

AN APPROXIMATE LIFE-TABLE FOR THE UNITED STATES

ON THE BASIS OF THE NINTH CENSUS, 1870.

[PLATES XXVIII-IX; XLIII-IV.]

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[In a letter to the Superintendent of the Census, 1872.]

IN compliance with your request to be furnished with a "life-table," based on that portion of the returns of the United States census which purports to show distributed, according to age, the number of persons living on the first day of June, 1870, and the number of deaths which occurred during the twelve months which immediately preceded that date, I have prepared the following analysis and statement.

An important difficulty is encountered, at the outset of an attempt to arrive even approximately at a table which shall fairly represent the law of mortality obtaining in the general population, in the fact, manifest on intelligent inspection and confirmed by careful comparison with other analogous and trustworthy data, that the number of deaths reported as having occurred in the period above referred to falls far short of the number which must have taken place.*

In conducting the investigation proposed, this deficiency could only be supplied by resort to a somewhat arbitrary assumption, limited, however, by an investigation of the rates of mortality relative to population which obtain in other communities, so far as accessible, and in portions of our own country.

In the construction of the following tables the deficiency in the returns of deaths was assumed to be *forty-one* per cent of the full number of deaths which must have taken place. This assumed deficiency gives a general rate of mortality not differing greatly from that obtaining in England and Wales, and is also in substantial accord with the results of observation at different periods in the State of Massachusetts, in our own country. It is impossible to determine with precision the amount of deficiency in the return of deaths, but from the results herein computed on the assumption of a deficiency of forty-one per cent, it is easy to calculate corresponding values which shall conform to the assumption of any other supposed rate of deficiency.

The distribution of the ages of the living population, and of the deaths as furnished by the official returns of the census, although to some extent faulty, yield ratios which, augmented as above described, have been accepted in the construction of the following tables as satisfactorily correct.

TABLE I.

UNITED STATES CENSUS, 1870.

Ages—years.	Population at specified ages.	Deaths at specified ages.	Rate of mortality to population on the first day of June, 1870, at a deficiency of 41 per cent in the return of deaths.	1. 2. 3. 4.			
				$N_{x:y}$			
0 to 1	1,100,475	710,445	.17010				
1 to 2	1,078,803	43,663	.04886				
2 to 3	1,245,430	33,944	.03550				
3 to 4	1,115,782	14,892	.02266				
4 to 5	1,078,514	10,269	.01614				
5 to 10	4,814,713	25,329	.00627				
10 to 15	4,786,189	15,679	.00666				
15 to 20	4,040,586	20,262	.00650				
20 to 25	3,748,399	25,085	.01175				
25 to 30	3,075,145	22,522	.01241				
30 to 35	2,562,329	19,523	.01202				
35 to 40	2,314,976	20,099	.01471				
40 to 45	1,929,712	17,576	.01353				
45 to 50	1,578,932	16,135	.01322				
50 to 55	1,367,969	16,123	.01199				
55 to 60	1,161,154	13,246	.02561				
60 to 65	778,971	15,883	.03456				
65 to 70	484,387	14,459	.05060				
70 to 75	344,368	14,919	.07197				
75 to 80	175,686	11,622	.11193				
80 to 85	94,602	9,594	.12785				
85 to 90	34,475	4,527	.22248				
90 to 95	12,671	1,625	.26545				
95 and over	7,564	1,327	.99973				
All specified ages.....	38,553,210	491,943	0.0216				
Unknown ages.....	5,161	2,020					
All ages.....	38,558,371	493,963					

$$\frac{100}{100-41} \times \frac{491,943}{38,553,210} = 0.0216$$

* It is easy to explain the cause of the wholesale omissions from the returns of deaths in the census, which have been referred to. To take the recent census as an example, the census law required the return of all deaths occurring in families from the 1st of June, 1869, to the 31st of May, 1870; in all, twelve months. The enumeration in the course of which this was to be accomplished began on the 1st of June, 1870, and closed, nominally, on the 1st of October, but really about the 1st of January, 1871. Thus, the officers of the census were called upon to recover all the deaths occurring during the census year, at a distance in time ranging from one day to nineteen months from the dates at which such deaths severally occurred. The antecedent improbability of success in such an attempt would be of the strongest; while the actual experience of three censuses has shown that assistant marshals fall short of the true number of deaths by not far from 40 per cent, as a rule. In some cases assistant marshals fail to put the question; in others, heads of families, or persons answering for them, fail to recall the fact of a death occurring during the year, especially when ten or eleven months have already elapsed since the date of death, and the mind, not unaturally, refers to the event as having taken place a year or longer before. In still another large number of cases, persons die *in families*, which class of cases seems not to have been in contemplation of the census law, which makes the return of mortality a family return. In still other cases, deaths occur in families, but the very death itself breaks up the family and scatters the surviving members, leaving no one to report the death in the census. In still other cases, deaths occur in what are constructively families for the purposes of the census, *i. e.*, boarding-houses, hotels, etc., but the common tie of membership or association is here so casual and so slight that the chances are altogether against the circumstance being retained in memory six or eight months after.

The dimensions attained by the life-insurance interest, within the past few years, make it peculiarly a matter of regret at the present time that the census should not afford the data for determining with absolute precision and certainty the death-rate of the country, whether in the aggregate or by classes of the population. This can never be done without a national scheme of registration, stringently enforced by penalties. Such a scheme, however, does not exist, and is, perhaps, in the nature of our Government, wholly impracticable. The number of States which provide for themselves a system of registering births, deaths, and marriages, will probably increase from decade to decade, while the results of registration will improve steadily with each year for which the effort is continued, affording thus fuller and better material for correcting errors and supplying deficiencies in the census statistics; but it is too much to expect, for many a decade to come, that all the States will join in efforts to secure exact information of this character.—[THE COMPILER.]

TABLE II.

APPROXIMATE LIFE-TABLE, CONSTRUCTED ON THE BASIS OF THE UNITED STATES CENSUS OF 1870, SHOWING FOR DIFFERENT INTERVALS OF AGE THE ANNUAL RATE OF MORTALITY PER 1,000 AT THE SPECIFIED AGES, THE NUMBERS LIVING IN A STATIONARY POPULATION SUSTAINED BY 100,000 ANNUAL BIRTHS, AND THE NUMBER OF ANNUAL DEATHS IN SUCH POPULATION.

Ages.	Rate of mortality per 1,000 persons living on the first day of specified ages.	Living at specified ages in stationary population sustained by 100,000 annual births.	Annual deaths at specified ages in stationary population sustained by 100,000 annual births.	1. 2. 3. 4.			
				$M_{x:y}$	$N_{x:y}$	$D_{x:y}$	$E_{x:y}$
0 to 1	170.10	92,712	15,837				
1 to 2	68.66	81,797	5,611				
2 to 3	31.30	77,690	2,464				
3 to 4	31.65	75,724	2,408				
4 to 5	16.14	74,254	1,199				
5 to 10	6.47	359,564	3,215				

TABLE III.

APPROXIMATE LIFE-TABLE (CONTINUED), CONSTRUCTED ON THE BASIS OF THE UNITED STATES CENSUS OF 1870, SHOWING, FOR DIFFERENT AGES OF LIFE, THE NUMBER OF PERSONS SURVIVING OUT OF 100,000 BORN ALIVE; THE NUMBER OF PERSONS LIVING AT AND OVER THOSE AGES IN A STATIONARY POPULATION SUSTAINED BY 100,000 ANNUAL BIRTHS; AND THE MEAN FUTURE DURATION OF LIFE.

Ages.	Proportion born and surviving to specified ages, also, the number of persons living at and over those ages in a stationary population sustained by 100,000 annual births.	Persons living at and over specified ages in stationary population sustained by 100,000 annual births.	Mean future duration of life from specified ages.	1. 2. 3. 4.			
				Q_x	P_x	$Q_x + P_x$	E_x
5	73,179	3,524,118	41.163				
10	69,864	3,166,954	45.230				
15	67,912	2,822,159	41.556				
20	65,083	2,439,305	38.248				
25	61,370	2,173,200	35.413				
30	57,744	1,875,498	32.480				
35	54,441	1,595,772	29.473				
40	50,489	1,334,147	26.425				
45	44,681	1,091,134	23.374				
50	42,866	869,756	20.367				
55	38,137	665,795	17.356				
60	33,159	487,354	14.692				
65	27,616	335,081	12.134				
70	21,585	211,906	9.317				
75	15,309	119,539	7.176				
80	9,544	57,580	6.033				
85	4,849	22,217	4.502				
90	1,930	6,454	3.116				
95	449.6	1,117.7	2.486				
100	57.9	103.0	1.770				
705	2.9	3.6	1.260				

In column (2) of Table III is shown the number surviving the different ages of life, out of 100,000 persons born alive. Thus, out of 100,000 born alive, 69,864 survive age 10; 65,083 survive age 20; 42,866 survive age 50; 9,544 survive age 80; 58 reaching the advanced age of 100 years. In column (4) of the same table is shown the mean after-life time, or mean future duration of life corresponding to the different ages specified. Thus, at birth, the mean future duration of life indicated is 39½ years; at age 20, 38½ years; at age 40, nearly 26½ years; at age 60, nearly 15 years; and at age 80, about 6 years.

TABLE IV.

PROPORTIONS BORN AND SURVIVING CERTAIN AGES IN DIFFERENT COMMUNITIES, COMPARED.

Ages—years.	United States, census 1870.		England and Wales, 1858-59 (17 years).		Prussia, 1839-40-41 (3 years.)†		Carlsruhe, 1849-1850 (9 years.)		Belgium, 1846-1850 (9 years.)‡		Massachusetts, (part of 1850 census) 1854	
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
0	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
10	6,986	7,025	6,389	6,400	6,400	6,912	6,873	6,873	6,873	6,873	6,873	6,873
20	6,503	6,628	6,165	6,090	6,386	6,386	6,437	6,437	6,437	6,437	6,437	6,437
30	5,774	6,037	5,817	5,642	5,754	5,754	5,746	5,746	5,746	5,746	5,746	5,746
40	5,049	5,376	5,008	5,073	5,130	5,130	5,078	5,078	5,078	5,078	5,078	5,078
50	4,261	4,493	4,213	4,297	4,413	4,413	4,409	4,409	4,409	4,409	4,409	4,409
60	3,316	3,563	3,141	3,141	3,141	3,141	3,141	3,141	3,141	3,141	3,141	3,141
70	2,159	2,380	1,873	2,401	2,185	2,185	2,175	2,175	2,175	2,175	2,175	2,175
80	954	901	444	953	787	787	787	787	787	787	787	787
90	183	115	50	142	170	170	170	170	170	170	170	170
100	58	2	1	9	5	5	5	5	5	5	5	5

† The numbers in this column, from the age of 20 years to the extreme of old age, are the result of careful adjustment. The sum of the numbers between the ages of 20 and 45, of 45 and 70, and of 70 and 95, respectively, in the unadjusted series of Table I (column 4) and in the adjusted series of Table II (column 2), are identical; but in the adjusted series of all the numbers from the age of 20 years to the extreme limit of old age, are connected by a single exponential law of relation. The numbers above the age of 20 are left as in Table I, undisturbed.

‡ See published proceedings of American Association for the Advancement of Science, at its meeting held in Buffalo, in 1856.

§ See published proceedings of American Association for the Advancement of Science, at its meeting held in Montreal, in 1857.

AN APPROXIMATE LIFE-TABLE FOR THE UNITED STATES.

TABLE V.
MEAN FUTURE DURATION OF LIFE AT CERTAIN AGES IN DIFFERENT COMMUNITIES,
COMPARED.

Ages—years.	United States census.		England and Wales, 17 years.		Prussia, 3 years.		Carlsruhe, 9 years.		Massachusetts, (part of) 466 towns, (townships).	
	Elliott.		Fabr.		Elliott.		Milnc.		Elliott.	
	1870.		1836-44.		1839-40-41.		1779-87.		1855.	
	Persons.	Persons.	Persons.	Persons.	Persons.	Persons.	Persons.	Persons.	Persons.	Persons.
0	39.25	40.9	36.7	38.7	39.8					
10	45.3	47.4	41.8	43.8	47.1					
20	38.2	39.9	37.5	41.5	39.9					
30	32.5	32.3	30.9	34.5	34.0					
40	26.4	26.7	23.8	27.9	27.9					
50	20.1	20.1	17.1	21.1	21.3					
60	14.7	13.9	11.2	14.9	15.0					
70	9.8	8.7	7.4	9.2	9.4					
80	6.0	5.1	4.8	5.5	5.0					
90	3.4	2.9	3.0	3.3	2.9					
95	2.5	2.2	...	3.5	2.3					

TABLE VI.—LIFE ANNUITIES—5 PER CENT. PER ANNUM.

PRESENT VALUE OF ONE DOLLAR, PAYABLE AT THE END OF EACH YEAR DURING THE LIFE OF A PERSON OF SPECIFIED AGE, THE RATE OF INTEREST ON INVESTMENTS BEING ASSUMED AT 5 PER CENT. PER ANNUM.

Ages—years.	United States census, 1870.		England and Wales, 1848-54 (17 years).		Massachusetts, (part of) 1855.	
	Persons.	Males.	Females.	Persons.	Persons.	Persons.
0	\$12.6	\$12.7	\$13.2	\$12.6	\$12.6	
10	16.0	16.5	16.5	16.3	16.3	
20	14.9	15.5	15.5	15.3	15.3	
30	14.7	14.4	14.6	14.5	14.5	
40	12.9	13.0	13.5	13.4	13.4	
50	11.1	11.0	11.4	11.7	11.7	
60	9.0	8.5	9.0	9.3	9.3	
70	6.5	5.9	6.2	6.5	6.5	
80	4.3	3.6	3.9	3.6	3.6	
90	2.4	2.1	2.2	2.1	2.1	
100	1.1	1.1	1.2	1.0	1.0	

NOTE.—For explanation of the process by which these adjustments are reached, reference is made to pp. xiv and xv, Vol. on "Vital Statistics," Ninth Census, 1870.

In this connection the Compiler has deemed it desirable to introduce the following abstract of Mr. Elliott's letter to the Superintendent of the Census [see Vol. on Vital Statistics, Ninth Census, pp. 315-31], respecting the distribution of the population at the earlier years of life. [Pl. XXXVIII, XXXIX, XL.]

In the examination of the numbers of population returned during the first two years of life, especially during the latter half of the first year, a very marked irregularity is observable.

It was desired that the data be so adjusted as to present approximately a correct exhibit of the distribution of the population of the United States during the first few years of life, more especially during the first five years. This task was undertaken, with the following general results:

The calculation is based upon the assumption that in a community comprising a large population, the number of persons existing within successive equal intervals of age, as a rule, gradually diminishes with advancing age. Under a strictly accurate census, involving large numbers, this rule will, in general, be found to hold, not merely with respect to a stationary population—that is, with respect to a population in which the loss at each interval of age caused by advancing age, by death, and by emigration, is exactly compensated by the gain arising from births, from advancing age, and from immigration, but also with respect to a population fluctuating by reason of excess or deficiency in the number of births, as compared with the number of deaths, and by any ordinary excess or deficiency in the number of immigrants as compared with the number of emigrants.

Inspection of the tabulated returns shows that the numbers purporting to represent the population at the earlier years of life, especially under the age of five years, do not conform to this standard, and the deviations are so marked and extreme as to impress the conviction that they are, to a notable extent, erroneous.

According to the returns, the number under 1 year of age (that is, for the first year of life) and the number from 1 to 2 (that is, for the second year of life) are each smaller than the numbers for the third and fourth years of life. From the third year of life onward, however, the general progress does not conflict with the test above assigned, the number diminishing by somewhat regular gradations with advancing age.

The following table shows, according to the United States census of 1870, the numbers for each of the first five years of life, and the annual mean of the first two years, compared with that of the three years next following, the number returned as of unknown ages (5,161) being proportionately distributed among those of specified ages, the addition amounting to about $1\frac{1}{4}$ for every 10,000 of the population.

Age in years.	Number of persons living for each annual interval of age.	Yearly mean.
0 to 1.....	1,100,622.....	1,089,785
1 to 2.....	1,078,947.....	
2 to 3.....	1,143,292.....	1,111,960
3 to 4.....	1,113,931.....	
4 to 5.....	1,078,658.....	

From this table it will be seen that the mean of the numbers of the first two years of life (to wit, 1,089,785) is less by two per cent. than the mean of the numbers of the three years next following (to wit, 1,111,960).

In England, according to the census of 1861, the mean of the earlier two years (to wit, 568,380) is in excess of the mean of the three years next following (to wit, 521,340) by nine per cent.

In France, Italy, and Norway the corresponding rates of excess, according to the censuses of 1861 and 1865, respectively, are ten, seventeen, and fourteen per cent.

In the calculated series of numbers for the United States, hereinafter given, the corresponding rate of excess is from 11 to 12 per cent, manifestly a more probable rate than that furnished directly by the census.

The following table exhibits by quarters and half-years the number and the monthly mean of persons returned, under the United States census of 1870, as surviving during the first year of life, commencing with the month of May, 1870, (the month immediately preceding the date of the census,) and reckoning backward; and also the number and monthly mean for the entire second year of life, the number of persons returned as of unknown ages being proportionately distributed among those of specified ages.

Ages by months.	Months.	Number of persons surviving.	Monthly mean.
0 to 3.....	May, 1870 April, 1870 March, 1870	355,177.....	118,390
3 to 6.....	February, 1870 January, 1870 December, 1869	346,188.....	115,396
6 to 9.....	November, 1869 October, 1869 September, 1869	273,309.....	91,103
9 to 12.....	August, 1869 July, 1869 June, 1869	125,948.....	41,983
0 to 6.....	May back to December inclusive.	701,365.....	116,894
6 to 12.....	December back to June, inclusive..	399,257.....	66,543
0 to 12.....	Entire year.....	1,100,622.....	91,719
12 to 24.....	Second year.....	1,078,947.....	89,912

The irregularity noticeable in the first year of life, and the apparent defect in the returns of the United States census for the last half of that year, are very marked. During the first six months, the tabulated number returned is 701,365, being a monthly mean of 116,894, numbers not varying greatly from, but probably in excess of, the actual numbers within that half-year interval of age. During the last six months of the year the number returned is 399,257, showing a monthly mean of only 66,543, an incredible falling off of 43 per cent. from the number returned for the first six months.

The number returned during the second year of life is 1,078,947, a monthly mean of 89,912; this mean being 33 per cent. in excess of the mean of the preceding six months, but 2 per cent. less than the mean of the preceding twelve months, and 23 per cent. less than the mean of the first six months of life.

An important influencing cause of the irregularities is believed to be found in the fact that, although the enumeration was made with reference to the population as it existed on the 1st day of June, 1870, yet the actual collection of the facts by the marshals was extended over a period of several months subsequent to that date, some of the enumerations having been made as late as nine months after the date designated by law. Inquiries, therefore, relative to the month of birth of children under the age of twelve months, living on the first day of June, 1870, required not unfrequently that investigation be made relative to the month of birth of children who were, at the date of actual enumeration, from 16 to 20 months of age. With respect to these more distant months of birth, it is believed that there was less effort in general by the enumerator to secure the requisite information, and greater difficulty encountered in successfully conducting the inquiries.

It is earnestly hoped that, in future censuses of the population, the system will be followed which has proved so successful in England and certain other countries of Europe, to wit, that of taking the census in one day, or as nearly so as possible, through the instrumentality of a prior distribution of schedules, to be filled up with reference to a single night; such schedules to be collected by the enumerators on the following day, or as soon thereafter as practicable.

It was possible to adjust the irregularities in the data under consideration by one of two methods—the one based on the assumption that there is no actual deficiency in the number of persons enumerated, but that the irregularities observed are due exclusively to an erroneous distribution of the numbers as regards age; that there may be, for some cause, or combination of causes, a general tendency on the part of the enumerators to record the ages of those under two years, and especially those of the second half of the first year of life as either less advanced or more advanced than accords with fact. The other method is based on the assumption that the irregularities in question are not to be wholly accounted for by imperfect distribution as respects age; but that, in addition to a faulty distribution, there were, with regard to the younger ages, actual deficiencies in the

returns, and that some considerable portion of those who were under the age of two years escaped enumeration.

The latter assumption is deemed the more probable.

An adjustment of the data under the age of five years has, however, been prepared in accordance with each of these two assumptions, and is herewith presented: the one, on the assumption that the irregularities in question are due entirely to faults in distribution; the other, that they are due in part to defective distribution of the numbers returned, and, in part, to actual omissions.

In the following table the third column exhibits the reported number of the population in 1870, according to the officially published abstract, the number of persons returned as of "Unknown Ages" being proportionately distributed among those of specified ages.

The fourth and fifth columns give adjusted values, the adjustment being made in conformity with the rule that the numbers of the population, in equal intervals of age, diminish gradually with advancing years. In the preparation of the former of these two columns, there has been no addition from without to supply supposed omissions; but the average number under the age of 5 years, and also from ages 5 to 25 in this adjusted column, are retained the same as furnished by the returns. In the second of the adjusted columns, however, the number expressing the aggregate of the adjusted values, under the age of five years, has been augmented by an addition of 100,000 to supply supposed omissions.

AGE.	PERIODS OF BIRTH.	OBSERVED.		ADJUSTED.	
				Without addition.	With 100,000 added under the age of 5 years.
1.	2.	3.	4.	5.	
Years.	From May 31 June 1	Average per month.		Average per month.	
1 to 2	1869 to 1869 (one year)	7,076,947	83,972	1,132,498	94,375
2 to 3	1868 to 1867	7,143,292	55,274	1,086,707	93,550
3 to 4	1867 to 1866	1,113,331	93,826	1,052,793	87,733
4 to 5	1866 to 1865	1,078,658	87,368	1,025,102	85,425
5 to 10	1865 to 1860 (five years)	4,815,358	80,256	4,673,822	80,330
10 to 15	1860 to 1855	4,786,830	79,780	4,448,705	74,146
15 to 20	1855 to 1850	4,041,139	67,357	4,173,666	69,561
20 to 25	1850 to 1845	3,748,801	62,480	3,940,363	66,231
All other ages.	Prior to June 1, 1845.	15,650,803		15,650,803	
All ages.		38,558,371		38,558,371	
Years.	From May 31 June 1	Average per month.		Average per month.	
0 to 1	1870 to 1869 (one year)	1,100,522	91,713	1,218,344	101,522
0 to 2	1870 to 1868 (two years)	2,179,469	90,815	2,350,822	97,052
2 to 5	1868 to 1865 (three years)	3,325,231	92,663	3,162,606	87,006
0 to 5	1870 to 1865 (five years)	5,525,450	91,924	5,515,450	91,924

TABLE

SHOWING THE NUMBER OF PERSONS SURVIVING WITHIN EACH SPECIFIED AGE-INTERVAL, ACCORDING TO THE CENSES OF 1870, THE NUMBER OF PERSONS (5161) RETURNED AS OF "UNKNOWN AGES" BEING PROPORTIONATELY DISTRIBUTED AMONG THOSE OF SPECIFIED AGES (38,553,210).*

AGE.	PERIODS OF BIRTH.	OBSERVED.	ADJUSTED.	
			Without addition.	With 100,000 added under the age of 5 years.
1.	2.	3.	4.	5.
Months.				
0 to 1	May, 1870	117,007	109,661	111,314
1 to 2	April, 1870	115,436	106,266	108,769
2 to 3	March, 1870	122,644	104,255	106,307
3 to 4	February, 1870	115,765	103,113	105,094
4 to 5	January, 1870	114,507	102,021	104,016
5 to 6	December, 1869	116,513	101,029	103,083
6 to 7	November, 1869	94,695	100,269	102,267
7 to 8	October, 1869	93,404	93,534	101,527
8 to 9	September, 1869	83,300	95,856	100,851
9 to 10	August, 1869	69,588	98,249	100,226
10 to 11	July, 1869	42,469	97,678	99,543
11 to 12	June, 1869	13,791	97,145	99,001

* The addition for those of unknown ages is slightly in excess of 1% in every 10,000 of the number at specified ages; more exactly, 0.0003387.

It will be seen, on comparing, at the foot of the preceding table, the observed series of values (column 3) with the first of the adjusted series of values (column 4), that 171,273 of the number of persons reported as surviving in the last three years of the first five-year group are transferred to the first two years of that group, making the entire number under two years of age, in the adjusted series, 2,350,822 instead of 2,179,569 as in the observed or unadjusted series.

On comparing the values in the observed series (column 3) of that table with those in the second series of adjusted values (column 5), it will be seen that the number in the first two years of life has been augmented by 216,962, 100,000 of which were added from without for supposed omissions, and the remaining 116,962 transferred from the group of three years of age next following, the number of persons in the adjusted series, under the age of two years, thereby becoming 2,396,531 instead of the observed number, 2,179,569.

Each of these adjusted series conforms, as already stated, to the test of progressive and gradual diminution with advancing years.

The mean annual number of births calculated in accordance with each of these adjustments (1,404,040 according to the first method of adjustment, and 1,408,721 according to the second method), is somewhat in excess of the mean annual number of survivors (1,402,730), indicated by the numbers returned for the first six months of life.

NOTE.—By reference to the Volume on Vital Statistics, of the census 1870, pp. 524-531, will be found an appendix to the letter of Mr. Ellsott there published, showing in detail the process of arriving at the adjustments of the population at the younger years of life. On comparing the tables as now printed with the earlier tables there presented, it will be seen that in the later tables the numbers at Unknown Ages are distributed proportionately among the different periods of life; while in the earlier tables they are not so distributed.