

U. S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

ROYAL MEEKER, Commissioner

BULLETIN OF THE UNITED STATES } . . . { WHOLE
BUREAU OF LABOR STATISTICS } . . . { NUMBER 207

INDUSTRIAL ACCIDENTS AND HYGIENE SERIES: NO. 11

CAUSES OF DEATH
BY OCCUPATION

OCCUPATIONAL MORTALITY EXPERIENCE
OF THE METROPOLITAN LIFE INSURANCE
COMPANY, INDUSTRIAL DEPARTMENT,
1911-1913: BY LOUIS I. DUBLIN, PH. D.



MARCH, 1917

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
10 CENTS PER COPY
▽

CONTENTS.

	Page.
INTRODUCTION.....	5
I. MALES.....	7-65
Distribution of deaths, by occupation.....	7-9
Principal causes of death in all occupations combined.....	8-17
Typhoid fever.....	10
Tuberculosis of the lungs.....	10, 11
Cancer (all forms).....	11, 12
Diabetes.....	12
Alcoholism.....	12
Chronic lead poisoning.....	12, 13
Cerebral hemorrhage, apoplexy, and paralysis.....	13
Organic diseases of the heart.....	13, 14
Acute and chronic bronchitis.....	14
Pneumonia (lobar and undefined).....	14, 15
Cirrhosis of the liver.....	15
Bright's disease.....	15, 16
Suicide.....	16
Accidental violence.....	16, 17
Average age at death, by cause, in all occupations combined.....	17-19
Age distribution.....	19
Mortality, by occupation.....	20-64
Bakers.....	20-22
Blacksmiths.....	23, 24
Cigar makers and tobacco workers.....	24-26
Clerks, bookkeepers, and office assistants.....	26-28
Coal miners.....	28-31
Compositors and printers.....	31-33
Railway enginemen and trainmen.....	33-36
Farmers and farm laborers.....	36-38
Iron molders.....	38-41
Laborers.....	41-43
Longshoremen and stevedores.....	43-45
Machinists.....	46-48
Masons and bricklayers.....	48-50
Painters, paper hangers, and varnishers.....	50-52
Plumbers, gas fitters, and steam fitters.....	53-55
Railway track and yard workers.....	55-57
Saloon keepers and bartenders.....	57-60
Teamsters, drivers, and chauffeurs.....	60-62
Textile-mill workers.....	62-64
Average age at death, by occupation.....	65

	Page.
II. FEMALES.....	67-81
Distribution of deaths, by occupation.....	67, 68
Mortality of all specified occupations combined.....	68-71
Average age at death, by cause, in all specified occupations combined....	72
Mortality, by occupation.....	72-81
Housewives and housekeepers.....	73, 74
Domestic servants.....	74, 75
Dressmakers and garment workers.....	76, 77
Textile-mill workers.....	77, 78
Clerks, bookkeepers, and office assistants.....	78-80
Store clerks and saleswomen.....	80, 81
Average age at death, by occupation.....	81
Conclusion.....	83-85
Appendix A.—Comparative population mortality.....	87, 88
Appendix B.—Occupation distribution of living policyholders—Metropolitan Life Insurance Co.....	88, 89

BULLETIN OF THE U. S. BUREAU OF LABOR STATISTICS.

WHOLE NO. 207.

WASHINGTON.

MARCH, 1917.

CAUSES OF DEATH, BY OCCUPATION.

BY LOUIS I. DUBLIN, PH. D.¹

INTRODUCTION.

The large industrial insurance companies are in a favorable position to study the influence of occupation on life and health. A considerable proportion of the persons insured by them are engaged in gainful work. The companies pay a large number of death claims annually on the lives of these persons, and obtain very comprehensive records of the essential facts relative to their occupations and their causes of death. In the interest of the community and in their own interest, the companies have devoted themselves for some time to an analysis of their experience. Indeed, the publications on the occupational mortality experience of the Prudential Insurance Co. from the pen of Dr. Hoffman have been invaluable in the discussion of industrial hygiene in America. It is the purpose in the present study to give the results of an analysis of the occupational mortality experience of the Metropolitan Life Insurance Co. There are available the records of 94,269 deaths which occurred in the three years 1911, 1912, and 1913 among occupied white males, and of 102,467 deaths in the same three years among white females, at ages 15 years and over, insured in the industrial department of the company. Data for colored persons are at hand, but do not illustrate any additional relations between occupation and mortality. They are therefore not presented in this study.

The occupations returned upon the death certificates were classified according to the titles in an abridged and modified list drawn from the classified index to occupations prepared by the Census Bureau.² Titles were added to this list to meet the requirements and opportunities of the material, but throughout the analysis attention was directed primarily to those occupations which were represented in large numbers or which possessed exceptional interest from the viewpoint of hazard.

¹ The author desires to acknowledge his indebtedness to Dr. Lee K. Frankel, third vice president of the Metropolitan Life Insurance Co., for his many courtesies which have made this investigation possible. Of the staff of the Statistical Bureau, special credit is gladly given to Mr. Edwin W. Kopf, assistant statistician, and to Mr. Philip Leiboff.

² Classified Index to Occupations. Thirteenth Census of the United States. Department of Commerce and Labor, Bureau of the Census. Washington, 1910.

I. MALES.

DISTRIBUTION OF DEATHS, BY OCCUPATION.

Male occupations will first be considered. Table 1 indicates the distribution of the more important occupations represented in this experience.

TABLE 1.—OCCUPATIONS OF WHITE MALE DECEDENTS, AGES 15 YEARS AND OVER.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Occupation.	Number of deaths.	Per cent of total.	Occupation.	Number of deaths.	Per cent of total.
Laborers (undefined).....	10,748	11.4	Plumbers, gas fitters, and steam fitters.....	1,153	1.2
Teamsters, drivers, and chauffeurs..	6,471	6.9	Tailors and garment workers.....	1,095	1.2
Clerks, bookkeepers, and office assistants.....	4,139	4.4	Compositors and printers.....	1,056	1.1
Carpenters.....	3,917	4.2	Railway enginemen and trainmen..	947	1.0
Farmers and farm laborers.....	3,890	4.1	Street-railway employees.....	868	.9
Machinists.....	3,152	3.3	Hostlers and stablemen.....	832	.9
Painters, paper hangers, and varnishers.....	2,722	2.9	Hucksters and peddlers.....	829	.9
Policemen, watchmen, and guards..	2,407	2.6	Sailors and marine workers.....	787	.8
Store clerks and salesmen.....	2,396	2.5	Iron and steel mill workers.....	762	.8
Textile-mill workers.....	2,390	2.5	Waiters.....	758	.8
Merchants and storekeepers.....	2,260	2.4	Cabinet and furniture makers.....	757	.8
Saloon keepers and bartenders.....	2,190	2.3	Cigar makers and tobacco workers..	693	.7
Railway track and yard workers.....	1,932	2.0	Leather goods workers.....	662	.7
Janitors and building employees.....	1,770	1.9	Bakers.....	654	.7
Masons and bricklayers.....	1,748	1.9	Longshoremen and stevedores.....	651	.7
Iron molders.....	1,646	1.7	Tinners and tinware workers.....	614	.7
Coal miners.....	1,557	1.7	Street and sewer cleaners.....	609	.6
Shoemakers.....	1,452	1.5	Electricians.....	596	.6
Stationary engineers and firemen..	1,443	1.5	Barbers.....	582	.6
Children, students, and scholars....	1,437	1.5	Coopers.....	521	.6
Blacksmiths.....	1,273	1.4	All other occupations.....	15,534	16.5
Professional service.....	1,186	1.3			
Agents and canvassers.....	1,183	1.3	All occupations (excluding "retired").....	94,269	100.0

The largest single group is "Laborers," forming 11.4 per cent of the total. More definite occupations are represented in considerable numbers, viz., clerical employees, farmers and farm laborers, and persons engaged in the various building trades, in iron and steel work, and in the railway service. Many of these groups are known to be exposed to definite occupational hazards. It is interesting to note the large degree of correspondence in the above distribution of occupations with that found in the list presented by Hoffman in his analysis of the material of the Prudential Insurance Co.¹ The total number of deaths in his list is 103,434, occurring during the years 1907 to 1910. His largest group is likewise composed of laborers, who represent 18.8 per cent of the total. The first five titles are the

¹ Exhibits of the Prudential Insurance Co. of America. Fifteenth International Congress on Hygiene and Demography, Washington, D. C., 1912. Table I, p. 23.

same in both lists. A considerable number of occupations appear in the two lists with virtually the same percentage of the total—as, for instance, tailors, printers, and coopers. Emphasis is placed upon this correspondence, first, because it tends to confirm the essential accuracy of the statements of occupations as given on the death certificates received by the insurance companies, and second, because it establishes the comparability of the mortality experience of the two companies.

It would be well if, in addition to the distribution of the occupations of the deceased, there were available the corresponding figures for the distribution of the occupations of living policyholders. We should then be able to present the death rates for each of the occupations in question. Such rates, especially if prepared for the various age periods of life, would undoubtedly be a very accurate measure of the hazard to life in the various occupations. Unfortunately, information with reference to the occupations of living policyholders is not at hand, because of the great cost involved in keeping records in such detail for over 10,000,000 industrial policyholders.

TABLE 2.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES IN ALL WHITE

[Metropolitan Life Insurance Co.—Industrial

Line No.	Cause of death.	Inter-national List No.	Ages 15 years and over.		Age periods (years).	
			Number of deaths.	Per cent.	15-24	
					Number of deaths.	Per cent.
1	Typhoid fever.....	1	1,390	1.5	581	5.2
2	Influenza.....	10	769	.8	64	.6
3	Tuberculosis of the lungs.....	28, 29	19,349	20.5	3,753	33.8
4	Cancer (all forms).....	39-45	4,578	4.9	76	.7
5	Acute articular rheumatism.....	47	380	.4	105	.9
6	Chronic rheumatism and gout.....	48	69	.1	4	.....
7	Diabetes.....	50	913	1.0	110	1.0
8	Alcoholism.....	56	889	.9	21	.2
9	Chronic lead poisoning.....	57	81	.1	3	.....
10	Other occupational and chronic poisonings.....	58, 59	31	.....	4	.....
11	Cerebral hemorrhage; apoplexy; paralysis.....	64-66	5,825	6.2	52	.5
12	Organic diseases of the heart.....	79	11,323	12.0	640	5.8
13	Acute and chronic bronchitis.....	89, 90	804	.9	30	.3
14	Pneumonia (lobar and undefined).....	92	6,776	7.2	599	5.4
15	Pleurisy.....	93	276	.3	46	.4
16	Cirrhosis of the liver.....	113	2,136	2.3	22	.2
17	Bright's disease.....	120	9,059	9.6	276	2.5
18	Suicide (all forms).....	155-163	2,150	2.3	308	2.8
19	Accidental violence.....	164-181	8,752	9.3	2,130	19.2
20	All other causes.....	185, 186	18,719	19.9	2,292	20.6
21	All causes.....	.....	94,269	100.0	11,116	100.0

We may nevertheless measure approximately the hazards involved in certain occupations by presenting the proportionate mortality from certain causes of death in each occupation. This method has the virtue of showing at once what causes predominate in each of the age periods. With proper precautions, occupations can be compared among themselves and valuable facts obtained for the practical purposes of industrial hygiene.

PRINCIPAL CAUSES OF DEATH IN ALL OCCUPATIONS COMBINED.

The first step in the investigation consists in obtaining the general proportionate distribution of the principal causes of death. This is shown in Table 2, which is for the entire experience; that is, for all occupied males combined. The causes of death selected are those which are of interest because of their numerical importance or because they indicate the character of the hazard in the occupations. The number of deaths from each cause in 10-year age periods, and the per cent distribution of the causes within each age period, are presented.

OCCUPATIONS (EXCLUDING "RETIRED"), BY AGE PERIODS, 15 YEARS AND OVER—MALES.

department—Mortality experience, 1911 to 1913.]

Age periods (years).										Average age at death (years).	Line No.
25-34		35-44		45-54		55-64		65 and over.			
Number of deaths.	Per cent.	Number of deaths.	Per cent.	Number of deaths.	Per cent.	Number of deaths.	Per cent.	Number of deaths.	Per cent.		
356	2.7	211	1.4	128	0.8	81	0.4	33	0.2	31.1	1
65	.5	94	.6	113	.7	189	1.0	244	1.3	53.3	2
5,292	40.9	5,017	32.9	3,084	18.5	1,640	8.6	563	2.9	37.1	3
103	.8	357	2.3	989	5.9	1,665	8.7	1,388	7.3	57.8	4
46	.4	52	.3	75	.4	51	.3	51	.3	41.1	5
6	-----	6	-----	10	.1	20	.1	23	.1	54.9	6
92	.7	100	.7	171	1.0	249	1.3	191	1.0	49.7	7
182	1.4	314	2.1	227	1.4	106	.6	39	.2	43.1	8
8	.1	24	.2	24	.1	14	.1	8	-----	47.5	9
4	-----	7	-----	7	-----	4	-----	5	-----	45.8	10
160	1.2	350	2.3	864	5.2	1,845	9.6	2,554	13.4	60.9	11
697	5.4	1,181	7.7	1,850	11.1	3,048	15.9	3,907	20.4	55.6	12
36	.3	52	.3	103	.6	213	1.1	370	1.9	59.9	13
952	7.3	1,228	8.1	1,369	8.2	1,431	7.5	1,197	6.3	48.1	14
30	.2	40	.3	59	.4	55	.3	46	.2	46.1	15
154	1.2	389	2.6	635	3.8	593	3.1	343	1.8	52.0	16
577	4.5	1,190	7.8	1,851	11.1	2,553	13.3	2,612	13.7	55.1	17
402	3.1	436	2.9	428	2.6	383	2.0	193	1.0	43.1	18
1,616	12.5	1,516	9.9	1,419	8.5	1,236	6.5	835	4.4	39.3	19
2,175	16.8	2,678	17.6	3,290	19.7	3,759	19.6	4,525	23.7	-----	20
12,953	100.0	15,242	100.0	16,696	100.0	19,135	100.0	19,127	100.0	47.9	21

Similar tables are presented for each of the occupations studied, and comparisons are made of the proportionate representation of any one cause in a certain occupation with the corresponding representation in all occupations. The ratio of these two percentages may be conveniently called the relative index of mortality for each specified cause in the occupation. The following illustration will clarify this point. Table 9 shows that among blacksmiths, in the age period 25 to 34 years, 28.7 per cent of the deaths were due to tuberculosis of the lungs. For all occupied males in the same age period the corresponding proportion of deaths was 40.9 per cent. The relative index of mortality from tuberculosis of the lungs among blacksmiths in the age period 25 to 34 is therefore *70.0*.¹ Pulmonary tuberculosis among blacksmiths at this age period, then, is not relatively as important a cause of death as it is in the entire group.

In the following sections are considered the chief characteristics of this experience for all occupations (Table 2) with reference to the important causes of death. Later the findings are summarized with special reference to certain of the more important occupations.

TYPHOID FEVER.

Typhoid fever is one of the minor causes of death, being responsible for only 1.5 per cent of the total deaths at all ages combined. The disease shows its highest proportionate mortality at the age period 15 to 24 years. In all occupations combined, the proportionate incidence decreases at the fairly constant rate of about 50 per cent in each succeeding age period, reaching the minimum in the age period 65 and over. The average age at death from this cause is 31.1 years.

The disease is found to be most prevalent among railway enginemen and trainmen (2.7 per cent at all ages), among machinists and textile-mill workers (2.3 per cent at all ages), among bakers, among compositors and printers (2.1 per cent at all ages), and among iron molders (1.8 per cent at all ages). Among all these occupations, except compositors and printers, the highest proportionate mortality from typhoid fever occurs in the age period 15 to 24 years; for compositors and printers the period having the highest proportion of deaths due to this disease is 25 to 34 years. This disease shows the lowest proportionate mortality among masons and bricklayers (0.6 per cent at all ages), and among blacksmiths, longshoremen and stevedores, and painters (0.9 per cent at all ages).

TUBERCULOSIS OF THE LUNGS.

Tuberculosis of the lungs is the most prevalent cause of death for all occupations combined, being responsible for 20.5 per cent of all deaths at all ages. At ages 15 to 24 years it shows a proportionate mortality of 33.8 per cent, and increases to its maximum, 40.9 per cent, in the

¹ Throughout this report relative indices are set in italics.

age period 25 to 34. From this period onward there is a continuous decrease in the per cent representation until, at 65 and over, pulmonary tuberculosis is responsible for only 2.9 per cent of all deaths. The average age at death is 37.1 years.

It must not be assumed that the proportionate mortality figures for the several age periods, as given above, are a true quantitative measure of the relative incidence of tuberculosis at the various ages. On the basis of exposure the highest rate from tuberculosis is in the age period 35 to 44 years and not in the age period 25 to 34, when the proportionate mortality is highest. It is only because of the increase in mortality from other causes that the relative position of tuberculosis is depressed. This phenomenon is even more marked in the later age periods, where there is still a very high mortality rate from tuberculosis, although the percentage distribution is very low. This comment is made in order to caution the reader against an incorrect interpretation of the figures given. Table 2 serves only to show the position of any one cause in relation to other causes of death.

Tuberculosis of the lungs is the most frequent cause of death in 15 out of 19 occupations referred to in the following tables for males. The proportionate mortality is highest among clerks, bookkeepers, and office assistants, among whom it is responsible for 35.0 per cent of all the deaths at all ages. It is also high among composers and printers; plumbers, gas fitters, and steam fitters; longshoremen and stevedores; and teamsters, drivers, and chauffeurs. It is least represented among coal miners, among whom it is responsible for only 5.8 per cent of all the deaths. It is also low among farmers and farm laborers (9.7 per cent).

Among clerks, bookkeepers, and office assistants the disease has its highest excess of proportionate mortality in the age period 25 to 34, when the percentage is 51.2. This is likewise true among composers and printers. The low proportionate mortality among coal miners is most striking in the age period 15 to 24 years, when it is 4.0 per cent.

CANCER (ALL FORMS).

Cancer (all forms) is of slight importance until the age period 45 to 54 years, when it causes 5.9 per cent of all deaths, all occupations combined. The percentage increases in the following age period to 8.7 per cent. It is then slightly more prevalent than pulmonary tuberculosis. In the last age period, the percentage declines to 7.3. The average age at death from cancer is 57.8 years.

This disease is found most highly represented among blacksmiths and among farmers and farm laborers (7.6 per cent at all ages). It is lowest among enginemen and trainmen (2.0 per cent, all ages). Among blacksmiths, the highest relative index of mortality from cancer is in the age period 55 to 64 years, when the proportionate mortality is 12.8 per cent. Among farmers and farm laborers the proportionate

mortality is highest also in this age period, the percentage being 10.4. Among enginemen and trainmen the proportionate mortality in the age period 55 to 64 is 5.3 per cent.

DIABETES.

The proportionate representation of diabetes in all occupations combined varies but slightly in the several age periods, ranging around 1 per cent of all deaths. The maximum proportion is 1.3 per cent in the age period 55 to 64. The average age at death from this cause is 49.7 years.

The small number of deaths from this disease renders uncertain any comparison of its representation in various occupations. Yet there appears to be confirmation of the findings of other workers (Bertillon,¹ and Thompson²) that the condition is most prevalent among those occupations which involve nervous strain and worry. Thus, the proportionate mortality from diabetes is 2.1 per cent among railway enginemen and trainmen at the age period 55 to 64. An even higher per cent, namely, 3.3, is found among saloon keepers and bartenders at the same age period.

ALCOHOLISM.

The number of deaths from alcoholism is always understated; many cases are assigned to the major effects of alcoholism, such as Bright's disease and cirrhosis of the liver, and to various forms of mental alienation. These figures show that it is responsible for only 0.9 per cent of all the deaths among all occupied males. Its highest proportionate mortality is shown in the age period 35 to 44 years, where 2.1 per cent of all deaths result from it. The proportion is the same for the age period 25 to 34 as it is for 45 to 54, namely, 1.4 per cent. The average age at death from this cause is 43.1 years.

The proportionate mortality is highest among saloon keepers and bartenders (3.4 per cent at all ages); it is also high among teamsters, drivers, and chauffeurs (1.6 per cent at all ages). Among saloon keepers and bartenders the highest proportionate mortality is found in the age period 25 to 34. Among teamsters, drivers, and chauffeurs the highest proportion is in the age period 35 to 44, but a higher relative index is found in the previous age period 25 to 34.

CHRONIC LEAD POISONING.

The occupational diseases are represented by small numbers, clearly the result of under registration, chronic lead poisoning being recorded in 81 cases and other occupational and chronic poisonings in 31. The largest number of lead-poisoning cases appear in the age

¹ Bertillon, Jacques: On Mortality and the Causes of Death according to Occupation. Fifteenth International Congress on Hygiene and Demography, Washington, D. C., 1912. P. 365.

² Thompson, W. Gilman: The Occupational Diseases. New York, 1914. P. 51.

periods 35 to 44 and 45 to 54 among all occupied males; they form 0.2 per cent of all the deaths at ages 35 to 44 and 0.1 per cent at ages 45 to 54. The average age at death is 47.5 years. It is only among painters, paper hangers, and varnishers that the figures for lead poisoning are sufficiently large to warrant reference. In this group 2.0 per cent of all the deaths were due to chronic lead poisoning and in the age period 35 to 44 this proportion rises to 3.4 per cent.

CEREBRAL HEMORRHAGE, APOPLEXY, AND PARALYSIS.

Cerebral hemorrhage, apoplexy, and paralysis come into prominence as causes of death in the age period 45 to 54 years; the proportionate mortality is then 5.2 per cent. In the two following age periods these causes assume great importance. The average age at death is 60.9 years, which is the highest for any cause listed in Table 2.

These diseases show their highest proportionate mortality among farmers and farm laborers (9.7 per cent at all ages), among blacksmiths (8.3 per cent at all ages), and among other groups which show a relatively high average age at death. The lowest proportion is found among longshoremen and stevedores (2.8 per cent at all ages). The farmers show their highest index of mortality in the age period 25 to 34 years, but the number of cases here is too small to make this index reliable. Most of the cases in this occupational group occur in the age period 65 and over, when the index of mortality is 106.7. Among blacksmiths, on the other hand, the highest reliable index is found in the age period 45 to 54; it is 155.8.

ORGANIC DISEASES OF THE HEART.

In this investigation organic diseases of the heart rank next to tuberculosis of the lungs in numerical importance. They are responsible for 12.0 per cent of all deaths in all occupations combined. Like tuberculosis, they form a prominent cause of death in every age period, but unlike tuberculosis, they show their highest proportionate mortality at the advanced ages. Organic diseases of the heart have a proportionate mortality of 5.8 per cent in the age period 15 to 24 years. The percentage remains fairly constant until age 34 is reached, and then increases rapidly until the highest relative mortality, 20.4 per cent, occurs at ages 65 and over. Organic diseases of the heart are the leading cause of death in this period, as also in the previous age period, 55 to 64 (15.9 per cent). The average age at death is 55.6 years.

These diseases are found to be most highly represented among farmers and farm laborers, among whom they are responsible for one death out of every six (16.5 per cent at all ages). They are also highly represented among laborers (14.1 per cent) and among black-

smiths (13.8 per cent). They are least represented among railway enginemen and trainmen (5.4 per cent). Inferences must not be drawn too hastily, however, from the proportionate representation of organic heart diseases in various occupations, since they are rather unsatisfactory assignments of cause of death, obscuring, in many instances, more definite conditions which autopsy would determine.

ACUTE AND CHRONIC BRONCHITIS.

These diseases are also among the unsatisfactory returns of causes of death, frequently hiding pulmonary tuberculosis. The proportionate mortality is 0.9 per cent at all ages. The percentages are insignificant until the age period 55 to 64, when 1.1 per cent of all deaths are caused by them. At ages 65 and over the percentage is 1.9 per cent. The average age at death is 59.9 years. The diseases are found to be most highly represented among coal miners (3.1 per cent at all ages). Among them it is in the age period 55 to 64 that the highest significant index of mortality from bronchitis is reached (*381.8*). These diseases follow closely the relative position of pneumonia in the several occupations, being high where pneumonia is common and low where pneumonia is least represented. The lowest percentage is found among railway enginemen and trainmen, where the proportionate mortality is 0.1 per cent at all ages. The above findings agree with those of Bertillon.¹

PNEUMONIA (LOBAR AND UNDEFINED).

Pneumonia (lobar and undefined) plays an important rôle at all ages (7.2 per cent) and at all age periods. The proportionate mortality in the age period 15 to 24 years is 5.4 per cent. This is increased to 7.3 per cent in the age period 25 to 34; to 8.1 per cent in the age period 35 to 44; and to the maximum, 8.2 per cent, at the age period 45 to 54. The proportion declines to 6.3 in the age period 65 and over. The average age at death from these causes, in all occupations combined, is 48.1 years.

The disease appears to be most common in occupations exposed to alcohol, and in those in which sudden changes in temperature take place. The highest proportionate mortality is found among iron molders (10.6 per cent at all ages), coal miners (10.3 per cent), laborers (9 per cent), saloon keepers and bartenders (8.7 per cent), teamsters, drivers, and chauffeurs (8.5 per cent), and longshoremen and stevedores (8.3 per cent). Among iron molders the highest relative index of mortality is in the age period 15 to 24 years (*187.0*) and among coal miners it is in the age period 45 to 54 (*179.3*). Among laborers the highest index (*141.1*) is in the age period 25 to 34, and among teamsters, drivers, and chauffeurs it is in the same age period (*143.8*). The lowest proportionate mortalities are found among cigar makers

¹ Op cit., p. 350.

and tobacco workers, composers and printers, and railway engineers and trainmen.

In many respects, this disease follows closely the description given above for bronchitis; indeed, all the respiratory diseases follow much the same course. The chief difference lies in the average age at death from the various conditions.

CIRRHOSIS OF THE LIVER.

Cirrhosis of the liver, including alcoholic cirrhosis, becomes prominent in the age period 35 to 44 years, and is then responsible for 2.6 per cent of all deaths in all occupations combined. It reaches its maximum proportion in the age period 45 to 54, with a percentage of 3.8 of all the deaths. The percentage decreases in the next age period to 3.1, and is still further reduced in the last age period, 65 and over, to 1.8 per cent. The average age at death is 52 years.

The proportionate mortality from this disease is highest among saloon keepers and bartenders, being 7.5 per cent of all deaths at all ages. In the age period 45 to 54 years the percentage is 10.7, with an index of 281.6. In this age period, cirrhosis of the liver is almost as important as pneumonia in this occupation; in the following age periods it is even more important. It is possible, however, that the returns for cirrhosis of the liver among saloon keepers often obscure the more definite statement of alcoholism. The disease shows its lowest percentage among longshoremen and stevedores (1.1 per cent of all deaths). This is found to be characteristic of all the age periods of this occupation.

BRIGHT'S DISEASE.

Bright's disease is a prominent cause of death at all age periods (9.6 per cent), but it is especially significant after 35 years of age. In the age period 35 to 44 the percentage of all deaths is 7.8; this proportion increases steadily until it reaches its maximum, 13.7 per cent, in the age period 65 and over. The average age at death is 55.1 years.

Bright's disease shares with cirrhosis of the liver and alcoholism the characteristic of being most prevalent among saloon keepers and bartenders and very low among railway engineers and trainmen. Among saloon keepers and bartenders the percentage at all ages is 12.2; in the age period 55 to 64 the proportion rises to 18.1 per cent. Bright's disease is then the most important cause of death. This is likewise true in the preceding and in the following age periods. In other words, Bright's disease among saloon keepers and bartenders is the principal cause of death at all ages beginning with age 45. This cause likewise accounts for 12.2 per cent of the deaths at all ages

among painters, paper hangers, and varnishers, among whom the maximum proportionate mortality, 18.6 per cent, is attained at ages 55 to 64. This may indicate the effect of chronic lead poisoning in this occupation. In this and in the following age period Bright's disease is one of the principal causes of death.

SUICIDE.

Suicide is another cause of death which is found closely related to alcoholism. Suicide (all forms) was responsible, in this investigation, for 2.3 per cent of all deaths at all ages combined. The proportion varies somewhat in the different age periods, but is highest at ages 25 to 34 years, being 3.1 per cent. The lowest proportion is in the age period 65 and over. It must not be inferred, however, that this cause shows the highest mortality rate at the earlier age period; for on the basis of number exposed to risk it is found most prevalent among white males in the age period 65 to 74, at which ages the rate in the Metropolitan Industrial Experience during the years 1911 to 1914 was 81.5 per 100,000. In the age period 25 to 34, on the other hand, while the proportion is highest, the rate per 100,000 is 30.1. The marked increase in the number of deaths from other causes at the advanced ages has the effect of reducing the proportionate representation of suicide, even though the rate is then highest. Emphasis is placed upon this difference between the proportion and the rate to caution the reader against misconstruction of the figures upon which this study is based. The average age at death from suicide is 43.1 years.

The proportionate mortality from suicide is found highest among bakers, among whom it is responsible for 5.4 per cent of all deaths at all ages. It is high among cigar makers (3.2 per cent at all ages) and among iron molders and saloon keepers and bartenders (2.7 per cent). It is found to be lowest among coal miners, among laborers, and in other occupations where mental stress is supposedly at a minimum.

ACCIDENTAL VIOLENCE.

Under this head are included deaths from all of the external causes, with the exception of suicide and homicide. It was the purpose originally to differentiate from this group deaths from poisonous gases and other poisons, because of the possible light that the figures might throw on occupational conditions. The number of cases, however, was found to be too small to warrant any conclusion with reference to the relative index of mortality from poisonous gases and other poisons in the various occupations. Taken together the accidental causes are responsible for a large proportion of all deaths (9.3 per cent at all ages). The highest proportion is reached in the very earliest age period—namely, 15 to 24 years—when 19.2 per

cent of all deaths are from these causes. If, in this age period, all external causes excepting homicide are combined the total percentage is 22.0. Next to tuberculosis of the lungs, this group of causes is most important. In the following age period "accidental violence," as here defined, is responsible for 12.5 per cent of the deaths. The proportion decreases steadily, until in the age period 65 and over it is only 4.4 per cent. The average age at death from accidental violence is 39.3 years.

The highest proportion is found among railway enginemen and trainmen, where 42.4 per cent of all the deaths at all ages combined are due to accidental violence. In this occupation all other causes are of secondary significance. The proportion is also high among railway track and yard workers (20.8 per cent) and among coal miners (20.3 per cent), and is least among saloon keepers and bartenders (3.2 per cent). The highest relative index of mortality from accidental violence is found in the age period 25 to 34 among railway enginemen and trainmen (461.6).

To summarize the above discussion, we find in the age period 15 to 24 two causes of preeminent importance, namely, tuberculosis of the lungs and accidental violence. Together they are responsible for 53.0 per cent of all deaths. In the age period 25 to 34 pneumonia becomes significant, and, added to the two aforementioned causes, increases the proportion to 60.7 per cent of the total. In the age period 35 to 44 Bright's disease and organic diseases of the heart raise the number of principal causes to five which together form 66.4 per cent of all of the deaths. There is no striking change in conditions in the two succeeding age periods. In the age period 65 and over organic diseases of the heart lead, and, together with Bright's disease, cerebral hemorrhage, apoplexy, and paralysis, cancer, and pneumonia, give a total of 61.1 per cent of the deaths from all causes.

AVERAGE AGE AT DEATH, BY CAUSE, IN ALL OCCUPATIONS COMBINED.

The last column of Table 2 shows the average age at death from each of the causes of death and from all causes combined. It is realized that these average ages are not reliable measures of the mortality of occupied persons in the various occupations; they are nevertheless significant as a descriptive factor for each one of the diseases or conditions listed. Typhoid fever shows the lowest average age at death (31.1 years). This is followed by tuberculosis of the lungs (37.1 years). Deaths from cerebral hemorrhage, apoplexy, and paralysis show the highest age at death (60.9 years). The table following shows the average age at death from each of the causes in ascending order of age.

TABLE 3.—SPECIFIED CAUSES OF DEATH LISTED IN ASCENDING ORDER OF AVERAGE AGE AT DEATH—WHITE MALES—AGES 15 YEARS AND OVER.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Average age (years).	Cause of death.	Average age (years).
Typhoid fever.....	31.1	Cirrhosis of the liver.....	52.0
Tuberculosis of the lungs.....	37.1	Influenza.....	53.3
Accidental violence.....	39.3	Chronic rheumatism and gout.....	54.9
Acute articular rheumatism.....	41.1	Bright's disease.....	55.1
Alcoholism.....	43.1	Organic diseases of the heart.....	55.6
Suicide.....	43.1	Cancer (all forms).....	57.8
Other occupational and chronic poisonings.....	45.8	Acute and chronic bronchitis.....	59.9
Pleurisy.....	46.1	Cerebral hemorrhage, apoplexy, and paralysis.....	60.9
Chronic lead poisoning.....	47.5		
Pneumonia.....	48.1	All causes.....	47.9
Diabetes.....	49.7		

These figures for the average ages at death are for occupied white males, ages 15 and over, and must not be compared with population figures for the same causes which usually include persons at all ages.

A detailed comparison of Table 2 with the corresponding table for the experience of the Prudential Life Insurance Co.¹ shows a remarkable correspondence in the proportionate incidence of each of the causes of death in the several age periods. This agreement may well have been expected in view of the similarity of the two insurance experiences. It is, nevertheless, a very encouraging condition, for it points unmistakably to the essential accuracy of the two studies. For some causes of death the definiteness of which leaves little to be desired, as, for example, suicide, the agreement in the two experiences is almost complete, as is shown in the following table:

TABLE 4.—PER CENT OF MORTALITY FROM SUICIDE, BY AGE PERIODS: THE METROPOLITAN AND THE PRUDENTIAL INDUSTRIAL EXPERIENCES COMPARED.

Insurance company.	Ages 15 years and over.	Per cent of deaths during age period (years)—					
		15-24	25-34	35-44	45-54	55-64	65 and over.
Metropolitan.....	2.3	2.8	3.1	2.9	2.6	2.0	1.0
Prudential.....	2.2	2.8	2.8	2.5	2.7	2.0	.9

For other causes where the two experiences diverge, they do so only within very narrow limits. These variations are the result of slightly different methods of compilation in the statistical offices of the two companies. It may not only be concluded from this correspondence then, that the qualitative measures of the mortality—that is, the proportional figures—are mutually confirmed in the two experiences, but the prediction may confidently be made that the quan-

¹ Op. cit., pp. 24, 25.

titative measures of the mortality in the several occupations—that is, the death rates—will be found just as similar in the two experiences, when such measures of mortality are finally obtained.

AGE DISTRIBUTION.

It is necessary to take up one other general characteristic of this material before considering each of the several occupations; namely, the age distribution of the deceased. The average age at death of all occupied persons is 47.9 years. The average age at death has been determined for each of the occupations, and is to be found in each of the tables descriptive of the occupation. It must not be assumed, however, that these average ages are trustworthy measures of the mortality of persons in the various occupations. They are dependent in large measure upon the age distribution of the living workers in each of the occupations. It is obvious that the average age at death will be low in such occupations as clerks, bookkeepers, and office assistants, where the largest number of persons exposed are in the earlier age periods. On the other hand, a high average age at death will be found in those occupations in which a considerable proportion of the workers are in the advanced age periods, as, for example, among laborers. Yet the mortality rate of laborers is clearly much higher per thousand exposed than the mortality rate found among clerks, bookkeepers, and office assistants. The determining factor is, then, the distribution of the ages of the living in each occupation. Data covering this point are not available in our experience, but, in spite of these limitations, it is nevertheless of interest to note the average ages of the deceased.

The following table presents the distribution, by number and percentage, of the 94,269 decedents by 10-year age periods, in the Metropolitan experience as compared with that of the Prudential. Again a striking correspondence is to be noted in the two sets of figures.

TABLE 5.—COMPARISON OF THE NUMBER OF DEATHS AND PER CENT DISTRIBUTION BY AGE PERIODS, OF THE METROPOLITAN LIFE INSURANCE CO. INDUSTRIAL MORTALITY EXPERIENCE, 1911 to 1913, WITH THE PRUDENTIAL EXPERIENCE, 1907 to 1910.

Age period.	Metropolitan experience.		Prudential experience.	
	Number of deaths.	Per cent of total.	Number of deaths.	Per cent of total.
15 to 24 years.....	11, 116	11. 8	10, 756	10. 4
25 to 34 years.....	12, 953	13. 7	15, 451	14. 9
35 to 44 years.....	15, 242	16. 2	17, 415	16. 8
45 to 54 years.....	16, 696	17. 7	17, 969	17. 4
55 to 64 years.....	19, 135	20. 3	20, 836	20. 1
65 years and over..	19, 127	20. 3	21, 007	20. 3
All ages.....	94, 269	100. 0	103, 434	100. 0

MORTALITY, BY OCCUPATION.

In this section the individual occupations have been considered, with special reference to the relative proportion of the causes of death. Not all the occupations in the list have been studied. Certain occupations leave much to be desired in the matter of definiteness of statement. Thus such a title as "policemen, watchmen, and guards," on examination, shows inclusions of such diversity as to invalidate any conclusions drawn from the findings. The title has been discontinued for future investigations. Other occupations are represented by too small numbers, as, for example, electric linemen, with only 198 deaths. The element of chance in the returns for such an occupation plays a very important part. Finally, certain occupations are of no great interest because of the lack of hazard involved in their pursuit. Such occupations are carpenters, merchants and storekeepers, agents and canvassers, etc. These, too, have not been considered. The following occupations taken from the general list appear, then, to satisfy three conditions: First, they permit definiteness of statement; second, they embrace a sufficiently large number of cases; and third, they indicate the presence of some element of hazard:

Bakers.
 Blacksmiths.
 Cigar makers and tobacco workers.
 Coal miners.
 Compositors and printers.
 Railway enginemen and trainmen.
 Iron molders.
 Longshoremen and stevedores.
 Machinists.
 Masons and bricklayers.
 Painters, paper hangers, and varnishers.
 Plumbers, gas fitters, and steam fitters.
 Railway track and yard workers.
 Saloon keepers and bartenders.
 Teamsters, drivers, and chauffeurs.
 Textile mill workers.

In addition a few occupations which are characterized by lack of hazard, or rather by the presence of favorable conditions which add to the longevity of those engaged in them have been considered. Thus agricultural workers (farmers and farm laborers), and clerks and office assistants make interesting groups for comparison with the more hazardous titles listed above.

BAKERS.¹

There were 654 deaths among bakers. The table following indicates the distribution of the deaths in this group by age periods, and the corresponding distribution in all occupations.

¹ This title includes foremen and workmen in bakeries where breads, pie, cakes, biscuits, and crackers are made. (Bakers' store clerks are not included.)

TABLE 6.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG BAKERS, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
BAKERS.							
Deaths	654	57	60	99	136	158	144
Per cent of deaths	100.0	8.7	9.2	15.1	20.8	24.2	22.0
ALL OCCUPATIONS.							
Per cent of deaths	100.0	11.8	13.7	16.2	17.7	20.3	20.3

There is a preponderance of deaths at the later age periods; 67 per cent of all deaths occurred after age 44, as against 58.3 per cent in all occupations. The average age at death is 50.6 years.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 7.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG BAKERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	654	.....	57	60	99	136	158	144	.....
Typhoid fever.....	14	2.1	7.0	5.0	4.0	0.7	0.6	0.7	34.0
Tuberculosis of the lungs.....	123	18.8	31.6	51.7	37.4	14.7	9.5	1.4	38.6
Cancer (all forms).....	37	5.7	1.8	.....	2.0	10.3	7.0	6.2	56.3
Cerebral hemorrhage, apoplexy, and paralysis.....	42	6.4	.....	1.7	1.0	5.1	6.3	16.0	63.4
Organic diseases of the heart.....	81	12.4	8.8	5.0	6.1	8.1	15.2	22.2	57.5
Pneumonia (lobar and undefined).....	35	5.4	1.8	3.3	10.1	3.7	7.0	4.2	51.4
Cirrhosis of the liver.....	20	3.1	3.5	.....	.....	6.6	2.5	3.5	54.9
Bright's disease.....	65	9.9	3.5	5.0	4.0	11.0	17.7	9.0	55.2
Suicide (all forms).....	35	5.4	3.5	.....	7.1	7.4	2.5	4.9	49.1
Accidental violence.....	37	5.7	17.6	10.0	4.0	3.6	7.0	7	40.3
All other causes.....	165	25.2	20.9	10.0	24.3	28.8	24.7	31.2	.....
Total.....	654	100.0	100.0	100.0	100.0	100.0	100.0	100.0	50.6

The principal causes of death for all ages combined are pulmonary tuberculosis, organic diseases of the heart, and Bright's disease. These and other causes, however, show more significant interrelations when considered by individual age periods. Up to the age of 35 years the number of deaths is too small to justify any comment. In the age period 35 to 44 tuberculosis leads all causes with 37.4 per cent of the total deaths. Pneumonia follows with 10.1 per cent, suicide with 7.1 per cent, and organic diseases of the heart with 6.1 per cent. In the age period 45 to 54 the proportionate mortality from tuberculosis declines markedly to 14.7 per cent, while cancer increases to 10.3 per cent.

Bright's disease here accounts for 11.0 per cent and suicide for 7.4 per cent of all deaths. In the next age period, 55 to 64, the percentage of tuberculosis continues to decrease. Bright's disease leads, with 17.7 per cent of all deaths, and is followed by organic diseases of the heart, with 15.2 per cent of all deaths. In the last age period, 65 and over, we note the predominance of organic diseases of the heart, cerebral hemorrhage, apoplexy and paralysis, Bright's disease, and cancer. The percentages are 22.2, 16.0, 9.0, and 6.2, respectively.

We may now compare the proportionate mortality of bakers with the corresponding figures for all occupations, as shown in Table 2. In the age period 25 to 34 pulmonary tuberculosis causes 51.7 per cent of all deaths among bakers, as against 40.9 per cent in all occupations. The ratio of the former percentage to the latter—i. e., the relative index—is *126.4*. This shows how much higher the proportionate mortality from tuberculosis, in this age period, is for bakers than for all occupations. At ages 35 to 44 the excess percentage of tuberculosis of the lungs is not so great (*113.7*). The proportionate mortality from pneumonia is above the average (*124.7*), and typhoid fever (*235.7*) and suicide (*244.8*) are both excessive. In the age period 45 to 54 both tuberculosis of the lungs (*79.5*) and pneumonia (*45.1*) have low indices. Cirrhosis of the liver (*173.7*), suicide (*284.6*), and cancer (*174.6*) have high indices. In the age period 65 and over no conditions of interest are observed except that suicide is very high (*490.0*).

The relative indices of tuberculosis of the lungs and of pneumonia are not so high as might be expected from the dusty character of this occupation. Except in the age period 35 to 44, the proportion of pneumonia is uniformly lower among bakers than in all occupations, and, except in the twenty years from ages 25 to 44, and in the age period 55 to 64, the proportion of pulmonary tuberculosis is likewise below the average. For all ages combined, the relative index of tuberculosis of the lungs is *91.7* and that of pneumonia is *75.0*. The Registrar General of England and Wales and other authorities¹ in general confirm these findings regarding the slight effect of dust on the incidence of pulmonary tuberculosis and respiratory diseases in this occupation. The relative mortality from suicide is strikingly high among bakers. This cause of death is likewise conspicuous in the English and United States census returns and in those of Hoffman in the Prudential experience. For all ages combined, the relative index is *234.8*. It is highest in the age period 65 and over (*490.0*). Other forms of violence are found to be lower than in all occupations.

¹ Supplement to the Sixty-fifth Annual Report of the Registrar General of Births, Deaths, and Marriages in England and Wales, Part II. London, 1908.

Exhibits of the Prudential Insurance Co. of America. Fifteenth International Congress on Hygiene and Demography, Washington, D. C., 1912.

Reports of the United States Census Office. Mortality Statistics, 1908.

BLACKSMITHS.¹

There were 1,273 deaths among blacksmiths. The following table indicates the distribution of the deaths throughout the various age periods:

TABLE 8.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG **BLACKSMITHS**, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
BLACKSMITHS.							
Deaths.....	1,273	47	87	165	235	337	402
Per cent of deaths.....	100.0	3.7	6.8	13.0	18.5	26.5	31.6
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

There is a preponderance of deaths in the later age periods—76.6 per cent of all deaths occur after age 44, as against 58.3 per cent in all occupations. The average age at death is 55.4 years, as against 47.9 in all occupations.

In this and in the following occupations it will be unnecessary to discuss principal causes of death and percentages, as these are apparent by inspection of the accompanying table. Only those causes will be selected for analysis which warrant attention by reason of the number of deaths occurring from them and their variation from the corresponding figures for all occupations. In these comparisons, to avoid repetition, only relative indices will be used. Table 9 analyzes the mortality of each age class, by cause of death.

In the two age periods 15 to 24 years and 25 to 34 years there are too small numbers to permit any inferences. In the age period 35 to 44 a high proportionate mortality is observed for pulmonary tuberculosis, 35.8 per cent (108.8), and a high proportion for suicide, 5.5 per cent (189.7). The proportionate mortality is low for organic diseases of the heart and for Bright's disease, the relative indices being respectively 71.4 and 85.9. In the age period 45 to 54 the proportionate mortality is high for cerebral hemorrhage, apoplexy, and paralysis (155.8) and for suicide (130.8), but low for accidental violence (49.4). In the age period 55 to 64 the relative indices are high for cancer (147.1) and diabetes (207.7). Other causes follow closely the proportionate mortality in all occupations. In the age period 65 and over, except for higher relative indices for Bright's

¹ This title includes blacksmiths, horseshoers, and hand forge workers in the various industries.

disease (116.1), cirrhosis of the liver (150.0), and cancer (116.4), no notable conditions are found.

TABLE 9.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG BLACKSMITHS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—					Average age at death.	
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64		65 and over.
Number of deaths.....	1,273		47	87	165	235	337	402	
Tuberculosis of the lungs.....	178	14.0	29.8	28.7	35.8	17.0	8.3	3.0	43.9
Cancer (all forms).....	97	7.6		1.1	1.8	6.8	12.8	8.5	60.8
Diabetes.....	20	1.6	4.3	1.1	1.2	.4	2.7	1.2	54.6
Alcoholism.....	14	1.1		1.1	2.4	2.6	.9		46.0
Cerebral hemorrhage, apoplexy, and paralysis.....	106	8.3		2.3	.6	8.1	10.7	11.9	62.8
Organic diseases of the heart.....	176	13.8		8.0	5.5	11.5	15.1	20.4	61.7
Acute and chronic bronchitis.....	12	.9			.6	1.3	.6	1.5	62.1
Pneumonia (lobar and undefined).....	86	6.8	4.3	13.8	7.3	7.2	7.1	4.7	52.4
Cirrhosis of the liver.....	33	2.6		2.3	2.4	3.4	2.4	2.7	56.2
Bright's disease.....	151	11.9	4.3	6.9	6.7	11.1	12.5	15.9	59.6
Suicide (all forms).....	30	2.4	6.4	3.4	5.5	3.4	1.2	.7	45.5
Accidental violence.....	69	5.4	19.2	12.6	5.5	4.2	5.0	3.2	48.1
All other causes.....	301	23.6	31.9	18.3	24.8	23.0	20.8	26.1	
Total.....	1,273	100.0	100.0	100.0	100.0	100.0	100.0	100.0	55.4

Tuberculosis of the lungs shows a lower index of mortality among blacksmiths than in the general group at all age periods, except at 35 to 44 years and 65 years and over, where the relative indices are 108.8 and 103.4, respectively. For all ages together, the relative index of mortality from this cause is 68.3. A low relative index for tuberculosis is likewise found in the returns of the Registrar General for 1900 to 1902—namely, 80.3—and in the returns of the United States Census Bureau for 1908, where the index is 73.3. Cancer, on the other hand, shows a uniformly higher index of mortality from age 45 onward. In the age period 45 to 54 the index is 115.3; it then increases to 147.1 in the next age period and declines to 116.4 in the age period 65 and over. Organic diseases of the heart show slight variation from the conditions in all occupations. Suicide is relatively prominent in all age periods up to age 55, while other accidental violence is distinctly lower after age 34.

No definite causal relation can be said to exist between the character of this occupation and the variations we have referred to in the proportionate mortality from the principal causes.

CIGAR MAKERS AND TOBACCO WORKERS.¹

There were 693 deaths among cigar makers and tobacco workers. The table following indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations.

¹ This title includes foremen and workmen: branders, bunch makers, cappers and nip wrappers, casers, classers, cutters, dippers, dryers and dry-house men, hangers and shakers out, lump makers, pressers, prizer hands, rollers, samplers, shapers, sizers, snuff makers, sorters, steam wrappers, steam-box hands, stemmers, strippers, tiers, weighers, and wrappers.

TABLE 10.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG CIGAR MAKERS AND TOBACCO WORKERS, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
CIGAR MAKERS AND TOBACCO WORKERS.							
Deaths.....	693	66	98	95	121	158	155
Per cent of deaths.....	100.0	9.5	14.1	13.7	17.5	22.8	22.4
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

There is a slight preponderance of deaths in the later age periods; 62.7 per cent occur after age 44, as against 58.3 per cent in all occupations. The average age at death is 49.5 years.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 11.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG CIGAR MAKERS AND TOBACCO WORKERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	693		66	98	95	121	158	155	
Tuberculosis of the lungs.....	167	24.1	48.5	44.9	41.1	25.6	11.4	1.9	37.9
Cancer (all forms).....	36	5.2		1.0	4.2	7.4	7.6	6.5	57.3
Cerebral hemorrhage, apoplexy, and paralysis.....	45	6.5		2.0	4.2	3.3	11.4	11.0	60.0
Organic diseases of the heart.....	81	11.7	4.5	8.2	9.5	9.9	15.2	16.1	54.7
Pneumonia (lobar and undefined).....	32	4.6	1.5	7.1	5.3	2.5	5.1	5.2	50.2
Cirrhosis of the liver.....	28	4.0		1.0	2.1	7.4	6.3	3.9	56.2
Bright's disease.....	70	10.1		4.1	3.2	12.4	13.3	17.4	59.4
Suicide (all forms).....	22	3.2	3.0	2.0	4.2	3.3	3.8	2.6	49.3
Accidental violence.....	32	4.6	7.5	4.1	9.5	5.0	1.3	3.9	43.8
All other causes.....	180	26.0	34.8	25.4	16.9	23.0	24.5	31.5	
Total.....	693	100.0	100.0	100.0	100.0	100.0	100.0	100.0	49.5

In the age period 15 to 24 the proportionate mortality from tuberculosis is alone worthy of attention, being responsible for 48.5 per cent of the total deaths, as compared with 33.8 per cent for all occupations; the relative index is 143.5. In the age period 25 to 34, the index of tuberculosis of the lungs decreases to 109.8. Organic diseases of the heart are prominent (151.9). Accidental violence has a low relative index (32.8). In the age period 35 to 44 the relative indices of tuberculosis of the lungs (124.9), organic diseases of the heart (123.4), cancer (182.6), and suicide (144.8) are high. Pneumonia is low (65.4). In the age period 45 to 54 the relative indices of tuberculosis (138.4) and cancer (125.4) are high. Pneumonia is again low

(30.5). Cirrhosis of the liver is very prominent (194.7). Suicide exhibits a high relative index (126.9). Accidental violence is low (58.8). In the age period 55 to 64 tuberculosis maintains a high index (132.6). The high relative index for cirrhosis of the liver continues (203.2). Suicide is again high, the relative index being 190.0. Pneumonia (68.0) and accidental violence (20.0) are both very low. In the age period 65 and over the various causes of death follow closely the proportionate mortality for all occupations, with the exception of suicide, which has a very high index (260.0).

The dusty character of this occupation suggests a high proportionate mortality from tuberculosis of the lungs, which is borne out by the facts. This disease shows a high relative index in every age period except 65 and over. It is highest at ages 15 to 24 (143.5). Pneumonia is consistently lower in every age period; the relative index for all ages is 63.9. Bright's disease is low at ages 35 to 44 (41.0). It is strikingly high, however, in the age period 65 and over (127.0); it is of greater significance here, being the principal cause of death in this well-represented period. Accidental violence is consistently lower in every age period, the relative index for all ages being 49.5. Suicide is of special interest among cigar makers and tobacco workers. For all ages combined the relative index is 139.1. It is high for every age division except 25 to 34. The highest proportionate mortality is in the age period 65 and over, where the relative index is 260.0. The high proportionate mortality from suicide is corroborated by the figures of the Prudential experience. At all ages the index was 186.4 in the Prudential returns for this occupational group—a figure even higher than that of the Metropolitan.

CLERKS, BOOKKEEPERS, AND OFFICE ASSISTANTS.¹

There were 4,139 deaths among clerks, bookkeepers, and office assistants. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 12.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG CLERKS, BOOKKEEPERS, AND OFFICE ASSISTANTS, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
CLERKS, BOOKKEEPERS, AND OFFICE ASSISTANTS.							
Deaths.....	4,139	1,307	893	695	518	431	295
Per cent of deaths.....	100.0	31.6	21.6	16.8	12.5	10.4	7.1
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

¹ This title includes bookkeepers, clerks, stenographers, typewriters, office boys, proof readers, copy-holders, post-office clerks, shipping clerks, and stock clerks.

It is evident that there is a heavy preponderance of deaths in the early age periods; 70.0 per cent of the deaths occurred between the ages of 15 and 44, as against 41.7 per cent in all occupations. The first age period, 15 to 24, contains the largest group, 31.6 per cent of all deaths; the last period, 65 and over, contains only 7.1 per cent. This accounts for the low average age at death in this occupation (36.5 years).

The following table analyzes the mortality of each age class, by cause of death:

TABLE 13.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG CLERKS, BOOKKEEPERS, AND OFFICE ASSISTANTS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	4,139	.....	1,307	893	695	518	431	295	.....
Tuberculosis of the lungs.....	1,449	35.0	46.3	51.2	33.4	21.6	8.8	1.7	29.4
Cancer (all forms).....	129	3.1	.4	.7	2.2	6.4	9.7	9.5	54.0
Cerebral hemorrhage, apoplexy, and paralysis.....	163	3.9	.3	1.2	2.6	6.9	9.7	17.6	55.5
Organic diseases of the heart.....	389	9.4	6.7	6.3	10.6	10.0	13.9	20.0	42.5
Pneumonia (lobar and undefined).....	292	7.1	5.7	7.2	8.8	7.1	9.7	4.4	37.6
Cirrhosis of the liver.....	67	1.6	.4	.3	2.7	4.1	2.1	3.4	48.3
Bright's disease.....	306	7.4	2.8	6.2	9.4	9.8	15.3	10.8	44.5
Suicide (all forms).....	95	2.3	1.5	3.1	2.6	3.3	1.9	1.4	36.6
Accidental violence.....	297	7.2	11.7	6.4	5.9	6.6	1.8	1.4	28.5
All other causes.....	952	23.0	24.1	17.4	21.8	24.2	27.0	29.8	.....
Total.....	4,139	100.0	100.0	100.0	100.0	100.0	100.0	100.0	36.5

In the age period 15 to 24 tuberculosis of the lungs exhibits a high proportionate mortality, causing 46.3 per cent of all deaths, as against 33.8 per cent in the general group; the relative index is 137.0. This is the only notable condition that obtains, unless attention be called to the low relative index for accidental violence (60.9). At the age period 25 to 34 tuberculosis is again prominent, the relative index being 125.2. Bright's disease also exhibits a high proportionate mortality, having a relative index of 137.8. The relative index for accidental violence is low (51.2). In the age period 35 to 44 the relative indices for most of the causes exhibit no significant variations from those for all occupations. Tuberculosis is now about the average in its proportion, the relative index being 101.5. Organic diseases of the heart and Bright's disease are higher, the relative indices being 137.7 and 120.5, respectively. As before, accidental violence is low (59.6). In the age period 45 to 54 tuberculosis is again high (116.8). Cerebral hemorrhage, apoplexy, and paralysis are high, the index being 132.7; that of suicide is 126.9. Accidental violence continues low (77.6). In the age period 55 to 64 there is little of interest, except that pneumonia (129.3) is high, and accidental violence

is low (*27.7*). In the age period 65 and over cancer (*130.1*), cerebral hemorrhage, apoplexy, and paralysis (*131.3*), and suicide (*140.0*) loom up in importance. Accidental violence, as in all periods, is low (*31.8*).

In this occupation tuberculosis of the lungs is the primary consideration throughout the working period of life, but more especially at the younger ages. For all ages combined, clerks, bookkeepers, and office assistants lead all the occupations listed, in the high index of mortality from this cause (*170.7*). Confirmation of this high proportionate mortality is found in numerous previous investigations. In Hoffman's series the index is *167.6* for all ages; the returns of the Registrar General give *180.3* for commercial clerks; and on the basis of the United States Census Bureau investigation of 1908 the figure is *178.7*. These high figures for all ages combined must not be taken too literally, however, in view of the peculiar age distribution of the deaths recorded in this occupation. As was pointed out above, nearly one-third of all deaths in this occupation occurred in the first age period, 15 to 24. More than one-half of all the deaths occurred in the first two age periods (under age 35). Since it is in these age periods that the high mortality from tuberculosis occurs, the effect on all ages is to exaggerate the proportionate mortality from this cause.

It is in the earlier age periods that the preponderance of tuberculosis as a cause of death among clerks, bookkeepers, and office assistants is beyond question. Not only are the relative indices of mortality high, as has been shown above, being *137.0* in the age period 15 to 24 and *125.2* in the following age period (which figures are in general agreement with those of other sources), but the death rates from tuberculosis as reported in the returns of the Registrar General for the age period 15 to 24 in the allied group of "clerks in the insurance service" are 50 per cent higher than in all occupations; in the age period 25 to 34 they are 25 per cent higher. In this instance the findings of proportionate mortality are confirmed by the death rates which are a much truer measure of the prevalence of a cause of death. From age 35 onward, the figures for the proportionate mortality from tuberculosis are inconstant, as shown by all investigations.

Among other causes of death, organic diseases of the heart exhibit a high relative index between ages 15 and 44; thereafter the indices are low. Accidental violence is uniformly very low in its proportionate mortality, the highest relative index being *77.6* at the age period 45 to 54.

COAL MINERS.¹

There were 1,557 deaths among coal miners. The table following indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations.

¹This title includes foremen and workmen in coal mines: line drivers, pit miners (in coal mines only), cagers, crib men, drillers, laborers in coal mines, trimmers, shaft tenders, and timbermen in coal mines.

TABLE 14.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES, AMONG **COAL MINERS**, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—**WHITE MALES**.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
COAL MINERS.							
Deaths.....	1,557	151	135	182	319	407	363
Per cent of deaths.....	100.0	9.7	8.7	11.7	20.5	26.1	23.3
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

A considerably larger proportion of the deaths in this occupation occurred after the age of 44—69.9 per cent, as against 58.3 per cent in all occupations. The average age at death is 51.3 years.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 15.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG **COAL MINERS**, BY AGE PERIODS, 15 YEARS AND OVER—**WHITE MALES**.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	1,557	.....	151	135	182	319	407	363	.....
Influenza.....	23	1.5	0.7	.....	1.6	0.6	2.2	2.2	58.9
Tuberculosis of the lungs.....	91	5.8	4.0	11.9	12.1	6.6	3.4	3.3	45.8
Cancer (all forms).....	71	4.6	.7	1.5	2.7	3.4	6.9	6.6	58.9
Cerebral hemorrhage, apoplexy, and paralysis.....	94	6.0	.7	.7	1.6	4.1	7.6	12.4	62.3
Organic diseases of the heart.....	149	9.6	2.6	4.4	6.6	8.8	10.8	15.2	57.9
Acute and chronic bronchitis.....	49	3.1	.....	.....	1.1	1.6	4.2	6.9	63.6
Pneumonia (lobar and undefined).....	161	10.3	4.6	7.4	10.4	14.7	11.3	8.8	53.1
Cirrhosis of the liver.....	37	2.4	.....	.7	1.1	4.1	2.9	2.5	56.4
Bright's disease.....	116	7.5	.....	1.5	6.6	7.8	11.5	8.3	58.3
Suicide (all forms).....	18	1.2	.7	2.2	2.2	2.2	.7	.....	44.6
Accidental violence.....	317	20.4	62.9	43.7	30.7	15.7	10.3	4.1	36.6
All other causes.....	431	27.7	23.2	25.9	22.9	30.4	28.0	29.9	.....
Total.....	1,557	100.0	100.0	100.0	100.0	100.0	100.0	100.0	51.3

In the age period 15 to 24, tuberculosis of the lungs is of small consequence, causing only 4 per cent of all deaths, as compared with 33.8 per cent in the general group. Its relative index is 11.8. Organic diseases of the heart are low (4.8), as is also suicide (25.0). On the other hand, accidental violence shows a relative index of 327.6. In the age period 25 to 34 practically the same general conditions are observed. Tuberculosis of the lungs is very low (29.1), and accidental violence remains high (349.6). In the age period 35 to 44 the relative index for tuberculosis of the lungs is 36.8. Influenza and the respiratory diseases exhibit a high proportionate mortality. The relative index for influenza is 266.7, that for bronchitis 366.7, and that for pneumonia 128.4. Suicide exhibits a relative index

of 75.9 and accidental violence remains high with an index of 310.1. In the age period 45 to 54 no new variations are noted. Tuberculosis of the lungs is 35.7; bronchitis and pneumonia remain high, the relative indices being, respectively, 266.7 and 179.3. Accidental violence, though lower than in the previous age periods, is still high (184.7). In the age period 55 to 64 the relative index for tuberculosis of the lungs is low (39.5); for bronchitis (381.8) and for pneumonia (150.7) it is high. Accidental violence still remains high, with a relative index of 158.5. In the age period 65 and over the relative indices for bronchitis (363.2) and pneumonia (139.7) are high.

The low proportionate mortality from tuberculosis of the lungs among coal miners is a matter of general record. The data of the Registrar General of England and Wales, and of Hoffman, in his occupational mortality statistics of the Prudential, give very low indices for pulmonary tuberculosis; for all ages combined the data of the former show 64.5, and of the latter 50.7. The Metropolitan index of 28.3 is the least recorded. Coal miners seem to be relatively free from pulmonary tuberculosis at every age period from 15 years to 65. The death rates from tuberculosis of the lungs also point to this conclusion. Thus the Registrar General of England and Wales reports that the death rate from phthisis among coal miners at the age period 15 to 24 is 70.6 per 100,000 living. This rate is 68.1 per cent of that prevailing for all occupied males.

The low tuberculosis rate among coal miners is, moreover, coupled with a high rate from accidental violence. This is characteristic of all age periods, but especially up to age 45. For all ages the relative index of accidental violence is 219.4. Between the ages of 15 and 44 the relative indices are all over 300. The age period 45 to 54 has a relative index of 184.7; in the age period 55 to 64 the index is 158.5. In the last age period, 65 and over, it is only 93.2. The Prudential experience is very nearly the same as that of the Metropolitan; for all ages the relative index is 246.2. The index for the material of the Registrar General's office is 256.9. The above figures show clearly the effect of the dangers of the occupation upon the mortality of coal miners.

The low proportionate mortality from tuberculosis of the lungs and the high proportionate mortality from accidental violence are closely related phenomena; it is evident that deaths from accidental violence, especially at the earlier ages, tend to decrease the number of deaths that would ordinarily have been reported from tuberculosis. The proportion of miners who die from accidents but who are also affected with tuberculosis can be determined only by a special investigation. It may at first thought appear that the low tuberculosis rate is a direct consequence of the high rate from accidents, and that we are really not concerned with a true immunity against tuberculosis in this occupation. The weight of much indirect evidence is,

however, strongly in favor of the theory of such a relative immunity. Thus we find a high proportionate mortality from pneumonia among coal miners at all ages; the index is 143.1. After age 25 the index is uniformly higher than for all occupations. The same may be said with reference to the proportionate mortality from acute and chronic bronchitis after age 34. Coal miners, therefore, show a high representation of the respiratory diseases. This is clear even in the presence of the high accident rate.

Much more convincing, however, is the fact that in other occupations we find high accident proportions together with almost average proportions from pulmonary tuberculosis. Thus among railway enginemen and trainmen at all ages 42.4 per cent of all deaths are due to accidental violence, and 14.0 per cent of all deaths are from pulmonary tuberculosis. In this occupation the accident proportion is much higher than among coal miners, and yet the relative incidence of tuberculosis is two and a half times as high. In like manner railway track and yard workers show, in the age period 15 to 24, a mortality from accidental violence amounting to 43.5 per cent of the deaths from all causes, and yet have a proportion of 18.6 per cent from tuberculosis of the lungs. In both these occupations the proportionate mortality from tuberculosis is high enough to show that the condition among coal miners is not necessarily the result of the accident situation. From all the evidence we must conclude, therefore, that the low tuberculosis mortality of coal miners is the resultant of occupational conditions which in some manner protect them from the fatal consequence of tuberculous infection. Future medical research alone can determine just what the nature of the protective factor is.

• COMPOSITORS AND PRINTERS.¹

There were 1,056 deaths in this industrial group. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 16.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG COMPOSITORS AND PRINTERS, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
COMPOSITORS AND PRINTERS.							
Deaths	1,056	217	221	225	176	120	97
Per cent of deaths	100.0	20.5	20.9	21.3	16.7	11.4	9.2
ALL OCCUPATIONS.							
Per cent of deaths	100.0	11.8	13.7	16.2	17.7	20.3	20.3

¹ This title includes foremen and workmen: compositors, type printers, typesetters, typographers, plate printers, job printers, pressmen, press feeders, and linotype operators.

The greater number of deaths occurred between the ages of 15 and 44, 62.7 per cent being accounted for between these ages, as against 41.7 per cent for all occupations. The average age at death is 40.2 years.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 17.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG COMPOSITORS AND PRINTERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths	1,056	.....	217	221	225	176	120	97	.....
Typhoid fever	22	2.1	3.2	4.5	1.8	0.6	.....	.....	27.9
Tuberculosis of the lungs	360	34.1	45.2	49.8	39.1	23.9	15.8	3.1	33.5
Cancer (all forms)	28	2.7	.9	.5	1.3	5.1	5.0	7.2	54.0
Cerebral hemorrhage, apoplexy, and paralysis	38	3.6	.....	.9	2.2	6.8	5.8	12.4	56.9
Organic diseases of the heart	118	11.2	6.0	5.9	10.2	13.1	19.2	23.7	48.2
Pneumonia (lobar and undefined)	52	4.9	4.6	7.2	2.7	5.1	5.8	4.1	39.7
Cirrhosis of the liver	19	1.8	.5	.5	1.3	2.3	6.7	2.1	52.1
Bright's disease	94	8.9	1.4	3.6	10.7	18.2	11.7	13.4	48.7
Suicide (all forms)	19	1.8	3.2	3.2	1.3	.6	.....	1.0	30.6
Accidental violence	62	5.9	10.1	5.4	4.8	7.4	1.7	2.1	33.9
All other causes	244	23.1	24.9	18.8	24.4	17.1	28.3	30.9	.....
Total	1,056	100.0	100.0	100.0	100.0	100.0	100.0	100.0	40.2

In the age period 15 to 24 the relative index of tuberculosis of the lungs is high (133.7); this cause accounts for 45.2 per cent of all deaths, as against 33.8 per cent in the general group. Accidental violence has a low index (52.6). In the period 25 to 34 tuberculosis of the lungs is somewhat lower than in the previous age period, though still high (121.8). Bright's disease is low (80.0) and accidental violence is still lower (43.2). In the age period 35 to 44 tuberculosis of the lungs (118.8) and organic diseases of the heart (132.5) are both high. Bright's disease is high (137.2). Pneumonia is very low (33.3). Both suicide (44.8) and accidental violence (48.5) exhibit low relative indices. In the age division 45 to 54 the high relative index for tuberculosis of the lungs is maintained (129.2). Cerebral hemorrhage, apoplexy, and paralysis loom up as important in this age period; the relative index is 130.8. The index for pneumonia remains low (62.2); Bright's disease is even higher than in the previous age period (164.0). Suicide remains low as before (23.1), and accidental violence shows an increase over the previous age period (87.1). In the age period 55 to 64 tuberculosis of the lungs shows a very high relative index (183.7). Organic diseases of the heart (120.8) are somewhat higher than the average and pneumonia is lower (77.3). Accidental violence is very low (26.2). There are

no cases of suicide in this age group. In the age period 65 and over the cases in which variations from all occupations are noted are too few to warrant discussion.

For every age division tuberculosis of the lungs shows a higher proportionate mortality than in the general group. For all ages the relative index is 166.3. The index is highest in the age period 55 to 64, being 183.7. Confirmatory figures are provided by the returns of the United States Census Bureau (198.7 for all ages), the Registrar General (216.4), and the Prudential (175.3). All these figures are higher than those quoted for the Metropolitan experience. The high proportionate mortality definitely marks this occupation as one in which environment favors the development of pulmonary tuberculosis. All investigators are agreed as to this, yet there is a diversity of opinion as to the exact causative factor. Some point to the exposure to lead dust as important in this connection. In the Metropolitan experience, to be sure, only four deaths from lead poisoning are recorded. It must not be inferred, however, that the exposure to lead is not a serious factor in the causation of tuberculosis. A similar relation has been suggested between lead poisoning and Bright's disease, which also shows a high proportionate mortality in the age periods 35 to 44 and 45 to 54, the relative indices being 137.2 and 164.0, respectively.

Organic diseases of the heart show a higher proportionate mortality among compositors and printers than in all occupations at every age period, possibly a result of slow lead poisoning. The highest index occurs in the age period 35 to 44 (132.5). Accidental violence is lower in every age period; for all ages the relative index is 63.4.

RAILWAY ENGINEMEN AND TRAINMEN.¹

There were 947 deaths among enginemen and trainmen. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 18.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG RAILWAY ENGINEMEN AND TRAINMEN, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
ENGINEMEN AND TRAINMEN.							
Deaths.....	947	203	300	173	109	94	68
Per cent of deaths.....	100.0	21.4	31.7	18.3	11.5	9.9	7.2
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

¹ This title includes railway engineers and firemen operating freight or passenger trains—coal or oil burning locomotives; railway trainmen, freight (conductors, brakemen, flagmen, and trainmen); railway trainmen, passenger (conductors, brakemen, dining-car cooks and waiters, baggagemen, flagmen, Pullman porters, railway mail and express employees, and ticket collectors).

There is a great preponderance of deaths in the early age divisions; 71.4 per cent in this group, as against 41.7 per cent in all occupations combined, occur between the ages 15 and 44. Hence the average age at death is very low (37.4 years).

The following table analyzes the mortality of each age class, by cause of death:

TABLE 19.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG RAILWAY ENGINEEMEN AND TRAINMEN, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—					Average age at death.	
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64		65 and over.
Number of deaths.....	947	.....	203	300	173	109	94	68	.....
Typhoid fever.....	26	2.7	4.9	3.3	3.5	.....	.....	.....	28.1
Tuberculosis of the lungs.....	133	14.0	11.8	14.7	24.9	13.8	7.4	.....	34.8
Cancer (all forms).....	19	2.0	1.0	.7	1.7	.9	5.3	8.8	51.2
Cerebral hemorrhage, apoplexy, and paralysis.....	32	3.4	.....	.3	1.2	6.4	13.8	13.2	58.4
Organic diseases of the heart.....	51	5.4	1.0	1.3	5.2	10.1	13.8	17.6	52.2
Pneumonia (lobar and undefined).....	48	5.1	2.0	4.7	6.9	9.2	6.4	2.9	41.1
Cirrhosis of the liver.....	12	1.3	.....	.7	1.2	4.6	2.1	1.5	47.7
Bright's disease.....	52	5.5	1.0	2.0	7.5	9.2	10.6	16.2	50.0
Suicide (all forms).....	23	2.4	2.5	2.3	2.9	2.8	2.1	1.5	36.7
Accidental violence.....	401	42.3	66.5	57.7	30.0	18.3	17.1	7.4	30.1
All other causes.....	130	15.8	9.4	12.2	15.1	24.7	21.3	30.9	.....
Total.....	947	100.0	100.0	100.0	100.0	100.0	100.0	100.0	37.4

In the age period 15 to 24 all the important causes of death, with the exception of accidental violence, are low in proportionate representation. The relative index for tuberculosis of the lungs is 34.9, the proportionate mortality being only 11.8 per cent, as against 33.8 per cent in the general group. The index for pneumonia is 37.0; that of suicide is 89.3. Accidental violence is exceedingly high (346.4); of all deaths in this age period, 66.5 per cent are accounted for by this cause. In the age period 25 to 34 the relative index of typhoid fever is high (122.2); added weight should be given to this cause of death by reason of the fact that the excessively high proportionate mortality from accidental violence (461.6) makes the percentages of all other causes appear disproportionately small. There is no question that, because of this peculiar effect, the proportionate mortalities from tuberculosis of the lungs (35.9), pneumonia (64.4), and Bright's disease (44.4) are too low. In the age period 35 to 44 typhoid fever is again very high (250.0). Tuberculosis of the lungs (75.7) and pneumonia (85.2) remain below the average. Accidental violence is still excessively high (303.0), and the effects upon the other causes of death are not so marked now as in the other age

periods. In this age division only 30.0 per cent of deaths resulted from accidental violence. In the age period 45 to 54 the relative index from tuberculosis of the lungs is low (74.6). Pneumonia is now high (112.2). Bright's disease is lower (82.9), and accidental violence is still very high (215.3). In the age period 55 to 64 cerebral hemorrhage, apoplexy, and paralysis are high (143.8). Pneumonia and Bright's disease are low, the relative indices being 85.3 and 79.7. Accidental violence remains high (263.1). In the age period 65 and over the relative index from cancer is 120.5. That of pneumonia is 46.0. Bright's disease is rather high (118.2), and accidental violence, as in all the previous age periods, is high (168.2).

Typhoid fever exhibits a high proportionate mortality in the age groups 25 to 34 and 35 to 44; in the former the index is 122.2 and in the latter it is 250.0. The high proportionate mortality exhibited by typhoid fever is undoubtedly due to the questionable water supplies used by the men in this occupation. Tuberculosis is very low for all ages (68.3) and for each age period. It is exceptionally low for the age periods 15 to 24 (34.9) and 25 to 34 (35.9). For the age period 35 to 44 the relative index is 75.7. The index for the age period 45 to 54 is 74.6; for the age period 55 to 64 it is 86.0. In the last age division there are no cases of pulmonary tuberculosis. The low proportionate mortality from pulmonary tuberculosis is probably more apparent than real, the conditions found being largely the result of the very high proportionate mortality from accidental violence.

Men who are killed by accident can not die of tuberculosis as well. The same fact probably explains the low proportionate mortality of cerebral hemorrhage, apoplexy, and paralysis (54.8), organic diseases of the heart (45.0), and Bright's disease (57.3). These causes are of greater importance in the later age periods, ages 55 and over. Since but few of the deaths, 17.1 per cent, occurred in these age divisions among enginemen and trainmen, the proportionate mortality from these causes is underweighted at all ages.

As may be expected, the proportionate mortality from accidental violence is excessively high among railway enginemen and trainmen, the lowest index, between the ages of 15 and 64, being over 200 and the highest over 400. For all ages the relative index is 454.8. Between the ages of 15 and 24 the index is 346.4; at the age division 25 to 34 the highest relative index is exhibited (461.6); for the age period 35 to 44 the index is 303.0; the age periods 45 to 54 and 65 and over show the lowest proportionate mortalities (the relative indices being 215.3 and 168.2, respectively). At the age period 55 to 64 the index is 263.1.

The figures of the United States Census for 1908 for accidents among steam railroad employees confirm very strongly the experi-

ence of the Metropolitan Life Insurance Co. For all ages the relative index is *493.3*. Between the ages of 20 and 34 the relative indices are about *350*. After age 35 the relative indices are over *400*.

Yet the figures of the Registrar General indicate an excessive proportionate mortality due to accidents among enginemen and trainmen, the relative index for all ages, *277.6*, being appreciably lower than the indices of the Metropolitan Life Insurance Co. in the various age periods.

The English experience does not show the same frightful mortality from this cause that the American figures reveal.

FARMERS AND FARM LABORERS.¹

This class of industrial workers of the Metropolitan Life Insurance Co. has been chosen with a view to demonstrating the absence rather than the presence of any one outstanding cause of death, there being no particular occupational influence conducive to a specific cause of death.

There were 3,890 deaths among farmers and farm laborers. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 20.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG **FARMERS AND FARM LABORERS**, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
FARMERS AND FARM LABORERS.							
Deaths.....	3,890	239	198	266	431	1,008	1,748
Per cent of deaths.....	100.0	6.1	5.1	6.8	11.1	25.9	44.9
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

There is a great preponderance of deaths in the later age periods; 81.9 per cent of all deaths occurred after the age of 44, as against 58.3 per cent for all occupations, and 44.9 per cent occurred after age 64. The average age at death is consequently very high, 58.5 years.

Table 2 analyzes the mortality of each age class, by cause of death.

At the age period 15 to 24 tuberculosis of the lungs exhibits a low proportionate mortality, 26.8 per cent, as against 33.8 per cent for all occupations, the relative index being *79.3*. Typhoid fever (*176.9*), pneumonia (*155.6*), suicide (*164.3*), and accidental violence (*132.8*) are all high.

¹ This title includes farmers and planters, florists and flower growers (not including storekeepers), fruit growers, gardeners, nurserymen, turpentine farmers, orchardists, farm laborers, and dairy farmers.

TABLE 21.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG FARMERS AND FARM LABORERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—					Average age at death.	
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64		65 and over.
Number of deaths.....	3,890		239	198	266	431	1,008	1,748	
Typhoid fever.....	53	1.4	9.2	5.1	1.9	0.7	0.8	0.3	35.5
Influenza.....	53	1.4		1.0	1.1	1.6	1.6	1.4	61.4
Tuberculosis of the lungs.....	378	9.7	26.8	31.8	30.5	13.9	6.7	2.4	43.2
Cancer (all forms).....	295	7.6	2.1	1.5	4.1	6.0	10.4	8.3	62.5
Cerebral hemorrhage, apoplexy, and paralysis.....	379	9.7	.8	2.5	1.5	4.4	9.8	14.3	66.4
Organic diseases of the heart.....	641	16.5	5.9	3.5	6.8	13.7	18.5	20.4	63.6
Pneumonia (lobar and undefined).....	241	6.2	8.4	6.6	7.1	7.7	5.9	5.5	56.1
Cirrhosis of the liver.....	81	2.1	.4		1.9	3.7	2.9	1.7	60.0
Bright's disease.....	350	9.0	1.3	5.1	3.0	10.2	9.0	11.1	63.5
Suicide (all forms).....	84	2.2	4.6	2.0	4.1	3.0	2.6	1.1	50.8
Accidental violence.....	316	8.1	25.5	16.2	11.3	9.0	8.0	4.3	46.8
All other causes.....	1,019	26.2	15.1	24.7	26.8	26.0	23.9	29.1	
Total.....	3,890	100.0	100.0	100.0	100.0	100.0	100.0	100.0	58.5

In the age period 25 to 34 typhoid fever is very high (188.9). Tuberculosis of the lungs has practically the same relative position as it had in the previous age period (77.8). In the age period 35 to 44 suicide becomes prominent (141.4). Accidental violence decreases (114.1). In the age period 45 to 54 the relative index of tuberculosis of the lungs is 75.1. Organic diseases of the heart become higher (123.4). In the age period 55 to 64 the index of accidental violence is 123.1, and the diseases which are generally associated with old age are high; cancer has an index of 119.5 and organic diseases of the heart show 116.4. Suicide is high (130.0). In the age period 65 and over cancer remains high (113.7); all the other causes of death follow very closely the proportionate mortality for all occupations.

Typhoid fever is high for the periods 15 to 24, 25 to 34, and 35 to 44, the relative indices being 176.9, 188.9, and 135.7, respectively. The high proportionate mortality from typhoid fever is in accord with common experience. It is well known that farmers do not, as a rule, have access to a pure water supply, often having recourse to wells which are polluted. After age 25 farmers also suffer more from influenza than do the workers in all occupations. In the age period 55 to 64 the relative index is 160.0; at 65 and over it is 107.7. For all ages the relative index is 175.0. Tuberculosis of the lungs is lower for every age period. For all ages it is 47.3; in most age periods the relative indices are slightly higher than 75. Cancer is higher in all ages (155.1), and is considerably higher in most age periods. It becomes important after age 54. For the age period 55 to 64 the relative index is 119.5, and for the age period 65 and over it is 113.7.

Cerebral hemorrhage, apoplexy, and paralysis, like cancer, become important only after age 54. For the age period 55 to 64 the relative index is *102.1*; for the age period 65 and over it is *106.7*. For all ages combined organic diseases of the heart are higher (*137.5*) than in the general group, but they are significantly higher only for the age period 45 to 54 (*123.4*) and the age period 55 to 64 (*116.4*). At the age period 65 and over the relative index is *100.0*, the proportionate mortality being exactly equal to that of all occupations. Pneumonia is lower than in the general group, for all age periods except 15 to 24, where the relative index is very high (*155.6*). For the other age periods the index fluctuates about *80*. For all ages it is *86.1*.

It is surprising that, for all ages, suicide should exhibit almost as high a proportionate mortality among farmers and farm laborers as in all occupations, and even higher proportionate mortalities in most age periods. Thus at ages 15 to 24 the relative index is *164.3*; in the next age period it is low (*64.5*), but after age 35 it is consistently higher, ranging from *141.4*, in the age period 35 to 44, to *110.0*, in the age period 65 and over. In this occupation there is no industrial stress; that health conditions and habits are good is a matter of common knowledge, and yet we find this peculiar condition regarding suicide. That this is not a chance circumstance is proved by the figures given by Hoffman in the Prudential experience. From them is also obtained a very high relative index for the age period 15 to 24 (*160.7*). For the age period 45 to 64 is obtained a relative index of *108.7*. The United States Census reports show, for the age periods 20 to 24, 25 to 34, 45 to 54, and 55 to 64, higher indices for suicide among farmers and farm laborers than among all occupations.

Among farmers and farm laborers it is to be noted that those diseases are prevalent which are associated with old age. Among these are cancer, cerebral hemorrhage, apoplexy, and paralysis, and organic diseases of the heart. These causes of death show high indices in the age periods after 54; combined with the great preponderance of deaths in the periods referred to, their effect is to weight heavily the proportionate representation of these causes in the figures for all ages.

Alcoholism, cirrhosis of the liver, and Bright's disease are all low, as is also pneumonia. This experience does not reveal any occupational diseases prevalent among farmers.

IRON MOLDERS.¹

There were 1,646 deaths among iron molders. The table following indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations.

¹ This title includes foremen and workmen in iron foundries; molders, core makers, bushelers, chippers, cupola tenders, pourers, and scratchers. (Iron and steel mill workers are excluded.)

TABLE 22.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG IRON MOLDERS, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
IRON MOLDERS.							
Deaths.....	1,646	138	226	310	341	345	286
Per cent of deaths.....	100.0	8.4	13.7	18.8	20.7	21.0	17.4
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

It is evident from the foregoing that the deaths are distributed in almost the same ratio as in all occupations. The average age at death is therefore very nearly the same, 48.0 years.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 23.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG IRON MOLDERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	1,646	.....	138	226	310	341	345	286	.....
Typhoid fever.....	29	1.8	7.2	4.0	2.9	.....	.....	0.3	30.1
Tuberculosis of the lungs.....	360	21.9	34.8	35.0	37.1	22.3	9.0	3.5	39.3
Cancer (all forms).....	64	3.9	1.4	1.3	1.0	5.3	7.5	4.2	55.0
Alcoholism.....	17	1.0	.7	.9	1.3	.9	1.7	.3	46.1
Cerebral hemorrhage, apoplexy, and paralysis.....	95	5.8	.....	1.3	2.3	5.3	9.9	11.5	59.3
Organic diseases of the heart.....	216	13.1	4.3	4.0	6.1	12.0	20.0	25.2	57.6
Pneumonia (lobar and undefined).....	175	10.6	10.1	9.7	9.4	12.6	10.4	10.8	48.4
Cirrhosis of the liver.....	38	2.3	.....	.9	1.9	2.6	3.8	2.8	53.6
Bright's disease.....	131	8.0	.7	6.2	3.5	10.0	11.0	11.5	54.9
Suicide (all forms).....	45	2.7	2.2	4.0	5.5	2.1	2.3	.3	41.7
Accidental violence.....	126	7.7	15.2	10.2	9.1	9.1	4.4	2.8	40.5
All other causes.....	350	21.3	23.4	22.5	19.9	17.8	20.0	26.8	.....
Total.....	1,646	100.0	100.0	100.0	100.0	100.0	100.0	100.0	48.0

In the age period 15 to 24 typhoid fever is high, having a proportionate mortality of 7.2 per cent as compared with 5.2 per cent (relative index, 138.5), and pneumonia is very high (137.0). In the age period 25 to 34 typhoid fever, pneumonia, Bright's disease, and suicide are all high, the percentages being about one-third to one-half more than the average for all occupations. The relative indices are 148.1, 132.9, 137.8, and 129.0, respectively. In the age period 35 to 44 typhoid fever is very high (207.1), and pneumonia is rather high (116.0), whereas Bright's disease is very low (44.9). Suicide is very high (189.7). At ages 45 to 54 tuberculosis of the lungs (120.5)

and pneumonia (*153.7*) are high. In the age period 55 to 64 the index for alcoholism is high (*283.3*), although based on few deaths. We might expect from this that cirrhosis of the liver would show a very high index. This is not true, though the relative index (*122.6*) is considerably above the normal. Organic diseases of the heart (*125.8*) and pneumonia (*138.7*) are both high. Suicide is high (*115.0*). In the age period 65 and over the relative index of organic diseases of the heart is *123.5*. Pneumonia and cirrhosis of the liver are both very high, the former having a relative index of *171.4* and the latter *155.6*.

Typhoid fever is high for the age periods between 15 and 44, the proportionate mortality being about one-third higher than that of the general group in the age period 15 to 24, and one-half higher in the period 25 to 34. At ages 35 to 44 it is more than twice as high. These facts seem to indicate the effect of the use of water supplies not sufficiently safeguarded.

The relative indices for tuberculosis of the lungs among iron molders do not indicate any wide variations from the normal. Between the ages of 15 and 34 they are equal to or below the normal. For the age period 35 to 44 the relative index is *112.8*, and for 45 to 54 it is *120.5*. The index clearly increases with age and duration of service. Not enough deaths are attributed to alcoholism to enable us to draw safe conclusions, although there seems to be an indication of an excessive use of alcohol. The relative index for all ages combined is *111.1*, and in the age period 55 to 64 there is a relative index of *283.3*.

Organic diseases of the heart are high at all ages (*109.2*) and in the age periods after 44, where this cause of death becomes of numerical importance. In the age period 45 to 54 the relative index is *108.1*; between 55 and 64 it is *125.8*; and at ages 65 and over it is *123.5*. The high indices for organic diseases of the heart are thoroughly in accord with the facts already established. Sir Thomas Oliver¹ says that "puddling is such very hard work that many of the men develop heart affection."

The Metropolitan Life Insurance experience also shows that, of all occupations, that of iron molders has the highest percentage of deaths from pneumonia at all ages combined and in each age period. For all ages the relative index is *147.2*. Between the ages of 15 and 24 the index is *187.0*; between 25 and 34 it is *132.9*; between 35 and 44 it is *116.0*; between 45 and 54 it is *153.7*; between 55 and 64 it is *138.7*; and at ages 65 and over it is particularly high—*171.4*. Cirrhosis of the liver is normal for all ages (*100.0*). In the age period 55 to 64 the index is *122.6*, and at ages 65 and over it is *155.6*. Suicide is higher for all ages (*117.4*), and varies for the various age periods. At the age periods 15 to 24, 45 to 54, and 65 and over the relative indices are lower than the average; for the remaining age

¹ Oliver, Thomas: *Dangerous Trades*. London, 1908. P. 756.

periods, 25 to 34, 35 to 44, and 55 to 64, the indices are higher. Accidental violence exhibits no important variations. For all ages the relative index is 82.8; the relative indices are below the normal for all the age periods except 45 to 54.

LABORERS.¹

There were 10,748 deaths among laborers. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 24.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG LABORERS BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
LABORERS.							
Deaths.....	10,748	622	1,026	1,453	2,049	2,732	2,866
Per cent of deaths.....	100.0	5.8	9.5	13.5	19.1	25.4	26.7
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

It is evident that the periods after age 44 have an excess of deaths over all occupations; 71.2 per cent of the deaths occurred as against 58.3 per cent. The average age at death is 52.8 years.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 25.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG LABORERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	10,748		622	1,026	1,453	2,049	2,732	2,866	
Typhoid fever.....	113	1.1	6.3	3.0	0.7	0.9	0.3	0.2	34.6
Tuberculosis of the lungs.....	1,760	16.4	30.5	34.8	33.9	20.1	8.1	3.1	41.8
Cancer (all forms).....	594	5.5	.5	.8	3.3	5.1	8.6	6.8	59.1
Alcoholism.....	117	1.1		2.3	2.5	1.8	.5	.2	44.2
Cerebral hemorrhage, apoplexy, and paralysis.....	746	6.9	.6	1.2	2.0	5.4	10.0	11.1	61.6
Organic diseases of the heart.....	1,517	14.1	4.2	6.7	7.1	11.8	15.7	22.7	59.2
Acute and chronic bronchitis.....	123	1.1	.3	.2	.3	.6	1.6	2.0	62.6
Pneumonia (lobar and undefined).....	964	9.0	5.6	10.3	9.7	9.5	9.8	7.6	52.5
Cirrhosis of the liver.....	206	1.9	.2	1.0	1.5	2.8	2.8	1.4	55.2
Bright's disease.....	1,055	9.8	1.8	5.4	6.8	10.2	11.9	12.5	57.7
Suicide (all forms).....	186	1.7	4.8	2.9	2.1	1.5	1.7	.7	44.9
Accidental violence.....	889	8.3	21.6	11.7	10.6	9.2	6.5	4.1	44.6
All other causes.....	2,478	23.0	23.8	19.7	19.3	21.1	22.5	27.5	.....
Total.....	10,748	100.0	100.0	100.0	100.0	100.0	100.0	100.0	52.8

¹This title includes simply laborers of undefined classification.

For the age period 15 to 24 typhoid fever has a proportionate mortality of 6.3 per cent as against 5.2 per cent for all occupations (index, *121.2*). The index for suicide is very high (*171.4*), and accidental violence exhibits a high proportionate mortality (*112.5*). At the age period 25 to 34 typhoid fever is again high (*111.1*). Alcoholism is excessively high (*164.3*). Organic diseases of the heart (*124.1*), pneumonia (*141.1*), and Bright's disease (*120.0*) are all high. In the age period 35 to 44 alcoholism (*119.0*) and pneumonia (*119.8*) are high. In the age period 45 to 54 tuberculosis of the lungs (*108.6*) is slightly higher than for all occupations. Alcoholism (*128.6*), pneumonia (*115.9*), and accidental violence (*108.2*) are also high. In the age period 55 to 64 bronchitis (*145.5*) and pneumonia (*130.7*) exhibit high relative indices. In the age period 65 and over organic diseases of the heart have an index of *111.3* and pneumonia has *120.6*.

Typhoid fever is more frequent, proportionately, in this occupation than in the general group. In the age periods 15 to 24 and 25 to 34 the relative indices are *121.2* and *111.1*, respectively. The relative indices for pulmonary tuberculosis fluctuate but slightly in the various age periods. For all ages the relative index is *80.0*. For the age period 15 to 24 it is *90.2*, and for 25 to 34 it is *85.1*. After age 34 the variations possess little significance. The lower proportionate mortality is explainable by the nature of the work done by laborers; they are kept out of doors for the most part. Bertillon likewise finds that pulmonary tuberculosis is infrequent in most occupations carried on in the open air and involving muscular exercise. This very condition would lead us to suspect that the respiratory diseases, and especially pneumonia, would cause a higher proportionate mortality. It will be seen that this is true.

The proportionate mortality due to cancer is high, the relative index for all ages being *112.2*. This would not appear from an examination of the age divisions, however, because of the fact that among laborers the later age groups are weighted heavily. Alcoholism is higher than normal for ages 15 and over (*122.2*), 25 to 34 (*164.3*), 35 to 44 (*119.0*), and 45 to 54 (*128.6*); it is lower for the next period and normal for the last. Organic diseases of the heart are considerably higher for all ages (*117.5*), although the index is alternately above and below *100* in the periods after age 15. As among iron molders, a causal relation can be said to exist between organic diseases of the heart and the hard work done by laborers. As remarked above, the fact that laborers are exposed to the wind, rain, and cold leads to a high proportionate mortality from the respiratory diseases. Bronchitis is high for all ages (*122.2*); for the age period 55 to 64 the index is *145.5*. and for ages 65 and over it is *105.3*. Pneumonia is high for all ages

(125.0). In every age period the percentage is higher than that found in the general group. Between the ages of 15 and 24 the relative index is 103.7. In the age period 25 to 34 the index is 141.1, and between the ages 35 and 44 it is 119.8. At ages 45 to 54 it is 115.9, and at 55 to 64 it is 130.7. It is 120.6 at the last age period, 65 and over.

Suicide is markedly low for all ages (73.9) and for each age division except 15 to 24, where the relative index is 171.4. After age 24, the highest relative index is in the age period 25 to 34 (93.5), and the lowest is in the age period 45 to 54 (57.7). Mental stress is at a minimum in this occupation, and the kind of man employed is usually one who, at the most, is not concerned much with the hubbub of life, and consequently does not experience the worries associated with other occupations. This condition reflects itself in the indices for suicides.

It is rather surprising that accidental violence among laborers should occupy an almost normal position. For all ages the relative index is 89.2. In the age period 15 to 24 there is an indication of a higher mortality from this cause, the relative index being 112.5. Thereafter the indices are slightly higher or lower than those of the general group.

LONGSHOREMEN AND STEVEDORES.¹

There were 651 deaths among longshoremen and stevedores. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 26.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG **LONGSHOREMEN AND STEVEDORES**, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years)—					
		15-24	25-34	35-44	45-54	55-64	65 and over.
LONGSHOREMEN AND STEVEDORES.							
Deaths.....	651	18	100	173	174	116	70
Per cent of deaths.....	100.0	2.8	15.4	26.6	26.7	17.8	10.8
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

Most of the deaths occurred in the main working periods of life; 86.5 per cent are accounted for between the ages of 25 and 64 as

¹ This title includes dockmen, dock hands, dock laborers, dock-wallopers, longshoremen, stevedores, ship laborers, ship unloaders.

against 67.9 per cent in all occupations. More than half of the deaths, 53.3 per cent, occurred between the ages of 35 and 54 as compared with 33.9 per cent. The average age at death is 47 years—a figure slightly below the average for the general group.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 27.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG LONGSHOREMEN AND STEVEDORES, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	651	.....	18	100	173	174	116	70	.....
Tuberculosis of the lungs.....	190	29.2	27.8	46.0	38.2	32.2	12.1	4.3	41.7
Cancer (all forms).....	28	4.3	.....	.....	2.3	3.4	14.7	1.4	53.9
Cerebral hemorrhage, apoplexy, and paralysis.....	18	2.8	.....	.....	1.2	2.9	3.4	10.0	59.4
Organic diseases of the heart.....	82	12.6	.....	4.0	6.4	13.2	14.7	38.6	56.2
Pneumonia (lobar and undefined).....	54	8.3	11.1	11.0	8.1	9.8	7.8	1.4	44.2
Bright's disease.....	64	9.8	5.6	3.0	6.4	8.6	18.1	18.6	54.2
Suicide (all forms).....	12	1.8	.....	3.0	1.2	2.3	1.7	1.4	45.9
Accidental violence.....	94	14.4	27.8	15.0	16.1	16.7	12.1	4.3	43.3
All other causes.....	109	16.7	27.8	18.0	20.1	10.9	15.4	20.0	.....
Total.....	651	100.0	100.0	100.0	100.0	100.0	100.0	100.0	47.0

In the age period 15 to 24 less than 3 per cent of the deaths occurred; consequently this period can be overlooked with impunity. In the age period 25 to 34 only tuberculosis of the lungs (*112.5*), pneumonia (*150.7*), and accidental violence (*120.0*) are of interest. In the age period 35 to 44 tuberculosis of the lungs occupies about the same relative position as before (*116.1*) and accidental violence becomes important (*162.6*). In the age period 45 to 54 there is a true indication of the hazards of this occupation. Tuberculosis of the lungs is very high (*174.1*), the proportionate mortality being 32.2 per cent, as against 18.5 per cent; organic diseases of the heart reflect the laborious character of this occupation (*118.9*). Pneumonia reveals the effect of exposure to the elements (*119.5*), and accidents show a decided causal relation between occupation and mortality (*196.5*). In the age period 55 to 64 tuberculosis of the lungs is still very high (*140.7*). Cancer is excessively high (*169.0*). Pneumonia is somewhat above the average (*104.0*). Bright's disease (*136.1*) is high, but accidental violence (*186.2*) is slightly lower than in the previous age period. In the age period 65 and over tuberculosis of the lungs (*148.3*), organic diseases of the heart (*189.2*), and Bright's disease (*135.8*) occupy relatively high positions.

Tuberculosis of the lungs is distinctly high for this occupation. For all ages the relative index is 142.4. In the period 15 to 24 the index is 82.2. For the age periods between 25 and 44 the relative indices are slightly higher than normal (around 115), but for the last three age divisions the relative indices are very high; for the first the index is 174.1, for the next it is 140.7 and for the last it is 148.3. It is evident that, although tuberculosis is at first rare in the occupation, it increases in relative importance with the duration of service. Cancer is high in the age period 55 to 64 (169.0). For all ages the index is low (87.8). The data in this study are not sufficient to permit the discussion of alcoholism as a cause of death in this occupation. For all ages the relative index is normal (100.0). It has already been pointed out that the laborious nature of the work leads one to infer the presence of a high index for organic diseases of the heart. In general the figures confirm this assumption. For all ages the relative index is only slightly above normal (105.0). At ages 45 to 54 it is high (118.9). In the next age period, 55 to 64, it is about normal. In the age period 65 and over it is excessively high (189.2). Pneumonia (115.3) is higher for all ages than in the general group. Between the ages of 25 and 34 the relative index is very high (150.7). For the age period 35 to 44 the proportionate mortality is normal. In the age period 45 to 54 the relative index is high (119.5), and in the age period 55 to 64 it is slightly above the average (104.0). Bright's disease reflects an interesting condition. Between the ages of 25 and 54 the relative indices are all considerably below the average, ranging around 75. After age 54—that is, in the age periods 55 to 64, and 65 and over—the relative indices are high, being 136.1 for the former and 135.8 for the latter. For all ages Bright's disease has an only slightly higher relative index (102.1). Accidental violence is one of the principal causes of death in this occupation, having a relative index of 154.8 for all ages. It is very high between the ages of 35 and 64. In the period 35 to 44 it is 162.6. At ages 45 to 54 the highest relative index is observed, 196.5. The relative index in the age period 55 to 64 remains high (186.2).

The general conclusions are confirmed by those of the Registrar General of England and Wales. Tatham¹ finds that "tuberculous phthisis, diseases of the respiratory system, and accident are inordinately fatal to these workers, and their mortality from cancer, as well as from diseases of the nervous and circulatory systems and from Bright's disease, is in each case above the average."

¹ Supplement to the Sixty-fifth Annual Report of the Registrar General of Births, Deaths, and Marriages in England and Wales, Pt. II. London, 1908. p. xlii.

MACHINISTS.¹

There were 3,152 deaths among machinists. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 28.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG MACHINISTS, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
Deaths.....	3,152	573	565	500	509	516	489
Per cent of deaths.....	100.0	18.2	17.9	15.9	16.1	16.4	15.5
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

It is evident that the deaths are distributed evenly among the age periods. The average age at death is 43.9 years.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 29.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG MACHINISTS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	3,152	.....	573	565	500	509	516	489	.....
Typhoid fever.....	72	2.3	6.8	3.2	1.8	0.8	0.4	.....	27.1
Tuberculosis of the lungs.....	789	25.0	39.4	44.8	30.4	18.9	9.7	2.5	33.7
Cancer (all forms).....	143	4.5	.9	.7	2.8	6.7	10.7	6.3	55.1
Cerebral hemorrhage, apoplexy, and paralysis.....	153	4.9	.2	.9	2.8	5.3	8.3	12.9	59.7
Organic diseases of the heart.....	350	11.1	3.3	5.7	9.2	13.9	16.7	19.6	53.2
Pneumonia (lobar and undefined).....	223	7.1	5.8	6.5	7.6	7.3	8.7	6.7	44.9
Cirrhosis of the liver.....	57	1.8	.....	1.1	3.0	2.8	2.5	1.8	50.2
Bright's disease.....	269	8.5	1.9	2.8	8.0	8.4	15.7	16.0	55.0
Suicide (all forms).....	81	2.6	1.6	3.5	3.2	3.3	1.4	2.5	43.8
Accidental violence.....	338	10.7	21.8	11.2	10.0	8.9	6.3	4.7	34.7
All other causes.....	677	21.5	18.4	19.7	21.2	23.8	19.9	26.9	.....
Total.....	3,152	100.0	100.0	100.0	100.0	100.0	100.0	100.0	43.9

In the age period 15 to 24 typhoid fever is high (130.8), being responsible for 6.8 per cent of all deaths, as against 5.2 per cent in the general group. Tuberculosis (116.6) is likewise higher than for all occupations. Pneumonia exhibits a slightly higher proportionate mortality (107.4). In the age period 25 to 34 typhoid fever remains high (118.5). Tuberculosis of the lungs is only slightly

¹ This title includes lathe hands, bench hands, die makers, toolmakers, gear cutters and makers, machine hands and repair men in automobile, car, railroad, machine, and other establishments where iron and steel are made into a finished product through the use of lathes, planers, and the usual equipment of a machine shop.

lower than in the previous age period (*109.5*), and suicide becomes somewhat prominent (*112.9*). In the age period 35 to 44 typhoid fever exhibits a high relative index (*128.6*). Organic diseases of the heart are high (*119.5*). Cirrhosis of the liver has a relative index of *115.4*, and that of suicide is *110.3*. In the age period 45 to 54 cancer (*113.6*), organic diseases of the heart (*125.2*), and suicide (*126.9*) are all high. In the age period 55 to 64 tuberculosis of the lungs exhibits a high relative index (*112.8*). Cancer (*123.0*), pneumonia (*116.0*), and Bright's disease (*118.0*) are also high. In the last age period, 65 and over, Bright's disease is high (*116.8*), and suicide shows a very high relative index (*250.0*).

Typhoid fever is high for all ages (*153.3*) and for the ages between 15 and 44. In the age period 15 to 24 it is *130.8*; in the period 25 to 34 it is *118.5*; and in the period 35 to 44 it is *128.6*. The remaining age periods are insignificant. High indices for typhoid fever have also been obtained in the experience of the Bureau of the Census and of Hoffman. The United States Census shows a relative index of *172.0*, and Hoffman's figures show *172.2* for all ages.

The proportionate mortality due to pulmonary tuberculosis is higher for machinists than for all occupations. At all ages the relative index is *122.0*. In the age period 15 to 24 it is *116.6*, and in the period 25 to 34 it is *109.5*; in the next age period, 35 to 44, it is lower, and in the remaining periods the percentages are very nearly alike. The presence of dust, grime, iron filings, and probably lead dust explains the high proportionate mortality due to tuberculosis of the lungs. The figures of both the United States Census and of Hoffman give high indices for tuberculosis of the lungs. For all ages the relative index of the former is *126.0*, and that of the latter is *126.5*. Cancer is high for the age periods between 35 and 64. At ages 35 to 44 the relative index is *121.7*; at ages 45 to 54 the index is *113.6*; and at ages 55 to 64 it is *123.0*. Organic diseases of the heart are higher than normal between 25 and 64. For the age period 35 to 44 the index is significantly higher (*119.5*) and the same is true of the period 45 to 54 (*125.2*). Bright's disease, like cancer and organic diseases of the heart (the causes of death which are associated with old age) is high for the later age periods. For the period between 55 and 64 the relative index is *118.0*, and for ages 65 and over it is *116.8*. Suicide among machinists exhibits a higher percentage for all ages, with a relative index of *113.0*. This is true in most age periods, the highest relative index being in the age period 65 and over (*250.0*). The variation in the proportionate mortality from suicide among the different occupations is not great. Consequently any deviation from the norm is likely to be of significance. The high proportionate mortality attributed to suicide among machinists is confirmed by the even higher indices obtained from the data of the United States

Census and of Hoffman. The census data give an index of 140.7, and those of Hoffman lead to an index of 127.3. Both also show that in the last age period, 65 and over, the highest relative index is registered—166.7 in both cases.

MASONS AND BRICKLAYERS.¹

There were 1,748 deaths among masons and bricklayers. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 30.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG MASONS AND BRICKLAYERS, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
MASONS AND BRICKLAYERS.							
Deaths.....	1,748	59	124	250	327	475	513
Percent of deaths.....	100.0	3.4	7.1	14.3	18.7	27.2	29.3
ALL OCCUPATIONS.							
Percent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

A larger proportion of the deaths occurred after age 34—89.5 per cent, as against 74.5 per cent in all occupations. The average age at death is 55 years.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 31.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG MASONS AND BRICKLAYERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	1,748	.....	59	124	250	327	475	513	.....
Tuberculosis of the lungs.....	332	19.0	28.8	45.2	42.0	26.6	10.5	3.3	44.2
Cancer (all forms).....	113	6.5	.....	1.6	2.8	4.6	10.3	7.8	60.6
Alcoholism.....	18	1.0	.....	2.4	1.6	1.8	.4	.6	48.9
Cerebral hemorrhage, apoplexy, and paralysis.....	136	7.8	.....	.8	2.4	2.4	12.2	12.3	63.8
Organic diseases of the heart.....	227	13.0	3.4	6.5	8.0	9.2	14.7	18.9	60.3
Acute and chronic bronchitis.....	18	1.0	.....	.8	.....	.6	.6	2.3	66.4
Pneumonia (lobar and undefined).....	132	7.6	10.2	7.3	6.0	10.1	6.7	7.2	53.9
Cirrhosis of the liver.....	34	1.9	.....	.8	2.0	1.8	2.9	1.6	56.9
Bright's disease.....	178	10.2	5.1	3.2	5.6	10.1	12.2	12.9	59.5
Suicide (all forms).....	29	1.7	1.7	.8	1.2	1.5	1.9	1.9	56.8
Accidental violence.....	133	7.6	25.4	8.1	9.2	9.8	5.7	5.1	48.9
All other causes.....	398	22.8	25.4	22.5	19.2	21.5	21.9	26.1	.....
Total.....	1,748	100.0	100.0	100.0	100.0	100.0	100.0	100.0	55.0

¹ This title includes foremen and workmen: stonemasons, bricklayers, masons, bricksetters, tile layers, and plasterers.

At the age period 15 to 24 high relative indices are observed for both pneumonia and accidental violence. Pneumonia has a percentage of 10.2, as against 5.4 in all occupations (index, 188.9). The index for accidental violence is 132.3. In the age period 25 to 34 tuberculosis of the lungs is high (110.5) and organic diseases of the heart show an index of 120.4. In the age period 35 to 44 tuberculosis alone is of interest (127.7). In the age period 45 to 54 tuberculosis of the lungs becomes of relative importance (143.8). Alcoholism (128.6), pneumonia (123.2), and accidental violence (115.3) are also high. In the age period 55 to 64 pulmonary tuberculosis, though lower than in the previous period, is still high (122.1). The causes of death associated with old age now become prominent; the index of cancer is 118.4, and that of cerebral hemorrhage, apoplexy, and paralysis is 127.1. In the age period 65 and over many of the causes of death exhibit high relative indices, and it is to be noted that this age period is an important one from the point of view of number, in that it contains more deaths than any other period. Tuberculosis of the lungs is high (113.8). The respiratory diseases exhibit high indices. The relative index for acute and chronic bronchitis is 121.1 and for pneumonia it is 114.3. A very high index is observed for suicide (190.0); accidental violence (115.9) is slightly higher than in the general group.

Bertillon,¹ in speaking of industrial workers in occupations exposing them to wind and weather but involving vigorous exercise, in which class masons are included, says that an analysis by ages shows that phthisis is very rare up to the age of 25 and rather rare up to the age of 35. In the later age periods it is more and more above the average, and after 55 far exceeds it. So the stock from which workers in these occupations are drawn is clearly good, but the work slowly exhausts those who carry it on.

The Metropolitan experience justifies a similar conclusion. At the age period 15 to 24 the tuberculosis proportion is low (85.2). The proportionate mortality after age 24 increases steadily up to the age of 54, the index rising from 110.5 at 25 to 34 to 127.7 at 35 to 44. At ages 45 to 54 the highest relative index is reached (143.8). In the last two age periods the indices decline, though they are still high. At ages 55 to 64 the index is 122.1, and at the period 65 and over it is 113.8. The United States Census figures, the English figures, and those of the Prudential Insurance Co., all confirm the occurrence of rising relative indices in successive periods up to age 65, suggesting a direct causal relationship between tuberculosis of the lungs as a cause of death and the duration of service in this occupation.

¹ Op. cit., p. 364.

Cancer is high for the age periods 55 to 64 and 65 and over. For the former period the relative index is 118.4, and for the latter it is 106.8. Alcoholism is high in the age period 25 to 34; the relative index is 171.4. In the period 35 to 44 it is 76.2; and in the period 45 to 54 it is 128.6. The indices merely indicate a high proportionate mortality, for the number of cases involved is few. Pneumonia is near the average for all ages, the relative index being 105.6, and varies above and below the normal in the age periods. The index is highest in the period 15 to 24 (188.9) and lowest in the period 35 to 44 (74.1). Suicide is low for all ages (73.9) and for every age period except 65 and over, where it is very high (190.0). In the age period 15 to 24 the relative index is 60.7. After age 24 there is a steady increase in the proportionate mortality with the duration of service. In the age period 25 to 34 the relative index is 25.8; at ages 35 to 44 it is 41.4; at 45 to 54 it is 57.7; and at 55 to 64 it is 95.0. It is striking that the figures of the Registrar General of England and Wales and of the United States Census confirm this phenomenon. Although the indices for suicide in this occupation are low, yet after age 24 there is a regular increase in proportionate mortality, until the highest is reached in the period 65 and over, where for the first time suicide is above the average. For the age period 15 to 24 the index is more than twice that for ages 25 to 34. Accidental violence, though below normal for all ages (81.7) is higher for the age periods 15 to 24, 45 to 54, and 65 and over. It is highest in the age period 15 to 24 (132.3).

PAINTERS, PAPER HANGERS, AND VARNISHERS.¹

There were 2,722 deaths among painters, paper hangers, and varnishers. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution for all occupations:

TABLE 32.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG PAINTERS, PAPER HANGERS, AND VARNISHERS, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
PAINTERS, PAPER HANGERS, AND VARNISHERS.							
Deaths.....	2,722	166	368	552	592	592	452
Per cent of deaths.....	100.0	6.1	13.5	20.3	21.7	21.7	16.6
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

¹This title includes painters, paper hangers, and varnishers; house painters, fresco painters, grainers, decorators, wood varnishers, carriage and auto painters, and interior finishers; sign writers, letterers, and gilders.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 33.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG PAINTERS, PAPER HANGERS, AND VARNISHERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—					Average age at death.	
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64		65 and over.
Number of deaths.....	2,722	.....	166	368	552	592	592	452	.....
Tuberculosis of the lungs.....	596	21.9	31.3	42.9	34.6	19.6	11.3	2.7	39.9
Cancer (all forms).....	111	4.1	.6	.5	1.8	3.9	6.9	7.5	57.7
Diabetes.....	15	.6	1.2	.5	.7	1.5	.7	.....	43.3
Alcoholism.....	30	1.1	1.2	1.6	2.5	1.0	.3	.....	39.1
Chronic lead poisoning.....	54	2.0	.6	1.1	3.4	2.5	1.9	.9	47.7
Cerebral hemorrhage, apoplexy, and paralysis.....	208	7.6	.6	.8	3.3	5.6	12.3	17.7	60.0
Organic diseases of the heart.....	290	10.7	4.2	4.6	8.0	10.6	12.3	19.0	55.2
Pneumonia (lobar and undefined).....	167	6.1	3.6	6.2	5.3	8.8	6.1	4.6	49.0
Cirrhosis of the liver.....	70	2.6	.6	1.4	2.4	5.2	2.7	.9	49.1
Bright's disease.....	331	12.2	1.8	4.9	9.2	12.5	18.6	16.6	54.8
Suicide (all forms).....	55	2.0	5.4	3.0	2.7	2.0	1.2	2	40.0
Accidental violence.....	238	8.7	19.3	14.4	8.8	6.9	7.6	4.0	41.7
All other causes.....	557	20.5	29.5	17.8	17.2	20.7	18.1	25.8	.....
Total.....	2,722	100.0	100.0	100.0	100.0	100.0	100.0	100.0	48.6

In the age period 15 to 24 a high relative index is observed for suicide (192.9). Accidental violence is responsible for 19.3 per cent of all deaths; for all occupations the proportionate mortality is 19.2 per cent (relative index, 100.5). In the age period 25 to 34 alcoholism is above the average (114.3). Chronic lead poisoning is extremely high (1,100.0). Cirrhosis of the liver is 116.7, Bright's disease 108.9, and accidental violence 115.2. In the age period 35 to 44 alcoholism rises to 119.0. Lead poisoning soars still higher (1,700.0). A high index for cerebral hemorrhage, apoplexy, and paralysis (143.5) is noted. Bright's disease is also of importance (117.9). In the age period 45 to 54 lead poisoning reaches its maximum relative index (2,500.0). Cirrhosis of the liver remains high (136.8) and Bright's disease maintains a relatively high index (112.6). In the age period 55 to 64 the proportionate mortality from tuberculosis of the lungs is in excess (131.4). Chronic lead poisoning maintains its excessively high proportionate mortality, with an index of 1,900.0. Cerebral hemorrhage, apoplexy, and paralysis (128.1), Bright's disease (139.8), and accidental violence (116.9) are all high. In the last age period, 65 and over, cerebral hemorrhage, apoplexy, and paralysis (132.1) and Bright's disease (121.2) are important.

In most age periods the proportionate mortality due to pulmonary tuberculosis is but slightly different from that found in all occupations. The relative index is 106.8 for all ages. It is high only for

the age period 55 to 64 (*131.4*). Alcoholism exhibits high relative indices; for all ages the index is *122.2*. Between the ages of 25 and 44 the indices are about *116*.

The proportionate mortality from lead poisoning is excessive in every age division. A distinct causal relation between occupation and cause of death is apparent. It may also be pointed out in this connection that painters, paper hangers, and varnishers suffer from alcoholism.¹ Authorities agree that the use of alcohol renders the organism more sensitive to lead poisoning. This fact may in some degree explain the extremely high proportionate mortality from plumbism in this occupation. For all ages the relative index is *2,000.0*, and in every age period the indices are much above *1,000*.

Cerebral hemorrhage, apoplexy, and paralysis also exhibit a high relative index (*122.6*), and authorities have pointed out that a relationship exists between lead poisoning and cerebral hemorrhage. A bulletin of the Bureau of Labor Statistics² gives the results of an analysis of the hospital or dispensary history of 100 poisoned painters; nine had had brain symptoms. Dr. Thompson³ points out further: "Lead produces exceptionally a considerable variety of cerebral symptoms both acute and chronic. The acute forms especially are much more liable to affect young subjects." Our experience shows that for all ages the relative index for cerebral hemorrhage, apoplexy, and paralysis is *122.6*. At the age period 35 to 44 the highest relative index is exhibited (*143.5*). After age 55 the index is about *130*.

Apparently painters do not suffer seriously from the respiratory diseases. The relative index for bronchitis is *66.7* for all ages. Pneumonia is also very low, with an index of *84.7*, and that of pleurisy is *66.7*.

The usual concomitants of alcoholism are in evidence in this occupation. Cirrhosis of the liver is high, the relative index being *113.0* for all ages. Disregarding the age period 15 to 24, the index is highest in the age period 45 to 54 (*136.8*). The age period 25 to 34 also exhibits a high index (*116.7*). Bright's disease is significantly high for painters, paper hangers, and varnishers in all ages combined (*127.1*). Between the ages 25 and 64 there is a steady increase in the proportionate mortality from this cause. The maximum proportionate mortality is reached at ages 55 to 64, where the index is *139.8*. Suicide is low for all age divisions with the exception of the period 15 to 24 (*192.9*). For all ages the relative index is *87.0*.

¹ Boos, William F. The Relation of Alcohol to Industrial Accidents and to Occupational Diseases. Fifteenth International Congress on Hygiene and Demography. Washington, D. C., 1912, p. 835.

² Hamilton, Alice, M. A., M. D. U. S. Bureau of Labor Statistics. Hygiene of the Painters' Trade. Bulletin No. 120. Washington, D. C., 1913.

³ Thompson, W. Gilman. The Occupational Diseases. New York, 1914, p. 254.

PLUMBERS, GAS FITTERS, AND STEAM FITTERS.¹

There were 1,153 deaths among plumbers, gas fitters, and steam fitters. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 34.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG **PLUMBERS, GAS FITTERS, AND STEAM FITTERS**, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
PLUMBERS, GAS FITTERS, AND STEAM FITTERS.							
Deaths.....	1,153	173	297	291	184	138	70
Per cent of deaths.....	100.0	15.0	25.8	25.2	16.0	12.0	6.1
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

It is evident that considerably more than half of the deaths occur before the age of 45; 51.0 per cent of the deaths occur between the ages of 25 and 44, as against 29.9 per cent in all occupations. This is, therefore, a young man's occupation, and the average age at death is low, 39.8, as compared with 47.9 for all occupations.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 35.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG **PLUMBERS, GAS FITTERS, AND STEAM FITTERS**, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	1,153		173	297	291	184	138	70	
Typhoid fever.....	16	1.4	5.2	1.3	0.3	0.5	0.7		26.1
Tuberculosis of the lungs.....	364	31.6	33.5	43.8	37.5	23.4	15.9	2.9	35.1
Cancer (all forms).....	32	2.8	.6	.7	1.0	7.1	5.1	8.6	52.3
Diabetes.....	15	1.3	1.2	2.0	1.0	1.1	1.4		36.5
Alcoholism.....	13	1.1		2.0	1.4	1.1	.7		37.4
Cerebral hemorrhage, apoplexy, and paralysis.....	59	5.1	2.9	2.0	3.1	6.5	12.3	14.3	49.9
Organic diseases of the heart.....	106	9.2	6.4	6.4	6.9	13.6	11.6	21.4	45.7
Pneumonia (lobar and undefined).....	75	6.5	8.1	5.1	9.3	5.4	5.1	2.9	38.1
Cirrhosis of the liver.....	21	1.8		1.0	2.1	2.7	3.6		49.3
Bright's disease.....	115	10.0	3.5	7.7	10.3	12.5	15.9	15.7	45.4
Suicide (all forms).....	20	1.7	2.3	1.7	2.7	1.1	.7		34.8
Accidental violence.....	102	8.8	13.5	9.8	7.5	4.8	5.8	2.9	34.1
All other causes.....	215	18.6	17.8	16.5	16.9	20.2	21.2	28.4	
Total.....	1,153	100.0	100.0	100.0	100.0	100.0	100.0	100.0	39.8

¹ This title includes pipe fitters, gas fitters, steam fitters, plumbers, plumbing repairers, pipe cutters, and plumbers' helpers.

In the age period 15 to 24 it is surprising to note the very presence of cerebral hemorrhage, apoplexy, and paralysis. The percentage is excessively high, being 2.9 per cent (580.0) as compared to 0.5 per cent for all occupations. Although the cases are few in number, the fact that we have any cases at all is significant. Pneumonia (150.0) and Bright's disease (140.0) show high indices.

In the age period 25 to 34 deaths from diabetes, though few in number, exhibit a very high relative index (285.7). Alcoholism is high, with an index of 142.9. The index for cerebral hemorrhage, apoplexy, and paralysis is very high (166.7). Organic diseases of the heart are higher than in the general group (118.5), and Bright's disease is very high (171.1).

In the age period 35 to 44 tuberculosis of the lungs becomes important (114.0). Cerebral hemorrhage, apoplexy, and paralysis (134.8), and Bright's disease (132.1), as in the previous age periods, still maintain high indices. Pneumonia is rather high (114.8).

In the age period 45 to 54 tuberculosis of the lungs increases in proportionate importance, attaining an index of 126.5, and all the causes of death associated with old age are of importance. Cancer has an index of 120.3; cerebral hemorrhage, apoplexy, and paralysis show 125.0. The index of organic diseases of the heart is 122.5, and that of Bright's disease is 112.6.

In the age period 55 to 64 tuberculosis of the lungs is excessively high (184.9). Cerebral hemorrhage, apoplexy, and paralysis (128.1) and Bright's disease (119.5), as in the previous periods, are higher than in all occupations.

In the last period, ages 65 and over, there are no conditions that were not noted before. Cancer, cerebral hemorrhage, apoplexy, and paralysis, and Bright's disease are all slightly higher than the normal percentages for these causes of death.

Tuberculosis of the lungs exhibits an interesting phenomenon which we have already encountered. In the first age period the proportionate mortality is 33.5 per cent, as against 33.8 per cent in all occupations; the relative index is 99.1, or about normal. In the succeeding age periods and up to the age of 65 tuberculosis of the lungs increases steadily in relative importance; it attains a maximum excess percentage between ages 55 and 64, with a relative index of 184.9. We may infer that the individual, when entering the occupation of plumber, gas fitter, or steam fitter, is of average resistance to tuberculosis, and that, as the duration of service increases, his hazard from tuberculosis increases.

In the three years' experience of the Metropolitan Life Insurance Co. there was only one case of lead poisoning recorded among plumbers, gas fitters, and steam fitters. This may be accounted for by the changes that this occupation has undergone. Plumbers to-day use much less lead in their trade than formerly. On the other hand, it

is to be noted that, in this occupation, cerebral hemorrhage, apoplexy, and paralysis manifest themselves in the highest relative proportions in the early age periods. Neglecting ages 15 to 24, where the relative index is excessively high, but where there are only a few cases, it is observed that the relative index is highest in the age period 25 to 34 (166.7). After age 34 there is a steady decrease in the excessive relative mortality, until in the last age period, 65 and over, the proportionate mortality from this cause becomes almost normal, the relative index being 106.7. Evidently an abnormal condition obtains in the early age divisions, becoming normal in the last age period.

It is hard to explain the high indices for cerebral hemorrhage, apoplexy, and paralysis, unless they may be attributed to the effect of lead poisoning. Especially is it difficult to explain why cerebral hemorrhage, apoplexy, and paralysis are so prevalent in the early age divisions. Dr. Robert Jones,¹ concluded from an examination of 133 individuals in the Claybury Essex Asylum who had been lead workers, that there is strong presumptive evidence that lead may be a factor in the causation of general paralysis. Osler² also found, in a number of cases, marked cerebral involvements; he notes that the cerebral symptoms of plumbism are numerous. Dr. Simeon Snell,³ says: "The brain and nervous system are frequently seriously affected in chronic plumbism, and kidney disease is also frequently occasioned thereby." The proportionate mortality from Bright's disease is highest between the ages of 15 and 44. In the age period 25 to 34 the relative index is 171.1. The following age periods all show decreases. At ages 65 and over the index is 114.6. It is to be noted that, as in the case of cerebral hemorrhage, apoplexy, and paralysis, Bright's disease also exhibits a high proportionate mortality in the early age periods, when these causes of death are usually infrequent. The conclusion is strongly suggested that the high proportion of cerebral hemorrhage, apoplexy, and paralysis and Bright's disease are all causally related to plumbism, although lead poisoning itself is of no significance as a cause of death. The experience of the Registrar General of England and Wales shows a high fatality among plumbers, painters, and glaziers from plumbism and Bright's disease. Bertillon⁴ also finds Bright's disease very common in all occupations exposing workers to lead poisoning.

RAILWAY TRACK AND YARD WORKERS.⁵

There were 1,932 deaths among railway track and yard workers. The table following indicates the distribution of the deaths by age periods, and the corresponding distribution in all occupations.

¹ Jones, Dr. Robert. In Oliver, Thomas: *Dangerous Trades*, London, 1902, p. 308.

² Osler, William, M. D. *Practice of Medicine*. New York, 1911, p. 378.

³ Snell, Simeon. In Oliver, Thomas: *Dangerous Trades*, London, 1902, p. 771.

⁴ *Op. cit.*, p. 354.

⁵ This title includes section laborers, switchmen, trackwalkers, roundhouse workers, car cleaners, air-brake inspectors and repairers, crossing watchmen and flagmen, car sealers, and track repairers and graders.

TABLE 36.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG RAILWAY TRACK AND YARD WORKERS, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
RAILWAY TRACK AND YARD WORKERS.							
Deaths.....	1,932	177	243	232	334	475	471
Per cent of deaths.....	100.0	9.2	12.6	12.0	17.3	24.6	24.4
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

By far the greater number of deaths occur in the later age periods; 66.3 per cent of all deaths occur after age 44, as against 58.3 per cent for all occupations. The average age at death is 50.7 years.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 37.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG RAILWAY TRACK AND YARD WORKERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	1,932		177	243	232	334	475	471	
Typhoid fever.....	29	1.5	6.2	4.1	1.3	1.2	0.2		31.2
Influenza.....	23	1.2		.8	.4	2.1	1.5		55.8
Tuberculosis of the lungs.....	215	11.1	18.6	27.2	21.1	10.2	5.1		38.5
Cancer (all forms).....	90	4.7		1.2	2.6	4.5	8.4		59.0
Cerebral hemorrhage, apoplexy, and paralysis.....	139	7.2	.6	1.6	1.7	5.1	10.1	13.8	61.7
Organic diseases of the heart.....	231	12.0	2.3	3.7	6.0	9.9	13.7	22.5	60.1
Acute and chronic bronchitis.....	26	1.3	1.1			.9	1.7		60.9
Pneumonia (lobar and undefined).....	123	6.4	3.4	4.9	6.5	6.0	7.4	7.4	53.9
Cirrhosis of the liver.....	37	1.9		.8	1.7	3.9	2.1	1.7	54.1
Bright's disease.....	163	8.4	.6	2.9	6.0	10.8	11.4	10.8	57.6
Suicide (all forms).....	26	1.3	1.7	2.1	2.2	2.4	.6		43.3
Accidental violence.....	402	20.8	43.5	34.6	32.3	19.5	13.0		41.4
All other causes.....	428	22.2	22.1	16.0	18.2	23.7	24.8	23.5	
Total.....	1,932	100.0	100.0	100.0	100.0	100.0	100.0	100.0	50.7

In the age period 15 to 24 tuberculosis of the lungs has a proportionate mortality of only 18.6 per cent, as compared with 33.8 per cent for all occupations; the relative index (55.0) is therefore low. The only other important cause of death in this period is accidental violence, the index of which is very high (226.6). If the excess of deaths from accidents were deducted and the various other causes in this age period increased proportionately, the proportion of tuberculosis would rise to about normal. It may be safely concluded, there-

fore, that railway track and yard workers do not exhibit any noteworthy freedom from tuberculosis of the lungs. At the age period 25 to 34 typhoid fever is very high (151.9). Tuberculosis of the lungs is low (66.5) and accidental violence is, as in the previous age period, high (276.8). In the age period 35 to 44 the same conditions are observed. Tuberculosis of the lungs remains low (64.1) and accidental violence maintains its high relative index (326.3). The same thing can be said for the age period 45 to 54, with the addition that influenza is of importance, having the very high index of 300.0. In the age period 55 to 64 influenza maintains a high relative index (150.0) and accidental violence is still high (200.0). In the last age period, 65 and over, organic diseases of the heart are somewhat in excess (110.3). Bronchitis (147.4) is high, and accidental violence (188.6), although lower than in the previous age period, is still high.

The most significant facts in the mortality of this occupation are that tuberculosis of the lungs is consistently low, and accidental violence consistently very high. The indices for organic diseases of the heart are low throughout all the age periods, with the exception of ages 65 and over. From the age period 15 to 24, where the relative index is 39.7, to the age period 65 and over, where the relative index is 110.3, there is a steady increase. For all ages the relative index of accidental violence is 223.7. It is highest at ages 35 to 44 (326.3). The percentages of deaths attributed to accidents decrease steadily with every age period, from 43.5 per cent in the age period 15 to 24, to 34.6 per cent, 32.3 per cent, 19.5 per cent, 13.0 per cent, and in the last age period, 8.3 per cent. Accidental violence decreases in proportionate representation as the men grow older and more experienced.

SALOON KEEPERS AND BARTENDERS.¹

There were 2,190 deaths among saloon keepers and bartenders. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 38.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG **SALOON KEEPERS AND BARTENDERS**, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
SALOON KEEPERS AND BARTENDERS.							
Deaths.....	2,190	57	492	775	535	243	88
Per cent of deaths.....	100.0	2.6	22.5	35.4	24.4	11.1	4.0
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

¹ This title includes bartenders and proprietors of cafés, saloons, and liquor stores.

There is a great preponderance of deaths in the middle periods of life. Between the ages of 25 and 54, 82.3 per cent of all deaths occur among saloon keepers and bartenders, as against 47.6 per cent in all occupations—almost twice as many. The average age at death is 42.6 years.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 39.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG SALOON KEEPERS AND BARTENDERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	2,190	.....	57	492	775	535	243	88	.....
Tuberculosis of the lungs.....	570	26.0	45.6	39.2	31.2	15.3	9.9	3.4	37.5
Cancer (all forms).....	60	2.7	.....	.2	2.1	3.9	7.8	3.4	50.7
Diabetes.....	25	1.1	.....	.4	.9	1.3	3.3	1.1	48.7
Alcoholism.....	75	3.4	3.5	4.7	4.5	2.2	1.2	.....	38.8
Cerebral hemorrhage, apoplexy, and paralysis.....	94	4.3	.....	1.6	3.1	5.8	7.8	13.6	49.7
Organic diseases of the heart.....	181	8.3	7.0	6.9	8.3	6.7	13.2	12.5	44.7
Pneumonia (lobar and undefined).....	191	8.7	5.3	8.7	9.0	10.8	5.8	3.4	41.7
Cirrhosis of the liver.....	165	7.5	.....	4.5	8.3	10.7	6.6	6.8	44.4
Bright's disease.....	267	12.2	3.5	6.3	10.7	17.4	18.1	15.9	46.8
Suicide (all forms).....	60	2.7	3.5	3.9	2.3	1.9	3.7	2.3	41.2
Accidental violence.....	72	3.3	5.3	4.0	2.1	3.5	3.3	6.8	42.2
All other causes.....	430	19.6	26.3	19.5	17.4	20.4	19.3	30.6	.....
Total.....	2,190	100.0	100.0	100.0	100.0	100.0	100.0	100.0	42.6

In the age period 15 to 24, because of paucity of data, there is only one cause of death which shows important variation from the average. Tuberculosis of the lungs is responsible for 45.6 per cent of all deaths, as against 33.8 per cent in all occupations. The relative index is high (134.9). In the age period 25 to 34 alcoholism is very high (335.7); the same is true of cerebral hemorrhage, apoplexy, and paralysis (133.3), cirrhosis of the liver (375.0), Bright's disease (140.0), and suicide (125.8). It may also be noted that organic diseases of the heart exhibit a high index (127.8) and pneumonia is above the average (119.2). In the age period 35 to 44, as in the previous age period, alcoholism, cerebral hemorrhage, apoplexy, and paralysis, cirrhosis of the liver, and Bright's disease are all high. As before, organic diseases of the heart and pneumonia are above the average. At ages 45 to 54 high indices are again observed for alcoholism and the usual accompanying causes. In this period the relative index of pneumonia increases to 181.7. In the age period 55 to 64 tuberculosis of the lungs is seen to be on the ascendent, with an index of 115.1; diabetes is very high (253.8). Alcoholism, Bright's disease, and suicide are very high for this period also. In

the last age period, 65 and over, tuberculosis of the lungs maintains its high index (117.2). Cirrhosis of the liver (377.8) exhibits a very high relative index. Bright's disease is somewhat above normal (116.1).

Tuberculosis of the lungs is low in the main working periods of life, between 25 and 54, and is higher for the remaining age periods. It is interesting to observe that, unlike the members of all other occupations, saloon keepers and bartenders exhibit their highest proportionate mortality from pulmonary tuberculosis in the first age period, 15 to 24, when 45.6 per cent of the total deaths are accounted for, as compared with 33.8 per cent (index, 134.9). Between 25 and 54, when alcoholism is at its highest, tuberculosis of the lungs is below the average. Alcoholism claims its greatest number of deaths in the age group 35 to 44, being responsible for a total of 35 deaths, and for a proportionate mortality of 4.5 per cent, as compared with 2.1 per cent (index, 214.3). The highest significant relative index is observed in the age period 25 to 34 (335.7). For all ages the relative index is 377.8. The Registrar General, Bertillon, and Hoffman all confirm the findings of the Metropolitan experience. For all ages the returns of the Registrar General of England and Wales give an index of 416.7, and Hoffman's figures for bartenders give an index of 446.7.

Cerebral hemorrhage, apoplexy, and paralysis are highest in the age periods 35 to 44 and 45 to 54, where the greatest number of deaths in this occupation occurs. In the former age period, the index is 134.8 and in the latter it is 111.5. Bertillon puts saloon keepers and bartenders first in order of "occupations most subject to this disease." Organic diseases of the heart are higher for the age periods between 25 and 44. For the period 25 to 34 the relative index is 127.8 and for 35 to 44 it is 107.8. Pneumonia increases in proportionate representation from ages 15 to 54, and the indices for the periods between these ages are also high. At age period 45 to 54 the index is 131.7. After age 54 the indices, as also the percentages, decline in numerical importance. The United States Census Bureau figures show high indices between the ages of 15 and 44.

Cirrhosis of the liver is very high in all age periods; in most cases the indices are well over 300. The percentage increases from 4.5 per cent, in the age period 25 to 34, to 10.7 per cent, in the age period 45 to 54. In the age period 55 to 64 the percentage decreases to 6.6, and is about the same in the succeeding age period. The Registrar General's figures show high indices for diseases of the liver. From Hoffman's figures a relative index of 196.6 is obtained for bartenders and 382.8 for saloon keepers. Bertillon observes that diseases of the liver are very common among members of occupations exposed to spirituous liquors.

Bright's disease shows a steady increase in proportionate representation, from 3.5 per cent, in the age period 15 to 24, to 18.1 per cent, in the age period 55 to 64. It is slightly lower in the last age period. A relationship is evident between advancing age and the incidence from this cause of death. The relative indices are high throughout, especially up to age 64. The highest index (156.8) is observed in the age period 45 to 54. The data both of the United States Census and of the Registrar General give high indices for Bright's disease. The former gives an index of 124.1; from the latter is obtained an index of 166.7. Bertillon confirms our finding that Bright's disease is very common among saloon keepers and bartenders. Suicide reveals high indices for the age periods between 15 and 34 and after 55. At 25 to 34 the highest proportionate representation is noted. In this age period 3.9 per cent of the total deaths are accounted for by suicide; a high index (125.8) is observed. For all ages the relative index is 117.4. Bertillon likewise concludes in his paper that suicide is most frequent in those occupations in which distilled liquors are indulged in.

TEAMSTERS, DRIVERS, AND CHAUFFEURS.¹

There were 6,471 deaths among teamsters, drivers, and chauffeurs. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 40.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG TEAMSTERS, DRIVERS, AND CHAUFFEURS, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					65 and over.
		15-24	25-34	35-44	45-54	55-64	
TEAMSTERS, DRIVERS, AND CHAUFFEURS.							
Deaths.....	6,471	768	1,498	1,579	1,152	818	656
Per cent of deaths.....	100.0	11.9	23.1	24.4	17.8	12.6	10.1
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

Most of the deaths occur between the ages of 25 and 54. Fully 65.3 per cent of the total deaths occur within these ages; for all occupations the same period shows only 47.6 per cent. The average age at death is 42.2 years.

The table following analyzes the mortality of each age class, by cause of death.

¹ This title includes mail, express, moving van, truck, warehouse, cab, hack, and retail-store teamsters and drivers; and taxi and private family automobile chauffeurs.

TABLE 41.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG TEAMSTERS, DRIVERS, AND CHAUFFEURS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	6,471	.....	768	1,498	1,579	1,152	818	656	.....
Tuberculosis of the lungs.....	1,825	28.2	36.6	42.7	35.7	20.2	10.0	4.0	35.5
Cancer (all forms).....	234	3.6	.5	.7	2.2	5.9	8.2	7.6	54.1
Alcoholism.....	101	1.6	.7	2.4	2.5	1.0	.9	.2	37.4
Cerebral hemorrhage, apoplexy, and paralysis.....	276	4.3	.3	1.4	2.0	4.4	9.4	14.2	56.3
Organic diseases of the heart.....	628	9.7	6.8	5.9	7.3	9.9	15.9	19.4	48.8
Pneumonia (lobar and undefined).....	550	8.5	7.3	10.5	8.6	9.5	6.8	5.5	40.8
Cirrhosis of the liver.....	133	2.1	.4	1.3	2.3	4.0	2.3	1.2	45.5
Bright's disease.....	550	8.5	2.6	4.6	7.9	11.6	11.7	16.3	49.5
Suicide (all forms).....	132	2.0	3.3	2.6	1.9	2.4	.9	.5	36.6
Accidental violence.....	665	10.3	17.1	9.8	10.4	10.7	7.8	5.5	38.5
All other causes.....	1,377	21.3	24.6	18.1	19.2	20.2	25.9	26.0	.....
Total.....	6,471	100.0	100.0	100.0	100.0	100.0	100.0	100.0	42.2

In the age period 15 to 24 tuberculosis is slightly above the average (108.3). Alcoholism causes 0.7 per cent of the total deaths in this age period, as against 0.2 per cent in all occupations. Though the number of cases involved is few, the index (350.0) suggests a high mortality from this cause. Organic diseases of the heart are high (117.2). Pneumonia (135.2) and suicide (117.9) also have high indices. In the age period 25 to 34 alcoholism is very high (171.4); together with this cause we find high indices for cerebral hemorrhage, apoplexy, and paralysis (116.7) and cirrhosis of the liver (108.3). The index for pneumonia increases to 143.8. In the age period 35 to 44 alcoholism falls considerably below the high figure quoted for the previous age period, but is still above the normal (119.0). Accidental violence now becomes significant; in the preceding age periods this cause of death was below the average. However, in this age period, 35 to 44, the relative index rises to 105.1. In the age period 45 to 54 a high index is observed for pneumonia (115.9). Accidental violence rises still higher (125.9). In the age period 55 to 64 tuberculosis of the lungs, though decreasing in proportionate representation, has a higher relative index than is found in all occupations (116.3). Alcoholism (150.0) and accidental violence (120.0) both exhibit high indices. In the age period 65 and over tuberculosis of the lungs decreases still more in proportionate representation, but increases in its relative index (137.9). Bright's disease (119.0) is also high, and accidental violence maintains the high index of the previous age periods (125.0).

The relative indices for tuberculosis of the lungs in this occupation are not significantly above the normal. Between the ages of 15

and 54 they are slightly higher than those of the general group. In the two succeeding age periods the indices rise, and in the last division, 65 and over, the index is highest (137.9). For all ages it is 137.6. Alcoholism exhibits very high indices in most age periods. For all ages the relative index is 177.8. At ages 25 to 34 it is 171.4. Organic diseases of the heart are higher than the normal only for the age periods 15 to 24 (117.2) and 25 to 34 (109.3). Pneumonia is higher for the age periods between 15 and 54. At the age period 25 to 34 the greatest percentage, 10.5 per cent as against 7.3 per cent, and the highest relative index (143.8) are observed. The Registrar General also finds very high indices for pneumonia in this occupation (i. e., among carmen, carriers, etc.). For all ages his figures give an index of 136.3; for the age period 25 to 34 it is 138.1. Suicide is high for the age period 15 to 24 (117.9) and is low for all other age periods. For all ages the relative index is 87.0. As may be expected from the character of this occupation, accidental violence exhibits high indices for most age periods, and particularly after age 34. For the age period 35 to 44 the relative index is 105.1; in the succeeding period, 45 to 54, it rises to 125.9; at ages 55 to 64 it declines to 120.0; and in the last age period, 65 and over, it again rises to 125.0. The English statistics show even higher indices for accidental violence in this occupation. For all ages the relative index is 193.1. After age 24 the indices are well over 160; the maximum index is reached in the age period 65 and over (221.7). With advancing age, as muscular strength and activity decrease, accidents evidently rise above the average in frequency.

TEXTILE-MILL WORKERS.¹

There were 2,390 deaths among textile-mill workers. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all occupations:

TABLE 42.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG **TEXTILE-MILL WORKERS**, BY AGE PERIODS, IN COMPARISON WITH ALL OCCUPATIONS—WHITE MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
TEXTILE-MILL WORKERS.							
Deaths.....	2,390	383	282	310	399	495	521
Per cent of deaths.....	100.0	16.0	11.8	13.0	16.7	20.7	21.8
ALL OCCUPATIONS.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

¹This title includes operatives in cotton, silk, wool, and linen mills (card-room workers, spinners, weavers, pickers, ballers, beamers, breaker hands, combers, creelers, doffers, quillers, reelers, shearers, spoolers, warpers, winders, knitters, darners, lacers, loopers, ribbers, seamers, clippers, passementerie workers, flax dressers, stretchers, throwsters, burlers, nappers, and skeiners) and all operatives in carpet, sail, awning, tent, thread, mat, veil, sack, shoddy, and other minor textile industries.

No marked differences from the standard table are observed, except perhaps that, in the age period 15 to 24, 16.0 per cent of all deaths occur, as against 11.8 per cent in all occupations. The average age at death is very nearly the same as for all occupations combined, being 47.6 years, as against 47.9.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 43.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG TEXTILE-MILL WORKERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE MALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	2,390	.....	383	282	310	399	495	521	.....
Typhoid fever.....	55	2.3	6.8	5.3	1.3	1.5	0.8	.....	29.4
Influenza.....	22	.9	.5	1.1	.6	1.0	1.2	.....	51.4
Tuberculosis of the lungs.....	525	22.0	36.8	47.5	37.7	18.0	8.9	.....	35.4
Cancer (all forms).....	99	4.1	.8	.4	1.3	4.8	7.1	.....	59.0
Diabetes.....	29	1.2	.8	.4	1.3	1.5	2.0	.....	51.1
Alcoholism.....	19	.8	.....	.7	2.6	1.8	.2	.....	45.1
Cerebral hemorrhage, apoplexy, and paralysis.....	146	6.1	.....	.4	1.0	5.8	9.9	.....	62.5
Organic diseases of the heart.....	290	12.1	3.9	5.7	5.5	10.3	17.0	.....	57.7
Pneumonia (lobar and undefined).....	142	5.9	4.4	4.3	9.0	6.3	5.7	.....	49.0
Cirrhosis of the liver.....	42	1.8	.....	1.8	2.6	2.5	2.4	.....	52.0
Bright's disease.....	208	8.7	3.1	2.5	7.1	12.5	12.1	.....	54.4
Suicide (all forms).....	43	1.8	2.3	1.4	1.0	3.5	1.4	.....	45.4
Accidental violence.....	184	7.7	11.8	8.2	10.7	7.5	5.4	.....	40.3
All other causes.....	586	24.5	28.7	20.6	18.3	23.0	25.9	.....	27.1
Total.....	2,390	100.0	100.0	100.0	100.0	100.0	100.0	100.0	47.6

In the age period 15 to 24 typhoid fever exhibits a high relative index (130.8). Bright's disease (124.0) is above the average. In the age period 25 to 34 the index of typhoid fever increases to 196.3 and that of influenza to 220.0. Tuberculosis of the lungs shows a relative index slightly higher than that of all occupations (116.1). Cirrhosis of the liver also exhibits a high index (150.0). In the age period 35 to 44 tuberculosis of the lungs maintains about the same relative index (114.6). Alcoholism rises above the average to 123.8, and pneumonia is somewhat above it with an index of 111.1. In the age period 45 to 54 typhoid fever is again in excess (187.5). Diabetes, though causing only 1.5 per cent of the total deaths, has the high relative index of 150.0, suggesting that this cause of death may be significant among textile-mill workers. In the same age period alcoholism (128.6) and the usual accompanying causes—cerebral hemorrhage, apoplexy, and paralysis (111.5), Bright's disease (112.6), and suicide (134.6)—are above the average. In the age period 55 to 64 typhoid fever exhibits a still higher relative index (200.0).

A high relative index is again observed for influenza (*120.0*). Diabetes is even higher than in the previous age period (*153.8*). In the age period 65 and over tuberculosis of the lungs exhibits an index somewhat higher than normal (*113.8*), and organic diseases of the heart (*110.3*) are slightly higher.

In most age periods typhoid fever exhibits high indices. For all ages the relative index is *153.3*. The highest proportionate mortality is observed in the age period 15 to 24, where typhoid fever causes 6.8 per cent of the total deaths as against 5.2 per cent. As the age increases the proportionate mortality decreases until, in the last age period entering into consideration, ages 55 to 64, the proportionate mortality is only 0.8 per cent of the total deaths. The relative indices, however, vary from age period to age period, and the highest indices are observed in the periods 25 to 34 (*196.3*) and 55 to 64 (*200.0*). In the Metropolitan experience tuberculosis of the lungs does not play a very important part among textile-mill workers, although for all ages the relative index is slightly higher than normal (*107.3*), and for the age periods 25 to 34, 35 to 44, and 65 and over the indices are about 15 points higher than the average. Diabetes, though credited with only few deaths in this occupation, exhibits high indices for most age periods. For all ages the relative index is *120.0*; for the age period 35 to 44 the highest index is observed (*185.7*). Too much importance must not be attached to these indices, as the cases involved are too few. However, we may take these figures as indications that diabetes is above the average in this occupation. As may be expected from the nature of the work, alcoholism is not an important factor. However, we note that the index is high in the age periods 35 to 44 (*123.8*) and 45 to 54 (*128.6*). Cerebral hemorrhage, apoplexy, and paralysis exhibit only one important variation from the figures for all occupations; in the age period 45 to 54 the index is *111.5*. Organic diseases of the heart do not exhibit any significant relative indices. In the age period 65 and over the index is *110.3*. Suicide is below normal in most age periods; for all ages it is *78.3*. As may be expected, violence is low for all ages and for most age periods.

AVERAGE AGE AT DEATH, BY OCCUPATION.

The following is a recapitulation, in ascending order, of the average age at death in the various occupations, as well as in all occupations combined:

	Average age at death.
Bookkeepers and office assistants.....	36.5
Enginemen and trainmen (railway).....	37.4
Plumbers, gas fitters, and steam fitters.....	39.8
Compositors and printers.....	40.2
Teamsters, drivers, and chauffeurs.....	42.2
Saloon keepers and bartenders.....	42.6
Machinists.....	43.9
Longshoremen and stevedores.....	47.0
Textile-mill workers.....	47.6
Iron molders.....	48.0
Painters, paper hangers, and varnishers.....	48.6
Cigar makers and tobacco workers.....	49.5
Bakers.....	50.6
Railway track and yard workers.....	50.7
Coal miners.....	51.3
Laborers.....	52.8
Masons and bricklayers.....	55.0
Blacksmiths.....	55.4
Farmers and farm laborers.....	58.5
All occupations.....	47.9

It may be pointed out once more that the occupations having a low age at death are, in general, either composed of large proportions of young men or characterized by special occupational hazards inducing an early death. On the other hand, occupations having a high average age at death must not necessarily be supposed to exhibit freedom from injurious influences. This condition may rather result from the high average age of the living.

II. FEMALES.

DISTRIBUTION OF DEATHS, BY OCCUPATION.

In addition to the material on males, there is available a series of tabulations of the causes of death of occupied white females, at ages 15 and over, which will now be considered. There were, in all, 105,281 deaths of white females at these ages in the three years 1911, 1912, and 1913. Of this number, the occupation of 2,814 was not stated; it has therefore seemed preferable to eliminate them from our consideration, and to limit the study to the remainder, i. e., 102,467.

The following table indicates the actual and proportionate distribution of females in the various occupations:

TABLE 44.—OCCUPATIONS OF **WHITE FEMALE DECEDENTS**, AGES 15 YEARS AND OVER.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Occupation.	Number of deaths.	Per cent of total.
Housewives and housekeepers.....	88,151	86.0
Domestic servants.....	4,235	4.1
Dressmakers and garment workers.....	2,172	2.1
Textile-mill workers.....	1,742	1.7
Bookkeepers and office assistants.....	1,235	1.2
Store clerks and saleswomen.....	794	.8
Other specified occupations.....	4,138	4.0
All specified occupations.....	102,467	100.0

It is evident that there is not the same diversity of occupation among the females as was observed among the males, where the group "all occupations" was the composite of a large number of types giving a fair average. Hence the same interest is not attached to the findings for white females as for those of the other sex. Eighty-six per cent of the decedents in all specified occupations were housewives and housekeepers. As a result the entire discussion of white females with reference to occupation and cause of death will largely be colored by the conditions among the housewives and housekeepers. Particularly in the later age divisions, will it be found that this class is practically coterminous with the entire body of the female deceased, so that there would be little or no value in a juxtaposition of the two. The comparison between any occupation and the standard—that is, all specified occupations—is therefore subject to considerable reservation; at any rate, such a comparison must be made with a clear understanding of this fact.

Next to housewives and housekeepers, the largest occupational group among females is that of domestic servants, constituting 4.1 per cent of all specified occupations; however, the members of this class can not be considered markedly different from housewives and housekeepers in the nature of their work. Dressmakers and garment workers (2.1 per cent), textile-mill workers (1.7 per cent), bookkeepers and office assistants (1.2 per cent), and store clerks and saleswomen (0.8 per cent) follow in the order named.

MORTALITY OF ALL SPECIFIED OCCUPATIONS COMBINED.

There were 102,467 deaths in all specified occupations. Table 45 indicates the distribution of the deaths by age periods, and the corresponding distribution among males.

It is clear that there is an increasing number of deaths in each successive age period. This condition was also found among the white males, although in the last age period, "65 and over," where the largest percentage of the total mortality is found among females, the proportion among males was the same as in the previous age

TABLE 46.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES IN ALL

[Metropolitan Life Insurance Co.—Industrial

Line No.	Cause of death.	Ages 15 years and over.		Age periods (years).	
				15-24	
		Number.	Per cent.	Number.	Per cent.
1	Typhoid fever.....	1,187	1.2	497	4.8
2	Influenza.....	1,207	1.2	57	.6
3	Tuberculosis of the lungs.....	14,782	14.4	4,167	40.4
4	Cancer (all forms).....	10,098	9.9	73	.7
5	Acute articular rheumatism.....	467	.5	99	1.0
6	Chronic rheumatism and gout.....	172	.2	5	(¹)
7	Diabetes.....	1,887	1.8	83	.8
8	Alcoholism.....	192	.2	4	(¹)
9	Chronic lead poisoning.....	3	(¹)		
10	Other occupational and chronic poisonings.....	33	(¹)	2	(¹)
11	Cerebral hemorrhage, apoplexy, and paralysis.....	8,552	8.4	47	.5
12	Organic diseases of the heart.....	15,183	14.8	714	6.9
13	Acute and chronic bronchitis.....	1,332	1.3	23	.2
14	Pneumonia (lobar and undefined).....	6,034	5.9	360	3.4
15	Pleurisy.....	262	.3	36	.3
16	Cirrhosis of the liver.....	1,343	1.3	9	.1
17	Bright's disease.....	9,889	9.7	288	2.8
18	Puerperal state.....	3,845	3.8	1,181	11.5
19	Suicide (all forms).....	750	.7	200	1.9
20	Accidental violence.....	2,887	2.8	363	3.5
21	All other causes.....	22,362	21.8	2,094	20.3
22	All causes.....	102,467	100.0	10,302	100.0

¹ Less than one-tenth of 1 per cent.

period. A larger proportion of women attain the upper age classes. The average age at death is 51.1 years among women, as opposed to 47.9 years among men.

TABLE 45.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG **WHITE FEMALES** BY AGE PERIODS, IN ALL SPECIFIED OCCUPATIONS, IN COMPARISON WITH MALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
FEMALES.							
Deaths.....	102,467	10,302	12,379	13,388	15,814	21,524	29,060
Per cent of deaths.....	100.0	10.1	12.1	13.1	15.4	21.0	28.4
MALES.							
Per cent of deaths.....	100.0	11.8	13.7	16.2	17.7	20.3	20.3

Table 46 analyzes the mortality of each age class, by cause of death:

SPECIFIED OCCUPATIONS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE FEMALES.

department—Mortality experience, 1911 to 1913.]

Age periods (years).										Average age at death.	Line No.
25-34		35-44		45-54		55-64		65 and over.			
Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.		
280	2.3	185	1.4	121	0.8	64	0.3	40	0.1	31.6	1
63	.5	94	.7	179	1.1	278	1.3	536	1.8	58.4	2
4,558	36.8	3,028	22.6	1,531	9.7	949	4.4	549	1.9	34.1	3
341	2.8	1,392	10.4	2,620	16.6	3,044	14.1	2,628	9.0	55.8	4
71	.6	59	.4	62	.4	88	.4	88	.3	44.4	5
9	.1	10	.1	23	.1	37	.2	88	.3	60.3	6
74	.6	114	.9	325	2.1	717	3.3	574	2.0	56.9	7
48	.4	78	.6	37	.2	18	.1	7	(1)	41.8	8
2	(1)	1	(1)							34.0	9
7	.1	9	.1	8	.1	3	(1)	4	(1)	44.3	10
145	1.2	441	3.3	1,322	8.4	2,507	11.6	4,090	14.1	62.0	11
861	7.0	1,344	10.0	2,196	13.9	4,022	18.7	6,046	20.8	57.4	12
38	.3	46	.3	95	.6	308	1.4	822	2.8	64.4	13
503	4.1	705	5.3	950	6.0	1,520	7.1	1,996	6.9	54.6	14
30	.2	41	.3	50	.3	46	.2	59	.2	47.9	15
81	.7	261	1.9	367	2.3	327	1.5	298	1.0	53.3	16
574	4.6	1,156	8.6	1,880	11.9	2,636	12.2	3,355	11.5	56.3	17
1,736	14.0	901	6.7	27	.2					29.0	18
176	1.4	158	1.2	107	.7	70	.3	39	.1	36.7	19
289	2.3	272	2.0	423	2.7	563	2.6	977	3.4	50.5	20
2,493	20.1	3,093	23.1	3,491	22.1	4,327	20.1	6,864	23.6	.....	21
12,379	100.0	13,388	100.0	15,814	100.0	21,524	100.0	29,060	100.0	51.1	22

The chief cause is seen to consist in the organic diseases of the heart. These are responsible for 14.8 per cent of all deaths. At no time negligible, the proportion increases constantly in importance with advancing years. At every age period it is higher among females than among males. The second place is occupied by tuberculosis; here, however, the proportionate mortality is lower for females at every age period except 15 to 24. Cancer (all forms) accounts for 9.9 per cent of the deaths—a figure almost twice as high as that of the men. Bright's disease causes 9.7 per cent of the mortality—a proportion about equal to that of the males. Cerebral hemorrhage, apoplexy, and paralysis come fifth, with a percentage of 8.4; here the percentage is higher for women, the relative index for all ages, in comparison with males, being 135.5. Pneumonia is low, with a percentage of 5.9. The puerperal state accounts for 3.8 per cent of the total mortality. Cirrhosis of the liver is low (1.3 per cent, as opposed to 2.3 per cent among males) and the same is true of alcoholism. Suicide plays a very minor part, accounting for only 0.7 per cent, as opposed to 2.3 per cent among males. Similarly, accidents are responsible for only 2.8 per cent as opposed to 9.3 per cent among males.

In the age period 15 to 24, pulmonary tuberculosis overshadows all other causes of death in importance. In this group it accounts for 40.4 per cent of the mortality; the corresponding figure for males is only 33.8 per cent, the relative index being 119.5. It is doubtless in the earlier ages that the influence of housewives and of domestic servants is lessened, to a considerable extent, by the other gainful occupations, and it is to this fact that so large a proportionate tuberculosis mortality may be attributed. This figure would be even larger if it were not for the cause of death that is second in importance, namely, the puerperal state, which accounts for 11.5 per cent of the deaths. This element has the effect of diminishing considerably the figures for all other causes, so that comparisons with the corresponding percentages for males may be made only with caution. Organic diseases of the heart are responsible for 6.9 per cent, and here again the corresponding percentage for males is less—5.8. Accidental violence is remarkably low, accounting for only 3.5 per cent of the deaths, as opposed to 19.2 per cent in the other sex.

At ages 25 to 34 tuberculosis of the lungs is still of primary importance, with proportionate mortality of 36.8 per cent. This is slightly less than that of men; the relative index is 90.0. This cause is followed by the puerperal state, with 14.0 per cent. The fact has already been emphasized that the proportionate mortality from this cause has the effect of lowering the percentages from the other causes. Organic diseases of the heart are again high, accounting for 7 per cent of the mortality. They are followed by Bright's disease

(4.6 per cent). Pneumonia is again rather low, with a proportionate mortality of 4.1 per cent, and the correlation of this fact with the low accident rate indicates clearly the lack of participation by women in the rougher and more exposed occupations.

At ages 35 to 44 tuberculosis of the lungs still leads, accounting for 22.6 per cent of the mortality. By this time the percentage for women has become considerably lower than that for men, which is 32.9 per cent. Cancer is second in order of importance, with a percentage of 10.4. This is very high in contrast with the other sex; the relative index is 452.2. Organic diseases of the heart account for 10.0 per cent—also a rather high proportionate mortality.

At ages 45 to 54 cancer takes first place, with the surprisingly high percentage of 16.6, as opposed to only 5.9 per cent among males. The index, in comparison with males of the same age class, is thus 281.4. It is evident that, as the puerperal state ceases to be an important element in the female mortality figures, its place is taken by cancer. The very high proportion of cancer of the breast, and of other forms of cancer peculiar to women, has the same effect as the puerperal state in making the remaining percentages correspondingly lower. Organic diseases of the heart are second, with a proportionate mortality of 13.9 per cent, and Bright's disease accounts for 11.9 per cent. Pulmonary tuberculosis has fallen into fourth place, with a mortality of 9.7 per cent; the corresponding figure for males is almost twice as high. Cerebral hemorrhage, apoplexy, and paralysis show the rather high proportionate mortality of 8.4 per cent; the index is 161.5. By this time the puerperal state, which had already begun to decrease in importance, accounts for only 0.2 per cent of the deaths.

At ages 55 to 64 organic diseases of the heart take the first place; they account for 18.7 per cent of the mortality, as opposed to 15.9 per cent among males. Cancer is responsible for 14.1 per cent of the deaths—again an extremely high proportion. The index is 162.1. Bright's disease comes third, with 12.2 per cent, and cerebral hemorrhage, apoplexy, and paralysis occupy fourth place, with 11.6 per cent. By this time tuberculosis has dropped to 4.4 per cent.

At ages 65 and over organic diseases of the heart play a still more important part than they did before; they are responsible for 20.8 per cent of the mortality. Next comes cerebral hemorrhage, apoplexy, and paralysis with 14.1 per cent; Bright's disease accounts for 11.5 per cent, cancer for 9.0 per cent, and pneumonia for 6.9 per cent. Accidental violence accounts for 3.4 per cent of the mortality; deaths from this cause increase slightly during the last four age periods, but they are at no time equal to the corresponding figure for males.

**AVERAGE AGE AT DEATH, BY CAUSE, IN ALL SPECIFIED OCCUPATIONS
COMBINED.**

As has been seen, the several causes of death become prominent in the mortality records at various periods of life, some being more important in the early years, others at the more advanced ages. The following table indicates for the various causes the average age at death, in ascending order, as well as the corresponding figures for males:

TABLE 47.—AVERAGE AGE OF DECEDENTS, FOR EACH OF THE SPECIFIED CAUSES OF DEATH, BY SEX.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Average age at death of—	
	Females.	Males.
Puerperal state	29.0	.....
Typhoid fever	31.6	31.1
Chronic lead poisoning	34.0	47.5
Tuberculosis of the lungs	34.1	37.1
Suicide (all forms)	36.7	43.1
Alcoholism	41.8	43.1
Occupational and chronic poisonings, excluding lead poisoning	44.3	45.8
Acute articular rheumatism	44.4	41.1
Pleurisy	47.9	46.1
Accidental violence	50.5	39.3
Cirrhosis of the liver	53.3	52.0
Pneumonia (lobar and undefined)	54.6	48.1
Cancer (all forms)	55.8	57.8
Bright's disease	56.3	55.1
Diabetes	56.9	49.7
Organic diseases of the heart	57.4	55.6
Influenza	58.4	53.3
Chronic rheumatism and gout	60.3	54.9
Cerebral hemorrhage, apoplexy, and paralysis	62.0	60.9
Acute and chronic bronchitis	63.4	59.9
All causes	51.1	47.9

The fact that women attain a higher average age than men has already been pointed out. The average age of decedents from the puerperal state, 29, indicates that the influence of this cause is limited to the earlier age classes. Women die of tuberculosis at an earlier age than men. Female suicides are, on the average, much younger than males. On the other hand, the contrary is true with respect to the respiratory diseases (pneumonia and bronchitis), influenza, and diabetes.

MORTALITY, BY OCCUPATION.

We shall now take up the mortality of the more important occupational groups. The deaths occurring in each occupation from the principal causes will be enumerated, and the percentage of each cause to all causes in the respective age classes will be determined. The figures for each occupation will be compared with the corresponding ones for all occupations (Table 46), which will be considered the standard.

HOUSEWIVES AND HOUSEKEEPERS.¹

There were 88,151 deaths among housewives and housekeepers. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all specified occupations:

TABLE 48.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG **HOUSEWIVES AND HOUSEKEEPERS**, BY AGE PERIODS, IN COMPARISON WITH ALL SPECIFIED OCCUPATIONS—WHITE FEMALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
HOUSEWIVES AND HOUSEKEEPERS.							
Deaths.....	88,151	5,202	10,074	11,425	13,881	19,786	27,783
Per cent of deaths.....	100.0	5.9	11.4	13.0	15.7	22.4	31.5
ALL SPECIFIED OCCUPATIONS.							
Per cent of deaths.....	100.0	10.1	12.1	13.1	15.4	21.0	28.4

There is a preponderance of deaths in the later age periods; fully 69.6 per cent occur after the age of 44. The average age at death is 53.3 years; this is higher than the average age of all white females in specified occupations, namely, 51.1.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 49.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG **HOUSEWIVES AND HOUSEKEEPERS**, BY AGE PERIODS, 15 YEARS AND OVER—WHITE FEMALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	88,151	.....	5,202	10,074	11,425	13,881	19,786	27,783	.....
Typhoid fever.....	799	0.9	3.9	2.2	1.5	0.8	0.3	0.1	36.0
Influenza.....	1,093	1.2	.4	.5	.7	1.1	1.3	1.9	60.1
Tuberculosis of the lungs.....	10,530	12.0	37.4	34.5	21.8	9.5	4.3	1.8	36.9
Cancer (all forms).....	9,097	10.3	.7	2.9	10.4	16.6	14.1	9.0	56.4
Diabetes.....	1,725	2.0	.5	.6	.8	2.2	3.5	2.0	58.6
Cerebral hemorrhage, apoplexy, and paralysis.....	7,984	9.1	.4	1.2	3.3	8.5	11.8	14.2	62.5
Organic diseases of the heart.....	13,512	15.3	5.9	6.9	9.9	13.8	18.6	20.8	59.1
Acute and chronic bronchitis.....	1,259	1.4	.3	.3	.4	.6	1.5	2.9	65.0
Pneumonia (lobar and undefined).....	5,257	6.0	3.3	4.1	5.3	5.7	6.7	6.8	56.3
Cirrhosis of the liver.....	1,272	1.4	.1	.8	2.1	2.5	1.6	1.1	53.7
Bright's disease.....	8,958	10.2	2.8	4.8	8.8	12.2	12.2	11.6	57.3
Puerperal state.....	3,609	4.1	20.0	16.5	7.7	.2	.....	.....	29.2
Suicide (all forms).....	545	.6	2.1	1.3	1.1	.6	.3	.1	39.4
Accidental violence.....	2,305	2.6	2.7	2.1	1.8	2.4	2.4	3.3	55.0
All other causes.....	20,146	22.9	19.5	21.3	24.4	23.3	21.4	24.4	.....
Total.....	88,151	100.0	100.0	100.0	100.0	100.0	100.0	100.0	53.3

¹This title includes only women who manage household; in family life. (Domestic servants are excluded.)

For all ages, housewives and housekeepers constitute 86.0 per cent of the total. At the later age periods, however, this percentage is considerably greater, since the members of the other gainful occupations are to a very large extent young women. It is, therefore, in the earlier ages that the most marked differences between the group of housewives and housekeepers and the general group will be found. Thus, in the first two age periods, 15 to 24 and 25 to 34, we find the proportions of deaths from the puerperal state to total deaths 20.0 per cent and 16.5 per cent, respectively, as against 11.5 per cent and 14.0 per cent in the general group. This is accounted for by the fact that the other occupied females, who are largely represented in these two age periods, are often unmarried women, and, as we shall see in later tables, have a low proportionate mortality from the puerperal state. The proportionate mortality from tuberculosis is lower in the earlier age periods among housewives and housekeepers than among all occupied females, probably due to the nonindustrial character of their work. In the age period 35 to 44 the two sets of figures approach a very close agreement, and in the remaining age periods of life the figures are virtually interchangeable. The housewives and housekeepers constitute so large a part of the total group that it is not at all surprising to find this very close correspondence. As we have already considered the main facts with reference to the proportionate mortality of all occupied females, it is unnecessary to repeat the details with regard to this occupation.

DOMESTIC SERVANTS.¹

There were 4,235 deaths occurring among domestic servants. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all specified occupations:

TABLE 50.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG DOMESTIC SERVANTS, BY AGE PERIODS, IN COMPARISON WITH ALL SPECIFIED OCCUPATIONS—WHITE FEMALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
DOMESTIC SERVANTS.							
Deaths.....	4,235	409	524	645	843	984	830
Per cent of deaths.....	100.0	9.7	12.4	15.2	19.9	23.2	19.6
ALL SPECIFIED OCCUPATIONS.							
Per cent of deaths.....	100.0	10.1	12.1	13.1	15.4	21.0	28.4

¹ This title includes maids, servants, home laundresses, nurse girls, cooks (home), personal servants, companions.

The deaths are more largely represented in the middle periods of life in this occupation than in the general group. Thus 35.1 per cent of all deaths among domestic servants occurred between the ages of 35 and 54, while the corresponding percentage for all specified occupations was only 28.5. The average age at death, 49.1 years, is slightly lower than that of the general group, 51.1.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 51.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG DOMESTIC SERVANTS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE FEMALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—					Average age at death.	
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64		65 and over.
Number of deaths.....	4,235		409	524	645	843	984	830	
Typhoid fever.....	41	1.0	5.1	1.3	0.6	0.6	0.2	0.2	31.3
Tuberculosis of the lungs.....	673	15.9	39.1	39.1	26.5	7.7	5.0	2.8	35.3
Cancer (all forms).....	440	10.4	.7	2.7	11.3	16.0	13.7	9.6	53.8
Diabetes.....	62	1.5	.5	.4	1.4	1.9	2.0	1.6	54.5
Cerebral hemorrhage, apoplexy, and paralysis.....	278	6.6	.5	1.0	3.3	6.6	9.9	11.7	58.9
Organic diseases of the heart.....	618	14.6	5.4	7.8	11.3	12.3	20.1	21.7	55.1
Acute and chronic bronchitis.....	43	1.0		.4	.3	.7	1.2	2.5	60.9
Pneumonia (lobar and undefined).....	277	6.5	3.2	4.2	3.9	9.1	7.4	8.1	53.6
Bright's disease.....	414	9.8	2.2	5.9	9.0	11.7	12.8	11.0	53.5
Puerperal state.....	59	1.4	6.6	4.6	1.1	.1			26.9
Suicide (all forms).....	67	1.6	5.4	3.2	2.2	1.1	.3	.2	33.5
Accidental violence.....	218	5.1	8.3	3.8	3.4	6.8	5.7	3.5	45.9
All other causes.....	1,045	24.7	23.0	25.6	25.7	25.4	21.7	27.1	
Total.....	4,235	100.0	100.0	100.0	100.0	100.0	100.0	100.0	49.1

The proportionate mortality from suicide is high in every age period (with the exception of ages 55 to 64, where it is the same for domestic servants and for all specified occupations) and particularly in the earlier ages. Thus the percentage for domestic servants at ages 15 to 24 is 5.4, whereas the corresponding figure for all specified occupations is 1.9. Similarly, accidental violence accounts for a high percentage of the deaths in each period. At ages 15 to 24, for example, the proportionate mortality from this cause is 8.3 per cent among domestic servants, as opposed to 3.5 per cent in the general group. The relative index is *237.1*. Tuberculosis of the lungs is higher than normal for all age periods except 15 to 24 and 45 to 54. Thus at ages 35 to 44 the proportionate mortality is 26.5 among domestic servants, as opposed to 22.6 in all specified occupations. The percentages of deaths from the puerperal state are low. At ages 15 to 24 the figure for domestic servants is 6.6 per cent, in contrast to 11.5 per cent in all specified occupations, the relative index being *57.4*. In the following age period the figures are even more strikingly different—4.6 per cent and 14.0 per cent, respectively.

DRESSMAKERS AND GARMENT WORKERS.¹

There were 2,172 deaths among dressmakers and garment workers. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all specified occupations:

TABLE 52.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG DRESSMAKERS AND GARMENT WORKERS, BY AGE PERIODS, IN COMPARISON WITH ALL SPECIFIED OCCUPATIONS—WHITE FEMALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
DRESSMAKERS AND GARMENT WORKERS.							
Deaths.....	2,172	462	305	355	433	311	246
Per cent of deaths.....	100.0	21.3	16.8	16.3	19.9	14.3	11.3
ALL SPECIFIED OCCUPATIONS.							
Per cent of deaths.....	100.0	10.1	12.1	13.1	15.4	21.0	28.4

The average age at death is 42.0; this is considerably below the normal—51.1. The deaths are distributed, for the most part, through youth and middle age. Thus 38.1 per cent of the deaths occurred at ages 15 to 34, as opposed to 22.2 per cent in all specified occupations, and 36.2 per cent occurred at ages 35 to 54, as opposed to 28.5 per cent in all specified occupations.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 53.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG DRESSMAKERS AND GARMENT WORKERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE FEMALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	2,172	.....	462	365	355	433	311	246	.....
Typhoid fever.....	36	1.7	3.5	2.7	1.4	1.2	.....	.....	29.6
Influenza.....	25	1.2	.4	1.4	.....	2.8	1.0	1.2	48.3
Tuberculosis of the lungs.....	604	27.8	48.3	52.1	24.8	13.6	10.3	4.9	31.5
Cancer (all forms).....	224	10.3	1.9	1.9	10.4	20.1	18.3	11.0	51.0
Cerebral hemorrhage, apoplexy, and paralysis.....	90	4.1	.....	.8	1.4	6.9	9.0	9.8	57.8
Organic diseases of the heart.....	273	12.6	6.3	7.4	11.0	14.1	18.6	24.0	49.7
Pneumonia (lobar and undefined).....	123	5.7	4.1	3.6	5.4	7.4	8.0	6.1	45.9
Bright's disease.....	159	7.3	2.6	4.4	8.7	8.8	11.6	10.6	49.1
Puerperal state.....	23	1.1	1.9	2.5	1.4	.....	.....	.....	27.7
Suicide (all forms).....	28	1.3	2.4	1.9	1.4	1.2	.....	.....	29.5
Accidental violence.....	48	2.2	4.3	1.1	1.4	2.5	.6	2.4	37.2
All other causes of death.....	539	24.8	24.3	20.2	32.7	21.4	22.6	30.0	.....
Total.....	2,172	100.0	100.0	100.0	100.0	100.0	100.0	100.0	42.0

¹ This title includes dressmakers and garment workers carrying on their occupation at home; women in the clothing industry (tailor shops and factories) engaged in manufacturing suits, coats, cloaks, and overalls (buttonhole makers, clothing designers, machine operators, and clothing trimmers); and other clothing workers (makers of waists, ties, caps, handkerchiefs, scarfs, shirts, collars, cuffs, corsets, gloves, and other smaller articles of clothing).

Tuberculosis of the lungs is much above the average at every age period. Thus there is a percentage of 48.3 from this cause at ages 15 to 24, and of 52.1 at ages 25 to 34; the relative indices are 119.6 and 141.6, respectively. The relative index shows a marked tendency to increase with advancing age, and the nature of the occupation is clearly concerned in this increase; in other occupations we have noted a decrease in the later years. Cancer becomes important at the higher ages. It accounts for 20.1 per cent of the deaths at ages 45 to 54, in contrast to only 16.6 per cent in the general group; the relative index is 121.1. The mortality from the puerperal state is very low. At ages 15 to 24 it has a percentage of 1.9; the relative index is only 16.5.

TEXTILE-MILL WORKERS.¹

There were 1,742 deaths among textile-mill workers. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all specified occupations:

TABLE 54.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG TEXTILE-MILL WORKERS, BY AGE PERIODS, IN COMPARISON WITH ALL SPECIFIED OCCUPATIONS—WHITE FEMALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
TEXTILE-MILL WORKERS.							
Deaths.....	1,742	663	332	291	248	157	51
Per cent of deaths.....	100.0	38.1	19.1	16.7	14.2	9.0	2.9
ALL SPECIFIED OCCUPATIONS.							
Per cent of deaths.....	100.0	10.1	12.1	13.1	15.4	21.0	28.4

Thirty-eight and one-tenth per cent of all deaths occurred at ages 15 to 24, as opposed to 10.1 per cent in all specified occupations; furthermore, 73.9 per cent of the deaths in this occupation occurred before the attainment of age 45, as against 35.3 per cent for all occupations. As a result, we find the low average age at death of 33.9 years.

Chief among the causes accounting for these phenomena is tuberculosis, which is strikingly prominent in every age period and particularly in the earlier years of life. This is evidenced in the following table, which analyzes the mortality of each age class, by cause of death. For all ages the relative index is 246.5. In the age period 15 to 24 the proportionate mortality from this cause is 50.2 per cent, while the corresponding figure for all specified occupations is only 40.4 per cent; the relative index is 124.3. In comparison with the tuberculosis mortality of male textile workers at ages 15 to 24 the

¹ The inclusions under this title are the same as in the case of males.

relative index is even more striking, 136.4. In the age division 25 to 34 the index rises to 132.6, when compared with all other specified female occupations, but is reduced somewhat in the next two periods, to 124.8 and 128.9, respectively. These findings are in accord with those of Perry,¹ who, in his investigation of cotton-mill operatives in Fall River, reported that in the corresponding age periods the death rates from pulmonary tuberculosis among cotton-mill operatives were far in excess of the corresponding rates for females in other occupations.

TABLE 55.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG TEXTILE-MILL WORKERS, BY AGE PERIODS, 15 YEARS AND OVER—WHITE FEMALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	1,742	.....	663	332	291	248	157	51	.....
Typhoid fever.....	65	3.7	7.1	2.7	2.1	0.8	0.6	.....	23.0
Tuberculosis of the lungs.....	618	35.5	50.2	48.8	28.2	12.5	4.5	5.9	26.7
Cancer (all forms).....	108	6.2	.2	3.0	9.3	14.9	17.2	11.8	48.8
Cerebral hemorrhage, apoplexy, and paralysis.....	67	3.8	.8	.6	4.1	9.3	0.6	19.6	50.5
Organic diseases of the heart.....	153	8.8	3.6	6.3	12.7	15.7	15.9	13.7	42.0
Pneumonia (lobar and undefined).....	72	4.1	3.3	2.4	3.8	7.3	5.7	7.8	38.6
Bright's disease.....	82	4.7	3.0	3.3	3.4	6.9	11.5	11.8	41.6
Puerperal state.....	43	2.5	3.3	3.9	2.7	.....	.....	.....	26.2
Suicide (all forms).....	25	1.4	1.4	1.8	1.4	2.0	.6	.....	32.3
Accidental violence.....	52	3.0	3.1	2.1	1.3	1.6	9.6	3.9	33.8
All other causes.....	457	26.2	24.2	25.0	30.8	29.0	24.8	25.5	.....
Total.....	1,742	100.0	100.0	100.0	100.0	100.0	100.0	100.0	33.9

As was found among male textile operatives, typhoid fever shows a high proportional figure. For all ages the relative index is 308.3. In the age period 15 to 24 the highest proportionate mortality is observed. The percentage of deaths from this cause is 7.1 among textile-mill workers but only 4.8 in the general group. The relative index is 147.9. There is also found a high proportionate mortality from suicide. This is most evident in the age period 45 to 54. At these ages 2.0 per cent of all the deaths are from this cause, as against .7 per cent in all specified occupations. The relative index is 285.7. The proportionate mortality from the puerperal state is very low. At ages 15 to 24 the percentage of deaths coming under this head is only 3.3, as compared with 11.5 for all specified occupations. In the following age group the figure is 3.9 as against 14.0.

CLERKS, BOOKKEEPERS, AND OFFICE ASSISTANTS.²

There were 1,235 deaths among clerks, bookkeepers, and office assistants. The following table indicates the distribution of these

¹ Perry, Arthur R., M. D. Causes of Death Among Woman and Child Cotton-Mill Operatives. In U. S. Department of Labor Report on Condition of Woman and Child Wage Earners in the United States. Washington, D. C., 1912, p. 71.

² This title includes clerks, bookkeepers, stenographers, typewriters, office girls, proof readers, copy-holders, and post-office clerks.

deaths by age periods, and the corresponding distribution in all specified occupations:

TABLE 56.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG **CLERKS, BOOKKEEPERS, AND OFFICE ASSISTANTS**, BY AGE PERIODS, IN COMPARISON WITH ALL SPECIFIED OCCUPATIONS—WHITE FEMALES.

Item.	Ages 15 years and over.	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
CLERKS, BOOKKEEPERS, AND OFFICE ASSISTANTS.							
Deaths.....	1,235	699	353	127	29	16	11
Per cent of deaths.....	100.0	56.6	28.6	10.3	2.3	1.3	0.9
ALL SPECIFIED OCCUPATIONS.							
Per cent of deaths.....	100.0	10.1	12.1	13.1	15.4	21.0	28.4

Between the ages 15 and 34 the number of deaths is greatly in excess of the average. Fully 85.2 per cent of all deaths occurred within these limits, while the corresponding percentage for all specified occupations was only 22.2. The average age at death is, accordingly, strikingly low, 26.1.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 57.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG **CLERKS, BOOKKEEPERS, AND OFFICE ASSISTANTS**, BY AGE PERIODS, 15 YEARS AND OVER—WHITE FEMALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—						Average age at death.
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64	65 and over.	
Number of deaths.....	1,235	.....	699	353	127	29	16	11	.....
Typhoid fever.....	59	4.8	6.9	2.8	0.8	(1)	(1)	(1)	21.4
Tuberculosis of the lungs.....	524	42.4	43.8	50.7	27.6	(1)	(1)	(1)	24.6
Cancer (all forms).....	27	2.2	.4	1.4	6.3	(1)	(1)	(1)	42.3
Diabetes.....	16	1.3	1.6	1.1	.8	(1)	(1)	(1)	22.6
Cerebral hemorrhage, apoplexy, and paralysis.....	18	1.5	.6	.6	5.5	(1)	(1)	(1)	38.2
Organic diseases of the heart.....	100	8.1	7.0	7.6	11.8	(1)	(1)	(1)	29.0
Pneumonia (lobar and undefined).....	44	3.6	3.6	2.8	5.5	(1)	(1)	(1)	26.3
Bright's disease.....	43	3.5	2.7	2.5	5.5	(1)	(1)	(1)	32.4
Puerperal state.....	19	1.5	2.0	1.1	.8	(1)	(1)	(1)	23.6
Suicide (all forms).....	26	2.1	2.4	1.1	1.6	(1)	(1)	(1)	26.2
Accidental violence.....	50	4.0	5.0	3.4	1.6	(1)	(1)	(1)	23.4
All other causes.....	309	25.0	24.0	24.9	32.2	(1)	(1)	(1)	.....
Total.....	1,235	100.0	100.0	100.0	100.0	.....	.....	.....	26.1

¹ Percentages omitted; numbers too small.

The proportionate mortality from pulmonary tuberculosis is rather high between the ages of 15 and 44. At ages 15 to 24 it accounts for 43.8 per cent of the mortality, while the corresponding figure for

all specified occupations is 40.4 per cent. The relative index is 108.4. In the next age group, 25 to 34, the proportionate mortality of the general group drops to 36.8 per cent, but that of bookkeepers and office assistants rises to 50.7 per cent, so that the relative index is now 137.8. At ages 35 to 44 the decrease which is to be expected does, indeed, take place, but the percentage for clerks, bookkeepers, and office assistants is 27.6, while that of all specified occupations is only 22.6; the index is 122.1. Typhoid fever is also high in the first two age periods. At ages 15 to 24, for example, it accounts for 6.9 per cent of the mortality of clerks, bookkeepers, and office assistants, in comparison with only 4.8 per cent of that of all specified occupations. The figures for the puerperal state are very low. Thus the proportionate mortality from this cause was 2.0 per cent at ages 15 to 24, as against 11.5 per cent in all specified occupations; at ages 25 to 34 the figures are in even more striking contrast, being 1.1 per cent and 14.0 per cent, respectively. The relative indices for the two age classes are 17.4 and 7.9, respectively.

STORE CLERKS AND SALESWOMEN.¹

There were 794 deaths among store clerks and saleswomen. The following table indicates the distribution of these deaths by age periods, and the corresponding distribution in all specified occupations:

TABLE 58.—NUMBER AND PER CENT OF DEATHS FROM ALL CAUSES AMONG STORE CLERKS AND SALESWOMEN, BY AGE PERIODS, IN COMPARISON WITH ALL SPECIFIED OCCUPATIONS—WHITE FEMALES.

Item.	Ages 15 years and over	Age periods (years).					
		15-24	25-34	35-44	45-54	55-64	65 and over.
STORE CLERKS AND SALESWOMEN.							
Deaths.....	794	413	198	109	47	15	12
Per cent of deaths.....	100.0	52.0	24.9	13.7	5.9	1.9	1.5
ALL SPECIFIED OCCUPATIONS.							
Per cent of deaths.....	100.0	10.1	12.1	13.1	15.4	21.0	28.4

A great preponderance of deaths occurred in the early age periods. Thus 52.0 per cent of the total mortality occurred at ages 15 to 24, as against 10.1 per cent in all specified occupations. At ages 25 to 34 the proportions were 24.9 per cent and 12.1 per cent among store clerks and saleswomen, and in all occupations, respectively. The average age at death is extremely low, being 28 years. This fact is to be associated, of course, with the characteristic age distribution of women engaged in this occupation.

¹This title includes store clerks, cashiers, saleswomen, and messengers; and department-store clerks, buyers, and saleswomen.

The following table analyzes the mortality of each age class, by cause of death:

TABLE 59.—NUMBER AND PER CENT OF DEATHS FROM SPECIFIED CAUSES AMONG STORE CLERKS AND SALESWOMEN, BY AGE PERIODS, 15 YEARS AND OVER—WHITE FEMALES.

[Metropolitan Life Insurance Co.—Industrial department—Mortality experience, 1911 to 1913.]

Cause of death.	Ages 15 years and over.		Per cent of deaths during age period (years)—					Average age at death.	
	Number.	Per cent.	15-24	25-34	35-44	45-54	55-64		65 and over.
Number of deaths	794		413	199	109	47	15	12	.....
Typhoid fever	23	2.9	4.1	2.5	(1)	(1)	(1)	(1)	22.9
Tuberculosis of the lungs	307	38.7	46.5	40.9	27.5	(1)	(1)	(1)	24.6
Cancer (all forms).....	41	5.2	1.0	1.5	19.3	(1)	(1)	(1)	41.6
Cerebral hemorrhage, apoplexy, and paralysis	15	1.9	.5	1.0	(1)	(1)	(1)	(1)	44.0
Organic diseases of the heart.....	72	9.1	7.7	6.6	(1)	(1)	(1)	(1)	33.3
Pneumonia (lobar and undefined).....	31	3.9	2.2	7.1	(1)	(1)	(1)	(1)	31.0
Bright's disease.....	85	4.4	2.2	5.1	9.2	(1)	(1)	(1)	34.4
Puerperal state.....	18	2.3	3.4	2.0	(1)	(1)	(1)	(1)	22.1
Suicide (all forms).....	15	1.9	2.4	1.5	(1)	(1)	(1)	(1)	24.3
Accidental violence.....	27	3.4	3.4	3.5	5.5	(1)	(1)	(1)	26.9
All other causes.....	210	26.4	26.6	28.3	(1)	(1)	(1)	(1)	.....
Total.....	794	100.0	100.0	100.0	100.0				28.0

¹ Percentages omitted; numbers too small.

Tuberculosis of the lungs is rather prominent between ages 15 and 44. In the age period 15 to 24, for example, it is responsible for 46.5 per cent of the total mortality, while the percentage for all specified occupations is only 40.4. The relative index is *115.1*. Suicide is above the average at ages 15 to 24 and 25 to 34. In the first age period it accounts for 2.4 per cent of the mortality, as opposed to 1.9 per cent in the general group; the relative index is therefore *126.3*. Accidental violence is also of importance in the first two age periods.

AVERAGE AGE AT DEATH, BY OCCUPATION.

The following table presents a recapitulation of the average age at death, in ascending order, in the various specified occupations of white females, as well as for all specified occupations taken together.

Clerks, bookkeepers, and office assistants.....	26.1
Store clerks and saleswomen	28.0
Textile-mill workers.....	33.9
Dressmakers and garment workers.....	42.0
Domestic servants.....	49.1
Housewives and housekeepers.....	53.3
All specified occupations.....	51.1

It may be pointed out once more that the low figures in the first three groups reflect the age distribution in the occupations in question much more clearly than influences bearing upon the occupational mortality.

CONCLUSION.

Having set forth in detail the figures for the mortality of the various occupations, both male and female, we may now conclude with a consideration of some general aspects of our data.

At the very outset it should be noted that caution must be exercised in drawing conclusions from the material here presented. The fact has already been emphasized that the number of living policyholders in each occupation was not available; consequently occupational death rates could not be determined. Difficulties are often occasioned by inaccuracies in designating occupations and causes of death. Furthermore, men occasionally shift from one occupation to another because of physical deterioration; thus blacksmiths take up less laborious work after their strength is lost, and men afflicted with tuberculosis often secure outdoor employment. Only the terminal occupations are then reported to the insurance company. Hence a death which has been accelerated by the injurious influences prevailing in a particular field of activity may frequently be so reported as to swell the mortality of quite a different occupational group. Some occupations start with a handicap from the very beginning, since they attract principally men of poor physique or a particular race whose general mortality is high. An industry may sometimes be associated with a high mortality not so much because of any deleterious influence inherent in it, but rather because those who enter it are peculiarly susceptible to certain diseases and conditions. These considerations must not be passed over lightly in any interpretation of mortality data with reference to the hazards involved in the occupations.

Yet, in spite of these limitations, certain definite conclusions are justified by our study. Two kinds of relationships have in general been observed. In the first there is a clear and direct connection between the cause of death and the occupation of the deceased. Thus we note the obvious relation between the employment of lead in certain industries and the high proportionate mortality from lead poisoning; between the manufacture and sale of distilled liquors and the high mortality from alcoholism; between exposure to moving machines and the high mortality from accidents.

The relationships of the second group are of a more insidious character. The injurious factors are usually discovered only after an intensive examination of the conditions prevailing in the occupations. Thus, when we consider a number of activities which give

returns of a high proportionate mortality from tuberculosis we find the presence of dust as a frequent concomitant to the industrial process. The dust may be mineral, metallic, or vegetable. The influence of sedentary employment and posture is also found, on examination, to be important as a factor in the high tuberculosis rate; this is exemplified by certain occupations like those of clerks, bookkeepers, and office assistants, and of garment workers. In some occupations the unfavorable influence of the work is not at once evident, but makes itself increasingly felt with duration of service.

In a number of occupations interesting associations have been observed between one disease and another. Thus the occurrence of an undue amount of alcoholism is associated almost invariably with an excess of cirrhosis of the liver and of Bright's disease, and frequently also with an undue amount of suicide. Where lead poisoning results in many deaths, cerebral hemorrhage, apoplexy, and paralysis are frequent; even where lead poisoning is not an important cause of death, but where lead is in constant use, the proportionate mortality from cerebral hemorrhage, apoplexy, and paralysis is high.

A number of relationships of a varied nature may be pointed out. The respiratory diseases are prominent where the industrial worker is exposed to colds, drafts, and dampness (as among masons and bricklayers), or to violent changes in temperature (as among teamsters, drivers, and chauffeurs). Organic diseases of the heart have a high proportional frequency in cases where the work is heavy and the cardiac powers are overtaxed (e. g., among iron molders). Suicide is frequent where depressing influences are present (as among bakers and cigar makers). Typhoid fever is high where questionable water supplies are used (as among enginemen and trainmen, farmers, iron molders, and laborers). Accidents ordinarily decrease as the duration of service and experience increases (e. g., among enginemen and trainmen, and railway track and yard workers).

It should be observed that mortality conditions, as we have discussed them above, are not the only measures of the effect of industrial work. Men suffer from numerous occupational diseases which do not directly cause death. Secondary and terminal diseases often occur, which cover up the condition that originally caused or accelerated the death. It is therefore of the greatest importance that living workers be examined, and that the diseases from which they suffer be accurately recorded. Therein lies the great advantage of periodic examinations of workers and, in particular, of the recent investigations of Hayhurst, Schereschewsky, and others who have recorded the physical defects of large numbers of persons engaged in various industries. Their findings often explain the facts as disclosed in studies of occupational mortality, and supplement these facts with a wealth of detail which mortality returns can not offer.

APPENDIXES.

APPENDIX A.—COMPARATIVE POPULATION MORTALITY.

The subject of the foregoing study has been the experience of industrial policyholders. While we have reason to believe that this experience is representative of wage earners generally, it is not entirely representative of the occupied population as a whole. The virtual absence of the professional classes and the, perhaps, lighter representation of the better paid and more skillful workers, who are found in other departments of the company, result in a mortality higher than that found in the population. This is especially true for insured males, who, at ages 15 and over, give a mortality 5 per cent higher than that found in the registration area of the United States. The differences are slight at the earlier ages (under 25) and at the most advanced ages (65 and over). The maximum difference between the population and industrial insurance mortality rates is found in the age period 35 to 44, when the rate for males is 47 per cent higher than the corresponding rate for males in the population. The differences between the rates for female policyholders and for females in the registration area are not so marked. The maximum difference is found in the age period 55 to 64, when there is an excess of nearly 12 per cent in the industrial experience. The higher rates for the insured persons may well be expected in view of the general and special hazards to which working men and women of the country are exposed.

This condition is further emphasized by a comparison of the proportionate mortality for the principal causes of death for insured males with the corresponding figures for males in certain specified occupations in the registration area. The following table has been prepared from data in the United States Census report on Mortality Statistics, 1909:

Data in the United States Census Report on Mortality Statistics, 1909.

NUMBER AND PERCENTAGE OF DEATHS FROM PRINCIPAL CAUSES IN ALL SPECIFIED OCCUPATIONS: MALES IN REGISTRATION AREA OF UNITED STATES, 1909, BY AGE PERIODS, 15 TO 84 YEARS.¹

Cause of death.	Age periods (years).													
	Ages, 15-84		15-24		25-34		35-44		45-54		55-64		65-84	
	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.
Typhoid fever.....	4,650	2.3	1,414	8.1	1,438	5.0	870	2.7	538	1.5	255	.7	135	.2
Tuberculosis of the lungs.....	30,994	15.2	5,092	29.0	8,890	31.0	7,675	23.6	5,140	14.4	2,707	7.5	1,500	2.8
Cancer—all forms.....	11,358	5.6	139	.8	379	1.3	1,087	3.3	2,420	6.8	3,364	9.4	3,970	7.3
Rheumatism.....	1,037	.5	107	.6	137	.5	169	.5	185	.5	171	.5	268	.5
Diabetes.....	2,393	1.2	113	.6	225	.8	272	.8	479	1.3	610	1.7	669	1.2
Alcoholism.....	1,928	.9	49	.3	313	1.1	623	1.9	521	1.5	280	.8	137	.3
Chronic lead poisoning.....	80	(1)	2	(?)	11	(?)	20	.1	22	.1	18	.1	7	(?)
Other occupational and chronic poisonings.....	104	.1	9	.1	21	.1	17	.1	16	(?)	19	.1	22	(?)
Cerebral hemorrhage, apoplexy and paralysis.....	14,709	7.2	103	.6	349	1.2	889	2.7	2,094	5.9	3,643	10.1	7,631	14.1
Organic diseases of the heart.....	24,245	11.9	628	3.6	1,383	4.8	2,501	7.7	4,028	11.3	5,531	15.4	10,174	18.7
Acute and chronic bronchitis.....	1,534	.7	39	.2	73	.3	116	.4	165	.5	271	.8	870	1.6
Pneumonia—all forms ²	16,496	8.1	1,139	6.5	2,105	7.4	3,075	9.5	3,211	9.0	2,974	8.3	3,992	7.4
Pleurisy.....	792	.4	64	.4	136	.5	128	.4	162	.5	144	.4	158	.3
Cirrhosis of the liver.....	3,877	1.9	44	.3	267	.9	691	2.1	1,078	3.0	980	2.7	817	1.5
Bright's disease.....	17,460	8.5	334	1.9	1,133	4.0	2,130	6.6	3,470	9.7	4,213	11.7	6,180	11.4
Suicide—all forms.....	5,392	2.6	528	3.0	1,069	3.7	1,202	3.7	1,258	3.5	823	2.3	512	.9
Accidents and injuries ³	21,821	10.7	4,063	23.1	5,260	18.4	4,674	14.4	3,639	10.2	2,252	6.3	1,933	3.6
All other causes.....	45,732	22.4	3,687	21.0	5,451	19.0	6,322	19.5	7,285	20.4	7,698	21.4	15,280	28.2

¹ The limitations on comparison between this table and the one shown on pages 8 and 9 are: This population table for ages 15 to 84 covers approximately the same divisional periods of life as the insurance table for ages 15 and over.

² Less than one-tenth of 1 per cent.

³ "Pneumonia" in this table includes "broncho-pneumonia;" the insurance table excludes "broncho-pneumonia."

⁴ "Accidents and injuries" in this table includes "homicides;" the insurance table excludes "homicides."

Interesting relations appear in the comparison of these figures with those given in Table 2, page 9. In all age periods typhoid fever shows a higher proportion of deaths in the male population than in the corresponding age periods of the insured. This is explained by the fact that the Registration Area includes a large rural population while the industrial policyholders are located mostly in urban centers, where typhoid fever rates are lower. On the other hand, tuberculosis of the lungs has a uniformly higher representation among insured males. The maximum difference between the two experiences is in the age period 25 to 34, when the proportion of tuberculosis deaths among the insured is nearly one-third greater than the proportion of population deaths. Cancer shows higher proportions in the general population. Rheumatism (acute and chronic), alcoholism, cerebral hemorrhage, apoplexy and paralysis, all show very much the same conditions in both experiences. Organic diseases of the heart show higher proportions among the insured at the early ages; between 35 and 65 years, the proportions are very much the same in both the population and insurance experiences. After age 65 the industrial group shows a higher proportion of organic heart diseases, but not too much emphasis can be placed on this difference. It is impossible to compare the two experiences for pneumonia, broncho-pneumonia having been excluded from the industrial tables and included in the published population data. Cirrhosis of the liver and Bright's disease are more highly represented in the industrial deaths than in the general population statistics. Suicide is lower in the insured group at virtually every age period. The figures for accidental violence are not comparable since homicides are excluded from the insurance figures while they are included in the population data. This explains, for the most part, the lower proportions of accidental violence in the insured group for it might very well be expected that the greater accidental hazards of the industrial population would produce higher figures from these causes.

A similar comparison between the experience of insured females and those in the population at large is not called for since these two groups show approximately the same mortality rates at the several age periods.

APPENDIX B.—OCCUPATION DISTRIBUTION OF LIVING POLICY-HOLDERS—METROPOLITAN LIFE INSURANCE CO.

Subsequent to the completion of the foregoing mortality study, an investigation was made into the occupations represented among persons who had recently been insured in the industrial department of the Metropolitan Life Insurance Co. The group examined consisted of 79,426 white men and women, 15 years and over, insured during the months of October, November, and December, 1915. It was hoped that the findings might throw some light on the constitution by occupation of the outstanding group of policyholders.

The following table shows the principal occupations found among 28,479 occupied white males:

TABLE 1.—NUMBER AND PER CENT OF 28,479 WHITE MALES, AGES 15 YEARS AND OVER, IN SPECIFIED OCCUPATIONS AMONG LIVING POLICYHOLDERS INSURED DURING OCTOBER, NOVEMBER, AND DECEMBER, 1915.

Occupation.	Num-ber.	Per cent of total.	Occupation.	Num-ber.	Per cent of total.
Laborers (undefined).....	2,669	9.4	Plumbers, gas fitters, and steam fitters.....	372	1.3
Teamsters, drivers, and chauffeurs.....	2,102	7.4	Tailors and garment workers.....	305	1.1
Clerks, bookkeepers, and office assistants.....	1,338	4.7	Compositors and printers.....	229	.8
Carpenters.....	963	3.4	Railway enginemen and trainmen.....	282	1.0
Farmers and farm laborers.....	939	3.3	Street railway employes.....	43	.2
Machinists.....	1,531	5.4	Hostlers and stablemen.....	168	.6
Painters, paper hangers, and varnishers.....	588	2.1	Hucksters and peddlers.....	260	.9
Policemen, watchmen, and guards.....	245	.9	Sailors and marine workers.....	65	.2
Store clerks and salesmen.....	831	2.9	Iron and steel mill workers.....	316	1.1
Textile-mill workers.....	1,508	5.3	Waiters.....	137	.5
Merchants and storekeepers.....	449	1.6	Cabinet and furniture makers.....	113	.4
Saloon keepers and bartenders.....	212	.7	Cigar makers and tobacco workers.....	93	.3
Railway track and yard workers.....	536	1.9	Leather goods workers.....	63	.2
Janitors and building employes.....	290	1.0	Bakers.....	206	.7
Masons and bricklayers.....	221	.8	Longshoremen and stevedores.....	168	.6
Iron molders.....	329	1.2	Tinners and tinware workers.....	151	.5
Coal miners.....	487	1.7	Street and sewer cleaners.....	38	.1
Shoemakers.....	495	1.7	Electricians.....	149	.5
Stationary engineers and firemen.....	352	1.2	Barbers.....	324	1.1
Children, students, and scholars.....	1,487	5.2	Coopers.....	50	.2
Blacksmiths.....	223	.8	All other occupations.....	6,452	22.6
Professional service.....	243	.9	All occupations (excluding "retired").....	28,479	100.0
Agents and canvassers.....	457	1.6			

The largest single group is the laborers, who compose 9.4 per cent of the total. Next come teamsters, drivers, and chauffeurs with 7.4 per cent. More skilled occupations are also represented in considerable numbers. In fact, we find a sequence of occupations not so very different from that shown in Table 1, page 7, for the occupations of the deceased policyholders. The actual percentage in any occupation is not the same among the living as among the dead, for a number of reasons. The deceased have a higher average age than the living policyholders and certain occupations are more likely to be represented in the one group than in the other on that account. In addition, the higher mortality involved in some of the occupations will determine a higher proportion among the dead than is found among the living.

The occupations found among 50,947 white females 15 years and over are shown in the following table:

TABLE 2.—NUMBER AND PER CENT OF 50,947 WHITE FEMALES, AGES 15 YEARS AND OVER, IN SPECIFIED OCCUPATIONS AMONG LIVING POLICYHOLDERS INSURED DURING OCTOBER, NOVEMBER, AND DECEMBER, 1915.

Occupation.	Num-ber.	Per cent of total.	Occupation.	Num-ber.	Per cent of total.
Housewives and housekeepers.....	39,958	78.4	Telephone operators.....	233	0.5
Students.....	1,889	3.7	Laundry workers.....	229	.4
Textile workers (cotton, silk, woolen, and linen mill workers).....	1,623	3.2	Shoe factory operatives.....	220	.4
Domestic servants.....	1,563	3.1	Cigar makers and tobacco workers.....	201	.4
Bookkeepers and office assistants.....	983	1.9	Clothing operatives in factory.....	168	.3
Store clerks and saleswomen.....	461	.9	Department-store clerks.....	161	.3
Dressmakers and garment workers (at home).....	407	.8	Merchants and storekeepers.....	108	.2
Other clothing workers.....	358	.7	All other occupations.....	2,081	4.1
Waitresses.....	304	.6	All occupations.....	50,947	100.0

The above figures may be compared with those in Table 44, page 67, for the occupations of the deceased white females. Housewives and housekeepers account for 78.4 per cent of the total as against 86.0 per cent among the dead. Domestic servants are represented in a proportion of 3.1 per cent among the living as against 4.1 per cent among the dead. These figures, however interesting they may be as an indication of the constitution by occupation of newly insured persons, do not have the same value as an index of the constitution of the living female policyholders as a group, as do the corresponding figures for the males. This is due to the fact that many of the females gainfully employed in specific occupations sooner or later become housewives. The tendency to shift occupations is much more pronounced among females than among males.

