers or potential workers. For a more detailed discussion see Appendix p. 63.

CHART 4

AVERAGE NUMBER OF REMAINING YEARS OF LIFE AND OF LABOR FORCE PARTICIPATION MALE WORKERS, 1940



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as those of men who may spend a protracted period of years in retirement. Under 1940 conditions, less than half of all men workers could expect to spend any significant period of their life outside of the labor force. For those men who did retire, the average span of retirement was considerably longer than the "average retirement-life expectancy" for all men workers of the same age. Thus, men workers retiring at age 65 would probably live in retirement about 12 additional years, provided their mortality experience corresponded to that of other men of the same age.

DIFFERENTIAL PATTERNS OF WORKING LIFE, 1940

The conditions under which men live and work obviously influence the pattern of working life. Basic information is at present not available for direct comparisons among workers in different occupations or socio-economic groups, but separate tables of working life have been constructed for urban and rural residents, and for white and nonwhite workers, based on the 1940 data (tables 2-9). From urban-rural comparisons some insight may be gained as to the differentials between farm and nonfarm workers. ^{13/} Likewise, the comparisons between whites and nonwhites (predominantly Negroes) are related to differences in occupational distribution, income level, and other social and economic factors. These differences in the rates of labor force entry and separation and in the average length of working life are here summarized, separately, for urban and rural residents and for whites and nonwhites.

Urban-Rural Differences

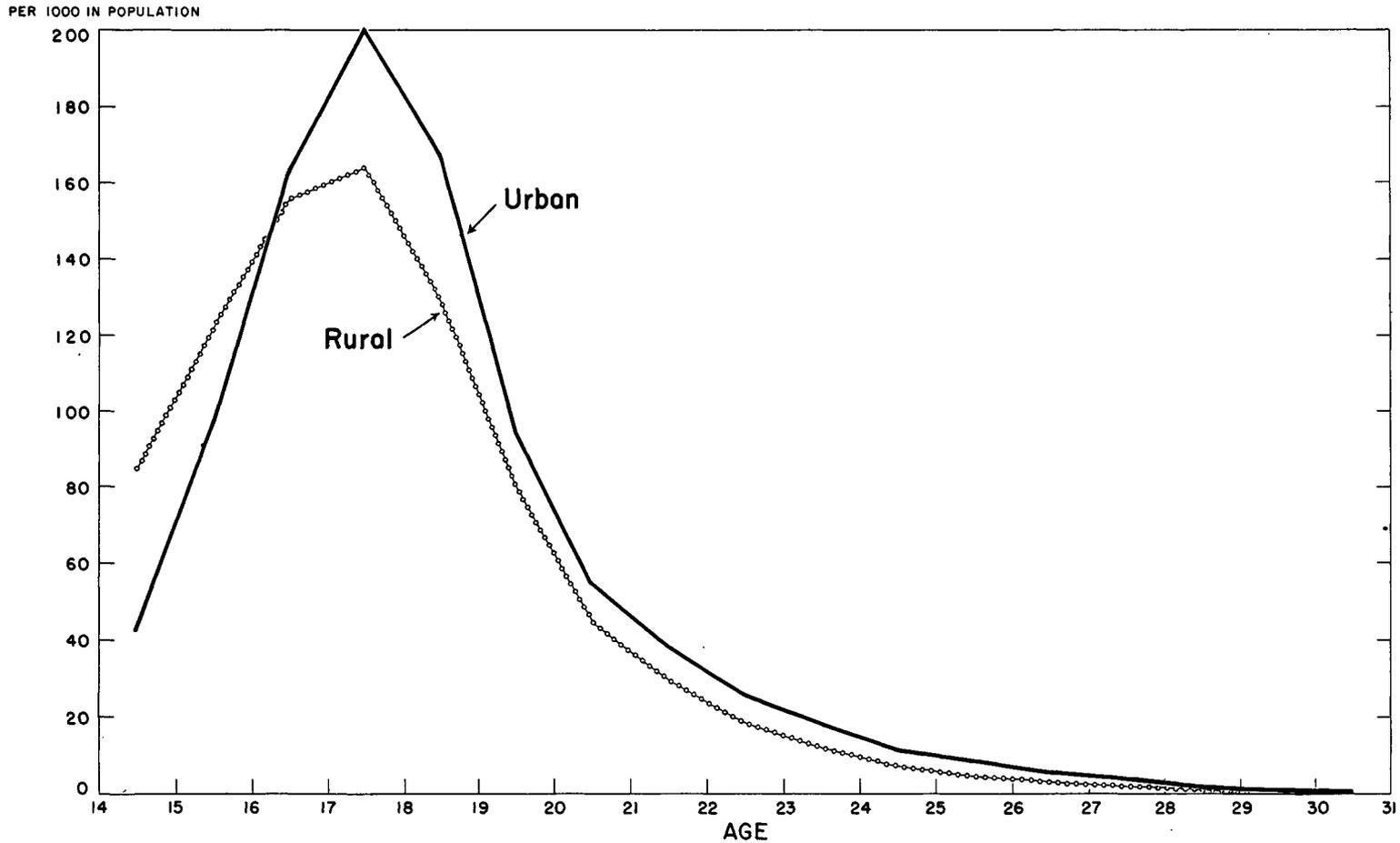
Age at Labor Force Entry. On the average, men in rural areas begin working at an earlier age than do urban residents. Thus, at the age of 14 years, 9 percent of youths in rural areas were already in the labor force as compared with only 2 percent of the urban youth. Annual accession rates were higher for the rural male population until age 15-16 (chart 5) after which age interval urban youth entered the labor force in proportionately greater numbers. These differences are also summarized in table 10, which indicates a median age at entry of 17.1 years for youth in rural areas, as compared with 17.8 years for the urban group.

Several factors account for the earlier average age of entry of rural youth. Agriculture, which employs about half of all male workers in rural areas, is still predominantly carried on as a family enterprise. Many teenage farm youths work on the family farm while attending school. Moreover, the low income level of rural families in many sections of the country, relative to urban levels, tends to place greater pressure on rural youth to leave

^{13/} In rural areas, more than half of all employed men in 1940 were engaged in agricultural pursuits; in urban areas almost all men workers were in nonagricultural employment. Separate tables could not be constructed for men living on farms, as distinct from total residents in rural areas, since mortality statistics were available only for the latter group.

ANNUAL RATES OF LABOR FORCE ACCESSION*

MALES IN URBAN AND RURAL AREAS, 1940



15

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*After age 14

school earlier than urban youth. Finally, child labor legislation and compulsory school attendance laws, which limit the labor force participation of youth in cities prior to age 16, are not applicable to rural youth to the same degree.

Age at Labor Force Separation. Annual rates of labor force separation were higher for urban workers, as a group, than for the rural workers. These differentials reflect both higher mortality among urban workers and an earlier average age at retirement.

Rates of separations from the labor force because of death were consistently lower for rural men workers (chart 6). As a result, for rural men the median age of labor force separation because of death was 61.1 years, about 3 1/2 years higher than for urban men. This difference appears to be due largely to the high proportion of farm residents among the rural group. Farmers, because of their relatively more healthful mode of life and their lesser exposure to contagious diseases, have characteristically experienced much lower age-specific mortality rates than city workers. 14/

Retirement rates for urban workers were also higher than for rural workers at all ages. The contrast becomes particularly pronounced after the conventional retirement period, in the mid-sixties. Thus, between the age of 64 and 65, the annual retirement probability of 85 per 1,000 for urban workers was more than 50 percent above the corresponding rural rate. This difference was reflected, too, in the earlier median age at retirement of the urban worker: 65.0 years compared with 66.5 years for rural men.

Like mortality differentials, the lower rates of retirement among the rural group are due to the importance of farming as a source of livelihood for rural men workers. The elderly man has much more scope for useful employment on the family farm than in urban industry. Consequently, a relatively small proportion of farmers withdraw completely from the labor force while still able to perform gainful work; rather they tend to "ease off" by adjusting their workload to their physical abilities.

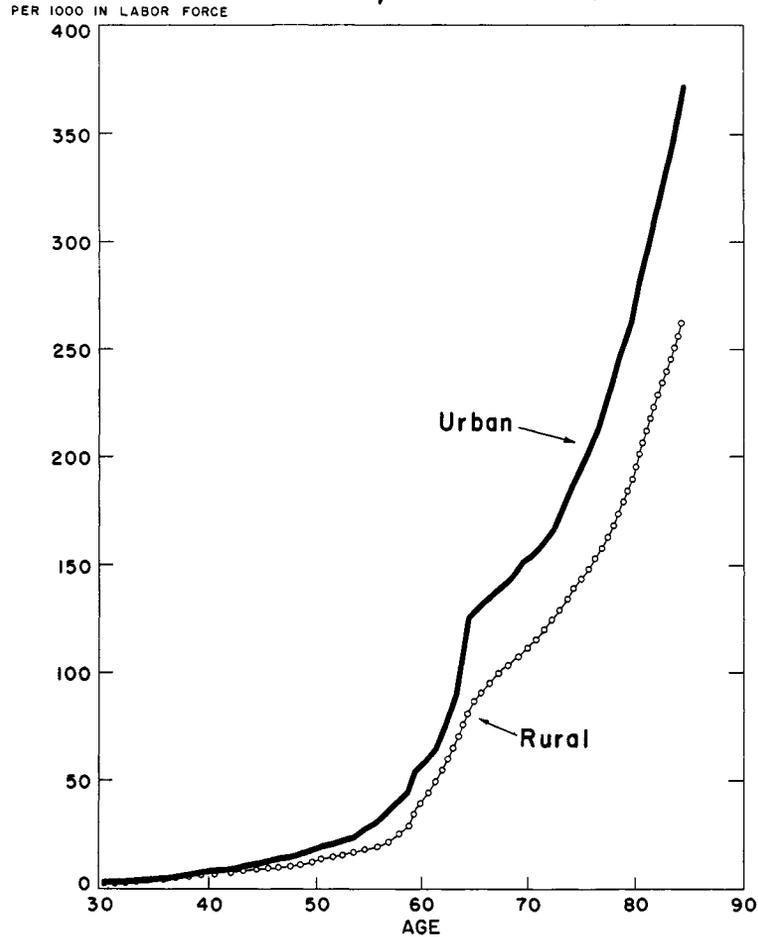
To some extent, this same opportunity to adapt to changing capacities at advanced ages exists for the business proprietor or own-account worker in urban areas. However, only a seventh of all employed men in urban areas were self-employed in 1940, as contrasted to over two-fifths of the rural men workers. The overwhelming proportion of urban men were employed as wage or salary workers in industry, commerce, or government, and as such were subject to the social and economic factors influencing retirement, discussed in the preceding section. 15/

14/ See p. 52.

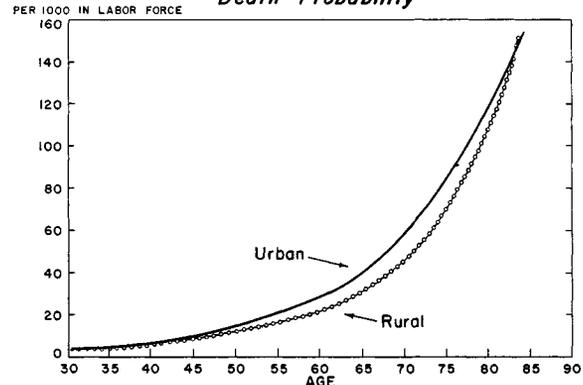
15/ Source: Sixteenth Census of the United States, 1940, Population, The Labor Force (Sample Statistics), Employment and Personal Characteristics, table 11.

ANNUAL RATES OF LABOR FORCE SEPARATION MALES IN URBAN AND RURAL AREAS, 1940

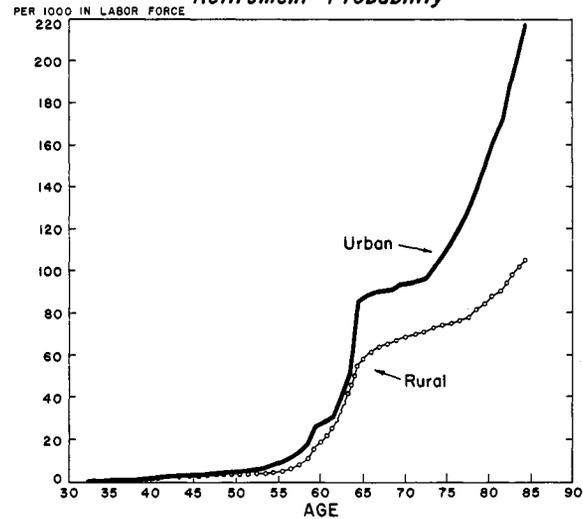
Total Separation Rate



Death Probability



Retirement Probability



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Table 2. - Table of working life: urban males, 1940

(1) Year of age	(2) Number living of 100,000 born alive		(3) In labor force		(4)	(5)	(6)		(7)	(8)	(9)	(10)
	In population	Number	Percent of population	Accessions to the labor force (per 1,000 in population)	1000 A _x	Due to all causes	Due to death	Due to retirement	Average number of years of life	Average number of years of labor force participation	8 _x	8 _w
x to x + 1	L _x	L _w	w _x									
	(In year of age)			(Between years of age)					(At beginning of year of age)			
14-15	92,319	2,069	2.2	42.2		1.6	1.6	--	51.0		45.6	
15-16	92,168	5,957	6.5	97.2		1.8	1.8	--	50.1		44.6	
16-17	92,004	14,904	16.2	162.2		1.9	1.9	--	49.2		43.7	
17-18	91,829	29,797	32.4	203.6		2.0	2.0	--	48.3		42.8	
18-19	91,641	48,155	52.5	166.5		2.2	2.2	--	47.4		41.9	
19-20	91,439	63,308	69.2	94.8		2.4	2.4	--	46.5		41.0	
20-21	91,223	71,829	78.7	55.0		2.5	2.5	--	45.6		40.0	
21-22	90,993	76,669	84.3	38.4		2.6	2.6	--	44.7		39.1	
22-23	90,752	79,960	88.1	25.3		2.7	2.7	--	43.8		38.2	
23-24	90,510	82,043	90.6	18.4		2.8	2.8	--	42.9		37.3	
24-25	90,256	83,476	92.5	11.3		2.9	2.9	--	42.0		36.4	
25-26	89,992	84,250	93.6	8.6		3.0	3.0	--	41.2		35.5	
26-27	89,726	84,768	94.5	5.5		3.1	3.1	--	40.3		34.7	
27-28	89,450	85,000	95.0	3.2		3.2	3.2	--	39.4		33.8	
28-29	89,164	85,061	95.4	1.9		3.3	3.3	--	38.5		32.9	
29-30	88,869	84,950	95.6	.9		3.4	3.4	--	37.7		32.0	
30-31	88,564	84,745	95.7	.4		3.6	3.6	--	36.8		31.1	
31-32	88,249	84,473	95.7	.1		3.8	3.8	--	35.9		30.2	
32-33	87,917	84,160	95.7	-.4		4.4	4.0	.4	35.0		29.3	
33-34	87,568	83,793	95.7	-.9		4.9	4.2	.7	34.2		28.4	
34-35	87,200	83,384	95.6	-.4		5.4	4.5	.9	33.3		27.5	
35-36	86,807	82,934	95.5	-.9		5.9	4.8	1.1	32.4		26.7	
36-37	86,388	82,444	95.4	-1.5		6.6	5.2	1.4	31.6		25.8	
37-38	85,943	81,908	95.3	-2.1		7.1	5.5	1.6	30.8		25.0	
38-39	85,473	81,328	95.2	-2.7		7.7	5.8	1.9	29.9		24.1	
39-40	84,980	80,703	95.0	-3.3		8.3	6.2	2.1	29.1		23.3	
40-41	84,453	80,034	94.8	-3.9		8.9	6.7	2.2	28.3		22.5	
41-42	83,888	79,320	94.6	-4.6		9.6	7.2	2.4	27.4		21.7	
42-43	83,282	78,560	94.3	-5.3		10.3	7.8	2.5	26.6		20.9	
43-44	82,629	77,746	94.1	-6.0		11.3	8.5	2.8	25.8		20.1	
44-45	81,923	76,866	93.8	-6.7		12.3	9.3	3.0	25.0		19.3	
45-46	81,163	75,922	93.5	-7.4		13.3	10.1	3.2	24.2		18.5	
46-47	80,340	74,911	93.2	-8.1		14.4	10.9	3.5	23.5		17.8	
47-48	79,461	73,827	92.9	-8.9		15.7	11.8	3.9	22.7		17.0	
48-49	78,523	72,667	92.5	-9.7		17.1	12.8	4.3	22.0		16.3	
49-50	77,521	71,429	92.1	-10.5		18.5	13.9	4.6	21.2		15.5	
50-51	76,444	70,110	91.7	-11.3		20.0	15.1	4.9	20.5		14.8	
51-52	75,292	68,710	91.3	-12.1		21.6	16.3	5.3	19.8		14.1	
52-53	74,065	67,227	90.8	-12.9		23.4	17.4	6.0	19.1		13.4	
53-54	72,770	65,779	90.2	-13.7		25.6	18.8	6.8	18.4		12.7	
54-55	71,396	64,379	89.6	-14.5		28.3	20.3	8.0	17.8		12.0	
55-56	69,942	62,918	88.9	-15.3		31.6	21.8	9.8	17.1		11.3	
56-57	68,408	60,200	88.0	-16.1		35.6	23.5	12.1	16.5		10.6	
57-58	66,792	58,055	86.9	-16.9		40.1	25.3	14.8	15.9		10.0	
58-59	65,091	55,729	85.6	-17.7		45.5	27.2	18.3	15.2		9.3	
59-60	63,304	53,197	84.0	-18.5		55.3	29.2	26.1	14.6		8.7	
60-61	61,430	50,257	81.8	-19.3		59.5	31.5	28.0	14.1		8.2	
61-62	59,468	47,264	79.5	-20.1		65.8	33.9	31.9	13.5		7.6	
62-63	57,422	44,155	76.9	-20.9		76.0	36.3	39.7	12.9		7.1	
63-64	55,300	40,802	73.8	-21.7		90.9	38.6	52.3	12.4		6.6	
64-65	53,109	37,092	69.8	-22.5		126.1	40.7	85.4	11.9		6.2	
65-66	50,854	32,416	63.7	-23.3		132.3	43.5	88.8	11.4		5.8	
66-67	48,542	28,127	57.9	-24.1		136.9	46.5	90.4	10.9		5.6	
67-68	46,177	24,275	52.6	-24.9		140.8	49.7	91.1	10.4		5.4	
68-69	43,769	20,657	47.7	-25.7		144.8	53.2	91.6	9.9		5.2	
69-70	41,327	17,836	43.2	-26.5		151.0	57.0	94.0	9.4		5.0	
70-71	38,856	15,142	39.0	-27.3		155.5	61.2	94.3	9.0		4.8	
71-72	36,362	12,787	35.2	-28.1		160.9	65.9	95.0	8.5		4.6	
72-73	33,845	10,730	31.7	-28.9		167.8	71.1	96.7	8.1		4.4	
73-74	31,316	8,929	28.5	-29.7		178.0	76.4	101.6	7.7		4.1	
74-75	28,794	7,340	25.5	-30.5		189.2	82.2	107.0	7.3		3.9	
75-76	26,295	5,951	22.6	-31.3		201.0	88.1	112.9	6.9		3.7	
76-77	23,839	4,755	19.9	-32.1		214.9	94.2	120.7	6.5		3.5	
77-78	21,447	3,733	17.4	-32.9		229.6	100.8	128.8	6.2		3.2	
78-79	19,137	2,876	15.0	-33.7		246.2	107.4	138.8	5.8		3.0	
79-80	16,929	2,168	12.8	-34.5		263.8	114.5	149.3	5.5		2.8	
80-81	14,835	1,596	10.8	-35.3		282.6	121.9	160.7	5.2		2.6	
81-82	12,869	1,145	8.9	-36.1		302.2	129.7	172.5	4.9		2.4	
82-83	11,043	799	7.2	-36.9		325.4	137.6	187.8	4.6		2.3	
83-84	9,366	539	5.8	-37.7		346.9	146.2	200.7	4.3		2.1	
84-85	7,844	352	4.5	-38.5		372.3	155.0	217.3	4.0		1.9	
85-86	6,480	221	3.4	-39.3		398.2	163.9	234.3	3.7		1.8	
86-87	5,277	133	2.5	-40.1		421.1	173.5	247.6	3.4		1.6	
87-88	4,232	77	1.8	-40.9		457.7	181.7	276.0	3.1		1.5	
88-89	3,340	42	1.2	-41.7		491.1	190.6	300.5	2.8		1.3	
89-90	2,591	21	.8	-42.5		529.4	198.1	331.3	2.5		1.2	
90-91	1,976	10	.5	-43.3		555.3	206.4	348.9	2.1		1.0	
91-92	1,482	4	.3	-44.1		575.1	215.9	359.2	1.6		.9	
92-93	1,092	2	.2	-44.9		--	--	--	1.0		.7	
93-94	80	--	--	-45.7		--	--	--	.3		--	
94-95	63	--	--	-46.5		--	--	--	.2		--	
95-96	49	--	--	-47.3		--	--	--	.9		--	

Table 3. - Table of working life: rural males, 1940

Year of age x to x + 1	(2) Number living of 100,000 born alive		(3) In labor force	(4) Percent of population	(5) Accessions to the labor force (per 1,000 in population)	(6) Separations from the labor force (per 1,000 in labor force)			(7) Due to all causes	(8) Due to death	(9) Due to retirement	(10) Average number of remaining years of life	(11) Labor force participation
	In population	Number	Number		1000 A _x	1000 Q _x ^a	1000 Q _x ^b	1000 Q _x ^c	1000 Q _x ^d	1000 Q _x ^e	Q _x	S _{wx}	
	L _x	L _{wx}	w _x										
		In year of age			Between years of age						At beginning of year of age		
14-15	91,990	8,649	9.4		84.7	1.5		1.5			54.0	48.3	
15-16	91,850	16,427	17.9		121.7	1.7		1.7			53.1	47.4	
16-17	91,690	27,573	30.1		155.5	1.9		1.9			52.2	46.4	
17-18	91,516	41,778	45.7		163.8	2.1		2.1			51.3	45.5	
18-19	91,329	56,681	62.1		129.0	2.3		2.3			50.4	44.6	
19-20	91,123	68,329	75.0		79.7	2.5		2.5			49.5	43.7	
20-21	90,899	75,418	83.0		44.8	2.7		2.7			48.6	42.8	
21-22	90,659	79,289	87.5		29.4	2.7		2.7			47.7	41.9	
22-23	90,414	81,742	90.4		18.8	2.8		2.8			46.9	41.0	
23-24	90,157	83,213	92.3		11.9	3.0		3.0			46.0	40.1	
24-25	89,887	84,032	93.5		7.4	3.0		3.0			45.1	39.3	
25-26	89,615	84,449	94.2		4.7	3.1		3.1			44.3	38.4	
26-27	89,333	84,607	94.7		2.9	3.2		3.2			43.4	37.5	
27-28	89,045	84,592	95.0		2.0	3.3		3.3			42.5	36.6	
28-29	88,747	84,489	95.2		1.2	3.4		3.4			41.7	35.7	
29-30	88,448	84,309	95.3		.6	3.5		3.5			40.8	34.9	
30-31	88,142	84,066	95.4		.4	3.5		3.5			40.0	34.0	
31-32	87,834	83,803	95.4		.1	3.7		3.7			39.1	33.1	
32-33	87,530	83,501	95.4		-.3	3.9		3.8		.1	38.2	32.2	
33-34	87,177	83,176	95.4		-.7	4.2		3.9		.3	37.4	31.3	
34-35	86,836	82,825	95.4		-.9	4.5		4.0		.5	36.5	30.5	
35-36	86,488	82,449	95.3		-.9	5.0		4.2		.8	35.7	29.6	
36-37	86,121	82,035	95.3		-.9	5.6		4.5		1.1	34.8	28.7	
37-38	85,737	81,583	95.2		-.9	6.0		4.6		1.4	34.0	27.9	
38-39	85,342	81,093	95.0		-.9	6.5		4.8		1.7	33.1	27.0	
39-40	84,930	80,567	94.9		-.9	7.0		5.2		1.8	32.3	26.2	
40-41	84,491	80,003	94.7		-.9	7.5		5.5		2.0	31.4	25.4	
41-42	84,027	79,402	94.5		-.9	8.0		5.8		2.2	30.6	24.6	
42-43	83,538	78,763	94.3		-.9	8.5		6.2		2.3	29.8	23.7	
43-44	83,022	78,094	94.1		-.9	9.0		6.6		2.4	28.9	22.9	
44-45	82,474	77,390	93.8		-.9	9.5		7.0		2.5	28.1	22.1	
45-46	81,896	76,652	93.6		-.9	10.1		7.5		2.6	27.3	21.3	
46-47	81,285	75,880	93.4		-.9	10.7		8.0		2.7	26.5	20.5	
47-48	80,634	75,068	93.1		-.9	11.4		8.5		2.9	25.7	19.8	
48-49	79,946	74,212	92.8		-.9	12.3		9.2		3.1	24.9	19.0	
49-50	79,212	73,303	92.5		-.9	13.1		9.9		3.2	24.1	18.2	
50-51	78,424	72,337	92.2		-.9	14.2		10.7		3.5	23.4	17.4	
51-52	77,582	71,310	91.9		-.9	15.2		11.6		3.6	22.6	16.7	
52-53	76,684	70,225	91.6		-.9	16.2		12.4		3.8	21.8	15.9	
53-54	75,731	69,083	91.2		-.9	17.4		13.4		4.0	21.1	15.1	
54-55	74,719	67,883	90.9		-.9	18.7		14.4		4.3	20.4	14.4	
55-56	73,644	66,616	90.5		-.9	20.6		15.5		5.1	19.6	13.6	
56-57	72,505	65,246	90.0		-.9	22.8		16.5		6.3	18.9	12.9	
57-58	71,299	63,756	89.4		-.9	26.0		17.8		8.2	18.2	12.2	
58-59	70,021	62,099	88.7		-.9	30.5		19.1		11.4	17.6	11.5	
59-60	68,679	60,207	87.7		-.9	37.2		20.2		17.0	16.9	10.8	
60-61	67,277	57,968	86.2		-.9	42.2		21.8		20.4	16.2	10.1	
61-62	65,799	55,524	84.4		-.9	50.2		23.4		26.8	15.5	9.5	
62-63	64,242	52,736	82.1		-.9	59.6		25.1		34.5	14.9	9.0	
63-64	62,604	49,591	79.2		-.9	70.0		26.9		43.1	14.3	8.5	
64-65	60,882	46,121	75.8		-.9	83.9		28.9		55.0	13.6	8.0	
65-66	59,073	42,249	71.5		-.9	91.9		31.1		60.8	13.0	7.6	
66-67	57,174	38,366	67.1		-.9	96.9		33.6		63.3	12.4	7.3	
67-68	55,189	34,647	62.8		-.9	101.5		36.3		65.2	11.8	7.0	
68-69	53,119	31,131	58.6		-.9	106.1		39.3		66.8	11.3	6.8	
69-70	50,959	27,828	54.6		-.9	111.4		42.5		68.9	10.7	6.5	
70-71	48,715	24,727	50.8		-.9	115.9		46.3		69.6	10.1	6.2	
71-72	46,377	21,862	47.1		-.9	121.1		50.6		70.5	9.6	5.9	
72-73	43,948	19,213	43.7		-.9	127.0		55.2		71.8	9.1	5.7	
73-74	41,425	16,772	40.5		-.9	133.4		60.4		73.0	8.6	5.4	
74-75	38,829	14,536	37.4		-.9	140.3		66.1		74.2	8.1	5.2	
75-76	36,163	12,497	34.6		-.9	147.9		72.5		75.4	7.6	4.9	
76-77	33,441	10,649	31.8		-.9	156.5		79.5		77.0	7.2	4.6	
77-78	30,677	8,983	29.3		-.9	166.0		87.3		78.7	6.7	4.4	
78-79	27,888	7,492	26.9		-.9	177.3		95.9		81.4	6.3	4.1	
79-80	25,100	6,164	24.6		-.9	189.7		105.6		84.1	6.0	3.9	
80-81	22,333	4,996	22.4		-.9	203.9		115.9		88.0	5.6	3.7	
81-82	19,626	3,979	20.3		-.9	218.4		126.5		91.9	5.3	3.4	
82-83	17,024	3,113	18.3		-.9	233.3		137.2		96.1	4.9	3.2	
83-84	14,570	2,368	16.4		-.9	248.3		147.9		100.4	4.7	3.0	
84-85	12,301	1,795	14.6		-.9	263.9		158.8		105.1	4.4	2.8	
85-86	10,239	1,320	12.9		-.9	280.9		169.7		111.2	4.1	2.7	
86-87	8,399	948	11.3		-.9	298.6		180.9		117.7	3.9	2.5	
87-88	6,785	665	9.8		-.9	317.2		191.6		125.6	3.7	2.3	
88-89	5,396	454	8.4		-.9	334.9		202.2		132.7	3.5	2.2	
89-90	4,229	302	7.1		-.9	361.0		211.8		149.2	3.3	2.0	
90-91	3,261	193	5.9		-.9	378.2		222.5		155.7	3.1	1.9	
91-92	2,474	120	4.8		-.9	408.3		230.9		177.4	2.9	1.7	
92-93	1,847	71	3.8		-.9	434.3		239.5		194.8	2.8	1.6	
93-94	1,357	40	3.0		-.9	463.2		247.9		215.3	2.6	1.4	
94-95	980	22	2.2		-.9	490.7		256.8		233.9	2.4	1.3	
95-96	695	11	1.6		-.9	527.4		262.1		265.3	2.1	1.2	
96-97	485	5	1.1		-.9	550.8		269.3		281.5	1.9	1.0	
97-98	333	2	.7		-.9	571.4		276.4		295.0	1.5	.8	
98-99	225	1	.4		-.9	-.9		-.9		-.9	1.0	.5	
99-100	99	-.9	-.9		-.9	-.9		-.9		-.9	.4	-.9	

Table 4. - Table of working life: white males, 1940

(1) Year of age x to x + 1	(2) Number living of 100,000 born alive			(3) In labor force		(4) Percent of population	(5) Accessions to the labor force (per 1,000 in population)		(6) Separations from the labor force (per 1,000 in labor force)			(7) Average number of years of labor force participation		
	In population	Number	L _x	1000 A _x	1000 Q _x ^a		1000 Q _x ^d	1000 Q _x ^r	O _x	O _w	(8) Due to		(9) Life	
											causes	death	retirement	Life
	L _x	L _w	W _x	1000 A _x	1000 Q _x ^a		1000 Q _x ^d	1000 Q _x ^r	O _x	O _w	(10) (At beginning of year of age)			
(In year of age)			(Between years of age)			(At beginning of year of age)								
14-15	92,753	4,552	4.9	56.9	1.4	1.4	--	53.2	47.4					
15-16	92,623	9,823	10.6	103.8	1.6	1.6	--	52.3	46.4					
16-17	92,475	19,422	21.0	158.7	1.7	1.7	--	51.4	45.5					
17-18	92,318	34,065	36.9	218.7	1.8	1.8	--	50.5	44.6					
18-19	92,152	51,332	55.7	252.7	1.9	1.9	--	49.6	43.7					
19-20	91,977	65,306	71.0	311.6	2.1	2.1	--	48.6	42.7					
20-21	91,784	73,594	80.2	322.9	2.2	2.2	--	47.7	41.8					
21-22	91,582	78,287	85.5	364.4	2.2	2.2	--	46.8	40.9					
22-23	91,381	81,448	89.1	381.2	2.3	2.3	--	45.9	40.0					
23-24	91,171	83,472	91.6	381.2	2.4	2.4	--	45.0	39.1					
24-25	90,952	84,740	93.2	366.6	2.4	2.4	--	44.1	38.2					
25-26	90,734	85,410	94.1	333.3	2.5	2.5	--	43.3	37.3					
26-27	90,507	85,795	94.8	300.0	2.6	2.6	--	42.4	36.4					
27-28	90,272	85,979	95.2	266.7	2.7	2.7	--	41.5	35.5					
28-29	90,028	86,009	95.5	233.3	2.8	2.8	--	40.6	34.5					
29-30	89,780	85,921	95.7	200.0	2.9	2.9	--	39.7	33.6					
30-31	89,524	85,744	95.8	166.7	3.0	3.0	--	38.8	32.7					
31-32	89,260	85,514	95.8	133.3	3.1	3.1	--	37.9	31.8					
32-33	88,988	85,251	95.8	100.0	3.2	3.2	0.3	37.0	30.9					
33-34	88,703	84,953	95.8	66.7	3.3	3.4	0.5	36.1	30.0					
34-35	88,401	84,622	95.7	33.3	3.4	3.6	0.7	35.3	29.1					
35-36	88,087	84,258	95.7	0.0	3.8	3.8	1.0	34.4	28.2					
36-37	87,751	83,854	95.6	--	4.1	4.1	1.3	33.5	27.4					
37-38	87,388	83,401	95.4	--	4.4	4.4	1.6	32.6	26.5					
38-39	87,003	82,901	95.3	--	4.7	4.7	1.9	31.8	25.7					
39-40	86,594	82,354	95.1	--	5.0	5.0	2.1	30.9	24.8					
40-41	86,161	81,769	94.9	--	5.4	5.4	2.2	30.1	24.0					
41-42	85,691	81,148	94.7	--	5.8	5.8	2.3	29.2	23.2					
42-43	85,190	80,491	94.5	--	6.3	6.3	2.4	28.4	22.3					
43-44	84,649	79,791	94.3	--	6.9	6.9	2.6	27.5	21.5					
44-45	84,069	79,033	94.0	--	7.5	7.5	2.8	26.7	20.7					
45-46	83,443	78,219	93.7	--	8.2	8.2	2.9	25.9	19.9					
46-47	82,763	77,351	93.5	--	8.9	8.9	3.1	25.1	19.1					
47-48	82,030	76,423	93.2	--	9.6	9.6	3.4	24.3	18.3					
48-49	81,247	75,430	92.8	--	10.4	10.4	3.7	23.5	17.6					
49-50	80,406	74,366	92.5	--	11.3	11.3	4.0	22.8	16.8					
50-51	79,501	73,228	92.1	--	12.2	12.2	4.3	22.0	16.1					
51-52	78,531	72,020	91.7	--	13.2	13.2	4.7	21.3	15.3					
52-53	77,494	70,751	91.3	--	14.2	14.2	5.3	20.5	14.6					
53-54	76,394	69,352	90.8	--	15.3	15.3	6.1	19.8	13.8					
54-55	75,225	67,868	90.2	--	16.5	16.5	7.1	19.1	13.1					
55-56	73,976	66,266	89.6	--	17.9	17.9	8.2	18.4	12.4					
56-57	72,644	64,536	88.8	--	19.3	19.3	9.6	17.7	11.7					
57-58	71,235	62,671	88.0	--	20.8	20.8	11.6	17.1	11.0					
58-59	69,746	60,640	86.9	--	22.3	22.3	15.0	16.4	10.3					
59-60	68,177	58,378	85.6	--	24.0	24.0	22.0	15.7	9.7					
60-61	66,520	55,693	83.7	--	25.9	25.9	24.9	15.1	9.1					
61-62	64,777	52,864	81.6	--	27.9	27.9	30.1	14.5	8.5					
62-63	62,944	49,798	79.1	--	29.9	29.9	37.9	13.9	8.0					
63-64	61,018	46,417	76.1	--	32.3	32.3	48.5	13.3	7.5					
64-65	58,998	42,667	72.3	--	34.4	34.4	72.0	12.7	7.1					
65-66	56,892	38,127	67.0	--	37.1	37.1	75.6	12.1	6.7					
66-67	54,696	33,830	61.9	--	40.0	40.0	76.3	11.6	6.5					
67-68	52,421	29,896	57.0	--	43.2	43.2	77.3	11.1	6.3					
68-69	50,067	26,294	52.5	--	46.6	46.6	77.8	10.5	6.0					
69-70	47,639	23,023	48.3	--	50.2	50.2	79.7	10.0	5.8					
70-71	45,147	20,032	44.4	--	54.1	54.1	80.0	9.5	5.6					
71-72	42,601	17,346	40.7	--	58.2	58.2	80.8	9.0	5.4					
72-73	40,019	14,935	37.3	--	62.7	62.7	82.3	8.6	5.1					
73-74	37,402	12,769	34.1	--	67.9	67.9	84.6	8.1	4.9					
74-75	34,750	10,822	31.1	--	73.7	73.7	87.0	7.7	4.7					
75-76	32,071	9,083	28.3	--	80.3	80.3	88.6	7.2	4.5					
76-77	29,377	7,549	25.7	--	87.4	87.4	89.7	6.8	4.2					
77-78	26,689	6,212	23.3	--	95.0	95.0	91.7	6.4	4.0					
78-79	24,031	5,052	21.0	--	103.3	103.3	94.1	6.1	3.8					
79-80	21,426	4,055	18.9	--	112.1	112.1	97.2	5.7	3.6					
80-81	18,902	3,206	17.0	--	121.4	121.4	100.7	5.4	3.4					
81-82	16,486	2,494	15.1	--	131.2	131.2	104.4	5.1	3.2					
82-83	14,204	1,906	13.4	--	141.6	141.6	108.1	4.8	3.0					
83-84	12,078	1,430	11.8	--	152.5	152.5	112.1	4.5	2.9					
84-85	10,126	1,052	10.4	--	164.0	164.0	116.2	4.2	2.7					
85-86	8,363	797	9.1	--	175.7	175.7	121.1	4.0	2.5					
86-87	6,799	532	7.8	--	187.5	187.5	126.5	3.7	2.4					
87-88	5,438	365	6.7	--	199.7	199.7	132.7	3.5	2.2					
88-89	4,275	244	5.7	--	212.4	212.4	140.5	3.3	2.1					
89-90	3,201	158	4.8	--	223.8	223.8	149.4	3.1	1.9					
90-91	2,302	99	4.0	--	235.7	235.7	159.3	2.9	1.8					
91-92	1,861	60	3.2	--	247.0	247.0	173.0	2.7	1.6					
92-93	1,358	35	2.6	--	258.0	258.0	186.2	2.5	1.5					
93-94	971	19	2.0	--	267.4	267.4	212.7	2.3	1.4					
94-95	680	10	1.5	--	276.1	276.1	239.0	2.0	1.3					
95-96	467	5	1.1	--	283.4	283.4	271.4	1.7	1.0					
96-97	314	2	.6	--	289.8	289.8	311.0	1.3	.8					
97-98	207	1	.5	--	297.3	297.3	366.6	.8	.5					

Table 5. - Table of working life: nonwhite males, 1940

(1) Year of age	(2) Number living of 100,000 born alive		(3) In labor force		(4) Percent of population	(5) Accessions to the labor force (per 1,000 in population)		(6) Separations from the labor force (per 1,000 in labor force)			(7) Due to all causes		(8) Due to death and retirement		(9) Average number of years of life		(10) Average number of years of labor force participation	
	In population	Number	Number	1000 L _x		1000 Q _x	1000 Q _x ^d	1000 Q _x ^r	Q _x	Q _x ^d	Q _x ^r	Q _x	Q _x ^d	Q _x ^r	Q _x	Q _x ^p		
																	(In year of age)	(Between years of age)
14-15	87,947	13,044	14.8	92.5	2.7	2.7	--	44.9	41.4									
15-16	87,710	21,142	24.1	142.6	3.2	3.2	--	44.0	40.5									
16-17	87,429	33,579	38.4	199.6	3.6	3.6	--	43.1	39.6									
17-18	87,114	47,407	54.4	134.3	4.1	4.1	--	42.2	38.7									
18-19	86,757	58,914	67.9	107.1	4.6	4.6	--	41.4	37.9									
19-20	86,358	67,938	78.7	55.4	5.1	5.1	--	40.6	37.0									
20-21	85,918	72,376	84.2	33.9	5.6	5.6	--	39.8	36.2									
21-22	85,437	74,883	87.6	21.0	6.1	6.1	--	39.0	35.4									
22-23	84,916	76,221	89.8	13.1	6.5	6.5	--	38.3	34.6									
23-24	84,364	76,838	91.1	8.1	6.9	6.9	--	37.5	33.8									
24-25	83,782	76,991	91.9	5.0	7.2	7.2	--	36.7	33.1									
25-26	83,179	76,857	92.4	3.1	7.5	7.5	--	36.0	32.3									
26-27	82,555	76,538	92.7	1.9	7.8	7.8	--	35.2	31.5									
27-28	81,911	76,097	92.9	1.2	8.1	8.1	--	34.5	30.8									
28-29	81,248	75,579	93.0	.8	8.4	8.4	--	33.8	30.0									
29-30	80,566	75,010	93.1	.5	8.8	8.8	--	33.0	29.2									
30-31	79,857	74,390	93.2	.3	9.1	9.1	--	32.3	28.5									
31-32	79,130	73,736	93.2	--	9.5	9.5	--	31.6	27.7									
32-33	78,378	73,039	93.2	--	10.1	9.8	v3	30.9	27.0									
33-34	77,610	72,298	93.2	--	10.9	10.2	.7	30.2	26.3									
34-35	76,818	71,507	93.1	--	11.6	10.6	1.0	29.5	25.5									
35-36	76,004	70,674	93.0	--	12.1	11.0	1.1	28.8	24.8									
36-37	75,168	69,816	92.9	--	12.6	11.5	1.1	28.1	24.1									
37-38	74,304	68,933	92.8	--	13.1	12.0	1.1	27.4	23.4									
38-39	73,412	68,027	92.7	--	13.7	12.6	1.1	26.7	22.7									
39-40	72,487	67,092	92.6	--	14.4	13.3	1.1	26.1	22.0									
40-41	71,523	66,123	92.4	--	15.4	14.0	1.4	25.4	21.3									
41-42	70,522	65,102	92.3	--	16.5	14.7	1.8	24.8	20.6									
42-43	69,485	64,025	92.1	--	17.7	15.5	2.2	24.1	20.0									
43-44	68,408	62,889	91.9	--	19.0	16.4	2.6	23.5	19.3									
44-45	67,286	61,691	91.7	--	20.3	17.3	3.0	22.8	18.7									
45-46	66,122	60,436	91.4	--	21.6	18.4	3.2	22.2	18.0									
46-47	64,905	59,129	91.1	--	23.0	19.6	3.4	21.6	17.4									
47-48	63,633	57,766	90.8	--	24.4	20.9	3.5	21.0	16.8									
48-49	62,303	56,357	90.5	--	25.9	22.4	3.6	20.4	16.2									
49-50	60,907	54,895	90.1	--	27.5	23.9	3.6	19.9	15.6									
50-51	59,451	53,388	89.8	--	29.0	25.4	3.6	19.3	15.0									
51-52	57,941	51,842	89.5	--	30.4	26.8	3.6	18.8	14.4									
52-53	56,388	50,268	89.1	--	31.9	28.1	3.8	18.3	13.8									
53-54	54,798	48,666	88.8	--	33.5	29.5	4.0	17.8	13.3									
54-55	53,176	47,038	88.5	--	35.1	30.8	4.3	17.3	12.7									
55-56	51,533	45,389	88.1	--	37.3	32.1	5.2	16.9	12.1									
56-57	49,874	43,695	87.6	--	40.5	33.3	7.2	16.4	11.6									
57-58	48,208	41,925	87.0	--	43.4	34.5	8.9	15.9	11.1									
58-59	46,535	40,105	86.2	--	48.3	35.8	12.5	15.5	10.5									
59-60	44,860	38,168	85.1	--	55.2	36.9	18.3	15.0	10.0									
60-61	43,191	36,061	83.5	--	59.6	38.0	21.6	14.6	9.5									
61-62	41,532	33,912	81.7	--	64.6	39.2	25.4	14.1	9.1									
62-63	39,883	31,721	79.5	--	71.1	40.5	30.6	13.7	8.7									
63-64	38,244	29,466	77.0	--	78.0	41.8	36.2	13.2	8.2									
64-65	36,615	27,168	74.2	--	91.5	43.0	48.5	12.8	7.8									
65-66	35,000	24,682	70.5	--	101.9	44.5	57.4	12.3	7.4									
66-67	33,397	22,167	66.4	--	108.5	46.0	62.5	11.9	7.1									
67-68	31,811	19,762	62.1	--	113.1	47.9	65.2	11.5	6.8									
68-69	30,236	17,327	58.0	--	117.1	50.0	67.1	11.0	6.6									
69-70	28,673	15,475	54.0	--	120.6	52.4	68.2	10.6	6.3									
70-71	27,119	13,609	50.2	--	124.4	55.2	69.2	10.1	6.1									
71-72	25,568	11,916	46.6	--	128.3	58.4	69.9	9.7	5.8									
72-73	24,021	10,387	43.2	--	132.7	62.1	70.6	9.3	5.6									
73-74	22,474	9,009	40.1	--	137.8	66.5	71.3	8.9	5.4									
74-75	20,923	7,768	37.1	--	144.6	71.7	72.9	8.5	5.1									
75-76	19,366	6,645	34.3	--	152.1	77.4	74.7	8.1	4.9									
76-77	17,809	5,634	31.6	--	160.3	83.7	76.6	7.7	4.7									
77-78	16,260	4,731	29.1	--	169.2	90.9	79.3	7.4	4.5									
78-79	14,738	3,931	26.7	--	178.6	98.9	82.7	7.1	4.2									
79-80	13,264	3,229	24.3	--	188.3	101.4	86.9	6.8	4.0									
80-81	11,838	2,621	22.1	--	198.2	106.7	91.5	6.5	3.8									
81-82	10,532	2,102	20.0	--	208.6	111.8	96.8	6.2	3.6									
82-83	9,294	1,664	17.9	--	219.8	116.8	103.0	5.9	3.5									
83-84	8,150	1,298	15.9	--	232.2	121.7	110.5	5.7	3.3									
84-85	7,100	997	14.0	--	245.8	126.6	119.2	5.4	3.1									
85-86	6,144	752	12.2	--	260.4	131.7	128.7	5.2	2.9									
86-87	5,279	556	10.5	--	275.8	137.0	138.8	5.0	2.7									
87-88	4,502	403	9.0	--	292.0	142.6	149.4	4.7	2.6									
88-89	3,808	285	7.5	--	309.0	148.6	160.4	4.5	2.4									
89-90	3,193	197	6.2	--	326.8	155.2	171.6	4.2	2.3									
90-91	2,651	133	5.0	--	345.4	162.2	183.2	3.9	2.1									
91-92	2,178	87	4.0	--	364.8	170.1	194.7	3.7	2.0									
92-93	1,768	55	3.1	--	385.0	178.5	206.5	3.4	1.9									
93-94	1,416	34	2.4	--	406.5	187.8	218.7	3.1	1.7									
94-95	1,117	20	1.8	--	430.8	197.7	233.1	2.8	1.5									
95-96	867	11	1.3	--	459.9	208.0	251.9	2.4	1.4									
96-97	661	6	.9	--	494.5	218.8	275.9	2.0	1.1									
97-98	493	3	.6	--	535.6	229.1	306.5	1.5	1.0									
98-99	360	1	.3	--	585.1	239.2	345.9	.8	.5									

Table 6. - Table of working life: urban white males, 1940

(1) Year of age	(2) Number living of 100,000 born alive		(3) In labor force Number	(4) Percent of population	(5) Accessions to the labor force (per 1,000 in population)	(6) Separations from the labor force (per 1,000 in labor force)			(7) Due to all causes	(8) Due to death	(9) Due to retirement	(10) Average number of remaining years of:	
	In population	In labor force				Due to all causes	Due to death	Due to retirement				Life	Labor force participation
x to x + 1	L_x	L_{x-1}	w_x		1000 A_x	1000 O_x^c	1000 D_x^d	1000 R_x^e				E_x	S_x
	(In year of age)				(Between years of age)							(At beginning of year of age)	
14-15	92,861	1,862	2.0		39.9		1.5					51.9	46.2
15-16	92,822	5,964	6.0		30.9		1.6					51.0	45.3
16-17	92,974	13,984	15.1		160.7		1.7					50.1	44.4
17-18	92,417	28,837	31.2		205.6		1.8					49.2	43.5
18-19	92,231	47,786	51.8		168.7		1.9					48.3	42.5
19-20	92,076	69,238	68.7		96.8		2.0					47.3	41.6
20-21	91,892	72,044	78.4		56.9		2.1					46.4	40.7
21-22	91,699	77,121	84.1		39.9		2.2					45.5	39.8
22-23	91,497	80,610	88.1		26.3		2.2					44.6	38.9
23-24	91,286	85,300	90.7		19.2		2.3					43.7	37.9
24-25	91,066	84,401	92.7		11.8		2.4					42.8	37.0
25-26	90,867	85,273	93.8		8.9		2.4					41.9	36.1
26-27	90,649	85,877	94.7		5.7		2.5					41.0	35.2
27-28	90,422	86,179	95.3		3.9		2.6					40.1	34.3
28-29	90,187	86,308	95.7		2.0		2.7					39.2	33.4
29-30	89,943	86,255	95.9		1.0		2.8					38.3	32.5
30-31	89,691	86,103	96.0		.3		2.9					37.4	31.5
31-32	89,431	85,880	96.0		--		3.1					36.5	30.6
32-33	89,154	85,617	96.0		--		3.7					35.6	29.7
33-34	88,860	85,300	96.0		--		4.2					34.8	28.8
34-35	88,549	84,942	95.9		--		4.7					33.9	27.9
35-36	88,213	84,543	95.8		--		5.2			1.1		33.0	27.1
36-37	87,851	84,103	95.7		--		5.8			1.4		32.1	26.2
37-38	87,464	83,615	95.6		--		6.4			1.7		31.3	25.3
38-39	87,053	83,080	95.4		--		7.0			2.0		30.4	24.5
39-40	86,618	82,498	95.2		--		7.6			2.2		29.5	23.6
40-41	86,150	81,871	95.0		--		8.2			2.3		28.7	22.8
41-42	85,642	81,200	94.8		--		8.8			2.4		27.9	22.0
42-43	85,094	80,485	94.6		--		9.5			2.5		27.0	21.2
43-44	84,498	79,720	94.3		--		10.4			2.7		26.2	20.4
44-45	83,847	78,911	94.1		--		11.3			2.9		25.4	19.6
45-46	83,143	78,000	93.8		--		12.3			3.1		24.6	18.8
46-47	82,378	77,041	93.5		--		13.4			3.4		23.8	18.0
47-48	81,558	76,009	93.2		--		14.6			3.8		23.0	17.2
48-49	80,681	74,899	92.8		--		15.9			4.2		22.3	16.5
49-50	79,741	73,708	92.4		--		17.3			4.5		21.5	15.7
50-51	78,724	72,433	92.0		--		18.8			4.9		20.8	15.0
51-52	77,630	71,072	91.6		--		20.4			5.3		20.0	14.2
52-53	76,458	69,621	91.1		--		22.2			5.9		19.3	13.5
53-54	75,212	68,075	90.5		--		24.4			6.8		18.6	12.8
54-55	73,881	66,414	89.9		--		27.2			8.1		17.9	12.1
55-56	72,462	64,606	89.2		--		30.6			9.9		17.3	11.4
56-57	70,955	62,631	88.3		--		34.6			12.2		16.6	10.7
57-58	69,339	60,464	87.2		--		39.1			14.9		16.0	10.0
58-59	67,667	58,100	85.9		--		44.3			18.1		15.3	9.4
59-60	65,881	55,526	84.3		--		54.1			25.9		14.7	8.8
60-61	63,997	52,522	82.1		--		68.3			30.6		14.1	8.2
61-62	62,013	49,460	79.8		--		84.5			31.5		13.6	7.7
62-63	59,926	46,370	77.2		--		104.8			35.4		13.0	7.1
63-64	57,772	42,809	74.1		--		130.2			37.8		12.4	6.6
64-65	55,530	38,948	70.1		--		125.9			39.9		11.9	6.2
65-66	53,214	34,044	64.0		--		131.5			42.8		11.4	5.9
66-67	50,830	29,587	58.2		--		135.9			45.9		10.9	5.7
67-68	48,385	25,549	52.8		--		139.7			49.3		10.4	5.5
68-69	45,888	21,980	47.9		--		143.8			52.8		9.9	5.2
69-70	43,330	18,819	43.4		--		150.1			56.5		9.4	5.0
70-71	40,779	15,994	39.2		--		154.7			60.8		9.0	4.8
71-72	38,177	13,520	35.4		--		160.0			65.6		8.5	4.6
72-73	35,547	11,337	31.9		--		167.2			70.8		8.1	4.4
73-74	32,902	9,438	28.7		--		177.5			76.2		7.7	4.1
74-75	30,260	7,779	25.7		--		189.0			82.0		7.3	3.9
75-76	27,639	6,309	22.8		--		201.2			88.0		6.9	3.7
76-77	25,060	5,040	20.1		--		215.2			94.2		6.5	3.4
77-78	22,546	3,955	17.5		--		230.5			100.8		6.2	3.2
78-79	20,116	3,043	15.1		--		247.5			107.5		5.8	3.0
79-80	17,791	2,290	12.9		--		265.8			114.7		5.5	2.8
80-81	15,585	1,681	10.8		--		285.2			122.2		5.2	2.6
81-82	13,512	1,202	8.9		--		305.1			130.1		4.8	2.4
82-83	11,585	835	7.2		--		328.0			138.3		4.5	2.2
83-84	9,815	561	5.7		--		353.0			146.9		4.2	2.1
84-85	8,207	363	4.4		--		378.7			156.0		4.0	1.9
85-86	6,767	226	3.3		--		406.0			165.2		3.7	1.7
86-87	5,496	134	2.4		--		434.1			174.7		3.4	1.6
87-88	4,393	76	1.7		--		467.5			183.7		3.1	1.4
88-89	3,452	40	1.2		--		505.0			192.3		2.7	1.3
89-90	2,665	20	.8		--		555.1			198.8		2.4	1.1
90-91	2,020	9	.4		--		605.4			204.8		2.0	1.0
91-92	1,503	4	.3		--		655.7			210.2		1.5	.8
92-93	1,097	1	.1		--		705.3			215.0		.8	.5

Table 7. - Table of working life: urban nonwhite males, 1940

(1) Year of age x to x + 1	(2) Number living of 100,000 born alive		(3) In labor force		(5) Accessions to the labor force (per 1,000 in population)	(6) Separations from the labor force (per 1,000 in labor force)			(9) Average number of remaining years of life		(10) Labor force participation
	In population	Number	Percent of population	w _x		Due to all causes	Due to death	Due to retirement	e _x	e _{wx}	
	(In year of age)			(Between years of age)			(At beginning of year of age)				
14-15	87,223	4,017	4.6	64.8	3.1	3.1	--	42.0	38.5		
15-16	86,993	3,997	4.6	160.4	3.6	3.6	--	41.1	37.6		
16-17	86,640	3,970	4.6	177.3	4.0	4.0	--	40.3	36.7		
17-18	86,293	3,936	4.6	190.3	4.6	4.6	--	39.4	35.9		
18-19	85,896	3,897	4.5	144.6	5.3	5.3	--	38.6	35.0		
19-20	85,441	3,854	4.5	75.2	6.1	6.1	--	37.8	34.2		
20-21	84,920	3,807	4.5	36.2	6.7	6.7	--	37.0	33.4		
21-22	84,351	3,756	4.5	23.0	7.2	7.2	--	36.2	32.6		
22-23	83,744	3,701	4.4	15.2	7.6	7.6	--	35.5	31.8		
23-24	83,108	3,643	4.4	9.8	8.0	8.0	--	34.7	31.1		
24-25	82,443	3,582	4.3	5.9	8.4	8.4	--	34.0	30.3		
25-26	81,750	3,519	4.3	4.5	8.8	8.8	--	33.3	29.5		
26-27	81,031	3,453	4.3	3.0	9.1	9.1	--	32.6	28.8		
27-28	80,284	3,384	4.2	1.5	9.5	9.5	--	31.8	28.1		
28-29	79,511	3,312	4.2	.8	9.8	9.8	--	31.1	27.3		
29-30	78,732	3,237	4.1	.5	10.2	10.2	--	30.4	26.6		
30-31	77,949	3,160	4.1	.3	10.6	10.6	--	29.7	25.8		
31-32	77,153	3,081	4.0	--	11.0	11.0	--	29.0	25.1		
32-33	76,345	3,000	4.0	--	11.9	11.5	+.4	28.4	24.4		
33-34	75,526	2,917	3.9	--	12.7	12.0	-.7	27.7	23.6		
34-35	74,695	2,832	3.8	--	13.5	12.5	1.0	27.0	22.9		
35-36	73,852	2,745	3.7	--	14.1	13.0	1.1	26.3	22.2		
36-37	72,996	2,656	3.6	--	14.7	13.6	1.1	25.7	21.5		
37-38	72,128	2,564	3.5	--	15.3	14.2	1.1	25.0	20.8		
38-39	71,248	2,470	3.4	--	15.9	14.8	1.1	24.3	20.2		
39-40	70,356	2,374	3.4	--	16.6	15.5	1.1	23.7	19.5		
40-41	69,452	2,276	3.3	--	17.7	16.2	1.5	23.0	18.8		
41-42	68,536	2,176	3.2	--	19.2	17.0	2.2	22.4	18.1		
42-43	67,608	2,073	3.1	--	21.1	17.9	3.2	21.8	17.4		
43-44	66,668	1,968	3.0	--	23.0	19.0	4.0	21.2	16.8		
44-45	65,716	1,861	2.9	--	24.8	20.2	4.6	20.5	16.2		
45-46	64,752	1,752	2.8	--	26.7	21.6	5.1	19.9	15.5		
46-47	63,776	1,641	2.7	--	28.6	23.4	5.2	19.4	14.9		
47-48	62,788	1,528	2.6	--	30.6	25.2	5.4	18.8	14.3		
48-49	61,788	1,413	2.5	--	32.5	27.1	5.4	18.3	13.8		
49-50	60,776	1,296	2.4	--	34.5	29.0	5.5	17.7	13.2		
50-51	59,752	1,177	2.3	--	36.5	30.8	5.7	17.2	12.6		
51-52	58,716	1,056	2.2	--	38.5	32.5	6.0	16.7	12.1		
52-53	57,668	933	2.1	--	40.5	34.1	6.4	16.3	11.5		
53-54	56,608	808	2.0	--	42.6	35.6	7.0	15.8	11.0		
54-55	55,536	681	1.9	--	45.1	37.1	8.0	15.4	10.4		
55-56	54,452	552	1.8	--	48.0	38.6	9.4	14.9	9.9		
56-57	53,356	421	1.7	--	51.8	40.2	11.6	14.5	9.4		
57-58	52,248	289	1.6	--	55.8	41.8	14.0	14.1	8.8		
58-59	51,128	156	1.5	--	63.7	43.4	20.3	13.7	8.3		
59-60	49,996	21	1.4	--	75.1	44.9	30.2	13.3	7.8		
60-61	48,852	--	1.3	--	81.0	46.6	34.4	12.9	7.3		
61-62	47,696	--	1.2	--	88.1	48.3	39.8	12.5	6.9		
62-63	46,528	--	1.1	--	96.0	50.0	45.0	12.1	6.5		
63-64	45,348	--	1.0	--	104.7	51.8	52.9	11.7	6.1		
64-65	44,156	--	1.0	--	129.2	53.1	76.1	11.3	5.7		
65-66	42,952	--	0.9	--	147.4	54.6	92.8	10.9	5.4		
66-67	41,736	--	0.9	--	177.1	56.6	100.5	10.5	5.2		
67-68	40,508	--	0.8	--	162.1	58.9	103.2	10.2	5.0		
68-69	39,268	--	0.8	--	166.0	61.4	104.6	9.8	4.9		
69-70	38,016	--	0.7	--	170.0	64.4	105.6	9.4	4.8		
70-71	36,752	--	0.7	--	174.1	67.8	106.3	9.1	4.7		
71-72	35,476	--	0.6	--	178.5	71.7	106.8	8.7	4.5		
72-73	34,188	--	0.6	--	183.1	75.9	107.2	8.4	4.4		
73-74	32,888	--	0.5	--	187.9	80.4	107.5	8.0	4.3		
74-75	31,576	--	0.5	--	193.0	85.1	107.9	7.7	4.1		
75-76	30,252	--	0.5	--	198.5	90.1	108.4	7.4	4.0		
76-77	28,916	--	0.4	--	204.5	95.2	109.3	7.1	3.9		
77-78	27,568	--	0.4	--	211.1	100.4	110.7	6.8	3.7		
78-79	26,208	--	0.4	--	218.4	105.7	112.7	6.5	3.6		
79-80	24,836	--	0.3	--	226.5	111.0	115.5	6.3	3.4		
80-81	23,452	--	0.3	--	235.5	116.0	119.5	6.0	3.3		
81-82	22,056	--	0.3	--	245.5	120.8	124.7	5.8	3.1		
82-83	20,648	--	0.2	--	256.6	125.3	131.3	5.5	3.0		
83-84	19,228	--	0.2	--	268.9	129.7	139.2	5.3	2.8		
84-85	17,796	--	0.2	--	282.5	134.1	148.4	5.1	2.7		
85-86	16,352	--	0.2	--	297.5	138.2	159.3	4.8	2.5		
86-87	14,896	--	0.1	--	314.0	142.3	171.7	4.6	2.4		
87-88	13,428	--	0.1	--	332.1	146.3	185.8	4.3	2.2		
88-89	11,948	--	0.1	--	351.9	150.3	201.6	4.0	2.1		
89-90	10,456	--	0.1	--	373.5	154.4	219.1	3.7	1.9		
90-91	8,952	--	0.1	--	397.0	159.1	237.9	3.4	1.7		
91-92	7,436	--	0.1	--	422.5	164.8	257.7	3.0	1.6		
92-93	5,916	--	0.1	--	450.1	171.5	278.6	2.6	1.4		
93-94	4,392	--	0.1	--	479.9	179.2	300.7	2.1	1.2		
94-95	2,864	--	0.1	--	512.0	187.5	324.5	1.6	1.0		
95	1,332	--	0.1	--	546.5	196.4	350.1	.9	.5		

Table 8. - Table of working life: rural white males, 1940

Year of age x to x + 1	(2) Number living of 100,000 born alive		(4) Accessions to the labor force		(6) Separations from the labor force			(9) Average number of remaining years of	
	In labor force		(per 1,000 in population)		(per 1,000 in labor force)			years of	
	In population	Percent of population	Number	Percent of population	Due to all causes	Due to death	Due to retirement	Life	Labor force participation
	L_x	L_x	w_x	1000 A_x	1000 Q_x^a	1000 Q_x^d	1000 Q_x^r	S_x	S_x
	(In year of age)			(Between years of age)			(At beginning of year of age)		
14-15	92,627	6,760	7.3	80.9	1.4	1.4	--	55.0	48.9
15-16	92,497	14,246	15.4	119.8	1.6	1.6	--	54.1	48.0
16-17	92,349	25,304	27.4	156.7	1.7	1.7	--	53.2	47.1
17-18	92,192	39,732	43.1	170.7	1.8	1.8	--	52.3	46.2
18-19	92,026	56,398	60.2	136.7	2.0	2.0	--	51.4	45.2
19-20	91,842	67,867	73.9	85.8	2.1	2.1	--	50.5	44.3
20-21	91,649	75,605	82.5	46.9	2.3	2.3	--	49.6	43.4
21-22	91,438	79,729	87.2	31.0	2.3	2.3	--	48.7	42.5
22-23	91,228	82,380	90.3	19.9	2.4	2.4	--	47.8	41.6
23-24	91,009	83,998	92.3	12.5	2.5	2.5	--	46.9	40.7
24-25	90,781	84,926	93.6	7.9	2.5	2.5	--	46.0	39.8
25-26	90,554	85,431	94.3	5.0	2.6	2.6	--	45.1	38.9
26-27	90,319	85,662	94.8	3.0	2.6	2.6	--	44.2	38.0
27-28	90,080	85,710	95.1	2.1	2.7	2.7	--	43.3	37.1
28-29	89,832	85,668	95.4	1.2	2.7	2.7	--	42.5	36.2
29-30	89,585	85,544	95.5	.5	2.8	2.8	--	41.6	35.3
30-31	89,330	85,349	95.5	.3	2.8	2.8	--	40.7	34.4
31-32	89,075	85,137	95.6	--	3.0	3.0	--	39.8	33.5
32-33	88,803	84,884	95.6	--	3.2	3.1	1	38.9	32.6
33-34	88,523	84,612	95.6	--	3.5	3.2	3	38.0	31.7
34-35	88,235	84,316	95.6	--	3.8	3.3	5	37.2	30.8
35-36	87,940	83,996	95.5	--	4.3	3.5	8	36.3	29.9
36-37	87,628	83,635	95.4	--	4.8	3.7	1.1	35.4	29.0
37-38	87,299	83,234	95.3	--	5.3	3.9	1.4	34.5	28.1
38-39	86,963	82,793	95.2	--	5.8	4.1	1.7	33.7	27.3
39-40	86,611	82,313	95.0	--	6.3	4.4	1.9	32.8	26.4
40-41	86,234	81,794	94.9	--	6.8	4.7	2.1	31.9	25.6
41-42	85,833	81,238	94.6	--	7.3	5.0	2.3	31.1	24.8
42-43	85,408	80,645	94.4	--	7.7	5.3	2.4	30.2	23.9
43-44	84,960	80,024	94.2	--	8.2	5.7	2.5	29.4	23.1
44-45	84,480	79,368	93.9	--	8.7	6.1	2.6	28.5	22.3
45-46	83,969	78,677	93.7	--	9.2	6.5	2.7	27.7	21.5
46-47	83,427	77,953	93.4	--	9.8	7.0	2.8	26.9	20.7
47-48	82,847	77,189	93.2	--	10.5	7.5	3.0	26.1	19.9
48-49	82,230	76,379	92.9	--	11.3	8.1	3.2	25.2	19.1
49-50	81,568	75,516	92.6	--	12.2	8.8	3.4	24.4	18.3
50-51	80,854	74,595	92.3	--	13.2	9.5	3.7	23.6	17.5
51-52	80,086	73,610	91.9	--	14.2	10.3	3.9	22.8	16.7
52-53	79,261	72,565	91.6	--	15.2	11.1	4.1	22.1	15.9
53-54	78,381	71,462	91.2	--	16.3	12.0	4.3	21.3	15.1
54-55	77,440	70,297	90.8	--	17.6	13.0	4.6	20.5	14.4
55-56	76,433	69,060	90.4	--	19.5	14.1	5.4	19.8	13.6
56-57	75,355	67,713	89.9	--	21.8	15.2	6.6	19.1	12.9
57-58	74,202	66,237	89.3	--	25.1	16.5	8.6	18.3	12.1
58-59	72,970	64,574	88.5	--	29.8	17.8	12.0	17.6	11.4
59-60	71,664	62,650	87.4	--	36.9	19.0	17.9	16.9	10.7
60-61	70,288	60,338	85.8	--	42.0	20.6	21.4	16.2	10.1
61-62	68,826	57,804	84.0	--	50.5	22.3	28.2	15.6	9.5
62-63	67,271	54,885	81.6	--	60.3	24.1	36.2	14.9	8.9
63-64	65,623	51,375	78.6	--	71.1	26.0	45.1	14.2	8.4
64-65	63,877	47,908	75.0	--	86.0	28.1	57.9	13.6	7.9
65-66	62,031	43,788	70.6	--	94.0	30.4	63.6	13.0	7.6
66-67	60,083	39,672	66.0	--	98.7	33.0	65.7	12.4	7.2
67-68	58,034	35,756	61.6	--	103.0	35.8	67.2	11.8	7.0
68-69	55,887	32,073	57.4	--	107.4	38.9	68.5	11.2	6.7
69-70	53,635	28,628	53.4	--	112.8	42.3	70.5	10.6	6.4
70-71	51,286	25,399	49.5	--	117.1	46.2	70.9	10.0	6.2
71-72	48,829	22,423	45.9	--	122.5	50.6	71.9	9.5	5.9
72-73	46,265	19,678	42.5	--	128.3	55.4	72.9	9.0	5.6
73-74	43,605	17,153	39.3	--	134.7	60.7	74.0	8.5	5.4
74-75	40,858	14,842	36.3	--	141.7	66.5	75.2	8.0	5.1
75-76	38,035	12,739	33.5	--	149.4	73.0	76.4	7.5	4.8
76-77	35,148	10,836	30.8	--	157.9	80.2	77.7	7.1	4.6
77-78	32,217	9,125	28.3	--	167.7	88.1	79.6	6.6	4.3
78-79	29,239	7,595	26.0	--	179.0	97.1	81.9	6.2	4.1
79-80	26,298	6,235	23.7	--	191.9	107.2	84.7	5.8	3.8
80-81	23,355	5,039	21.6	--	206.1	118.1	88.0	5.4	3.6
81-82	20,471	4,000	19.5	--	221.1	129.3	91.8	5.1	3.4
82-83	17,697	3,116	17.6	--	236.6	140.7	95.9	4.8	3.2
83-84	15,081	2,379	15.8	--	252.4	152.4	100.2	4.5	3.0
84-85	12,662	1,778	14.0	--	269.3	164.2	105.1	4.2	2.8
85-86	10,468	1,299	12.4	--	286.8	176.2	110.6	4.0	2.6
86-87	8,516	926	10.9	--	304.4	188.5	115.9	3.7	2.4
87-88	6,811	644	9.5	--	324.1	200.7	123.4	3.5	2.3
88-89	5,354	435	8.1	--	344.7	212.9	131.8	3.3	2.1
89-90	4,134	285	6.9	--	366.8	224.7	142.1	3.1	2.0
90-91	3,134	180	5.7	--	390.7	236.3	154.4	2.9	1.8
91-92	2,331	110	4.7	--	419.6	247.1	172.5	2.7	1.7
92-93	1,701	64	3.8	--	446.2	258.0	188.2	2.6	1.5
93-94	1,217	35	2.9	--	480.1	267.4	212.7	2.4	1.4
94-95	853	18	2.1	--	515.1	276.1	239.0	2.2	1.3
95-96	585	9	1.5	--	554.8	283.4	271.4	2.0	1.1
96-97	393	4	1.0	--	599.8	288.8	311.0	1.7	1.2
97-98	239	2	.8	--	657.3	290.7	366.6	1.3	1.0
98-99	167	1	.6	--	696.2	295.0	403.2	.8	.5

Table 9. - Table of working life: rural nonwhite males, 1940

Year of age	(2) Number living of 100,000 born alive		(4) Accessions to the labor force (per 1,000 in population)		(7) Separations from the labor force (per 1,000 in labor force)			(9) Average number of remaining years of life	
	In labor force		Percent of population		Due to all causes			Labor force participation	
	In population	Number	Number	Percent of population	Due to all causes	Due to death	Due to retirement	Life	Labor force participation
x to x + 1	L _x	L _w	w _x	1000 A _x	1000 Q _x ^a	1000 Q _x ^b	1000 Q _x ^c	S _x	S _w
	(In year of age)			(Between years of age)				(At beginning of year of age)	
14-15	86,443	19,171	21.7	106.8	2.2	2.2	--	48.2	44.5
15-16	86,248	28,375	32.4	132.7	2.6	2.6	--	47.3	43.6
16-17	86,019	40,211	45.7	148.6	3.0	3.0	--	46.4	42.7
17-18	87,754	53,170	60.6	123.6	3.5	3.5	--	45.6	41.8
18-19	87,447	63,830	73.0	83.7	3.9	3.9	--	44.7	41.0
19-20	87,106	70,901	81.4	43.4	4.3	4.3	--	43.9	40.1
20-21	86,731	74,376	85.8	32.4	4.7	4.7	--	43.1	39.3
21-22	86,323	76,836	89.0	20.2	5.1	5.1	--	42.3	38.5
22-23	85,883	78,188	91.0	12.6	5.5	5.5	--	41.5	37.7
23-24	85,411	78,840	92.3	7.9	5.9	5.9	--	40.7	36.8
24-25	84,907	79,050	93.1	4.9	6.2	6.2	--	39.9	36.1
25-26	84,381	78,976	93.6	3.1	6.4	6.4	--	39.1	35.3
26-27	83,841	78,733	93.9	1.9	6.7	6.7	--	38.4	34.5
27-28	83,279	78,364	94.1	1.2	6.9	6.9	--	37.6	33.7
28-29	82,704	77,923	94.2	.8	7.1	7.1	--	36.9	32.9
29-30	82,117	77,436	94.3	.5	7.2	7.2	--	36.2	32.2
30-31	81,526	76,920	94.4	.3	7.4	7.4	--	35.4	31.4
31-32	80,923	76,375	94.4	--	7.6	7.6	--	34.7	30.6
32-33	80,308	75,799	94.4	--	8.1	7.8	.3	33.8	29.9
33-34	79,682	75,182	94.4	--	8.7	8.0	.7	33.2	29.1
34-35	79,045	74,525	94.3	--	9.2	8.2	1.0	32.4	28.3
35-36	78,397	73,836	94.2	--	9.6	8.5	1.1	31.7	27.6
36-37	77,731	73,124	94.1	--	10.0	8.9	1.1	31.0	26.8
37-38	77,039	72,390	94.0	--	10.5	9.4	1.1	30.2	26.1
38-39	76,315	71,627	93.9	--	10.9	9.8	1.1	29.5	25.4
39-40	75,567	70,843	93.7	--	11.4	10.3	1.1	28.8	24.6
40-41	74,789	70,032	93.6	--	12.2	10.9	1.3	28.1	23.9
41-42	73,974	69,175	93.5	--	12.9	11.5	1.4	27.4	23.2
42-43	73,123	68,280	93.4	--	13.7	12.2	1.5	26.7	22.5
43-44	72,231	67,342	93.2	--	14.4	12.8	1.6	26.0	21.8
44-45	71,306	66,372	93.1	--	15.1	13.4	1.7	25.3	21.1
45-46	70,350	65,370	92.9	--	15.9	14.2	1.7	24.6	20.4
46-47	69,351	64,331	92.8	--	16.7	15.0	1.7	24.0	19.7
47-48	68,311	63,257	92.6	--	17.7	15.9	1.8	23.3	19.0
48-49	67,225	62,137	92.4	--	18.7	16.9	1.8	22.7	18.3
49-50	66,089	60,975	92.3	--	19.9	18.1	1.8	22.1	17.7
50-51	64,893	59,762	92.1	--	21.1	19.3	1.8	21.4	17.0
51-52	63,641	58,501	91.9	--	22.4	20.6	1.8	20.8	16.4
52-53	62,330	57,193	91.8	--	23.7	21.8	1.9	20.3	15.7
53-54	60,971	55,836	91.6	--	25.0	23.1	1.9	19.7	15.1
54-55	59,563	54,440	91.4	--	26.4	24.3	2.1	19.1	14.4
55-56	58,116	53,003	91.2	--	28.3	25.5	2.8	18.6	13.8
56-57	56,634	51,503	91.0	--	30.3	26.6	3.7	18.0	13.2
57-58	55,128	49,942	90.6	--	32.6	27.6	5.0	17.5	12.6
58-59	53,601	48,314	90.1	--	35.4	28.7	6.7	17.0	11.9
59-60	52,037	46,604	89.5	--	39.3	29.6	9.7	16.5	11.3
60-61	50,506	44,772	88.6	--	43.5	30.7	12.8	15.9	10.8
61-62	48,945	42,824	87.5	--	48.0	31.8	16.2	15.4	10.2
62-63	47,374	40,768	86.1	--	54.6	33.0	21.6	14.9	9.7
63-64	45,792	38,542	84.2	--	61.5	34.3	27.2	14.4	9.2
64-65	44,198	36,172	81.8	--	69.0	35.7	33.3	13.9	8.7
65-66	42,594	33,676	79.1	--	76.7	37.2	39.5	13.4	8.3
66-67	40,975	31,093	75.9	--	84.2	38.9	45.3	12.9	7.9
67-68	39,344	28,475	72.4	--	91.0	40.6	50.4	12.4	7.5
68-69	37,703	25,884	68.7	--	97.0	42.5	54.5	11.9	7.2
69-70	36,055	23,373	64.8	--	102.3	44.7	57.6	11.4	6.9
70-71	34,396	20,982	61.0	--	107.3	47.2	60.1	10.9	6.6
71-72	32,721	18,731	57.2	--	112.7	50.4	62.3	10.4	6.3
72-73	31,020	16,620	53.6	--	118.5	54.0	64.5	9.9	6.0
73-74	29,289	14,651	50.0	--	124.3	58.1	66.2	9.5	5.8
74-75	27,529	12,830	46.6	--	131.2	62.7	68.5	9.0	5.5
75-76	25,742	11,147	43.3	--	138.4	67.8	70.6	8.6	5.2
76-77	23,932	9,604	40.1	--	146.8	73.8	73.0	8.2	5.0
77-78	22,099	8,194	37.1	--	155.9	80.2	75.7	7.8	4.7
78-79	20,256	6,917	34.1	--	165.7	86.7	79.0	7.4	4.5
79-80	18,427	5,771	31.3	--	176.2	93.0	83.2	7.1	4.2
80-81	16,640	4,754	28.6	--	187.4	99.0	88.4	6.7	4.0
81-82	14,916	3,863	25.9	--	199.3	104.9	94.4	6.4	3.8
82-83	13,274	3,093	23.3	--	211.9	110.6	101.3	6.2	3.6
83-84	11,728	2,438	20.8	--	225.2	116.0	109.2	5.9	3.4
84-85	10,289	1,889	18.4	--	239.2	121.5	117.7	5.6	3.2
85-86	8,961	1,437	16.0	--	253.9	127.1	126.8	5.3	3.0
86-87	7,745	1,072	13.8	--	269.3	132.9	136.4	5.1	2.8
87-88	6,641	783	11.8	--	285.4	138.8	146.6	4.8	2.6
88-89	5,646	560	9.9	--	302.3	145.0	157.3	4.6	2.5
89-90	4,737	391	8.2	--	320.1	151.9	168.2	4.3	2.3
90-91	3,968	266	6.7	--	338.9	159.7	179.2	4.1	2.2
91-92	3,272	176	5.4	--	358.9	168.4	190.5	3.8	2.0
92-93	2,663	113	4.2	--	380.4	177.9	202.5	3.5	1.9
93-94	2,136	70	3.3	--	403.9	187.9	216.0	3.3	1.7
94-95	1,686	42	2.5	--	430.1	197.9	232.2	3.0	1.6
95-96	1,309	24	1.8	--	459.9	208.1	251.8	2.7	1.5
96-97	997	13	1.3	--	494.5	218.6	275.9	2.3	1.3
97-98	744	7	.9	--	535.6	229.2	306.4	1.9	1.1
98-99	543	3	.6	--	583.1	239.2	345.9	1.4	.8
99-100	386	1	.3	--	645.6	247.9	397.7	.8	.5

Table 10. -- Median ages of accession and separation for the stationary labor force, males, by color and by urban-rural residence, 1940 ^{1/}

(In years)

Color and residence	Age at accession	Age at separation		
		All causes	Deaths	Retirements
Total.....	17.5	63.2	59.0	65.5
White.....	17.7	63.6	60.0	65.5
Nonwhite.....	16.5	57.7	52.6	66.2
Total urban.....	17.8	62.1	57.7	65.0
White.....	17.8	62.6	58.5	65.0
Nonwhite.....	17.0	54.8	49.9	64.1
Total rural.....	17.1	64.7	61.1	66.5
White.....	17.3	65.0	62.1	66.4
Nonwhite.....	16.1	61.7	55.7	68.5

^{1/} Estimated on basis of tables of working life for 1940.

It has not been possible, as yet, to develop separate tables of working life for wage and salary workers, but data on the age distribution of employed men, by class of worker, provide some insight into the differences between the retirement pattern of employees and of the self-employed. The proportion of wage and salary workers among employed men in each age group in 1940 declined gradually from a peak of 83 percent in the age group 20-24 years to about 56 percent for men aged 60 to 64 years. After age 64 the decline became particularly sharp; among employed men aged 75 years and over, only 35 percent were wage and salary workers. This decline in wage and salary employment with age is due in part to the shift to self-employment by many employees as they acquire the requisite experience and capital. Some older workers who are past the conventional retirement age or who, for other reasons, can no longer secure regular paid employment also tend to shift to work on their own account, often on a part-time or intermittent basis. ^{16/} However, the steepness of the decline of wage and salary employment after the early sixties strongly suggests that, on the average, men who have been employees during all, or most, of their working lives are compelled to withdraw from gainful activity at an earlier age than are the self-employed.

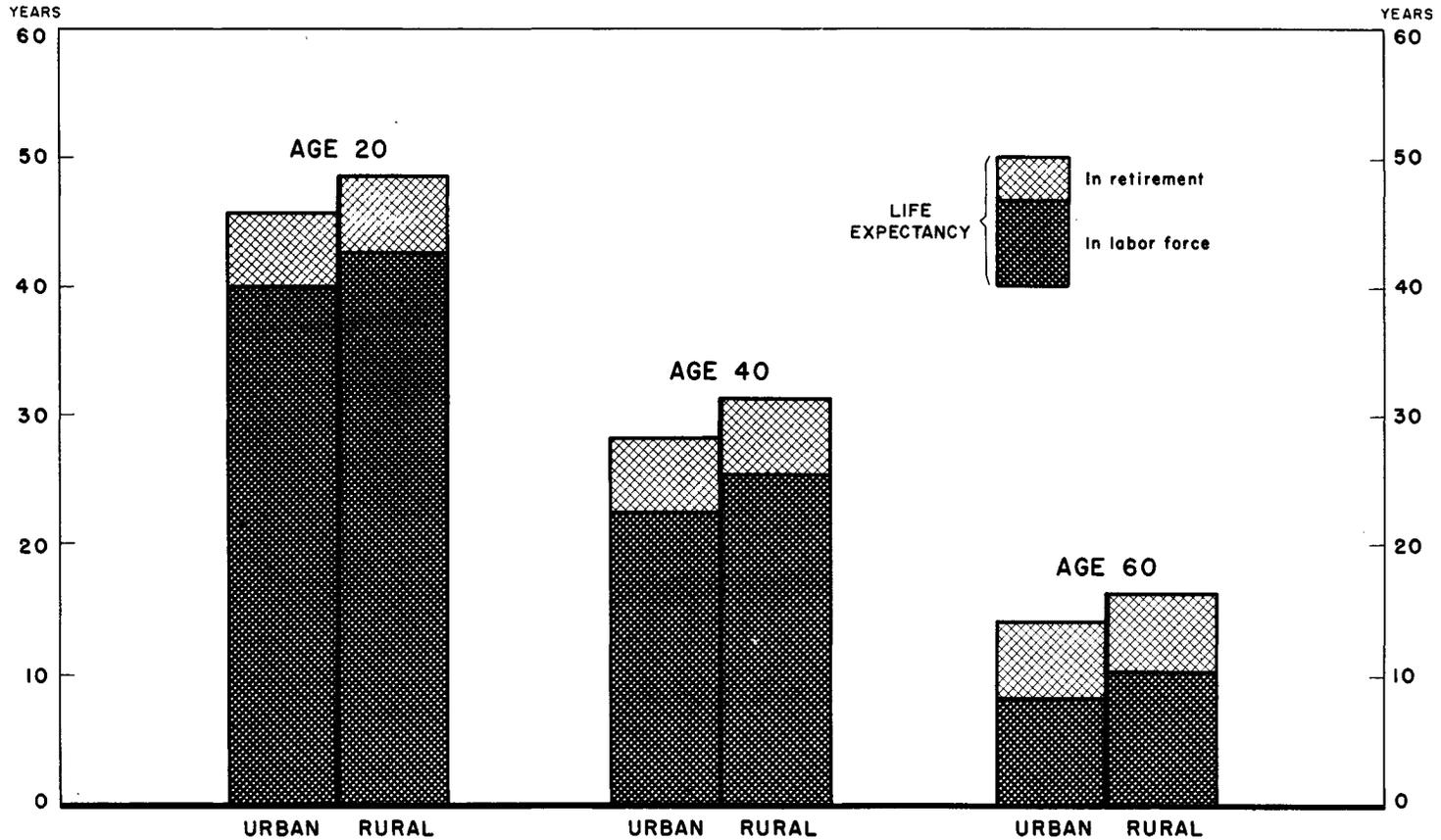
Life Expectancy and Work-Life Expectancy. The lower mortality rates of men living in rural areas are reflected in a significantly higher average life expectancy than for urban men workers. In 1940, the rural resident at age 20 had an average expectation of life of 48 1/2 years or 3 years more than men in urban areas (table 11). At age 60, the differential in favor of the rural worker was still fully 2 years.

Since the rural worker tends to retire at a later age than the urban worker, his greater average longevity has contributed to his working life, rather than to the period of retirement. Thus, the average work-life expectancy of the rural worker at age 20 (42.8 years) was about 3 years greater than that of the urban worker; in contrast, the rural worker's average retirement-life expectancy of 6 years was about the same as for urban men. (See chart 7.)

^{16/} The relatively greater importance of part-time employment among older men is indicated by the proportion of employed men who worked less than 35 hours in the Census survey week, March 24-30, 1940. This proportion rose from 10 percent among employed men aged 45-54 years (for whom hours of work were reported) to about 22 percent among those in the group 75 years and over. The relative increase in part-time employment with increased age was greatest, moreover, among farm residents, indicating the greater flexibility of employment conditions for this group. Source: Sixteenth Census of the United States, 1940, op.cit., table 29.

CHART 7

AVERAGE NUMBER OF REMAINING YEARS OF LIFE IN LABOR FORCE AND IN RETIREMENT MALE WORKERS IN URBAN AND RURAL AREAS, 1940



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Table 11. — Average number of remaining years of life, in labor force and in retirement, males, by color and by urban-rural residence, 1940

Color	Age 20			Age 40			Age 60		
	Total	In labor force	In retirement	Total	In labor force	In retirement	Total	In labor force	In retirement
	${}^o e_x$	${}^o e_{w_x}$	${}^o e_x - {}^o e_{w_x}$	${}^o e_x$	${}^o e_{w_x}$	${}^o e_x - {}^o e_{w_x}$	${}^o e_x$	${}^o e_{w_x}$	${}^o e_x - {}^o e_{w_x}$
Total.....	46.8	41.1	5.7	29.5	23.7	5.8	15.1	9.1	6.0
White....	47.7	41.8	5.9	30.1	24.0	6.1	15.1	9.1	6.0
Nonwhite.	39.8	36.2	3.6	25.4	21.3	4.1	14.6	9.5	5.1
Total urban	45.6	40.0	5.6	28.3	22.5	5.8	14.1	8.2	5.9
White....	46.4	40.7	5.7	28.7	22.8	5.9	14.1	8.2	5.9
Nonwhite.	37.0	33.4	3.6	23.0	18.8	4.2	12.9	7.3	5.6
Total rural	48.6	42.8	5.8	31.4	25.4	6.0	16.2	10.1	6.1
White....	49.6	43.4	6.2	31.9	25.6	6.3	16.2	10.1	6.1
Nonwhite.	43.1	39.3	3.8	28.1	23.9	4.2	15.9	10.8	5.1

White-Nonwhite Differentials

Labor Force Accessions. Nonwhite youths typically begin working at an earlier age than do white youths. At age 14, almost 15 percent of the nonwhite males were in the labor force in 1940, as compared with only 5 percent of the whites. Labor force entry rates were higher for the nonwhites until ages 16-17; after this age interval, white youths began working in proportionately greater numbers. (See chart 8.) This contrasting pattern of labor force entry resulted in a median age at accession of 16.5 years for the nonwhites, which was more than 1 year earlier than for white youths.

This differential is closely related to the relatively unfavorable social and economic status of the nonwhite youths as a group. Lower family income and the larger average number of children per family have made it necessary for nonwhite youths to contribute to the family livelihood at an earlier age than white youths. Relatively more limited access to occupations requiring substantial training or education has also tended to reduce the incentive for Negroes as a group to obtain advanced education and has encouraged them to leave school at an earlier age.

Labor Force Separations. Nonwhite men are subject to substantially higher rates of labor force separation than are white men, until the early sixties; above this age, the situation is reversed. (See chart 9.) For all nonwhite men in the 1940 stationary labor force, the median age at separation of 57.7 years was about 6 years lower than for white men. The differential was greatest for the urban nonwhites, who stopped working about 8 years earlier, on the average, than white men in urban areas. In rural areas, the median age at labor force separation of nonwhites was only about 3 years lower than for whites.

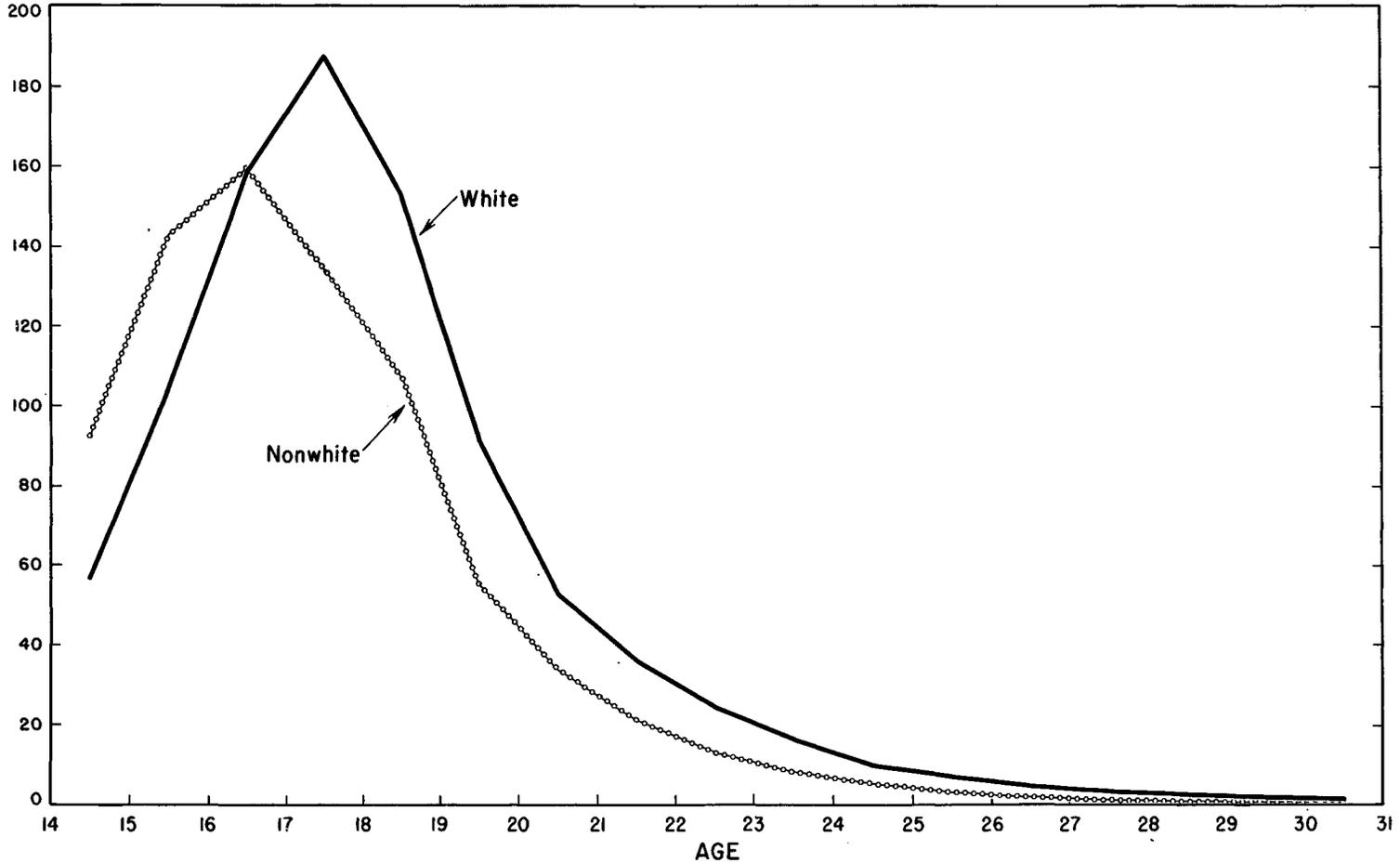
The lower average age of labor force separation of nonwhites is largely due to their much higher rates of mortality, during the period of working age. At age 30, the death rate among nonwhite men was about 3 times as high as among whites, and—even at age 60—it was still about 50 percent above the corresponding rate for whites. These striking differences in mortality experience reflect the less adequate level of nutrition, hygiene, and medical care available to the nonwhite population, as well as the other basic handicaps associated with a lower standard of living.

The apparently more favorable mortality rates reported for nonwhite men in the upper ages (i.e., above age 75) are partially explained by the high proportion of farmers, a group with particularly favorable mortality rates, among the nonwhites surviving to these ages. They may, however, be due in part to incomplete death registration of nonwhites and to biases in age reporting, and should therefore be interpreted with caution. 17/

17/ See Appendix, p. 61.

ANNUAL RATES OF LABOR FORCE ACCESSION* WHITE AND NONWHITE MALES, 1940

PER 1000 IN
POPULATION

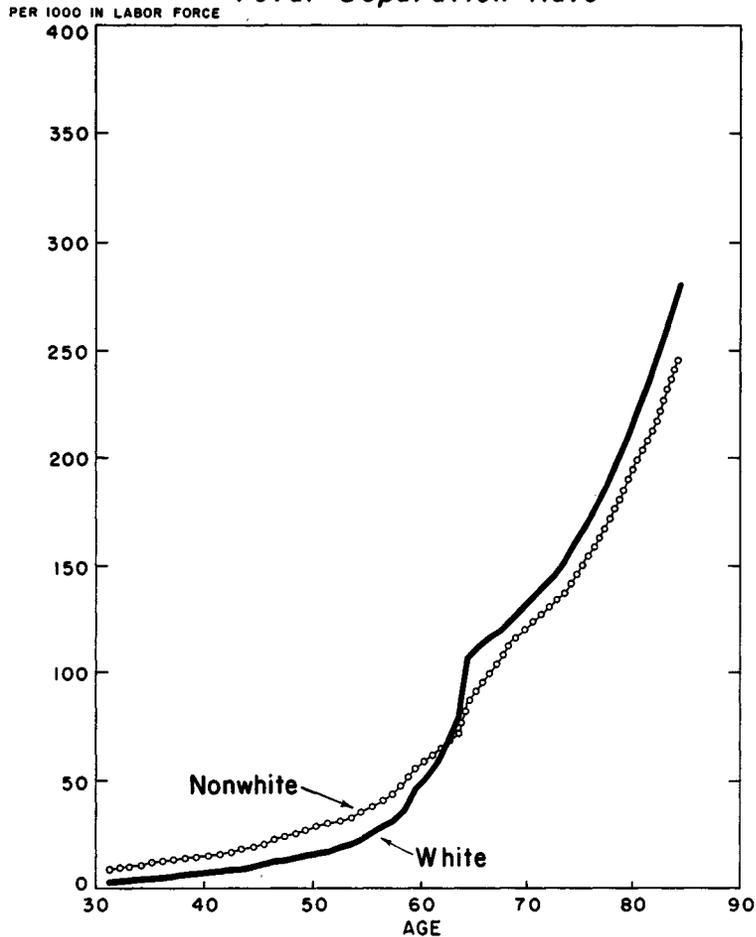


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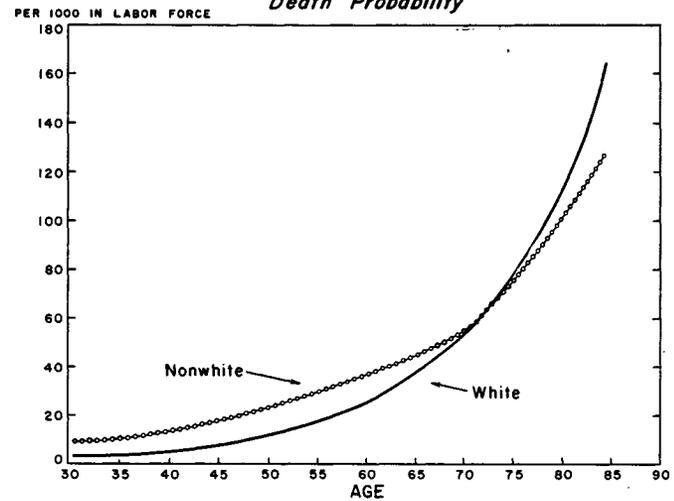
* After age 14

ANNUAL RATES OF LABOR FORCE SEPARATION WHITE AND NONWHITE MALES, 1940

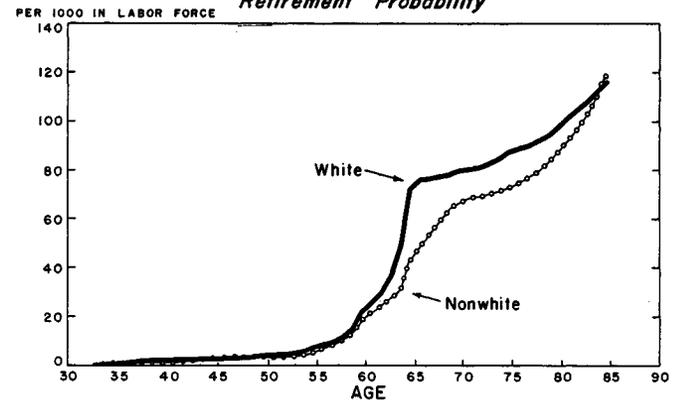
Total Separation Rate



Death Probability



Retirement Probability



Retirement rates among nonwhite workers tend to be lower, at most ages, than among white workers, thus differing from the mortality pattern. The difference is most pronounced in the age span of the sixties, when nonwhite men apparently experience much less "bunching" of retirements. These differences largely arise because a relatively high proportion of nonwhite workers are farmers or farm laborers, who are less subject to the social and economic factors that influence retirement of other workers. 18/

Separate examination of the retirement patterns of urban and rural workers discloses significant contrasts between retirement rates of whites and nonwhites in each group. In urban areas, the median retirement age of nonwhites in the stationary labor force (64.1 years) was about 1 year less than for white workers. This is probably due to a combination of factors: higher rates of unemployment among the urban nonwhites, a higher incidence of disability, and a much greater concentration in unskilled and semi-skilled jobs, in which age and physical disabilities are likely to be greater handicaps to continued employment.

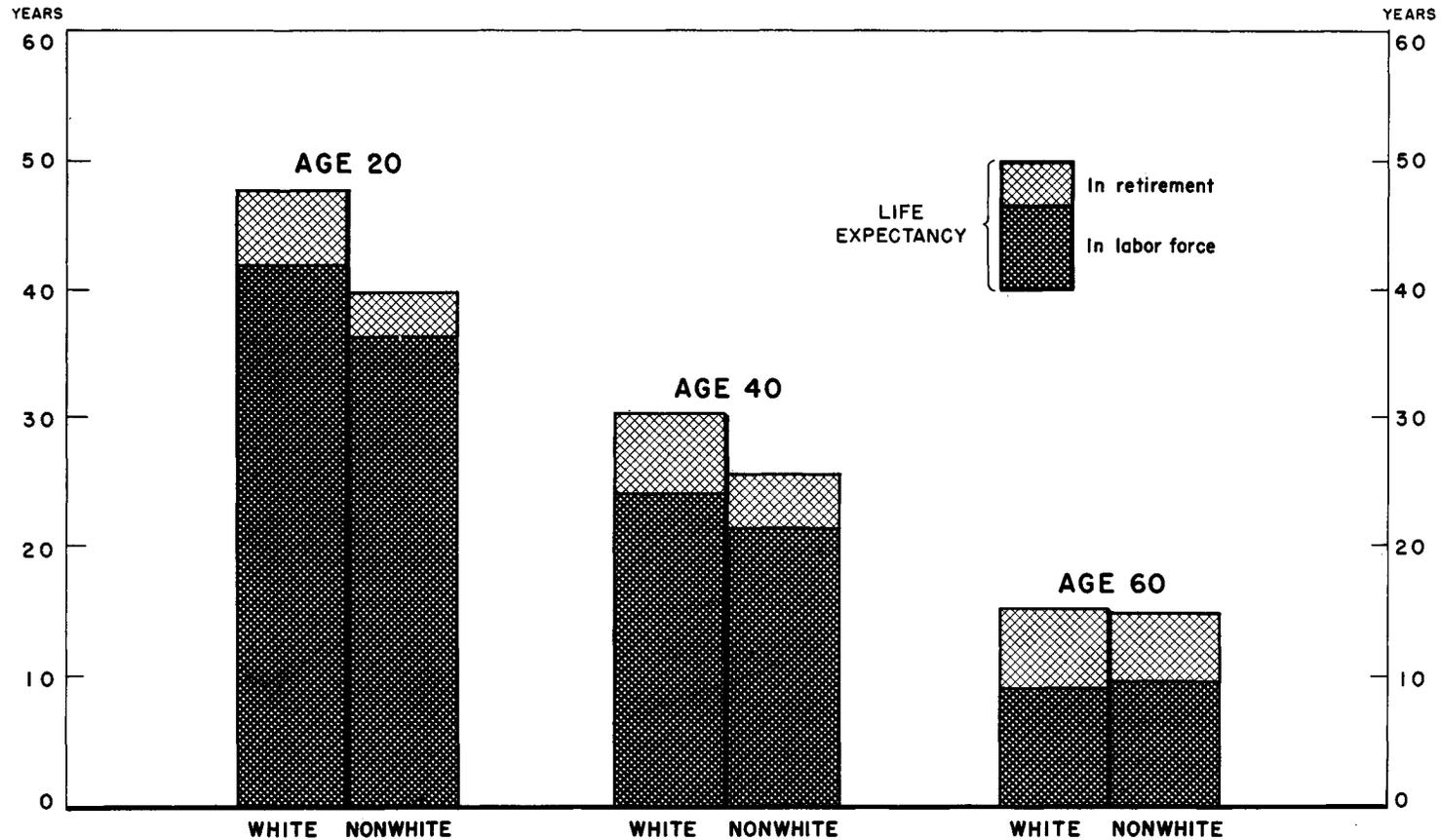
In rural areas, the reverse was true: the median retirement age of rural nonwhites, 68.5 years, was fully 2 years higher than for the white group. With work opportunities more readily accessible to them, virtually all able-bodied nonwhites in rural areas apparently continued working even at the most advanced ages. Thus, in rural areas in 1940, only about 5 percent of the nonwhite men, 75 years and over, not in institutions, were reported as outside of the labor force for causes other than disability, as compared with 14 percent of the whites. 19/

Life Expectancy and Work-Life Expectancy. A comparison of color differentials in working-life expectancy shows that, at most ages, the known differences in life expectancy apply to working life, although in lesser degree (chart 10). Under 1940 conditions, the average life expectancy for the nonwhite worker, aged 20, was about 8 years less than that for a white youth of the same age. His working-life expectancy, of 36.2 years, was about 5 1/2 years less than for the white worker—largely reflecting his poorer chances of surviving through the "prime" of working life. Just as for total life expectancy, this differential narrowed gradually over the period of middle age and, by age 60, the working-life expectancy of the surviving nonwhite workers, as a group, actually exceeded that of white workers. This partly reflects the relatively low mortality rates of nonwhites at advanced ages, and partly the predominantly rural composition (and lower retirement rates) of the nonwhite labor force in the upper age groups.

18/ In March 1940, about 45 percent of nonwhite males 55 years and over in the labor force were in rural-farm areas as compared with 28 percent of the white males. Source: Sixteenth Census of the United States, 1940, Population, The Labor Force (Sample Statistics), Employment and Personal Characteristics, table 1.

19/ Source: Sixteenth Census of the United States, 1940, Population, Characteristics of Persons not in the Labor Force, table 1.

AVERAGE NUMBER OF REMAINING YEARS OF LIFE IN LABOR FORCE AND IN RETIREMENT WHITE AND NONWHITE MALE WORKERS, 1940



Largely as a result of the shorter life expectancy of the nonwhites, their average retirement-life expectancy was also less than for white workers. At age 20, the difference between the life and the working-life expectancies of the nonwhite worker, about 3 1/2 years, was over 2 years less than for a white man of the same age, mainly because a smaller proportion of the nonwhite workers could expect to attain retirement age. The retirement-life expectancy of the nonwhites showed a pronounced rise, however, to over 5 years at age 60, reflecting the relative improvement in life expectancy of those nonwhite workers surviving to advanced ages.

CHANGES IN THE PATTERN OF WORKING LIFE, 1940-47

The pattern of working life is continually changing. It is affected by trends in mortality and also by various long-term social and economic forces. In addition to these basic trends, experience during the past decade has revealed marked changes in the pattern of labor force participation in relation to age, resulting from wartime mobilization of the labor force and subsequent transition to a period of high postwar employment.

In order to gage the effect of these changes on the length of working life, an abridged working-life table for males, by 5-year age groups, was constructed on the basis of 1947 experience (table 12). A comparable abridged table is also shown for 1940.

Stationary Population and Labor Force

The abridged tables, like the detailed tables for 1940, begin with an initial group of 100,000 persons born alive each year. The estimated number of survivors in the population and in the labor force, and the corresponding rates of entry and separation from the labor force, are shown, however, for 5-year groups only. Thus, the 1947 stationary population, aged 10-14, of 475,284 represents the probable number who would be living within these attained ages, on the assumption of 100,000 male live births annually (or 500,000 in a 5-year period) and subjected to the stated conditions of mortality. Use of this summary form was necessitated by the absence of any reliable population and labor force data by single years of age after 1940. 20/

20/ The rates of labor force participation shown in the 1947 table were based on a special tabulation of the Census Bureau's Monthly Report on the Labor Force for April 1947. Because of sample limitations, the development of estimates by single years of age was not feasible.

Table 12. — Abridged table of working life, males, 1940 ^{1/} and 1947

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Age interval	Number living of 100,000 born alive		Accessions to the labor force (per 1,000 in population)	Separations from the labor force (per 1,000 in labor force)			Average number of remaining years of		
	In population	In labor force		Due to all causes	Due to death	Due to retirement	Life	Labor force participation	
Number		Percent of population	1000 n^A_x						1000 n^S_x
x to x+n	n^L_x	n^W_x	n^P_x	1000 n^A_x	1000 n^S_x	1000 n^D_x	1000 n^R_x	e^o_x	e^w_x
	(Within age interval)			(Between successive age intervals)			(At beginning of age interval)		
1940									
10-14.....	461,865	6,196	2/	431.0	8.2	8.2	-	-	-
15-19.....	458,100	205,229	44.8	441.6	12.0	12.0	-	51.3	45.8
20-24.....	452,589	405,067	89.5	68.0	14.9	14.9	-	46.8	41.3
25-29.....	445,845	429,795	96.4	7.9	17.6	17.6	-	42.4	36.8
30-34.....	438,014	425,750	97.2	-	28.0	21.9	6.1	38.0	32.3
35-39.....	428,373	413,808	96.6	-	37.8	29.7	8.1	33.7	28.0
40-44.....	415,611	398,155	95.8	-	53.3	42.1	11.2	29.6	23.8
45-49.....	398,028	376,933	94.7	-	80.2	60.8	19.4	25.5	19.8
50-54.....	373,582	346,684	92.8	-	117.8	85.9	31.9	21.8	16.0
55-59.....	340,970	305,850	89.7	-	211.6	115.7	95.9	18.3	12.4
60-64.....	299,545	241,134	80.5	-	376.7	148.9	227.8	15.1	9.2
65-69.....	248,456	150,316	60.5	-	495.5	191.8	303.7	12.2	6.8
70-74.....	189,583	75,833	40.0	-	576.4	262.4	314.0	9.6	5.6
75 and over	232,278	44,830	19.3	-	-	-	-	-	-
1947									
10-14.....	475,284	18,320	2/	524.1	5.8	5.8	-	-	-
15-19.....	472,525	259,889	55.0	346.7	9.5	9.5	-	52.6	47.4
20-24.....	468,041	421,237	90.0	67.2	11.3	11.3	-	48.0	42.8
25-29.....	462,739	447,931	96.8	6.9	12.6	12.6	-	43.5	38.2
30-34.....	456,917	445,494	97.5	-	20.7	16.6	4.1	39.0	33.6
35-39.....	449,323	436,293	97.1	-	32.5	24.4	8.1	34.5	29.1
40-44.....	438,330	422,112	96.3	-	47.9	36.7	11.2	30.2	24.8
45-49.....	422,149	401,886	95.2	-	75.6	56.3	19.3	26.0	20.7
50-54.....	398,186	371,508	93.3	-	106.7	82.1	24.6	22.1	16.9
55-59.....	365,102	331,878	90.9	-	160.5	115.1	45.4	18.6	13.2
60-64.....	322,102	278,618	86.5	-	354.7	148.6	206.1	15.3	9.7
65-69.....	267,931	179,782	67.1	-	501.8	189.2	312.6	12.4	7.0
70-74.....	204,978	89,575	43.7	-	544.3	258.8	285.5	9.9	5.9
75 and over	263,826	60,944	23.1	-	-	-	-	-	-

^{1/} Labor force data for 1940 have been adjusted to allow for a revision in Census Bureau enumeration procedures introduced in July 1945. The resulting rates are comparable with those shown in the abridged table for 1947, but may not be compared directly with the detailed tables for 1940. See Appendix, p. 72.

^{2/} In accordance with current Census definitions, only persons 14 years of age or over are enumerated in the labor force. No meaningful percentage of the population in the labor force could therefore be computed for the age interval 10-14 years.

There have been pronounced increases in the labor force potential of the male population as compared with 1940 (chart 11). Increases in the stationary labor force are shown for each age interval, with sharp gains recorded among the teen-age youth and, to a lesser extent, among the older men. In the aggregate, the stationary population in 1947 could expect to yield a total of 4,163,013 man-years in the labor force, which is 9 percent more than the corresponding total of 3,825,580 in 1940. 21/

This striking gain was traceable to the increase in life expectancy and also to the higher rates of labor force participation by youths and older men. The relative importance of these factors and the changes in the pattern of labor force entries and separations are discussed in the following sections.

Lower Age of Labor Force Entry

A marked reduction in the average age of entry into the labor force occurred between 1940 and 1947. Under 1940 conditions, about 43 out of every 100 boys aged 10-14 could expect to begin their work careers in the following 5-year interval, as compared with an entry rate of 44 per 100 for youths who were 15-19 years of age in 1940. In 1947, the 5-year entry rate for boys 10-14 years old rose to 52 per 100, while fewer entries occurred at the later ages than under 1940 conditions. 22/

The earlier average age of entrance into the postwar labor force, compared with 1940, was due in part to the after-effects of World War II. During wartime, the long-term trend towards longer schooling had been interrupted. Millions of youths left school early to enter the Armed Forces or to take civilian jobs, and many others took part-time jobs after school hours. Although many youths quit the labor market after VJ-day, reconversion of the labor force did not bring a complete return to the prewar work pattern. Many young people who had acquired wartime work experience preferred to remain in the postwar labor market. In addition, large numbers of 17-19-year-old youths were still in the Armed Forces in April 1947, some of whom might otherwise have been in school.

The changed employment situation also was important in reducing the average age of labor force entry. In April 1940, job opportunities for inexperienced youths were limited. About a third of all male youths, 17-18 years of age, who were in the labor force were reported as unemployed, and relatively few boys attending school had opportunities for part-time employment after school hours. Thus, of 3,870,000 boys, 14-17 years old enrolled in school at the time of the 1940 Census, only 240,000, or 6 percent, were employed. In 1947, with jobs generally available and unemployment near the frictional level, over a fifth of the 14-17-year-olds enrolled in school were also employed. 23/

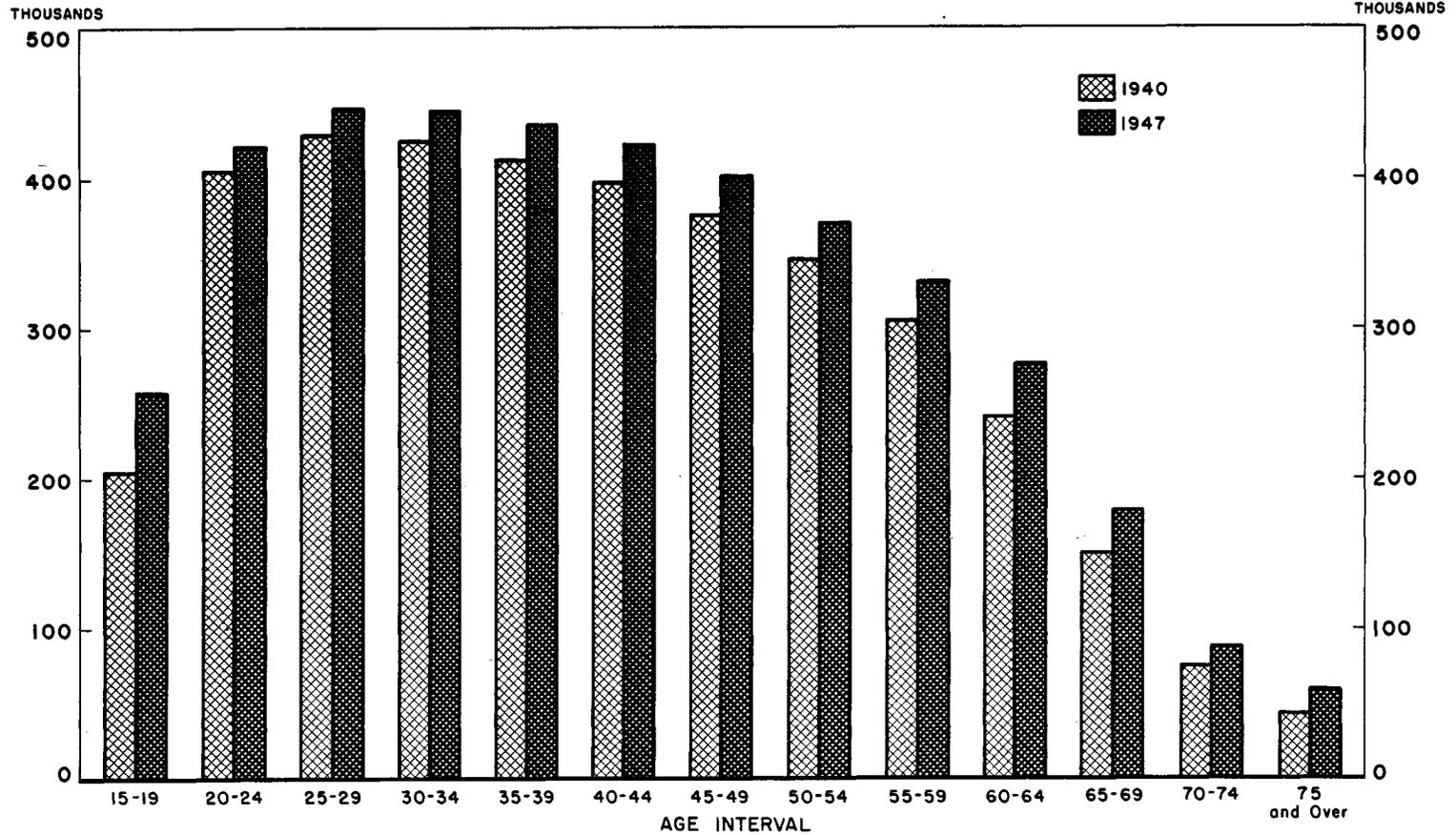
21/ This total represents the cumulative number in the stationary labor force, obtained by a summation of column 3 in the abridged table.

22/ These findings are consistent with the statistics on the age distribution of applicants for new Social Security account numbers. In 1940, the modal age of male applicants was 17; in 1947, the modal age was 16.

23/ U. S. Bureau of the Census, School Enrollment of the Civilian Population: April 1947, table 6 (Series P-20, No. 12).

STATIONARY LABOR FORCE MALES, 1940 AND 1947

Number in Labor Force, of 100,000 Born Alive Annually



UNITED STATES DEPARTMENT OF LABOR
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Later Age at Separation

The labor force potential of the population was also enhanced between 1940 and 1947 by a reduction in the age-specific rates of labor force separation. As shown in chart 12, the 5-year labor force separation rates declined at all ages up to 65, with the drop most pronounced for men 55-59 years of age.

Reduced mortality was a major factor in the decline. Probabilities of separation due to death were lower at all age intervals in 1947 than in 1940. Although the decline in mortality continued a long-term trend, the great medical advances of recent years, coupled with the pronounced rise in living standards, had resulted in a particularly favorable mortality record. Thus, between 1939 and 1947, deaths due to pneumonia and influenza had dropped from 75.7 to 43.1 per 100,000 population, largely because of the extensive use of chemotherapy and antibiotics; the tuberculosis death rate had declined by over a fourth, largely as a result of the improvement in the standard of living among low-income families and the increased facilities for treatment and detection of the disease. 24/

In addition, the proportion of men retiring from the labor force before the late sixties declined significantly. The 5-year probability of retirement for men workers 55-59 years of age dropped by more than 50 percent, from 96 per 1,000 in 1940 to 45 per 1,000 in 1947. A slight decline was also recorded for the 60-64 group; however, the proportion of retirements among men aged 65-69 was somewhat higher in 1947 than in 1940.

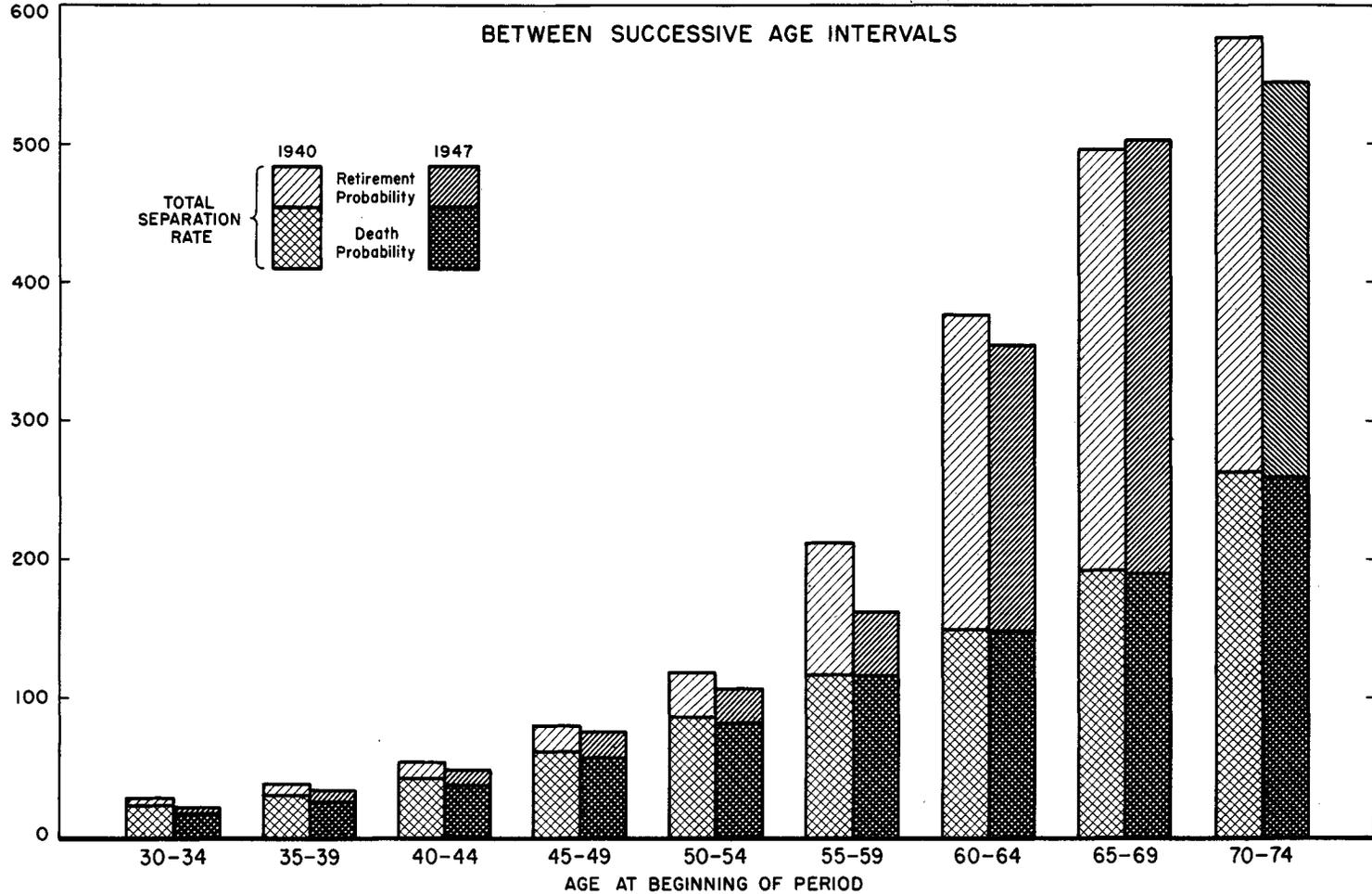
The higher level of job opportunities in the postwar period appears to have been a major factor in the shift of the retirement pattern. During the war years, age barriers to employment were generally lifted, and many older workers who had previously dropped out of the labor force returned to gainful employment. With the continuance of high employment after the war, many men in their late fifties and sixties remained at work in preference to retiring. 25/ Higher postwar wages and prices also contributed to the later ages at retirement. Coverage under public and private old-age pension programs had expanded during the war years, but the benefits established were generally based on earnings during a period of years preceding the date of retirement. With job opportunities still available for many older men, retirement on pensions became relatively less attractive in the postwar years.

24/ Data from Federal Security Agency, Vital Statistics of the United States, 1947, Part I, table X. An analysis of recent changes in longevity appears in the Statistical Bulletin of the Metropolitan Life Insurance Co., January 1950.

25/ In 1947, there were about 842,000 men, 65 years or over, entitled to OASI benefits, but who had continued in covered employment, according to the Bureau of Old Age and Survivors Insurance of the Social Security Administration.

FIVE-YEAR SEPARATION RATES FROM THE LABOR FORCE TOTAL MALES, 1940 AND 1947

PER 1,000 IN
LABOR FORCE



UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

The Increase in Work-Life Expectancy

The foregoing changes significantly increased both the total longevity and the working-life span of the American male worker between 1940 and 1947. In 1947, a 20-year-old male worker could expect to live an additional 48.0 years, or 1.2 years more than in 1940, and could look forward to an additional 42.8 years in the labor force, a gain of 1.5 years over 1940. Since the increase in total life expectancy was matched by the lengthening of the work-life span between 1940 and 1947, there was no significant change in the number of years which the average male worker could expect to spend in retirement.

THE TREND OF OLD-AGE DEPENDENCY

During the past few centuries, the average expectation of life has increased markedly as a result of the great progress of medical science and the general rise in living standards. At the same time, a number of social and economic factors have tended to curtail the labor force participation of older men, particularly after age 65. Thus, for the average worker, the period has lengthened during which he must seek support from some source other than his own employment.

In order to measure this trend, estimates of working-life expectancy of men were prepared for the year 1900. These estimates, it should be noted, are not strictly comparable with those shown here for 1940 and 1947, because the mortality experience was limited to white men in the 11 States where death registration was required in 1900. However, the estimates provide a clear indication of the growing period of old-age dependency.

Under 1900 conditions of mortality and of labor force participation, a young white man, at age 20, had an average additional life span of 42.2 years, and a working-life expectancy of 39.4 years (table 13). He could expect, therefore, 2.8 years outside of the labor force. Between 1900 and 1940, the life expectancy of a white male, at age 20, increased by 5.5 years. His average work-life expectancy, however, increased by only 2.6 years. Therefore, the gap between total life expectancy and working-life expectancy had widened to 5.7 years—about double the length in 1900.

For those men who survived until age 60 the contrast is equally striking. While the life expectancy of a 60-year-old white man rose by almost 1 year between 1900 and 1940, his average working-life expectancy actually dropped more than 2 years, owing to the trend toward earlier retirement. Thus, both comparisons indicate a pronounced widening in the expected period of retirement in the course of the four decades.

Table 13. -- Average number of remaining years of life, in labor force and in retirement; white males, 1900, 1940; total males, 1940, 1947, 1975

Year	Average number of years of life remaining		
	Total e_x	In labor force ^{1/} e_{w_x}	In retirement $e_x - e_{w_x}$
At age 20			
White males:			
1900 ^{2/}	42.2	39.4	2.8
1940.....	47.7	42.0	5.7
Total males:			
1940.....	46.8	41.3	5.5
1947.....	48.0	42.8	5.2
1975 (A) ^{3/}	52.7	42.8	9.9
1975 (B) ^{3/}	52.7	45.9	6.8
At age 40			
White males:			
1900 ^{2/}	27.7	24.5	3.2
1940.....	30.1	24.2	5.9
Total males:			
1940.....	29.6	23.8	5.8
1947.....	30.2	24.8	5.4
1975 (A) ^{3/}	33.9	24.5	9.4
1975 (B) ^{3/}	33.9	27.2	6.7
At age 60			
White males:			
1900 ^{2/}	14.3	11.5	2.8
1940.....	15.1	9.2	5.9
Total males:			
1940.....	15.1	9.2	5.9
1947.....	15.3	9.7	5.6
1975 (A) ^{3/}	16.8	7.9	8.9
1975 (B) ^{3/}	16.8	10.5	6.3

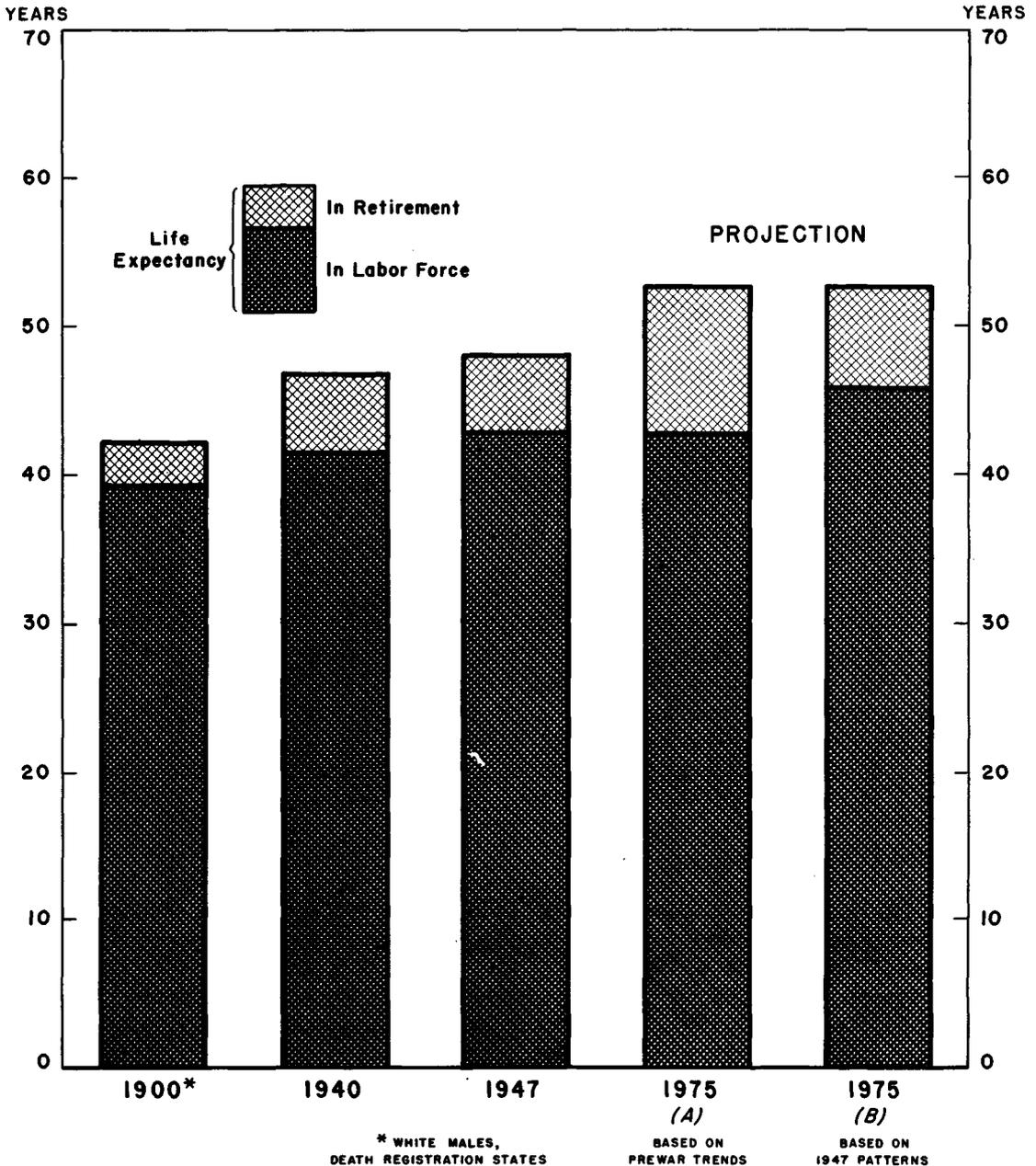
^{1/} Labor force estimates for 1900 and 1940 have been adjusted for comparability with the estimates for 1947 and 1975, but may not be compared directly with the detailed tables for 1940. See Appendix, p. 72.

^{2/} Mortality data based on records of 11 original death registration states.

^{3/} A: Assumes continued decline in labor force participation rates for men, 55 years and over, based on 1920-40 trends. B: Assumes labor force participation rates at 1947 levels.

CHAR. 13

AVERAGE REMAINING YEARS OF LIFE IN LABOR FORCE AND IN RETIREMENT MALE WORKERS, AGE 20



UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

If this trend simply resulted from a preference for retirement and an increased financial ability to retire, it would not indicate any serious social problem. The weight of the evidence, however, lies in the opposite direction. A number of factors operated to reduce the opportunities of older workers for gainful employment. There was a steady shift of employment opportunities from agriculture to nonagricultural industries and from small family-type establishments to large-scale business enterprises. Modern industry, with its more rigid and impersonal standards, its emphasis on speed and its tendency to set arbitrary age limits for hiring and retirement, offered relatively fewer opportunities for gainful employment at advanced ages. And superimposed on these long-term trends was the mass unemployment of the 1930's, which caused many older men to abandon the search for work, even though they were still capable of a productive role in the economy.

This long-term trend contrasts sharply with the experience between 1940 and 1947. As summarized in the preceding section, the shift from a depression to a full-employment economy was accompanied by increased labor force participation of men in their late fifties and sixties. As a result, despite the marked increase in longevity, the average period outside the labor force did not widen from 1940 to 1947.

On the basis of both the prewar trend and the more recent experience during the past decade, alternative patterns of working life for the future may be projected (chart 13). To illustrate, two estimates of work-life expectancy have been prepared for the year 1975. The first assumes 1940 labor force participation rates for the younger adult age groups and a continued downtrend in the proportion of workers among men 55 years and over, based on the rates of decline in the period 1920-40. The second alternative is based on the maintenance of the 1947 rates of labor force participation.

Under both assumptions, the estimates of life expectancy are based on a continued favorable trend in mortality, consistent with recent forecasts of the population published by the United States Bureau of the Census. ^{26/} Thus, under 1975 conditions, the 20-year-old man could expect an average lifetime of almost 73 years, as compared with 68 years in 1947; at age 60, his average lifetime would be extended to almost 77 years--1 1/2 years above the 1947 level.

Under the first alternative of progressively earlier retirement, the average work-life expectancy of the 20-year-old male worker, slightly under 43 years, would be the same in 1975 as in 1947. The average life expectancy in retirement would widen, however, to almost 10 years, as compared with 5 years in 1947 and less than 3 years (for white males) in 1900.

^{26/} Forecasts of the Population of the United States, 1945-1975 (1947). The Census Bureau "low mortality" projection for 1975 was selected since it was most consistent with the mortality experience between 1945 and 1949.

The contrast at age 60 is also pronounced. Of an average future lifetime of almost 17 years, the 60-year-old worker could expect to continue in the labor force for only about 8 years, and would have to provide for about 9 years in retirement. The prospect would, therefore, be for a progressive decline in the work-life span and a further lengthening of retirement.

The second alternative, based on the 1947 rates of labor force participation, produces quite different results. The gain in total longevity would be added mainly to the period of productive life. At age 20, the average working-life expectancy would be increased by more than 3 years as compared with 1947, and the span of retirement would be raised by 1 1/2 years. At age 60, the future work-life span, would increase by almost a full year as compared with 1947, rather than decline.

These comparisons do not, of course, allow for all of the factors which may influence the relative economic burden of dependency in old age. Changes in the age structure of the population, for example, will be significant, and will be influenced by future trends in the birth rate and by future immigration, as well as by the increase in life expectancy. The prospective cost of old-age pensions and related programs will be affected, too, by changes in coverage, eligibility, benefit amounts, and in other provisions of these programs. Changes in the average levels of earnings and of productivity will also significantly affect the relative cost of programs for the aging.

These comparisons do, however, focus attention on one of the pivotal aspects of the problem of old-age dependency. Individually and collectively, vital decisions will be made in the coming decades as to the disposition of the latter years of life between retirement and continued productive activity. In turn, these decisions will have important repercussions on the size of the Nation's labor force, the national income, and on the prospective standard of living of the American population.

THE RATE OF LABOR FORCE GROWTH

The rates of labor force entry and separation are readily adaptable to a variety of manpower studies. To illustrate one major application, estimates of male labor force entries and separations during the decade 1940-50 were prepared on the basis of the 1947 abridged table for total males. This table was selected, in preference to the table for 1940, as more representative of the experience during the decade as a whole.

In estimating the number of men entering the labor force during the 1940-50 decade, 10-year accession rates for 5-year age groups were computed from the 1947 abridged table. Application of these rates to the male population in each age group in 1940 yields an estimate of about 11,190,000 young

men who began their work careers during the past decade, or an average of about 1.1 million annually, ^{27/} (table 14). This estimate does not allow for labor force entries due to immigration, and is a "net" figure in the sense that it does not include the much greater volume of shifting between worker and nonworker status of seasonal and intermittent workers.

Similar estimates of the number of men who were separated from the labor force during the decade 1940-50 were computed on the basis of the mortality and retirement patterns prevailing in 1947. As shown in table 15, 7.2 million men, or 17.5 percent of the male labor force in April 1940, are estimated to have left the labor force because of death or retirement during the past decade. ^{28/} Of these, 4.2 million workers, or about three-fifths, were separated by death, and the remainder retired from gainful activity owing to disability, receipt of pensions, or other causes. The estimated median age at separation was 62.2 years for all men workers separated during the decade, as compared with a median age of 58.1 years for workers separated because of death, and of 66.1 years, for retirements.

The estimate of separations like that for labor force entrants, applies to a "closed group," i.e., the male labor force in 1940. No allowance was made, for example, for separations of men workers who entered the United States after 1940 or those men who withdrew from the labor force and subsequently resumed year-round work activity.

The difference between the estimates of male labor force entries and separations represents the estimated "natural" growth of the male labor force over the decade, 1940-50, i.e., the increase expected because of the changing size and age composition of the male population, exclusive of immigration. As the following tabulation shows, a natural increase of 4.0 million men workers, or about 10 percent, is estimated for the decade 1940-50. This means that, on the average, about 400,000 additional jobs for men workers were required annually during the decade, simply to allow for labor force growth resulting from the increase of the resident male population of working age.

^{27/} On the basis of the 1940 abridged table, the estimated number of male entries into the labor force during the decade 1940-50 was 11,160,000, which is not significantly different from the estimate of 11,190,000 derived from the 1947 table. However, the distribution of male labor force entrants by age in 1940, based on the 1940 abridged tables, did show a substantially larger proportion of prospective entrants from the age group 15-19 years, and correspondingly fewer entrants from the age groups 5-9 years, than shown in table 14.

^{28/} On the basis of the 1940 abridged table, about 7,850,000 men workers would have been expected to leave the labor force between 1940 and 1950, because of death or retirement, or about 10 percent more than the estimate based on the 1947 table.

Table 14. -- Estimated accessions to the male labor force, 1940-50 1/

Age in 1940	Male population 1940 (in thousands)	Accessions, 1940-50	
		Rate (per 1,000 in popu- lation)	Number (in thousands)
Total, ages 0-29	34,040	-	11,190
0-4	5,350	38.2	200
5-9	5,420	544.8	2,950
10-14	5,950	848.3	5,050
15-19	6,180	409.1	2,530
20-24	5,690	73.2	420
25-29	5,450	6.8	40

1/ Based on accession rates for total males, adapted from the abridged table for 1947.

Table 15. — Estimated separations from the male labor force, 1940-50 ^{1/}

Age in 1940	Male labor force, 1940 ^{2/} (in thousands)	Total separations 1940-50		Deaths		Retirements	
		Rate (per 1,000 in labor force)	Number ^{3/} (in thousands)	Probability (per 1,000 in labor force)	Number (in thousands)	Probability (per 1,000 in labor force)	Number (in thousands)
Total, 14 years and over	40,910	-	7,160	-	4,230	-	2,930
14-19	2,840	20.2	60	20.2	60	-	-
20-24	5,080	23.8	120	23.8	120	-	-
25-29	5,220	33.0	170	28.9	150	4.1	20
30-34	4,910	52.5	260	40.5	200	12.0	60
35-39	4,610	78.9	360	59.9	280	19.0	90
40-44	4,240	119.9	510	90.2	380	29.7	130
45-49	3,980	174.2	690	132.3	530	41.9	170
50-54	3,480	250.0	870	184.9	640	65.1	230
55-59	2,700	458.3	1,240	236.6	640	221.7	600
60-64	1,940	678.5	1,320	264.8	510	413.7	800
65 years and over.	1,910	814.1	1,560	378.1	720	436.0	830

^{1/} Based on separation rates for total males, adapted from abridged table for 1947 (Table 12).

^{2/} Estimates are comparable to current MRLF. Adapted from Census releases P-50, No. 2 and P-44, No. 12.

^{3/} Total separations do not necessarily add to separate estimates of deaths and retirements, due to rounding.

	Number (in thousands)
Male labor force, April 1940	40,910
Accessions, 1940-50	11,190
Separations, 1940-50	<u>7,160</u>
Natural growth: Number	4,030
Percent of 1940 male labor force	9.9%

The natural rate of labor force growth differs, of course, from the actual growth in the labor force from year to year, primarily because it does not allow for the effects of immigration and for year-to-year changes in the rates of labor force participation. It is, however, a significant measure because, over a period of years, the rate of natural growth of the labor force is largely determined by the age structure of the population and is not readily amenable to control by social and economic influences.

From a somewhat different perspective, these comparisons of estimated labor force entries and separations indicate that almost two-thirds of the 11 million young men who began their work careers during the decade 1940-50 were replacing older men who died or retired. This emphasizes the importance, for vocational guidance and related purposes, of determining the prospective replacement needs in various fields of employment, as one factor affecting relative job opportunities. The development of such estimates will be discussed in the following section.

OCCUPATIONAL SEPARATION RATES

In the absence of statistics on the number of persons leaving different occupations, the tables of working life provide a means for estimating occupational replacement needs arising out of deaths and retirements. Given the age-specific rates of labor force separation from the tables of working life and an age distribution of men by occupation from Census or other sources, it is possible to estimate the probable number of men who will be separated from each occupation because of death or retirement, over a period of years.

As an illustration of this application, the estimated number and rate of labor force separations in the period 1940-50 were computed for 33 selected occupations by applying 10-year separation rates, based on the 1947 abridged table, to the 1940 age distribution of experienced men workers in these occupations. These calculations disclose a wide range in the resulting rates of labor force separation, by occupation (table 16). Thus, as compared with an average decennial separation rate of 17.5 percent for all men workers, 33 percent of the blacksmiths, forgemen, and hammermen, and about 30 percent of the tailors and furriers, were expected to stop working

Table 16. -- Estimated separations due to death or retirement from selected occupations, 1940-50

Occupation	Number of men in experienced labor force 1940 <u>1/</u>	Separations due to death or retirement	
		Rate (per 1,000 in labor force) <u>2/</u>	Number
Blacksmiths, forgemen, and hammermen	86,900	330	28,700
Tailors and furriers.....	118,100	299	35,300
Carpenters.....	763,900	264	201,700
Masons, tile setters, and stonecutters.....	155,400	233	36,200
Cabinetmakers and pattern makers.....	91,100	229	20,900
Telegraph operators.....	34,100	228	7,800
Barbers, beauticians and manicurists.....	222,000	218	48,400
Boilermakers.....	32,900	217	7,100
Painters (construction), paperhangers, and glaziers.....	475,200	209	99,300
Plasterers and cement finishers.....	79,200	205	16,200
Stationary engineers, cranimen, hoistmen....	319,300	199	63,500
Plumbers and gas and steam fitters.....	210,100	197	41,400
Molders, metal.....	87,200	188	16,400
College instructors, professors and presidents	55,700	182	10,100
Machinists, millrights, and toolmakers.....	655,900	176	115,400
Structural and ornamental metal workers.....	38,400	169	6,500
Power station operators.....	21,700	169	3,700
Compositors and typesetters.....	166,300	168	27,900
Printing craftsmen, excluding compositors and typesetters.....	65,500	166	10,900
Roofers and sheet metal workers.....	123,800	166	20,600
Bakers.....	133,800	155	20,700
Cooks, except private family.....	203,200	153	31,100
Bookkeepers, accountants, cashiers, ticket agents.....	493,800	150	74,100
Electricians.....	226,300	144	32,600
Rollers and roll hands, metal.....	30,300	134	4,100
Painters, excluding construction and maintenance.....	93,800	131	12,300
Mechanics and repairmen, and loom fixers....	969,600	131	127,000
Waiters and bartenders.....	323,900	129	41,800
Designers and draftsmen.....	101,400	125	12,700
Chemists, assayers, and metallurgists.....	58,300	114	6,600
Line-and servicemen, telegraph, telephone, power.....	109,800	113	12,400
Chauffeurs, truck drivers, and deliverymen..	1,758,000	94	165,300
Welders and flame-cutters.....	137,000	93	12,700

1/ Includes employed men classified by current occupation and men seeking work or on public emergency work, classified by usual occupation. Source: U. S. Bureau of the Census, Series P-14, No. 13 (1943).

2/ In computing occupational separation rates, age distributions by occupation were based on data for employed men and men seeking work. Source: Sixteenth Census of the United States, 1940, Population, The Labor Force, (Sample Statistics), Occupational Characteristics, table 1.

in the decade 1940-50. In contrast, decennial labor force separation rates of only about 10 percent were estimated for welders, truck drivers and line-men, occupational fields which had a predominantly young labor force in 1940.

Clearly, other factors being equal, occupations with the greatest number of prospective losses because of death or retirement will offer the greatest job opportunities. Thus, it is significant that, although electricians slightly outnumbered plumbers in 1940, the estimated number of labor force separations of plumbers during 1940-50 was about a fourth greater than among electricians. This means that, if employment trends were similar for the two occupations, relatively more jobs would have opened up for plumbers than for electricians over the decade, owing to the higher replacement needs.

For purposes of appraising job prospects, replacement needs arising out of deaths and retirements must be considered in conjunction with all other factors affecting the demand for labor in various fields of work. In such industries as coal-mining, the presence of a large proportion of older workers has been due to a long-term employment downtrend. This is also true of certain occupations, such as telegraphy, which have been subject to technological displacement.

However, in other fields of employment, relatively high replacement needs may appear in combination with a rising trend of employment. Thus, the building trades inherited a shortage of younger workers from the depression decade of the thirties, when few apprentices were trained. In the decade 1940-50, the high level of construction activity and the relatively heavy losses because of death and retirement combined to create a very favorable employment outlook. A somewhat similar situation existed in certain branches of the apparel industry, which in the past were staffed largely by immigrants and which, in recent years, have become increasingly aware of the need for attracting new workers.

A number of other important considerations enter into the use of estimated separation rates, based on experience for the labor force as a whole, for occupational outlook analysis.

Occupational-Life Expectancy v. Working-Life Expectancy

In certain occupational fields, including most of the professions and skilled trades, deaths and labor force retirements account for the greatest proportion of separations among experienced men workers. Relatively few men in such occupations are likely to shift to unrelated types of work, after having invested a substantial period in training and education for their chosen field, except under extreme pressure (such as wartime mobilization or protracted unemployment) or unusual personal circumstances. In such occupations, the individual's working-life expectancy in the occupation may not differ significantly from his total work-life expectancy and, therefore, estimated rates of labor force separation provide a significant guide to prospective replacement needs. These, moreover, are generally the occupations in which vocational guidance and planning are most important.

In other occupations, deaths and retirements account for only a small proportion of total separations of men workers. This is particularly true of many unskilled jobs and certain "entry" occupations, such as office boys or shipping clerks, for which turn-over is characteristically high, because the entrants tend to move on to more skilled and responsible jobs. It is typical, too, of workers in certain highly skilled occupations, such as athletes, dancers, and air-line pilots, in which the individual's occupational-life expectancy is much shorter than his total working-life expectancy because of exacting physical standards. Professional athletes and ballet dancers, for example, are considered "old" at 40. In such occupations, obviously, estimates of death or retirement rates based on experience for the labor force as a whole will not be very helpful in determining replacement needs.

Differential Mortality

Very little current information is available on the extent of differences in mortality between occupations, for men of the same age. Earlier studies, both in the United States and abroad, revealed a pronounced and fairly consistent pattern of differentials in mortality rates among men classified in broad occupational groups, reflecting differences in living standards and in their way of life. Farm workers, in general, had much lower mortality rates than nonfarm workers. Among nonfarm occupations, the lowest age-specific mortality rates were among white-collar workers, such as proprietors, professionals, and clerks; the highest mortality rates were among the unskilled and semiskilled manual groups. 29/

Some notable differences also appeared within the broad occupational groups, since some types of work are more hazardous and involve more "wear and tear" on the human organism than others. For example, relatively high mortality rates were found among manual workers in the hazardous mining and lumbering occupations. Similarly, because of their strenuous life and constant exposure to disease, physicians experienced mortality rates considerably higher than other professional workers. On the other hand, the ministry and teaching were among the occupations with the lowest age-specific death rates.

If reliable mortality data are available for an occupation which indicate significant differentials as compared with the broader population group, of course it is desirable to substitute the specific occupational death rates for those in the life tables. However, it is likely that the absence of separate mortality information will not seriously impair the usefulness of the estimates in the large majority of occupations.

29/ For statistics on differential mortality by occupation, see in particular: Jessamine Whitney, *Death Rates by Occupation*, National Tuberculosis Association, 1934, and *The Registrar General's Decennial Supplement*, England and Wales, 1931, Part IIa, *Occupational Mortality*, H. M. Stationery Office, 1938.

Differential Retirements

Even in the absence of any comprehensive statistical data, it is apparent that significant differentials in age-specific retirement rates are likely to exist among occupations. Differences in the nature of the work, the degree of exposure to disabilities, the coverage and provisions of pension plans, the extent of opportunities for self-employment, and many other factors may influence the retirement patterns prevailing in different occupations. The use of over-all retirement rates is, therefore, in no sense a substitute for a detailed analysis of the actual retirement patterns prevailing in individual occupations, where such information can be developed. They do, however, provide a useful point of departure for estimating the effect of differences in age distribution among the various occupations upon the prospective replacement needs due to retirement.

ALTERNATIVE MEASURES OF WORKING-LIFE EXPECTANCY

The method of estimating the working-life expectancy and related functions in the tables of working life represents one of several possible alternatives. Among the principal alternatives are (1) the preparation of estimates of working-life expectancy for all persons living at a given age, rather than for those in the labor force at that age; (2) the use of different definitions of labor force or employment status; and (3) the development of tables based on the actual experience of a generation during its life time, rather than upon the pattern of mortality and of labor force participation prevailing at a given time. Each of these alternative methods is discussed briefly.

Work-Life Expectancy of the Population

In the tables of working life, the average work-life expectancy (\bar{e}_{w_x}) has been defined as the average number of years in the labor force that remain for a group of persons in the labor force at a given age. It has, accordingly, been computed by dividing the cumulative man-years in the labor force remaining (T_{w_x}) by the number of persons in the life-table labor force at the beginning of the year of age (l_{w_x}) (See Appendix, p. 67).

For certain purposes it may be desirable to estimate the average work-life expectancy of all persons living in a given year of age, rather than of only those in the labor force. This measure, hereafter referred to as (\bar{e}'_{w_x}), is computed by dividing the cumulative man-years in the labor force remaining (T_{w_x}) by the number in the life-table population at the beginning of the year of age (l_x). ^{30/} Since the numerator is the same in both cases, it follows that the value of \bar{e}'_{w_x} will be smaller than \bar{e}_{w_x} in all cases, in proportion to the ratio l_{w_x}/l_x , i.e., the worker rate.

^{30/} This definition was employed by John D. Durand in estimating the "average years in labor force" in *The Labor Force in the United States, 1890-1960*, Social Science Research Council, 1948 (p. 259).

Each of the preceding measures has certain advantages for analytical purposes. The concept employed in the tables of working life is more consistent with the conventional concept of life expectancy, because it deals with the expectation of survival as a worker of persons who are workers at a given time. The alternative measure is, however, useful in gaging changes in the over-all length of working life, because it is influenced by changes in the age of labor force entry, as well as by the age of separation from the labor force. On the basis of the latter measure, for example, it is possible to compare the average working-life expectancy at birth with the total life expectancy (table 17).

Table 17: Average life expectancy and work-life expectancy, at birth

	Average life expectancy	Average working-life expectancy	Average number of years of life outside of labor force
	e_0^o	ew'_0	$e_0^o - ew'_0$
White males:			
1900 <u>1/</u>	48.2	32.1	16.1
1940	62.5	39.1	23.4
Total males:			
1940	61.2	38.3	22.9
1947	64.2	41.6	22.6

1/ Mortality rates based on original death registration States of 1900.

Under 1900 conditions, the average white male's life expectancy at birth was about 48.2 years and the average work-life, 32.1 years. He could therefore expect to spend about 16.1 years, or a third of his average life span outside of the labor force, either in school or in retirement. The work-life expectation at birth was considerably lower than a corresponding value at age 20 (37.6 years) since a considerable proportion of new born babies could not be expected to survive until working age.

Between 1900 and 1940, the average life expectancy at birth increased by about 14 years, for white males. Only half of this gain was reflected in the increase in work-life expectancy. As a result of the long-term trends towards longer schooling and earlier retirement, the average period of dependency (i.e., the expected number of years outside of the labor force) also increased by about 7 years over this period.

Between 1940 and 1947, a significant reversal of this pattern occurred. The total life expectancy and the work-life expectancy, at birth, both increased by about 3 years, since the continued reduction in mortality was accompanied by an earlier entry into the labor force and later retirement. As a result, the expected period of dependency showed no significant change over this period and declined as a proportion of the total life expectancy at birth.

A more detailed analysis of the changes between 1940 and 1947, comparing the alternative measures of working-life expectancy, is shown in table 18. The values of $\overset{\circ}{e}w'_x$ are lower at each age than the corresponding $\overset{\circ}{e}w_x$ value but differences are greatest for the youngest and oldest age groups, which have the largest proportions of the population outside the labor force. Because of the decrease in the age of entry into the labor force between 1940 and 1947 and the later age at retirement, the $\overset{\circ}{e}w'_x$ function shows a somewhat greater gain over this period, at both age extremes, than does the average work-life expectancy of those in the labor force ($\overset{\circ}{e}w_x$).

Alternative Measures of Employment Status

In the present study, the worker rates are derived from Census data and are therefore consistent with the Census definition of the "labor force." Included in the labor force, under the Census definition, are all persons 14 years and over, not in institutions, who are either employed (for pay or profit, or as unpaid family workers) or unemployed. In its classification of the population, the Census definition gives priority to labor force activity over other status, such as student, housewife, or retirement. As a result, the Census includes in the labor force, at both age extremes, and particularly among youth of school-age, a considerable proportion of persons engaged in casual and part-time work. A measure based on major activity or status (e.g., worker, student, retirement), would yield a somewhat more realistic pattern of the ages at which young men permanently enter the year-round labor force, or of the ages at which older men withdraw from full-time work activity. Owing to lack of detailed data, however, it was impossible to develop estimates of working life based on that concept.

Table 18. -- Average number of years remaining in labor force, total males 1940, 1947

Age last birthday	For persons alive at age x (\bar{e}'_x)			For persons in labor force at age x (\bar{e}_{w_x})		
	1947	1940	Increase 1940-47	1947	1940	Increase 1940-47
0	41.6	38.3	3.3	-	-	-
5	43.5	41.0	2.5	-	-	-
10	43.7	41.3	2.4	-	-	-
15	43.7	41.5	2.2	47.4	45.8	1.6
20	41.3	39.7	1.6	42.8	41.3	1.5
25	37.2	35.7	1.5	38.2	36.8	1.4
30	32.8	31.4	1.4	33.6	32.3	1.3
35	28.3	27.1	1.2	29.1	28.0	1.1
40	24.0	22.9	1.1	24.8	23.8	1.0
45	19.8	18.9	.9	20.7	19.8	.9
50	15.9	15.0	.9	16.9	16.0	.9
55	12.2	11.4	.8	13.2	12.4	.8
60	8.8	8.0	.8	9.7	9.2	.5
65	5.5	4.9	.6	7.0	6.8	.2

Whereas the above alternative would probably have the effect of reducing slightly the estimated average work-life expectancy, a maximum measure would be obtained by including in the labor force all persons who were employed or unemployed at any time during the year, rather than at a given time, such as during the Census survey week. Some indication of the over-all difference in magnitude resulting from application of the former concept can be obtained from a recent Census Bureau survey. There were, in December 1947, about 44.8 million males in the United States who had done some work for pay or profit in 1947. This total was about 6.5 percent greater than the seasonal peak number of 42.1 million employed for pay or profit in August 1947, and about 12.0 percent above the corresponding level of 40.0 million in April 1947. ^{31/} Analysis of the Census data indicates that a relatively large proportion of the males with work experience during 1947, but who were not in the labor force in December 1947, were school-age youth and older men. The use of a measure of labor force participation based on activity during any time of the year would therefore have the effect of showing an earlier average age of labor force entry and a later average retirement age.

^{31/} Source: U. S. Bureau of the Census, Work Experience of the Population in 1947, Series P-50, No. 8; and Monthly Report on the Labor Force. The above comparison was limited to persons employed for wages or salaries and the self-employed. The contrast would probably have been even more pronounced if comparable data were available for other labor force members (i.e., unpaid family workers and unemployed).

Apart from the lack of detailed statistics needed to develop this concept, such a measure would be undesirable for general use in the measurement of working-life expectancy, because it would give excessive weight to the casual or intermittent work activities of "fringe" groups. It might prove useful, however, for special analytical purposes, such as measurement of the expected income-earning potential over the life-span.

Generation Tables of Working Life

In the conventional life tables, the expectation of life and related functions are based upon the mortality rates prevailing during a particular year or period of years. The assumption is that a cohort of 100,000 persons born alive will be exposed to this fixed pattern as it passes through the life span. Similarly, in the tables of working life it is assumed that this cohort will be subject to the age-specific worker rates existing at a given time. Since both mortality rates and the probabilities of labor force participation have been subject to decided long-term trends, the use of this more or less instantaneous picture will not conform to the actual experience of any particular generation over time.

In connection with mortality data, it has been possible to construct "generation life tables" whereby the mortality experience of actual cohorts of the population is traced from one decade to the next. These tables have proved valuable for many analytical purposes. ^{32/} It is at least theoretically possible to construct similar tables of working life based on the labor force and occupational statistics of the Decennial Censuses of Population. However, over a period of decades, there have been significant changes in the Census definitions of labor force and occupational status, in the seasonal timing of the decennial Census enumerations, in the age groupings shown, and in other Census procedures. Such changes render any precise computations based on comparisons of these data extremely hazardous. For these reasons, no attempt has been made to develop a "generation" table of working life for the present study.

^{32/} For a summary of applications of generation life tables, see Dublin, Lotka, and Spiegelman, op. cit. (pp. 174-182).

TECHNICAL APPENDIX

DETAILED TABLE OF WORKING LIFE, 1940

In applying the life table technique to the measurement of working life in the present study, an attempt was made to maintain the essential features of the standard life table structure. A number of departures from conventional methodology have been introduced, however, partly because of the nature of the data and partly for ease in presentation. For the latter reason, the 1940 tables shown in this report omit several functions which are included in conventional life tables.

A detailed table of working life for total males is shown in this Appendix (table 1a) for purposes of technical exposition. A description of the columns in this detailed table and of the methods of computation follows.

Year of Age (x to x+1) (Column 1)

All of the variables in the table are expressed in terms of the exact birthday (x) or of the interval between successive birthdays (x to x+1), in accordance with standard life table practice.

Mortality Rate (1,000'q_x) (Column 2)

The expected number of deaths between successive birthdays per 1,000 persons living at the beginning of the year of age are shown under the conditions of mortality prevailing at the time of the life table. The rate of mortality is the keystone of the conventional life table, and all other variables pertaining to the life-table population and total life expectancy are derived from it.

The rates of mortality of males, by color and urban-rural residence, were derived from the United States Bureau of the Census, United States Abridged Life Tables, 1939, Urban and Rural, by Regions, Color and Sex. Single-year mortality rates for the separate color and residence groups were interpolated graphically from these tables, which presented rates at 5-year intervals only.

Since the 1939 abridged tables did not show mortality rates for total males and for certain other combined groups, it was necessary to derive these functions from the more detailed groupings. For these combined groups, the mortality rates were computed from the weighted estimates of the number living at successive birthdays (l_x), l_{x+1} by the following formula:

$$q_x = \frac{l_x - l_{x+1}}{l_x}$$

1/ See p. 61.

The 1939 abridged tables were used in the present study, in preference to the Census Bureau's detailed United States Life and Actuarial Tables, 1939-41, because the former were the only official United States life tables presenting separate mortality rates by urban-rural residence. The mortality rates shown in the 1939 tables are slightly higher, up to about age 65, than in the corresponding tables for 1939-41, but are slightly lower above that age. The net effect on the estimates of total life expectancy is very slight, however. The maximum difference between the estimated life expectancies for the period of working life is at age 14, when the average number of years of life remaining for total males is 52.2 years, based on the 1939 tables, and 52.36 years based on the 1939-41 tables.

Mortality rate differentials between urban and rural residents and between whites and nonwhites must be interpreted with caution. Evidence exists that reporting of deaths is less complete in rural areas than in urban districts. Underregistration of deaths of rural nonwhites is particularly pronounced in parts of the South. There is also evidence that rural residents are reported as residents of adjacent urban communities on death certificates. These biases have the effect of exaggerating the mortality differentials in favor of rural residents as shown in the life tables. However, available evidence (including earlier studies of differential mortality by occupation) indicates that death rates for men in the middle and upper-age spans would remain lower for the rural population as a whole than for urban residents, even after allowing for these biases.

Number Living at Beginning of Year of Age (l_x) (Column 3)

This column shows the number of persons who would survive to the age indicated from a group of 100,000 persons born alive, subject throughout life to the rates of mortality of column 2. ^{2/}

Since the mortality rates were not available from the 1939 abridged tables for certain combined groups (i.e., total males, total urban, and total rural) the corresponding l_x values for these groups were derived from these tables by a weighting procedure. Thus, for total males, the l_x values for total whites and nonwhites were weighted by their proportion of total male births, adjusted for underenumeration, in the total population. The weighting ratios were based on the enumerated population of white and nonwhite males at age 2 in 1940, as shown in the 16th Census of Population, survived back to age 0 on the basis of the mortality rates for the respective groups, as shown in the 1939 life tables. Use of this method compensates for the relatively greater underenumeration of nonwhite infants, which is largely concentrated in the first 2 years of life. A similar weighting procedure was used for developing the l_x functions for total urban and total rural males.

^{2/} The use of an initial group of 100,000 is consistent with standard life table practice, and is designed for ease in computing life table values. This has resulted, however, in some cases, in presenting data in a greater number of places than is warranted by the statistical reliability of the data.

Table la. - Detailed table of working life, males, 1940

Year of age	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Mortality rate	Number living of 100,000 born alive	Average number of years remaining at beginning of year	Percent of population in labor force	Number in labor force of 100,000 born alive	Average number of years in labor force remaining at beginning of year					
	Number dying per 1,000 alive at beginning of year of age	At beginning of year of age	In year of age	In year of age	at beginning of year of age	In year of age	In year of age	In year of age	At beginning of year of age	At beginning of year of age	At beginning of year of age
x to x+1	1,000 q_x	L_x	L_x	T_x	q_x	w_x	$L_{w_x}/1$	$T_{w_x}/1$	$L_{w_x}/1$	q_{w_x}	
14-15	1.5	92,184	92,115	4,812,653	52.2	6.1	88,113	4,111,252	88,179	46.6	
15-16	1.7	92,042	91,968	4,720,538	51.3	12.2	87,972	4,023,139	88,043	45.7	
16-17	1.8	91,890	91,812	4,628,570	50.4	23.0	87,823	3,935,167	87,897	44.8	
17-18	2.0	91,725	91,638	4,536,758	49.5	38.9	87,656	3,847,344	87,740	43.8	
18-19	2.2	91,542	91,446	4,445,120	48.6	57.1	87,473	3,759,688	87,565	42.9	
19-20	2.4	91,341	91,236	4,353,674	47.7	71.9	87,272	3,672,215	87,372	42.0	
20-21	2.5	91,122	91,008	4,262,438	46.8	80.6	87,054	3,584,943	87,163	41.1	
21-22	2.7	90,890	90,771	4,171,430	45.9	85.6	86,827	3,497,889	86,941	40.2	
22-23	2.7	90,648	90,525	4,080,659	45.0	89.1	86,593	3,411,062	86,709	39.3	
23-24	2.9	90,400	90,273	3,990,133	44.1	91.6	86,351	3,324,469	86,472	38.4	
24-25	3.0	90,142	90,011	3,899,860	43.3	93.1	86,100	3,238,118	86,225	37.6	
25-26	3.0	89,876	89,741	3,809,849	42.4	94.0	85,842	3,152,018	85,971	36.7	
26-27	3.1	89,602	89,463	3,720,108	41.5	94.7	85,576	3,066,176	85,709	35.8	
27-28	3.2	89,320	89,177	3,630,645	40.6	95.1	85,302	2,980,600	85,439	34.9	
28-29	3.3	89,030	88,883	3,541,468	39.8	95.4	85,021	2,895,298	85,162	34.0	
29-30	3.4	88,732	88,581	3,452,589	38.9	95.6	84,732	2,810,277	84,877	33.1	
30-31	3.6	88,426	88,271	3,364,004	38.0	95.6	84,436	2,725,545	84,584	32.2	
31-32	3.7	88,112	87,953	3,275,733	37.2	95.7	84,131	2,641,109	84,284	31.3	
32-33	3.9	87,786	87,619	3,187,780	36.3	95.7	83,812	2,556,978	83,972	30.5	
33-34	4.1	87,444	87,269	3,100,161	35.5	95.6	83,452	2,473,166	83,632	29.6	
34-35	4.3	87,086	86,902	3,012,826	34.6	95.6	83,060	2,389,714	83,256	28.7	
35-36	4.5	86,711	86,520	2,925,990	33.7	95.5	82,636	2,306,654	82,848	27.8	
36-37	4.7	86,321	86,122	2,839,470	32.9	95.4	82,173	2,224,018	82,404	27.0	
37-38	5.1	85,911	85,700	2,753,348	32.0	95.3	81,664	2,141,845	81,918	26.1	
38-39	5.4	85,477	85,254	2,667,648	31.2	95.1	81,109	2,060,181	81,386	25.3	
39-40	5.8	85,016	84,777	2,582,394	30.4	95.0	80,501	1,979,072	80,805	24.5	
40-41	6.2	84,522	84,268	2,497,617	29.5	94.8	79,849	1,898,571	80,175	23.7	
41-42	6.6	83,998	83,729	2,413,249	28.7	94.5	79,162	1,818,722	79,500	22.9	
42-43	7.0	83,444	83,160	2,329,620	27.9	94.3	78,442	1,739,560	78,802	22.1	
43-44	7.6	82,856	82,553	2,246,460	27.1	94.1	77,681	1,661,118	78,062	21.3	
44-45	8.2	82,227	81,901	2,163,907	26.3	93.9	76,865	1,583,437	77,273	20.5	
45-46	8.8	81,553	81,205	2,082,006	25.5	93.6	75,996	1,506,572	76,430	19.7	
46-47	9.6	80,832	80,458	2,000,801	24.8	93.3	75,069	1,430,576	75,532	18.9	
47-48	10.3	80,060	79,661	1,920,343	24.0	93.0	74,078	1,355,507	74,574	18.2	
48-49	11.1	79,235	78,809	1,840,682	23.2	92.7	73,026	1,281,429	73,552	17.4	
49-50	12.0	78,352	77,893	1,761,973	22.5	92.3	71,909	1,208,403	72,468	16.7	
50-51	13.0	77,408	76,921	1,683,978	21.8	91.9	70,723	1,136,494	71,316	15.9	
51-52	14.0	76,402	75,883	1,607,057	21.0	91.6	69,471	1,065,771	70,097	15.2	
52-53	15.0	75,333	74,783	1,531,174	20.3	91.1	68,144	996,300	68,808	14.5	
53-54	16.2	74,200	73,616	1,456,391	19.6	90.7	66,733	928,156	67,438	13.8	
54-55	17.4	72,998	72,379	1,382,775	18.9	90.1	65,225	861,123	65,979	13.1	
55-56	18.7	71,728	71,036	1,310,396	18.3	89.5	63,620	796,198	64,422	12.4	
56-57	20.0	70,390	69,704	1,239,320	17.6	88.8	61,902	732,578	62,761	11.7	
57-58	21.4	68,982	68,261	1,169,616	17.0	88.0	60,057	670,676	60,980	11.0	
58-59	22.8	67,506	66,752	1,101,355	16.3	87.0	58,053	610,619	59,054	10.3	
59-60	24.4	65,964	65,177	1,034,603	15.7	85.7	55,828	552,568	56,940	9.7	
60-61	26.2	64,352	63,528	969,426	15.1	83.8	53,235	496,710	54,522	9.1	
61-62	28.2	62,664	61,800	905,998	14.5	81.7	50,469	443,525	51,842	8.6	
62-63	30.4	60,894	59,989	844,098	13.9	79.2	47,512	393,056	48,990	8.0	
63-64	32.7	59,044	58,099	784,109	13.3	76.2	44,272	345,544	45,892	7.5	
64-65	35.2	57,114	56,129	726,010	12.7	72.5	40,704	301,272	42,488	7.1	
65-66	37.9	55,104	54,080	669,881	12.2	67.4	36,426	260,568	38,565	6.8	
66-67	40.8	53,018	51,953	615,801	11.6	62.3	32,354	224,442	34,396	6.5	
67-68	43.9	50,856	49,757	565,898	11.1	57.5	28,604	191,788	30,479	6.3	
68-69	47.2	48,625	47,493	514,089	10.6	53.0	25,177	163,184	26,890	6.1	
69-70	50.6	46,332	45,171	466,596	10.1	48.8	22,058	138,007	23,618	5.8	
70-71	54.4	43,988	42,804	421,425	9.6	44.9	19,217	115,949	20,638	5.6	
71-72	58.4	41,597	40,390	378,621	9.1	41.2	16,652	96,732	17,934	5.4	
72-73	62.8	39,168	37,946	338,231	8.6	37.8	14,341	80,080	15,496	5.2	
73-74	67.7	36,709	35,472	300,285	8.2	34.6	12,266	65,739	13,304	4.9	
74-75	73.5	34,222	32,971	264,813	7.7	31.6	10,410	53,473	11,338	4.7	
75-76	79.9	31,708	30,445	231,842	7.3	28.8	8,758	43,063	9,584	4.5	
76-77	87.0	29,176	27,906	201,397	6.9	26.1	7,296	34,305	8,027	4.3	
77-78	94.8	26,638	25,369	173,491	6.5	23.7	6,013	27,009	6,654	4.1	
78-79	103.2	24,112	22,855	148,122	6.1	21.4	4,896	20,996	5,454	3.8	
79-80	112.1	21,623	20,391	125,267	5.8	19.3	3,935	16,100	4,416	3.6	
80-81	121.6	19,198	18,005	104,876	5.5	17.3	3,118	12,165	3,526	3.5	
81-82	131.4	16,864	15,724	86,871	5.2	15.5	2,432	9,047	2,775	3.3	
82-83	141.9	14,648	13,571	71,147	4.9	13.7	1,866	6,615	2,149	3.1	
83-84	152.7	12,570	11,568	57,576	4.6	12.2	1,406	4,749	1,636	2.9	
84-85	163.9	10,650	9,732	46,008	4.3	10.7	1,039	3,343	1,222	2.7	
85-86	175.7	8,904	8,076	36,276	4.1	9.3	752	2,304	896	2.6	
86-87	187.6	7,340	6,605	28,200	3.8	8.1	532	1,552	642	2.4	
87-88	201.1	5,963	5,323	21,399	3.6	6.9	367	1,020	450	2.3	
88-89	212.4	4,770	4,220	16,274	3.4	5.9	247	653	307	2.1	
89-90	224.9	3,757	3,294	12,054	3.2	4.9	161	406	204	2.0	
90-91	237.6	2,912	2,529	8,760	3.0	4.0	102	245	132	1.9	
91-92	250.5	2,220	1,910	6,231	2.8	3.3	63	143	82	1.7	
92-93	263.2	1,664	1,418	4,321	2.6	2.6	37	80	50	1.6	
93-94	275.7	1,225	1,035	2,903	2.4	2.0	21	43	29	1.5	
94-95	288.3	888	742	1,868	2.1	1.6	12	22	16	1.4	
95-96	302.2	632	522	1,126	1.8	1.1	6	10	9	1.2	
96-97	315.2	441	360	604	1.4	.8	3	4	4	1.0	
97-98	327.8	302	244	244	.8	.5	1	1	2	.5	

1/ In ages 14-31 inclusive, hypothetical values of L_x , L_{w_x} and T_x were computed on the basis of the peak worker rate, at age 32, in order to eliminate the effect of labor force accessions. (See page)

Table la. - Detailed table of working life, males, 1940 - Continued

Year of age	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
	Mortality rate	Accessions to labor force		Total		Separations from the labor force		Due to retirement		Retirement rate
	Per 1,000 living in year of age	Number, of 100,000 born alive	Rate per 1,000 living in year of age	Number, of 100,000 born alive	Rate per 1,000 living in year of age	Number, of 100,000 born alive	Per 1,000 in labor force in year of age	Number, of 100,000 born alive	Per 1,000 in labor force in year of age	Per 1,000 in labor force in year of age
x to x+1	1,000 Q_x	a_x	1,000 A_x	e_x	1,000 Q_x^0	d_x	1,000 Q_x^d	r_x	1,000 Q_x^r	1,000 Q_x^r
Between years of age										
14-15	1.6	5,591	60.7	9	1.6	9	1.6	--	--	--
15-16	1.7	9,775	108.5	19	1.7	19	1.7	--	--	--
16-17	1.9	14,580	158.8	40	1.9	40	1.9	--	--	--
17-18	2.1	16,623	181.4	75	2.1	75	2.1	--	--	--
18-19	2.3	13,507	147.7	120	2.3	120	2.3	--	--	--
19-20	2.5	7,892	86.5	164	2.5	164	2.5	--	--	--
20-21	2.6	4,523	49.7	191	2.6	191	2.6	--	--	--
21-22	2.7	5,213	55.4	210	2.7	210	2.7	--	--	--
22-23	2.8	2,182	24.1	226	2.8	226	2.8	--	--	--
23-24	2.9	1,417	15.7	240	2.9	240	2.9	--	--	--
24-25	3.0	810	9.0	251	3.0	251	3.0	--	--	--
25-26	3.1	583	6.5	262	3.1	262	3.1	--	--	--
26-27	3.2	394	4.4	271	3.2	271	3.2	--	--	--
27-28	3.3	221	2.7	280	3.3	280	3.3	--	--	--
28-29	3.4	142	1.6	288	3.4	288	3.4	--	--	--
29-30	3.5	62	.7	296	3.5	296	3.5	--	--	--
30-31	3.6	26	.3	304	3.6	304	3.6	--	--	--
31-32	3.8	--	--	320	3.8	320	3.8	--	--	--
32-33	4.0	--	--	360	4.3	335	4.0	25	.3	.2
33-34	4.2	--	--	392	4.7	350	4.2	42	.5	.5
34-35	4.4	--	--	424	5.1	366	4.4	58	.7	.8
35-36	4.6	--	--	463	5.6	380	4.6	83	1.0	1.1
36-37	4.9	--	--	509	6.2	402	4.9	107	1.3	1.3
37-38	5.2	--	--	555	6.8	424	5.2	131	1.6	1.5
38-39	5.6	--	--	608	7.5	454	5.6	154	1.9	1.7
39-40	6.0	--	--	652	8.1	483	6.0	169	2.1	1.9
40-41	6.4	--	--	687	8.6	511	6.4	176	2.2	2.1
41-42	6.8	--	--	720	9.1	538	6.8	182	2.3	2.3
42-43	7.3	--	--	761	9.7	573	7.3	188	2.4	2.5
43-44	7.9	--	--	816	10.5	614	7.9	202	2.6	2.6
44-45	8.5	--	--	869	11.3	654	8.5	215	2.8	2.8
45-46	9.2	--	--	927	12.2	699	9.2	228	3.0	3.0
46-47	9.9	--	--	991	13.2	743	9.9	248	3.3	3.3
47-48	10.7	--	--	1,052	14.2	793	10.7	259	3.5	3.5
48-49	11.6	--	--	1,117	15.3	847	11.6	270	3.7	3.7
49-50	12.5	--	--	1,186	16.5	898	12.5	288	4.0	4.0
50-51	13.5	--	--	1,252	17.7	955	13.5	297	4.2	4.3
51-52	14.5	--	--	1,327	19.1	1,007	14.5	320	4.6	4.7
52-53	15.6	--	--	1,411	20.7	1,063	15.6	348	5.1	5.2
53-54	16.8	--	--	1,508	22.6	1,121	16.8	387	5.8	5.9
54-55	18.0	--	--	1,605	24.6	1,168	17.9	437	6.7	6.7
55-56	19.3	--	--	1,718	27.0	1,222	19.2	496	7.8	7.9
56-57	20.7	--	--	1,845	29.8	1,275	20.6	570	9.2	9.3
57-58	22.1	--	--	2,006	33.4	1,321	22.0	685	11.4	11.6
58-59	23.6	--	--	2,223	38.3	1,358	23.4	865	14.9	15.1
59-60	25.3	--	--	2,613	46.8	1,396	25.0	1,217	21.8	22.1
60-61	27.2	--	--	2,746	51.6	1,432	26.9	1,314	24.7	25.1
61-62	29.3	--	--	2,957	58.6	1,458	28.9	1,459	29.7	30.2
62-63	31.5	--	--	3,240	68.0	1,468	30.9	1,772	37.3	37.9
63-64	33.9	--	--	3,568	80.6	1,465	33.1	2,103	47.5	48.3
64-65	36.5	--	--	4,278	105.1	1,433	35.2	2,845	69.9	71.1
65-66	39.3	--	--	4,072	111.8	1,377	37.8	2,695	74.0	75.4
66-67	42.3	--	--	3,750	115.9	1,317	40.7	2,433	75.2	76.8
67-68	45.5	--	--	3,427	119.8	1,253	43.8	2,174	76.0	77.7
68-69	48.9	--	--	3,119	123.2	1,183	47.0	1,936	76.9	78.7
69-70	52.4	--	--	2,841	128.8	1,110	50.3	1,731	78.5	80.5
70-71	56.4	--	--	2,565	133.5	1,041	54.2	1,524	79.3	81.5
71-72	60.5	--	--	2,311	138.8	967	58.1	1,344	80.7	83.1
72-73	65.2	--	--	2,075	144.7	896	62.5	1,179	82.2	84.8
73-74	70.5	--	--	1,856	151.3	828	67.5	1,028	83.8	86.7
74-75	76.6	--	--	1,652	158.7	763	73.3	889	85.4	88.6
75-76	83.4	--	--	1,462	166.9	699	79.8	763	87.1	90.8
76-77	90.9	--	--	1,283	175.9	634	86.9	649	89.0	93.1
77-78	99.1	--	--	1,117	185.7	569	94.6	548	91.1	95.6
78-79	107.8	--	--	961	196.3	503	102.8	458	93.5	98.6
79-80	117.0	--	--	817	207.7	438	111.4	379	96.3	102.0
80-81	126.7	--	--	686	219.9	376	120.4	310	99.5	105.9
81-82	136.9	--	--	566	232.9	315	129.8	251	103.1	110.2
82-83	147.6	--	--	460	246.7	260	139.7	200	107.0	115.0
83-84	158.7	--	--	367	261.3	210	149.9	157	111.4	120.5
84-85	170.2	--	--	287	276.7	166	160.3	121	116.4	126.5
85-86	182.1	--	--	220	292.9	128	171.0	92	121.9	133.3
86-87	194.4	--	--	165	309.9	97	182.0	68	127.9	140.7
87-88	206.9	--	--	120	327.7	71	193.0	49	134.7	149.1
88-89	219.5	--	--	86	346.3	51	203.9	35	142.4	158.6
89-90	232.2	--	--	59	365.7	35	214.7	24	151.0	169.2
90-91	244.9	--	--	39	385.9	23	225.2	16	160.7	181.1
91-92	257.6	--	--	26	406.9	15	235.5	11	171.4	194.2
92-93	270.4	--	--	16	428.7	9	245.7	7	183.0	208.7
93-94	283.4	--	--	9	451.3	5	255.7	4	195.6	224.3
94-95	296.6	--	--	6	474.7	3	265.6	3	209.1	241.1
95-96	310.0	--	--	3	498.9	2	275.3	1	223.6	259.2
96-97	323.6	--	--	2	524.9	1	284.7	1	240.2	280.0
97-98	337.4	--	--	1	552.7	1	293.7	0	259.0	303.6

Number Living in Year of Age (L_x) (Column 4)

The "stationary population" or the number of persons who would be living in any age interval under the assumption of 100,000 live births annually, subject throughout life to the specified mortality rates, is shown in this column. Under these fixed conditions, if births were distributed evenly throughout each year and if there were no migration, a census taken at any time would always show the same total population and the same number of persons in each age interval.

On the assumption of an even distribution of deaths within each year of age, in ages 14 and over, the L_x function was computed by linear interpolation between the corresponding l_x values, as follows:

$$L_x = 1/2 (l_x + l_{x+1})$$

This method, though subject to some slight statistical bias, is consistent with prevailing actuarial practice. 3/

Number of Man-years of Life Remaining (T_x) (Column 5)

The total man-years of life remaining at a given age and at all succeeding years for persons alive at the exact year of age are given in this column. It may be expressed algebraically as follows:

$$T_x = \sum_{x=n}^{\infty} (L_x)$$

Average Number of Years of Life Remaining (e_x^o) (Column 6)

The average life expectancy of persons in the stationary population is measured from the exact year of age. It is computed by dividing the cumulative man-years of life remaining, T_x , by the number living at the beginning of the year of age, l_x .

3/ United States Life and Actuarial Tables, 1939-41, (p. 133).

This column may also be defined as the average life expectancy of workers at any given age, if it is assumed that the mortality rates for persons in the labor force are identical with those for the total population. 4/

Percent of Population in Labor Force (w_x) (Column 7)

The percent of the population in the labor force, or the "worker rate," bears the same pivotal relationship to the estimates of working-life expectancy as does the mortality rate to the computation of total life expectancy. Unlike the mortality function, which describes a rate during a specified time interval, the "worker rate" is based on a cross section of the population at a given point in time, such as the Census week of 1940. However, if it is assumed that the age-specific worker rates remain constant, apart from seasonal fluctuations, the differences between successive single-year worker rates at a given time may serve as a reasonable approximation of the net annual rates of labor force accession or separation between successive ages, after allowing for mortality. This is a fundamental assumption inherent in the construction of tables of working life.

In the tables of working life, crude worker rates for men, by urban-rural residence, color, and single years of age were derived from the Sixteenth Census of the United States, 1940, Population, The Labor Force (Sample Statistics), Employment and Personal Characteristics, table 1. Worker rates for rural residents were computed by combining the labor force and population data for rural-farm and rural-nonfarm areas. The employment characteristics and worker rates of rural-nonfarm residents resemble more closely those of urban residents than those of rural-farm groups. They were combined with the latter group because of the absence of any separate mortality data for rural-nonfarm residents.

4/ No adequate information is available on differential mortality of workers and nonworkers. It may be assumed that men outside the labor force, particularly before age 60, have higher mortality rates, since they include a relatively large proportion of persons suffering from illness or serious disability. Moreover, it is frequently asserted that retirement, and the resulting difficulties in adjustment, tend to shorten the life span. On the other hand, persons who continue to work at advanced ages are more exposed to the possibility of death, through specific occupational hazard or as a result of their more active mode of life.

In the case of railroad workers, actuarial studies by the Railroad Retirement Board indicate relatively small differences in mortality rates between employees and annuitants retiring at age 60 or over on the basis of age and service. (U. S. Railroad Retirement Board, Annual Report, 1946, pp. 86-9). If this general pattern held true for the labor force as a whole, errors resulting from the assumption of identical death rates would be relatively small, since retirements remain quite low until the late fifties. For example, if it were assumed that mortality rates at ages prior to 60 of persons outside the labor force were twice as great as for the entire population, and if the mortality rates for those in the labor force were correspondingly adjusted, the work-life expectancy of men at age 30 would be increased by only 0.3 years.

The crude worker rates developed from the Census data could not be used directly in determining the underlying pattern of labor force participation. Certain distortions and irregularities were introduced into these crude rates by the distribution of the institutional population and by biases in age reporting, as well as by random errors of sampling. In order to eliminate, where possible, the effects of such factors, the following adjustments were made:

1. Redistribution of Institutional Population. Many mental and penal institutions are located in rural-nonfarm areas, although their inmates (all outside of the labor force, by Census definition) are drawn from both the urban and rural population. In April 1940, for example, 3.7 percent of all males 14 years or over in rural-nonfarm areas were inmates of institutions, compared with 1.0 percent of the urban residents. This depressed the crude worker rates in rural areas, in relation to urban areas. In the absence of specific data on the original residence of inmates of institutions, they were redistributed in proportion to the urban-rural distribution of the non-institutional population, by age and color.

The 1940 institutional population, prior to age 60, constituted a fairly small and stable percentage of the total population among white males, and therefore had no significant effect on age-to-age differences in worker rates. However, for nonwhite men, the percentage in institutions rose from about 1.3 percent at age 14 to 3.4 percent at 27, and then declined among those in the forties and fifties. These variations distorted the underlying pattern of labor force entries and separations for the nonwhite male population. For nonwhite males aged 18 to 65, the pattern of worker rates based on the noninstitutional population was therefore used, adjusted to the average level of the worker rate based on the total population for this period.

2. Age-Reporting Bias. In addition to a tendency of respondents to report ages rounded to the nearest 0 or 5, other biases affected particular age groups in the population. Thus, in past censuses, there have been indications that older persons often tended to report themselves as younger for economic and personal reasons. At the upper age extremes, there has also been some tendency towards exaggeration of age. Analysis of the 1940 Census population data in relation to mortality data for 1930-40 revealed a new bias: a tendency for older persons below age 65 to report their age as 65 years or over. This tendency, particularly pronounced among nonwhites, appeared to have developed after 1936, the year old-age assistance programs under the Social Security Act became effective in most States. In the construction of United States Life Tables for 1939-41, the following redistribution of the male Negro population was made to allow for this bias:

Estimated Male Negro Population

<u>Age</u>	<u>Original</u>	<u>Adjusted</u>	<u>Difference</u>
55-59	208,656	218,324	9,668
60-64	154,632	168,242	13,610
65-69	151,407	128,129	- 23,278

Source: United States Life Tables and Actuarial Tables, 1939-41, (p. 112).

Since the apparent motive of this group for misreporting their ages appeared to be the desire to qualify for old-age assistance or pensions, it was assumed that a comparatively large proportion of such persons were outside the labor force. This appeared to be supported by the pattern of worker rates for urban nonwhites, which showed an exceptionally sharp drop at age 65, as compared with whites in the corresponding groups. Worker rates for nonwhite rural residents, whose old-age dependency problems differ substantially from those of the urban workers, did not appear to exhibit any such distortion. The nonwhite urban population was therefore redistributed on the basis of the above estimates, and worker rates were adjusted on the assumption that the population added to the younger age groups had the lower worker rates of the age group which they had reported, i.e., ages 65-69. The adjustment thus reduced the crude worker rates for urban nonwhites between ages 55 and 64, and reduced somewhat the decline in worker rates in the vicinity of age 65.

3. Smoothing of Worker Rates. The resultant worker rates still exhibited considerable year-to-year irregularities after the above adjustments. It was assumed that the true worker rates for the population were inherently smooth, except for certain ages, such as 60, 65, or 70, when known institutional factors were operative.

Curve fitting with polynomials and by osculatory interpolation (using Jenkins' fifth difference formula) was attempted, but neither of these methods gave satisfactory results. A free-hand curve-fitting was therefore adopted.

A graphic illustration of the process of adjustment and smoothing of worker rates is shown in chart 14 for nonwhite males in urban areas.

Number in Labor Force in Year of Age (Lw_x) (Column 8)

For ages 32 and over, the number in the stationary labor force was computed directly as the product of the stationary population (L_x) and the worker rate (w_x). For ages 14-31, inclusive, hypothetical Lw_x values were estimated by assuming that the same percentage of the population was in the labor force as at age 32, and that the labor force at age 32 was smaller than that at age 14 by the number of deaths between these years:

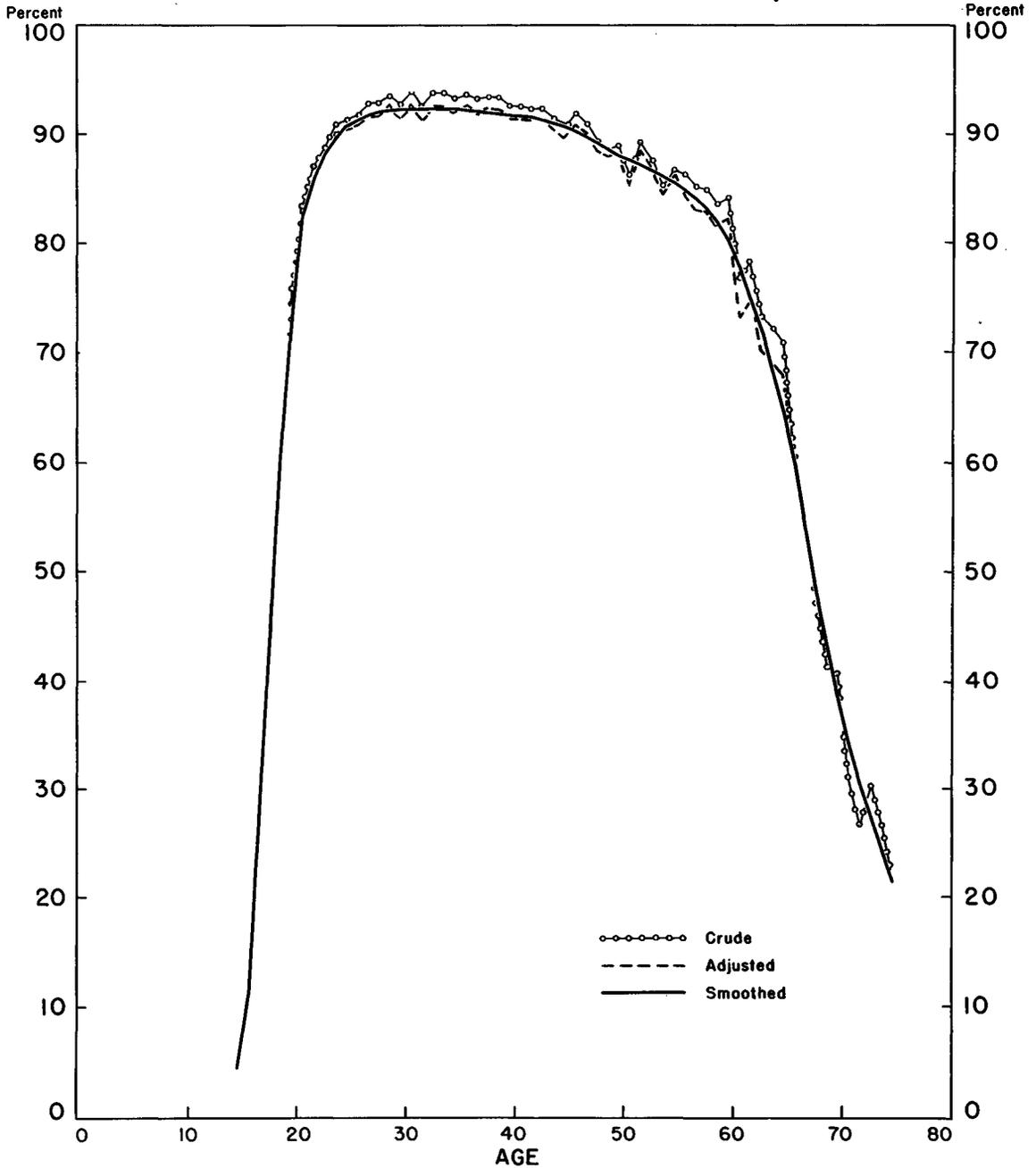
$$Lw_{14-31} = L_{14-31} (w_{32})$$

This assumption was necessary in order to eliminate the effects of accessions when estimating the work-life expectancy of workers between the ages 14-31.

CHART 14

LABOR FORCE PARTICIPATION RATES

NONWHITE MALES IN URBAN AREAS, 1940



UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

Number of Man-years in Labor Force Remaining (Tw_x) (Column 9)

The total number of man-years in the labor force remaining in the given year and all following years for persons in the labor force at the exact year of age is computed from the values in column 8 as follows:

$$Tw_x = \sum_{x=n}^{\infty} Lw_x$$

Number in Labor Force, at Beginning of Year of Age (lw_x) (Column 10)

The number of survivors of 100,000 persons born alive expected to be in the labor force at each exact year of age (or birthday) is shown in this column. On the assumption of an even distribution of labor force separations between successive age intervals, it was computed by direct interpolation from the Lw_x values of column 8, as follows:

$$lw_x = 1/2 (Lw_{x-1} + Lw_x)$$

Average Number of Years in Labor Force Remaining ($\bar{e}w_x$) (Column 11)

The average work-life expectancy of persons in the labor force at a given age is computed by dividing the total remaining (Tw_x) man-years in the labor force by the number in the labor force at the beginning of the year of age (lw_x).

Mortality Rate, Between Successive Years of Age (1,000 Q_x) (Column 12)

This and the following columns of the detailed table of working life trace the development of the estimated rates of labor force entry and of separation between successive years of age. These mortality rates differ, conceptually, from those of the standard life table in one important respect. The conventional mortality rate (1,000 q_x) expresses the number of deaths expected between two exact age intervals (or birthdays) as a ratio to the number alive at the beginning of the year of age (l_x). In the tables of working life, the mortality rate between successive years of age (1,000 Q_x) is based on the stationary population (L_x), and expresses the number of deaths expected within an interval of 1 year as a ratio to the stationary population within the initial year of age. This rate is derived directly from the successive differences in the stationary population (column 4) as follows:

$$Q_x = \frac{L_x - L_{x+1}}{L_x}$$

This modification has been introduced into the tables of working life in order to facilitate the application of the derived rates of labor force entry and separation to available population and labor force data, which are almost invariably in terms of the attained age.

It should be noted that the above rate may readily be expressed in terms of the conventional mortality rate. If it is assumed that deaths of persons

of working age are distributed evenly within each year of age, then the stationary population in any year of age (L_x) would equal the number of survivors at the mid-year of age. The mortality rate between successive years of age per 1,000 in the stationary population ($1,000 Q_x$) therefore equals the mortality rate per 1,000 living at the exact mid-year of age ($1,000 q_{x+1/2}$).

Accessions to the Labor Force (Columns 13 and 14)

The net number of persons entering the stationary labor force between successive years of age (a_x) (column 13) is computed from the net increments in the stationary labor force, up to age 32, after allowing for the probability of deaths among workers during the year:

$$a_x = Lw_{x+1} - Lw_x + Lw_x (Q_x)$$

The rate of accessions (column 14), per 1,000 persons in the stationary population, becomes in turn:

$$1,000 A_x = \frac{1,000 a_x}{L_x}$$

Since the number and rate of accessions are derived from the net changes in the worker rates, no accessions are shown beyond the age of the peak worker rate (i.e., age 32).

Separations from the Labor Force (Columns 15 and 16)

The net number of persons separated from the stationary labor force between successive years of age is shown in column 15. From age 32 on, this was derived from the decrease in the stationary labor force between successive years of age: $s_x = Lw_x - Lw_{x+1}$

The annual rate of labor force separation between successive years of age was therefore:

$$1,000 Q_x^s = \frac{1,000 s_x}{Lw_x}$$

Between ages 14 and 32, it was assumed that labor force separations were due solely to death and therefore:

$$Q_x^s = Q_x \text{ and } s_x = Lw_x (Q_x)$$

Since some workers become permanently disabled and are forced to withdraw from the labor force before age 32, a slight understatement of the true separation rate for these ages has resulted. The error, however, is believed to be statistically insignificant.

Separations from the Labor Force Due to Death or Retirement (Columns 17-21)

These columns (17-21) show the expected number of workers to be separated from the stationary labor force between successive years of age, because of

death or retirement (d_x, r_x), and the corresponding probabilities, ($1,000 Q_x^d, 1,000 Q_x^r$). Also shown is the derived rate of retirement ($1,000 r_x$).

In order to determine these functions, it was necessary to assume that the age-specific death rate for persons in the labor force was the same as that for the population as a whole. ^{5/} Given the separation rate and the death rate, it was possible to derive the probability of separation due to death or retirement for ages 32 and over, and the retirement rate.

The probability of death or retirement differs significantly from the corresponding rate. For example, the probability of death is defined as the ratio of the number of separations from the labor force because of death during a year, to the number of persons in the stationary labor force at the beginning of the year, i.e., ($Q_x^d = \frac{d_x}{Lw_x}$). The death rate, however, is the number

of deaths within the labor force divided by the number of workers exposed to death. On the assumption that retirements are distributed evenly within each year of age, the average person retiring is exposed to death, as a worker, for only half a year. The total number of workers exposed to death during the year would then be the number at the beginning of the year less half of those retiring, i.e., $Lw_x - 1/2 r_x$. The death rate, for persons in the labor force, may therefore be expressed as:

$$Q_x^d = \frac{d_x}{Lw_x - 1/2 (r_x)}$$

Similarly, the probability of retirement is: $Q_x^r = \frac{r_x}{Lw_x}$; and the rate of retirement is: $rQ_x = \frac{r_x}{Lw_x - 1/2 (d_x)}$.

^{5/} See p. 63.

Solving algebraically, the respective formulae for the probabilities of death and retirement were computed as follows: 6/

$$Q_x^d = \frac{Q_x (2 - Q_x^s)}{2 - Q_x}, \text{ and } Q_x^r = Q_x^s - Q_x^d$$

The retirement rate was also derived from the probabilities of death and retirement, as follows: 7/

$$rQ_x = \frac{2 Q_x^r}{2 - Q_x^d}$$

Finally, the number of deaths and retirements from the labor force were computed as the product of the stationary labor force and the respective probabilities.

$$d_x = Lw_x (Q_x^d); \quad r_x = Lw_x (Q_x^r)$$

6/ Proof

Given the following relationships:

$$(1) \quad Q_x^d = \frac{d_x}{Lw_x}; \quad Q_x^r = \frac{r_x}{Lw_x}; \text{ and } Q_x^s = Q_x^d + Q_x^r$$

$$(2) \quad Q_x = \frac{d_x}{Lw_x - 1/2 r_x} \text{ and } rQ_x = \frac{r_x}{Lw_x - 1/2 d_x}$$

Dividing in (2) by Lw_x yields:

$$(3) \quad Q_x = \frac{\frac{d_x}{Lw_x}}{1 - 1/2 \left(\frac{r_x}{Lw_x} \right)} = \frac{2 Q_x^d}{2 - Q_x^r};$$

and, in like manner:

$$(4) \quad rQ_x = \frac{2 Q_x^r}{2 - Q_x^d} \text{ and substituting for } Q_x^r, \text{ in (3):}$$

$$(5) \quad Q_x = \frac{2 Q_x^d}{2 - (Q_x^s - Q_x^d)}$$

Then, solving for Q_x^d yields: (6) $Q_x^d = \frac{Q_x (2 - Q_x^s)}{2 - Q_x}$

7/ The retirement rate may also be derived directly from the differences between successive worker rates for ages 32 and over:

$$rQ_x = w_x - w_{x+1}$$

Differences between the two methods are due solely to rounding.

ABRIDGED TABLES OF WORKING LIFE, 1940 AND 1947

An abridged table of working life was developed for 1947 because data were not available on population and labor force by single years of age for years subsequent to 1940. This form differs from the single-year tables for 1940 primarily because the stationary population and labor force are grouped in 5-year intervals and the rates of accessions and separations are shown from one interval to the next, for the grouped 5-year cohort. In this respect, the form of the abridged table of working life differs from that of the conventional abridged life tables, which describe the change in a single year cohort from the beginning of one interval to the beginning of the next. The form used in the present study was designed to facilitate application of the rates to grouped data available from enumerative surveys of the population and labor force.

In general, the major assumptions and methodology described in the preceding section also apply to the abridged tables. In the present section, only those specific sources and methods are described which differ from those employed in the single-year tables for 1940. Following is a brief description of the columns of the abridged table (page 36).

Age Interval (x to $x+n$) (Column 1)

The functions in the abridged table, as in the single-year table, are expressed in terms of the exact birthday (x) or of an interval of n years between birthdays. The intervals cover 5-year groups, with the exception of the last (75 years and over).

Stationary Population (${}_nL_x$) (Column 2)

The stationary population is the number living within the age interval of 100,000 persons born alive annually (or of 500,000 born alive in a 5-year period). For 1940, these values were derived by a summation of the single-year L_x values shown in table 1a for each 5-year interval.

For 1947, these values were based on the United States abridged life tables for that year. ^{g/} Since the abridged tables were shown separately for whites and nonwhites, the values of ${}_nL_x$ for total males were computed by weighting the respective white and nonwhite values by the estimated number of births of white and nonwhite males in 1947.

Stationary Labor Force (Columns 3 and 4)

The percent of the stationary population in the labor force, i.e., the "worker rates," (${}_nW_x$) and the stationary labor force (${}_nLW_x$), are shown within each age interval.

^{g/} National Office of Vital Statistics, Federal Security Agency, Vital Statistics of the United States, 1947, Part I.

For 1940, the grouped 5-year worker rates for total males shown in the abridged table for 1940 are not directly comparable with the corresponding single-year worker rates in table la. As noted previously, worker rates for the 1940 tables of working life were derived from the original published Census statistics. Two major revisions in these data have since been made by the Census Bureau. In 1944, revised labor force statistics were issued, allowing for misreporting of labor force status in April 1940 of certain groups, such as NYA student-workers, persons on emergency relief projects, and other smaller categories. 9/ In July 1945, the Census Bureau revised the labor force enumeration procedures used in its Monthly Report on the Labor Force (MRLF), after having discovered that the methods previously followed in the 1940 Census and in the MRLF tended to understate the number of workers in certain marginal groups. Comparable estimates of the labor force were subsequently released for the Census week in 1940, and for intervening months. 10/

Neither of the two Census revisions contained labor force estimates by single year of age, color, or residence; therefore, it was necessary to rely on the original Census data in developing the single-year 1940 tables. However, in constructing the abridged tables, 5-year worker rates comparable with the current MRLF were developed, based on interpolations from the revised Census Bureau estimates. The effect of these revisions was to increase the rates of labor force participation both at the youngest and oldest ages, with relatively little change for males in the intervening span.

For 1947, a special MRLF tabulation by age, sex, and veteran status, in April 1947, served as the basis for computing 5-year worker rates. In general, these rates paralleled those of similar grouped rates for 1940, although at a significantly higher level. For young men aged 20-34, however, they dropped below the 1940 rates. This was entirely due to the presence in this age group of large numbers of veterans of World War II, attending schools and colleges under the G. I. Bill of Rights. In order to eliminate the influence of this temporary factor from the 1947 abridged table, worker rates were computed for civilian nonveterans in the age groups 20-34. The latter tied in reasonably well with the 1947 worker rates for total males at adjoining ages, and were therefore used. Otherwise, relatively little adjustment was required in the grouped 5-year worker rates. 11/

Accessions to the Labor Force (nA_x) (Column 5)

In this column, the proportion of persons is shown in a given age group who may be expected to enter the labor force before they become 5 years older. The computation is made in the same way as for the single-year accession rates, with a substitution of the grouped data for the corresponding single-year functions.

9/ U. S. Bureau of the Census, Estimates of Labor Force, Employment and Unemployment in the United States: 1940 and 1930.

10/ U. S. Bureau of the Census, Labor Force, Employment and Unemployment in the United States, 1940 to 1946, (Series P-50, No. 2).

11/ April 1947 worker rates from the MRLF were subject to sampling error.

Separations from the Labor Force (${}_nQ_x^s$) (Column 6)

Similarly, the rate of separation from the labor force within a 5-year period is shown for persons in the stationary labor force (${}_nLw_x$) at the beginning of the period.

Probabilities of Separation Due to Death or Retirement (Columns 7 and 8)

These columns show the probable number of labor force separations due to death or retirement within a 5-year period per 1,000 persons in the stationary labor force at the beginning of the period.

Following the practice for the single-year probabilities, these functions were computed, initially, from the total separation rate (${}_nQ_x^s$) and the death rate (${}_nQ_x^d$), on the assumption of a constant relationship between the death rate and the retirement rate between successive age intervals.

This assumption was considered sufficiently accurate for use in computing single-year probabilities of death or retirement, but a significant bias was introduced when it was applied to the grouped data. This was due to the fact that, during the ages of peak retirements, i.e., ages 60-75, the relationship between the death rates and retirement rates changed significantly within 5-year age intervals. In order to adjust for this bias, the probability of death (${}_nQ_x^d$) for total males in 1940 in successive 5-year intervals was derived directly from the single-year functions for 5-year age groups, as follows:

$$(1) \quad {}_nQ_x^d = \frac{\sum_{x=n}^{n+4} d_x + \sum_{x=n+1}^{n+5} d_x \dots \sum_{x=n+4}^{n+8} d_x}{nLw_x}$$

These derived values were then compared with those estimated by application of the basic formula to the 1940 data.

$$(2) \quad {}_nQ_x^d = \frac{{}_nQ_x (2 - Q_x^s)}{2 - Q_x}$$

The following tabulation shows a comparison of the two sets of values.

Probability of Death

$${}_nQ_x^d$$

	(1)	(2)	(3)
<u>Age group</u>	<u>Derived from single-year values</u>	<u>"Estimated"</u>	<u>Ratio of "derived" to "estimated" (col. 1 / col. 2)</u>
30-34	.0220	.0220	100.0
35-39	.0297	.0297	100.0
40-44	.0421	.0420	100.2
45-49	.0609	.0608	100.2
50-54	.0858	.0858	100.0
55-59	.1157	.1157	100.0
60-64	.1479	.1504	98.3
65-69	.1918	.2022	94.9
70-74	.2625	.2817	93.2

Differences between the "estimated" and "derived" values are insignificant prior to age 60, but became substantial from this age onward. In order to adjust for this bias, the empirical ratios derived above (column 3) were applied as adjustment factors to the estimated ${}_nQ_x^d$ values comparable to current MRLF for ages 60 and over, in 1940 and 1947. Corresponding adjustments were then made in the estimated probability of retirement (${}_nQ_x^r$).

Average Number of Remaining Years of Life (e_x^o) (Column 9)

In both the abridged table for 1940 and the single-year table of working life, the average number of remaining years are identical for total males. In estimating the e_x^o values for 1947, it was necessary to compute the number of persons living at the beginning of each age interval (l_x). This was derived from the United States abridged life tables for 1947 by combining the l_x values for white and nonwhite males, by a weighting procedure similar to that described previously.

Average Number of Years of Working Life Remaining (e_{w_x}) (Column 10)

The working-life expectancy shown in the abridged tables is derived by the same method as in the single-year tables of working life. In order to estimate the number of persons in the labor force at the beginning of each age interval (lw_x), it was necessary to derive beginning-of-interval values for the worker rate, by interpolation between the successive 5-year grouped worker rates.