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REPORT ON CONDITION
OF
WOMAN AND CHILD WAGE-EARNERS
IN THE UNITED STATES

IN 19 VOLUMES

VOLUME XIII: INFANT MORTALITY AND ITS RELATION
TO THE EMPLOYMENT OF MOTHERS

Prepared under the direction of
CHAS. P. NEILL
Commissioner of Labor

IN THE SENATE OF THE UNITED STATES,

June 15, 1910.

Resolved, That the complete report on the condition of woman and child wage-earners in the United States, transmitted and to be transmitted by the Secretary of Commerce and Labor in response to the act approved January twenty-ninth, nineteen hundred and seven, entitled "An act to authorize the Secretary of Commerce and Labor to report upon the industrial, social, moral, educational, and physical condition of woman and child workers in the United States," be printed as a public document.

CHARLES G. BENNETT, *Secretary.*

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LETTERS OF TRANSMITTAL.

DEPARTMENT OF COMMERCE AND LABOR,
OFFICE OF THE SECRETARY,
Washington, June 11, 1912.

SIR: In partial compliance with the Senate resolution of May 25, 1910, I beg to transmit herewith a report showing the results of a study of the relation of the employment of mothers and infant mortality.

This report has just been completed, and is the thirteenth section available for transmission of the larger report on the investigation carried on in accordance with act of Congress approved January 29, 1907, which provided "That the Secretary of Commerce and Labor be, and he is hereby, authorized and directed to investigate and report on the industrial, social, moral, educational, and physical condition of woman and child workers in the United States wherever employed, with special reference to their age, hours of labor, term of employment, health, illiteracy, sanitary and other conditions surrounding their occupation, and the means employed for the protection of their health, persons, and morals."

The remaining parts of the general report are being completed as rapidly as possible and will each be transmitted at the earliest practicable moment.

Respectfully,

CHARLES NAGEL,
Secretary.

HON. JAMES S. SHERMAN,
President of the Senate, Washington, D. C.

DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF LABOR,
Washington, June 11, 1912.

SIR: I beg to transmit herewith Volume XIII of the report on woman and child wage-earners in the United States, which relates to the employment of mothers and infant mortality. This is the thirteenth section of the report of the general investigation into the condition of woman and child workers in the United States, carried on in compliance with the act of Congress approved January 29, 1907.

This section of the report is in two distinct parts. The first part is a study of the relation of woman's employment and infant mortality, based on the available statistics of Massachusetts, and is the work of Edward Bunnell Phelps. The second part is a comprehensive original study of the infant mortality in Fall River, Mass., during one year, in relation to the work of the mother before and after confinement. The field work for this latter study was carried on under the immediate supervision of Special Agent Laura M. Keisker, M. D., who was assisted by Special Agents Edith Shatto and Frances W. Valentine. The tabulation and text of the study have been prepared by Chas. H. Verrill.

I am, very respectfully,

CHAS. P. NEILL,
Commissioner.

The SECRETARY OF COMMERCE AND LABOR,
Washington, D. C.

PART I.

**INFANT MORTALITY AND ITS RELATION TO
WOMAN'S EMPLOYMENT: A STUDY OF
MASSACHUSETTS STATISTICS.**

BY EDWARD BUNNELL PHELPS.

INFANT MORTALITY AND ITS RELATION TO WOMAN'S EMPLOYMENT: A STUDY OF MASSACHUSETTS STATISTICS.

INTRODUCTION.

IMPORTANCE OF DEATH RATE UNDER 1 YEAR AS COMPARED WITH GENERAL DEATH RATE.

Infant mortality, or the deaths of children under 12 months of age, is generally recognized as one of the most complex social problems of the present day. The first fact which entitles it to a place among our most serious social problems is its magnitude as compared with the general death rate. Despite the lack of mortality records for the whole United States, and the many and serious defects of those for many of the registration States, the registration area of the Twelfth Census was sufficiently large to produce in its figures an approximate index of the mortality of the country at large. Checked up as are these figures of mortality in various age groups by those of England and Wales, France, and various other foreign countries with established systems of registering vital statistics, they probably record with approximate accuracy the death rate under age 1, as compared with the ratio of deaths at other ages.

In a recent statistical study of this subject,^a it was shown (the figures being restricted to the registration States—and omitting the registration cities in nonregistration States in order to eliminate the abnormally high mortality of the colored population in the registration cities of the South) that the rate of deaths per 1,000 living population under age 1, in the registration States in 1900, apparently was 159.3, as contrasted with a death rate of only 14.1 per 1,000 population over age 1. In other words, the death rate of the census year 1900, in the registration States, in the case of infants under 1 year of age was more than eleven times as high as at all other ages of childhood and adult life, as measured by the ratio of deaths to living population in both age groups. This comparison is probably approximately correct, though the returns of all censuses of population under age 1 are somewhat unreliable owing to the carelessness of parents in reporting as "one-year-old" babies within a few months, under or over, that age.

^a Edward B. Phelps: A Statistical Study of Infant Mortality. Quarterly Publications of the American Statistical Association, new series, No. 83 (September, 1908), pp. 266-268.

STABILITY OF DEATH RATE UNDER 1 YEAR.

The second fact concerning infant mortality which has attracted the attention of those who have investigated the subject is, that the infant death rate as compared with that at higher ages has shown so little improvement during a long period. It has not responded adequately to improvements in public sanitation and medical practice. A recent English writer^a on the subject has commented on this aspect of the problem: "Whilst during the last half century, a time of marvellous growth of science and of preventive medicine, human life has been saved and prolonged, and death made more remote for the general population, infants still die every year much as they did in former times. Indeed, in many places it appears that they die in greater numbers, and more readily than in the past."

In many cities and in some countries there apparently has been a decrease in the infant death rate of late years, but this decrease has not been sufficiently widespread or extended through a sufficiently long period of years to lessen the seriousness of the situation.

INFANT MORTALITY RATE DEFINED.

Before proceeding further, it is necessary to explain the method by which the infant mortality rate is usually computed, and the difference between that rate and an ordinary death rate.

By the infantile mortality rate is meant "the proportion which the deaths of such infants bear to every 1,000 births. An ordinary death rate is the proportion which the total deaths of a community bear to 1,000 of the population in such a community. But it is clear that a more accurate death rate for infants is obtained if we compare the total number of infant deaths not to 1,000 of the general population, but to 1,000 births in the same year."^b

In the presentation of infantile mortality rates, stillbirths are usually excluded, and this practice has been followed in the present case. The only exception in this study to the above method of expressing the infant death rate is in the statement above from the United States Census, in which the infant death rate for the registration area for 1900 is stated as 159.3 per 1,000 living population under age 1.

INFANT MORTALITY RATES IN MASSACHUSETTS, 1856 TO 1908.

The State of Massachusetts early established a registration system, and for this reason is recognized as the most reliable index of American vital statistics. The following table, compiled from registration re-

^a George Newman, M. D.: *Infant Mortality—A Social Problem*. London, 1906, p. 2.

^b Newman: *Infant Mortality*, p. 1.

ports of that State and adapted from a statistical study ^a of infant mortality to which reference has already been made, clearly illustrates the fact that the infant death rate, when considered through a long period of years, and in sufficiently long time intervals to remove superficial tendencies, can not as yet be said to show a marked decline:

BIRTHS AND DEATHS UNDER 1 YEAR AND THEIR RATE PER 1,000 BIRTHS IN MASSACHUSETTS BY FIVE-YEAR PERIODS FOR THE FIFTY-THREE YEARS, 1856 TO 1908, STILLBIRTHS EXCLUDED IN BOTH CASES.

{Compiled from the Twenty-eighth Annual Report of the Massachusetts Board of Health, 1896, p. 750, and Sixty-seventh Registration Report of Massachusetts, 1908, p. 207.]

Years.	Living births.	Deaths under 1 year.	
	Number.	Number.	Rate per 1,000 births.
1856-1860.....	175,729	21,579	122.8
1861-1865.....	158,732	23,490	148.0
1866-1870.....	179,740	26,457	147.2
1871-1875.....	217,134	37,498	172.7
1876-1880.....	209,749	32,277	153.9
1881-1885.....	235,580	37,709	160.1
1886-1890.....	273,707	43,962	160.6
1891-1895.....	330,501	53,288	161.2
1896-1900.....	362,501	55,560	153.3
1901-1905.....	367,815	50,807	138.1
1906.....	80,237	11,106	138.4
1907.....	85,001	11,293	132.9
1908.....	86,911	11,606	133.5

INFANT MORTALITY RATES IN ENGLAND AND WALES, 1861 TO 1909.

This relatively slight decline in the infant death rate is by no means peculiar to Massachusetts. The statistics of births and deaths in England and Wales are known to be fairly reliable, and a recent table covering the period 1861 to 1908, prepared by Dr. Arthur Newsholme, medical officer to the Local Government Board, not only shows how relatively small has been the decline of infant mortality in that country, but presents in striking contrast the rapid decline during the same period in child mortality from the beginning of the second to the close of the fifth year of life. This table, which is reproduced below, shows the average death rates per 1,000 at each age and the relative mortality figures, the death rates for the period 1861 to 1865 being taken as the basis or 100.

^a Phelps: A Statistical Study of Infant Mortality. Quarterly Publications of the American Statistical Association, new series, No. 83 (September, 1908), p. 257.

DEATH RATES OF INFANTS UNDER 1 YEAR OF AGE AND FOR EACH OF THE NEXT FOUR YEARS OF LIFE, WITH RELATIVE MORTALITY FIGURES, FOR ENGLAND AND WALES, BY FIVE-YEAR PERIODS, 1861 TO 1909.

[From the Thirty-ninth Annual Report of the Local Government Board, 1909-10, Supplement to the Report of the Board's Medical Officer, containing a Report by the Medical Officer on Infant and Child Mortality. London, 1910, p. 15.]

Year.	Average death rates per 1,000 at each age.					Relative mortality figures, the death rate in 1861-1865 being stated as 100.				
	0-1 year.	1-2 years.	2-3 years.	3-4 years.	4-5 years.	0-1 year.	1-2 years.	2-3 years.	3-4 years.	4-5 years.
1861-1865.....	155	69	37	25	18	100	100	100	100	100
1866-1870.....	157	63	32	22	16	102	92	88	88	90
1871-1875.....	154	59	28	19	14	100	86	77	76	81
1876-1880.....	145	58	27	17	13	94	85	74	68	74
1881-1885.....	139	53	23	15	12	90	78	64	60	69
1886-1890.....	144	53	22	14	10	93	78	61	56	58
1891-1895.....	151	52	21	14	10	98	76	58	56	58
1896-1900.....	156	49	19	13	9	101	72	53	52	50
1901-1905.....	138	41	16	11	8	90	60	44	44	46
1906-1908.....	124	37	15	9	7	80	53	41	36	40
1909 ^a	109	33	14	9	7	70	48	38	36	39

^a Figures for 1909 from Seventy-second Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales, 1911.

From the above table it will be seen that the mortality rate under 1 year has decreased from an average of 155 per 1,000 in the period 1861-1865 to 124 per 1,000 in the years 1906-1908; or, expressed in the relative mortality figures, taking the first period as a basis, they have decreased from 100 to 80. It is only in the last period, however, that so low a figure appears, no previous period having shown a relative mortality figure below 90, and in the five-year period 1896 to 1900 the average was 101. It is scarcely safe to assume, therefore, that the mortality figure of 80, which is shown for the last period, can be accepted as indicating a level showing permanently bettered conditions. When the relative mortality figures under 1 year are compared with those for the other ages under 5 years, it will be seen that a far greater gain has been made at the higher ages, the figures in 1909 at 4 to 5 years being 39 and at 3 to 4 years being 36.

These facts might at first glance seem to indicate that the infant mortality rate is incapable of any considerable reduction. But there is ample evidence that a rate so high as that for Massachusetts, or as that for England and Wales, is an index of bad conditions, which can be mended.

WIDE RANGE OF INFANT MORTALITY RATES IN DIFFERENT COUNTRIES.

The following table, from the latest report of the registrar-general of the United Kingdom, is of interest in this connection, as showing the wide range of infant mortality rates in various countries:

BIRTH RATES, AND DEATH RATES UNDER 1 YEAR PER 1,000 BIRTHS (STILLBIRTHS EXCLUDED) FOR THE PRINCIPAL FOREIGN COUNTRIES, BY FIVE-YEAR PERIODS, 1881 TO 1909.

BIRTHS PER 1,000 POPULATION.

[From Seventy-second Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales, 1909.]

Countries.	1881-1885.	1886-1890.	1891-1895.	1896-1900.	1901-1905.	1906.	1907.	1908.	1909.
Europe:									
Norway.....	31.2	30.8	30.2	30.1	28.6	26.7	26.3	26.2	26.1
Ireland.....	23.9	22.8	23.0	23.3	23.2	23.6	23.2	23.3	23.5
Sweden.....	29.4	28.8	27.4	26.9	26.1	25.7	25.5	25.7	25.6
Bulgaria.....	37.2	35.9	37.5	41.0	40.6	44.0	43.6	40.4	(a)
Scotland.....	33.3	31.4	30.5	30.0	28.9	27.9	27.0	27.2	26.4
Denmark.....	32.4	31.4	30.4	30.0	29.0	28.5	28.3	28.3	28.0
Finland.....	35.5	34.5	31.8	32.6	31.3	31.4	31.3	30.8	31.3
England and Wales.....	33.5	31.4	30.5	29.3	28.1	27.1	26.3	26.5	25.6
Switzerland.....	28.6	27.5	27.7	28.5	28.1	27.4	26.8	27.1	(a)
Belgium.....	30.7	29.3	28.9	28.9	27.7	25.7	25.3	24.9	(a)
Servia.....	46.3	43.7	43.3	40.1	38.7	41.3	40.0	36.8	36.5
France.....	24.7	23.1	22.3	21.9	21.2	20.6	19.7	20.2	19.6
The Netherlands.....	34.8	33.6	32.9	32.1	31.5	30.4	30.0	29.7	29.1
Italy.....	38.0	37.5	36.0	34.0	32.6	31.9	31.5	33.4	32.4
Spain.....	36.4	36.0	35.3	34.3	35.0	33.4	32.9	33.2	32.6
Prussia.....	37.4	37.3	37.0	36.5	34.8	33.8	33.0	32.8	31.8
Roumania.....	41.8	40.9	41.0	40.2	39.4	40.5	41.7	40.8	41.7
Austria.....	38.2	37.8	37.4	37.3	35.6	34.9	33.8	33.5	(a)
Hungary.....	44.6	43.7	41.7	39.4	37.2	36.0	36.0	36.3	37.0
Russia in Europe.....	49.1	48.2	48.2	49.3	(a)	(a)	(a)	(a)	(a)
Australasia:									
New Zealand.....	36.3	31.2	27.7	25.7	26.6	27.1	27.3	27.4	27.3
Tasmania.....	35.0	34.1	32.7	28.2	29.0	29.5	29.6	30.8	29.9
South Australia.....	38.5	34.7	32.0	27.0	24.5	23.7	23.9	24.7	24.7
Queensland.....	36.5	37.4	34.1	29.1	26.7	26.3	26.9	26.7	27.2
New South Wales.....	37.7	36.4	32.9	28.0	26.7	27.0	27.1	26.8	26.9
Victoria.....	30.8	32.7	30.9	26.2	25.0	25.1	25.2	24.6	24.6
Western Australia.....	34.5	36.9	30.7	28.3	30.3	30.0	29.2	28.9	27.7
Other countries:									
Japan.....	(a)	28.5	28.6	31.1	31.7	28.9	33.0	33.9	(a)
Ceylon.....	(a)	30.3	31.7	37.1	38.8	35.7	32.8	40.1	36.7
Jamaica.....	(a)	36.8	38.6	38.9	39.0	38.1	35.0	37.6	37.8
Chili.....	39.1	35.5	37.0	35.0	36.1	36.6	38.6	39.3	38.8

DEATHS UNDER 1 YEAR PER 1,000 BIRTHS.

Europe:									
Norway.....	99	96	98	96	81	69	67	76	(a)
Ireland.....	94	95	102	106	98	93	92	97	92
Sweden.....	116	105	103	101	91	81	77	85	(a)
Bulgaria.....	(a)	(a)	140	143	148	154	154	170	(a)
Scotland.....	117	121	126	129	120	115	110	121	(a)
Denmark.....	135	136	138	132	119	109	106	123	(a)
Finland.....	162	144	145	139	131	119	112	125	111
England and Wales.....	139	145	151	156	138	132	118	120	109
Switzerland.....	171	159	155	143	134	127	121	108	(a)
Belgium.....	156	163	164	158	148	153	132	147	(a)
Servia.....	157	158	172	159	149	144	147	158	(a)
France.....	167	166	171	159	139	143	135	(a)	(a)
The Netherlands.....	181	175	165	151	136	127	112	125	99
Italy.....	(a)	(a)	185	168	168	160	155	153	(a)
Spain.....	193	(a)	(a)	(a)	173	173	(a)	(a)	(a)
Prussia.....	207	208	205	201	190	177	168	173	164
Roumania.....	179	195	219	(a)	(a)	(a)	(a)	(a)	(a)
Austria.....	(a)	(a)	(a)	226	215	200	204	(a)	(a)
Hungary.....	(a)	(a)	250	219	212	205	208	199	212
Russia in Europe.....	271	264	276	261	(a)	(a)	(a)	(a)	(a)
Australasia:									
New Zealand.....	90	84	87	80	75	62	89	68	62
Tasmania.....	109	163	94	98	90	91	82	75	65
South Australia.....	(a)	105	99	112	87	76	66	70	61
Queensland.....	137	119	103	103	94	75	77	70	72
New South Wales.....	124	115	111	113	97	75	89	76	74
Victoria.....	122	131	111	111	96	93	73	86	71
Western Australia.....	(a)	123	130	160	126	110	98	85	78
Other countries:									
Japan.....	(a)	(a)	147	153	154	153	151	157	(a)
Ceylon.....	(a)	158	169	168	171	198	186	183	202
Jamaica.....	(a)	170	171	175	174	197	223	175	174
Chili.....	(a)	264	336	333	331	328	297	320	(a)

a Not reported.

It will be seen that for several countries the infant mortality rate through the entire period of twenty-nine years covered has been below or only slightly above 100 deaths per 1,000 births, namely, Norway, Ireland, Sweden, New Zealand, Tasmania, and South Australia. Various estimates have been made as to the proportion of infant deaths which are preventable, and considerable discussion, more or less academic, has taken this preventable proportion for its theme. It is clearly impracticable to attempt to determine an absolute infant mortality rate attainable by all countries; but it is reasonable to conclude, even allowing for a considerable margin of error in the statistics of the subject, that if the countries named have through a long period of years enjoyed the degree of infantile health indicated by the above table the infantile mortality rate of Massachusetts and of the entire registration area of the United States is quite too high and demands attention.

RELATION OF HIGH INFANT MORTALITY RATES TO RATES AT LATER AGES.

It has frequently been argued that a high infant mortality has a selective influence; in other words, that it acts as a "weeding-out process," and hence tends to reduce mortality at later ages. This contention was one of the main points recently investigated by the medical officer of the British Local Government Board, and the results of his inquiry are embodied in the recent report referred to above.^a Doctor Newsholme, with the records of the registrar-general of births, deaths, and marriages as a basis, concludes as follows: "Infant mortality is the most sensitive index we possess of social welfare and of sanitary administration, especially under urban conditions. A heavy infant mortality implies a heavier death rate up to 5 years of age; and right up to adult life the districts suffering from a heavy child mortality have higher death rates than the districts whose infant mortality is low. A careful study of the death rate in England and Wales during the last fifty years, at each of the first five years of life, leaves it doubtful whether any appreciably greater selection or 'weeding out' is exercised by a heavier than by a lighter infantile mortality. Any such effect, if it exists, is concealed behind the overwhelming influence exerted by the evil environment to which children are exposed in districts of high infant mortality. It is strictly correct, therefore, to say that a high infant mortality implies a high prevalence of the conditions which determine national inferiority." Thus in effective fashion he has summed up the second grave circumstance which has made a high infant mortality a social problem. It is a

^a Great Britain, Local Government Board. 39th Annual Report. Supplement on Infant and Child Mortality, pp. 74, 75.

problem, first, because of its magnitude. It is a needless sacrifice of human life. It is a problem, in the second place, because it is an index of the general environmental conditions which make for deterioration.

FACTORS IN INFANT MORTALITY RATE, AS GENERALLY RECOGNIZED.

Although the problem of effecting any material decrease in the infant death rate is yet to be solved, certain factors are now generally recognized as related to it. They fall naturally into two groups. The first group may be termed the general conditions of sanitation which affect the health of the entire community, but show an especial relation to the death rate of infants, namely, (1) urban or rural conditions of life, (2) domestic and municipal sanitation—that is to say, condition of the streets, methods of sewage removal, purity of the milk and water supply, and related matters—and (3) the housing of the wage-working population.

The second group may be termed the social condition of the population as it shows itself in (1) the ignorance or intelligence of the people, but especially of the mothers, (2) the degree of economic well-being of the majority of the inhabitants of any region under consideration, (3) the prevalence or absence of extra-domestic employment of married women, (4) whether or not the custom of very early marriage prevails with the female portion of the population, (5) the proportion of legitimate to illegitimate births, and (6) the size of the birth rate.

DOCTOR GREENHOW'S CONCLUSIONS AS TO RELATION OF WOMEN'S WORK TO INFANT MORTALITY.

In the absence of exact information, the many discussions of the subject during the last fifty years have assigned a varying importance to these different factors. Certain of them, however, have been accepted almost unanimously as being of great importance, and among these the extra-domestic employment of married women has been regarded as fundamental. This relation of women's work to infant mortality was apparently first formulated in an official document by Sir John Simon, in a public health report of Great Britain in June, 1858.^a

This factor was further emphasized by him in subsequent statements,^b and in 1861 Doctor Greenhow, medical officer of the privy

^a Great Britain. Public Health Reports, vol. 1, p. 460.

^b English Sanitary Institutions, 1890, p. 298; Papers relating to the Sanitary State of the People of England, 1858, pp. xxxiv, 132; Fourth Report of the Medical Officer of the Privy Council, 1861, pp. 187-196.

council, after elaborate investigations in a number of industrial towns, stated his conclusions with regard to it as follows:

1. The infantile death rate bears no definite relation to the general death rate, but their comparative proportions to each other vary in different districts.

2. The infantile death rate bears the largest proportion to the general death rate in districts where the infantile population is especially exposed to unwholesome influences, as in Coventry, Nottingham, and certain other manufacturing towns.

3. The unwholesome influences to which infants are exposed in the manufacturing towns comprised in the present inquiry may be attributed mainly to the industrial employment of the married women, which leads them to consign the tendance of their infants, at a very early age, to young children or strangers.

4. That infants thus deprived of the mother's care are habitually fed on diet ill adapted to their digestive powers, and are very frequently drugged with opiates in order to allay the fractiousness arising from the illness induced by improper food.

5. That infants in manufacturing towns where women are much engaged in factory labor are likewise exposed to other causes of sickness proceeding from the ignorance or carelessness of the mothers or nurses, such as deficiency of exercise and exposure to inclement weather.^a

Doctor Greenhow's statement since that day has been generally accepted as a satisfactory summary of an acknowledged fact, but very recently a more accurate statistical and medical knowledge has opened the entire question of infant mortality for a critical reconsideration.

DIFFICULTY OF DETERMINING EFFECT OF WOMEN'S EMPLOYMENT.

It is obvious that prolonged and exhaustive medical, statistical, and social research would be necessary before the relative importance of this and the many other enumerated factors related to the infant mortality problem could be accurately known. It would be possible to draw positive conclusions as to the relative importance of this particular factor only by point-to-point comparison of the infant mortality for a period of years in two large communities, or two classes of large communities, in which all the material conditions were substantially common, with the single important exception that in one a considerable proportion of the married female population of child-bearing age were at work outside of their homes and in the other community with which the comparison was made none of the women were so employed.

To admit of entirely sound conclusions, it would be necessary that the populations—and especially the women—of both communities should be of like ages, races, and physical health, that their living

^a Fourth Report of the Medical Officer of the Privy Council, pp. 187-196.

conditions should be practically identical, and that, in a general way, the child-bearing women should be of about the same grade of intelligence. Of course no such comparison ever has been or ever will be possible, for the reason that the one exception of the women's work would in various ways make the other conditions of the two communities radically dissimilar. In default of some such comparison on a broad scale of the mortality of the infants of working and non-working women of similar ages, races, intelligence, and living conditions, no one can determine accurately how many of the deaths of working women's infants are due to the mothers' work and how many to the other conditions of their lives and environment.

The nearest approach to definite conclusions which seems to be practicable is that to be obtained by a tabulation of the experience for many years of large and representative communities in which widely varying percentages of married women of child-bearing age are employed in work taking them away from their homes, and by a comparison not only of the average infant death rates for these several communities but of all their social and economic conditions which admit of statistical expression.

All that such a statistical presentation of the subject can accomplish is to point out in the simplest fashion certain facts which may help to serve as guides in determining the part which the extra-domestic employment of married women plays in determining the infant death rate. With this purpose in view the best available facts in regard to American conditions have been brought together in the following pages of this study.

INFANT MORTALITY IN NEW ENGLAND STATES IN 1880, 1890, AND 1900.

In any study on a broad basis of the relation of women's work and infant mortality in the United States the six States of New England afford the largest practicable area of investigation. In the first place it would be impracticable to include any except registration States, and no States outside of New England have registration records of births and infant deaths of real value for any considerable number of years. In the second place, in any comparison of vital statistics of the United States, the Negro factor must be eliminated, or at least practically eliminated. The colored death rate at all ages in the registration area of the country is about half again as high as the white death rate at all ages, and in the case of deaths under age 1 the colored rate is more than twice as high as the white rate, as will be shown by this comparison of the white and colored death rates under age 1 per 1,000 births in the census year 1900, according to the Twelfth Census.^a

^a Twelfth Census, Vital Statistics, 1900, Part I, pp. 286-288.

WHITE AND COLORED DEATH RATES UNDER 1 YEAR OF AGE PER 1,000 BIRTHS
IN 1900.

Race.	Registra- tion record.	Registra- tion cities.	Registra- tion States.	Cities in registration States.	Rural part of registra- tion States.
White	143.4	154.2	142.0	162.4	107.5
Colored.....	297.0	307.0	282.4	318.9	190.3

The above comparison makes obvious the impracticability of including in any tabulation of infant mortality rates for the United States any States, cities, or rural districts in which the colored population is of appreciable size. In the case of none of the New England States is the colored population proportionately large enough to act as a disturbing factor in the mortality statistics, the entire Negro population of New England at the time the Twelfth Census was taken aggregating less than 1 per cent of the total population.

In addition to these qualifications as a basis for a broad generalization of the infant mortality experience of this country the compact area embraced in the New England States is a representative region in several particulars of importance in connection with this subject. It is a highly developed manufacturing district, and at least two of its chief industries are those which employ women in large numbers. It thus becomes possible to show the available statistical facts concerning the employment of women in relation to the other statistical facts which have an important bearing upon the infant death rate. It presents a similarity of geographical and climatic conditions, an essential basis of any fair comparison. It is a highly urbanized region. At the same time considerable rural areas are present, which make it possible partially to compare urban and rural conditions. It contains a heavy foreign-born population, thus presenting in that respect a condition typical of those which prevail in many of the industrial sections of the country at large.

**RELATIVE IMPORTANCE OF MANUFACTURING, AGRICULTURAL, AND
OTHER EMPLOYMENTS.**

The relative importance of manufacturing, agricultural, and other employments in the various States may be seen from the following table. The table presents for each of the New England States the per cent of the total population 10 years of age and over employed in gainful occupations who were in each main occupation group at each of the last three censuses, 1880, 1890, and 1900.

PER CENT OF TOTAL POPULATION 10 YEARS OF AGE AND OVER IN EACH OF THE MAIN OCCUPATION GROUPS FOR THE NEW ENGLAND STATES, 1880, 1890, AND 1900.

[Figures for the several States are from Twelfth Census, Special Report on Occupations, p. xciv; figures for New England computed from same report, pp. lxxxviii, lxxxix.]

State.	Agriculture.			Professions.			Domestic and personal service.			Trade and transportation.			Manufactures and mechanical pursuits.		
	1880.	1890.	1900.	1880.	1890.	1900.	1880.	1890.	1900.	1880.	1890.	1900.	1880.	1890.	1900.
Maine.....	36.0	32.0	27.8	4.4	4.8	5.0	15.5	15.4	19.8	13.4	14.4	15.6	30.7	33.4	31.8
New Hampshire.....	31.7	25.7	21.7	4.6	4.1	4.3	14.6	13.9	17.1	8.9	12.0	14.4	40.2	44.3	42.5
Vermont.....	46.9	41.9	36.9	4.6	4.9	5.2	18.7	16.7	17.1	8.1	11.3	14.0	21.7	25.2	26.8
Massachusetts.....	9.0	7.1	5.5	3.8	4.4	5.0	19.0	18.2	19.1	17.0	20.0	23.5	51.2	50.3	46.9
Rhode Island.....	9.4	7.5	5.7	3.2	3.5	4.1	17.2	17.8	18.2	13.8	17.5	19.3	56.4	53.7	52.7
Connecticut.....	18.3	14.4	11.6	3.7	3.9	4.4	17.3	18.3	19.5	12.8	15.6	18.6	47.9	47.8	45.9
Total.....	19.4	15.2	12.1	4.0	4.3	4.8	17.6	17.4	18.9	14.2	17.2	20.2	44.8	45.9	44.0

It will be seen from the foregoing table that in three of the States—Massachusetts, Rhode Island, and Connecticut—approximately one-half of the wage-earners were engaged in manufacturing employments, the per cent so employed in New Hampshire being only slightly less, while in Maine and Vermont the per cent so employed was much smaller. In these two States the per cent in agriculture, on the other hand, was much larger than in the four other States.

COMPARISON OF INFANT MORTALITY AND PER CENT FOREIGN-BORN, PER CENT LIVING IN TOWNS, AND PER CENT OF WOMEN IN GAINFUL PURSUITS.

It is possible to make a comparison for these States of conditions as to the percentage of foreign-born in the total population, the per cent of the population living in cities or towns, and the per cent of women 16 years of age and over who are at work as breadwinners. In the following table these facts are presented in comparison with the death rates of children under 1 year per 1,000 births. Before presenting this table it is necessary to make some explanation of the character of the data upon which the figures of the table are based.

The infant death rates for 1900 in the table on page 22 have been compiled from the Twelfth Census, Vital Statistics, Part I, Table 19 (pp. 285-555) in which for the first time in the vital statistics of the census stillbirths were excluded. The figures for 1890 and 1880 have been compiled from the tabular readjustment on that basis of the infant mortality statistics of the Eleventh and Tenth Censuses presented in connection with the analysis of the "Relation of Age to Deaths" of the Eleventh Census, Report on Vital and Social Statistics, Part I, pages 24 and 25. In each case, therefore, stillbirths have been eliminated, and all of the returns in question reduced to a common basis.

It should be borne in mind, however, that Massachusetts was the only one of the New England States whose registration returns were

used in the compilation of the Tenth Census (1880), and the registration returns of Maine were not included in the making up of the Eleventh Census. The above infant mortality records of five of the New England States for the Census year 1880, and of Maine for the census year 1890, are therefore based on the census enumerators' returns, and not on local registration records, and, dating back nearly 30 years as do the earliest of those in question, the hastily gathered enumerators' returns are undoubtedly more or less defective as compared with the figures for 1900, all of which were taken from the local registration records of the six New England States.

Making full allowance for the almost-certain incompleteness of all the 1880 figures in the above tabulation, with the exception of those for Massachusetts, and for the probable defects in the Maine returns for 1890, the figures in question are nevertheless comparable—at least with each other—having been collected in a uniform manner and presumably having approximately the same margin of error.

The Special Report of the Bureau of the Census, issued in 1907 under the title of "Statistics of Women at Work," from which the figures below for women at work are cited is based on information derived from the schedules of the Twelfth Census, 1900. The term "breadwinners" has been applied to persons reported by the census as engaged in gainful occupations, and "applies to every person 10 years of age and over who is at work; that is, occupied in gainful labor during any part of the census year (June 1, 1899, to May 31, 1900, inclusive), or who is ordinarily occupied in remunerative work, but during the census year was unable to secure work of any kind." In the tabulation from which the above figures were quoted, all females between the ages of 10 and 15, inclusive, had been eliminated.

The table follows:

PER CENT OF FOREIGN-BORN OF TOTAL POPULATION, PER CENT OF POPULATION LIVING IN TOWNS OF 4,000 AND MORE INHABITANTS, PER CENT OF FEMALE BREADWINNERS OF TOTAL FEMALE POPULATION OF 16 YEARS AND OVER, AND DEATHS UNDER 1 YEAR PER 1,000 BIRTHS, FOR THE SIX NEW ENGLAND STATES, 1880, 1890, AND 1900.

[Population figures from Eleventh Census, Population, p. lxxx, and Twelfth Census, Population, Part I, p. ciii.]

State.	Per cent of foreign-born of total population.			Per cent of population living in towns of 4,000 and more inhabitants.			Per cent of women of 16 years and over who are breadwinners.			Deaths under 1 year per 1,000 births.		
	1880.	1890.	1900.	1880.	1890.	1900.	1880.	1890.	1900.	1880.	1890.	1900.
Maine.....	9.1	11.9	13.4	20.9	34.2	36.2	14.3	18.6	20.5	67.8	95.6	132.2
New Hampshire.....	13.3	19.2	21.4	26.3	37.6	46.7	22.2	24.9	26.6	89.8	153.7	156.0
Vermont.....	12.3	13.3	13.0	11.4	12.1	21.0	13.4	16.3	18.4	81.9	103.3	111.9
Massachusetts.....	24.9	29.4	30.2	65.9	83.0	86.9	25.2	30.2	30.8	142.5	182.6	160.0
Rhode Island.....	26.8	30.8	31.4	77.2	89.8	91.6	27.0	30.0	31.4	107.7	192.7	177.0
Connecticut.....	20.9	24.6	26.2	53.9	64.7	65.5	20.3	24.9	26.2	100.3	147.8	142.5
Total.....	19.8	24.3	25.8	49.6	65.1	70.5	21.7	26.4	27.8	113.3	160.0	152.3

An examination of the foregoing table indicates that some relationship exists between the various tabulated items. It will be noted that for the last two census years Rhode Island shows the highest rate of infant mortality of any State in the New England group. At the census of 1880 it showed the second highest rate. When its rank in respect to the proportion of females of 16 years and over gainfully employed is noted, it again is found to rank first in the years 1880 and 1900, and second in 1890. If we were to go no further, it would be easy to conclude that here is a causal relation. But it is seen that the State ranks first for all three census years in the proportion of foreign-born to total population. It also ranks first for all three census years in the proportion of its population living in cities of 4,000 or more inhabitants, and in the natural correlative of this high degree of urbanization, namely, the proportion of its population engaged in manufactures.

An examination of any of those States which rank low in regard to infant mortality shows the opposite situation. Vermont has the lowest rate for 1900, and ranks fifth in the two preceding censuses. In the census of 1900 it was sixth in respect to proportion of foreign-born, and fifth in 1890 and 1880. It is sixth for all three censuses in degree of urbanization of its population and in the proportion of women gainfully employed. It is, as would be expected from these factors, first as regards the proportion of its population employed in agriculture, and sixth in the proportion engaged in manufactures. Detailed comparisons for each State, while there are occasional variations and irregularities, show the same general relationship. It may be said that the most significant relationship is shown by the census of 1900, for the reason that that census was more comprehensive and reliable than the preceding censuses, and for the first time the registration records of all of the New England States were used in the Twelfth Census, though in the preceding census (1890), with the single exception of Maine, all of these States were recognized as registration States.

It may be here noted that one factor of significance in relation to the infant death rate in these States has of necessity been omitted from consideration in this table, namely, the birth rate. Existing data, except as considered later for the State of Massachusetts alone, are so unsatisfactory as to be misleading.

PER CENT OF MARRIED WOMEN IN GAINFUL PURSUITS.

As regards the figures for women at work, the clearly significant thing is not simply the proportion of women at work in gainful pursuits, but the proportion of married women between 15 and 45 years of age engaged in those occupations which take them out of their own homes. Indeed, perfect accuracy would demand that data for

mothers of children under 1 year only, occupied outside of their homes, should be considered.

The detailed figures of ages and marital condition by States are not given, however, in the special report of the Bureau of the Census, with the single exception of the number of female breadwinners by States and age groups in 1900, which, by showing that 476,883 of the 561,235 female breadwinners of New England were between ages 16 and 44, thereby indicate that 85 per cent of all the females of 16 years and over engaged in gainful occupations in New England in the census year 1900 were of child-bearing age. Presumably the age percentage in the case of women of 16 years and over employed in gainful occupations in the census years 1890 and 1880 was not materially different from that of 1900, and the above tabular summary of working women in the three census years in question would therefore seem to be fairly comparable with a similar tabulation of the infant death rates in the States in question. But as to the vital issue, the extra-domestic employment of the mothers of families, these general figures for women breadwinners serve only as the crudest possible indication of the number so employed. All that it is possible to say is that probably, in the absence of prohibitive legislation, those States where women-employing industries prevail are likely to have a rather large proportion of married women at work.

It can not be said, however, that even this probability is borne out by the meager statistics available on the subject. The Twelfth Census presents figures showing the number and per cent of married women gainfully employed in the census years 1890 and 1900, in comparison to the total number of married women in the population, but such figures are not available for the census of 1880. The figures for 1890 and 1900 are presented in the table following:

NUMBER AND PER CENT OF MARRIED WOMEN ENGAGED IN GAINFUL PURSUITS, COMPARED TO TOTAL NUMBER OF MARRIED WOMEN IN THE POPULATION OF THE NEW ENGLAND STATES.

[From Twelfth Census, Special Report on Occupations, 1900, p. ccxxiii.]

State.	Married women employed in gainful pursuits.			
	Number.		Per cent of total married women in population.	
	1890.	1900.	1890.	1900.
Maine.....	5,770	7,991	4.2	5.6
New Hampshire.....	5,941	7,783	7.6	9.2
Vermont.....	2,276	3,298	3.3	4.5
Massachusetts.....	27,145	38,555	6.4	7.3
Rhode Island.....	4,211	5,505	6.5	6.9
Connecticut.....	5,690	8,686	4.0	5.0
Total.....	51,033	71,818	5.6	6.7

The above table shows that for New England as a whole, or even for single States, the per cent of married women who are gainfully employed is small, in 1900 being less than 7 per cent for all New England and only 6.9 and 7.3 per cent in Rhode Island and Massachusetts, respectively, the States which are most important industrially. These per cents, however, probably do not fully indicate the relative importance of the employment of married women of child-bearing age, as the proportion of women of child-bearing age would be greater among the wage-earning married women than in the nonwage-earning married women of the population.^a

But though the percentages of the foregoing table may fall short of representing the importance of the employment of married women of child-bearing age, they are misleading if taken as an accurate measure of the effect of such employment upon the infant mortality rate. Here, it will be obvious, the point of real significance as directly affecting infant mortality is the extent of employment outside the home of married women who are mothers of children under 1 year.^b

CONCLUSIONS FROM NEW ENGLAND STATISTICS.

It will be seen at once that definite conclusions as to the effect of any single influence upon the infant mortality rate can not be drawn from the foregoing tables. If the infant mortality rates were compared with any one item, a causal relationship would almost certainly be assumed. There is a striking correspondence between that rate and each of the important items in the tables. It may be said that until quite recently the accuracy of the statement that infant mortality and the employment of married women are intimately related has usually been maintained upon the ground of such isolated comparisons, and other data bearing upon the situation have been given but small consideration.

^a Out of 4,150 married, widowed, divorced, and separated women employed in the New England cotton mills investigated by the Bureau of Labor in 1908, whose ages were reported, 85.9 per cent were under 45 years of age; see Cotton Textile Industry, Vol. I of this report, page 637.

^b In Massachusetts, for example, of the 7,535 women 16 years of age and over employed in 22 representative cotton mills studied by the agents of the Bureau of Labor 29.6 per cent were married and 4 per cent widowed, divorced, or separated. Out of 407 married, widowed, divorced, and separated women (including wage earners and nonwage earners) living in the Massachusetts cotton mill families visited in the course of the same investigation, only 101 were at work as wage earners at the time of the agents' visits, and of these only 13, or 12.9 per cent, were mothers of children under 3 years of age. As compared with the total of 407 married, widowed, divorced, and separated women in this limited number of representative cotton mill families, this is only 3.2 per cent, and it may be fairly assumed that the per cent of women at work at any one time who were the mothers of children under 1 year would be less than one-third of this number, or not over 1 per cent. As compared with the total number of married, widowed, divorced, and separated women in the total population of the State the proportion would evidently be even smaller.

At best, however, comparisons of mortality statistics on any such broad basis as that of entire States are unsatisfactory and may be extremely misleading. There is certain to be a great variety of differential factors involved in the case of the States whose rates are compared and the previous study of the apparent relationship of women's work, and infant mortality in the New England States in the last three census years, therefore, is valuable chiefly as a preliminary to a more detailed study.

INFANT MORTALITY IN MASSACHUSETTS CITIES.

For the reasons already pointed out on a previous page, the State of Massachusetts offers by far the best field in the United States for a careful study of the subject of infant mortality and woman's employment.

Aside from its comprehensive system of recording both vital and industrial statistics, its greatest industries are those which employ many women, namely, the manufacture of textiles, and of boots and shoes. It may also be said to be the best American example of a highly organized industrial district, and it therefore may be said to be not only representative of conditions for the industrial sections of the United States, but is an index of the conditions which are becoming increasingly predominant in this country.

CHARACTER OF STATISTICS AVAILABLE.

The main sources of statistical information on infantile mortality and its related factors for Massachusetts are the reports of births, marriages, and deaths in Massachusetts, which have been issued annually for about seventy years, the annual reports of the State board of health, and the State censuses, which are issued every five years by the Massachusetts Bureau of Statistics.

The Twenty-eighth Annual Report of the State Board of Health of Massachusetts, published in 1897, included a tabulation of "Infant mortality of cities, ten years, 1881-1890." This table stated the aggregate numbers of births and deaths under age 1 and the infant death rates for this ten-year period for each of the 32 cities in the State at the period in question.

The fourth and sixth decennial state censuses supply detailed figures as to the nativity, conjugal condition, occupations, etc., of the populations for each of the 32 cities in question in the years 1885 and 1905, and with this information it is possible to compile a comparison for two ten-year periods of the infant death rates with the number of women employed and with the other important related factors which admit of statistical presentation in these cities.

Certain points in this table which are fundamental to the discussion of the greater part of this study demand explanation. The table gives the birth rate per 1,000 total population for the two

decades under consideration, namely, 1881-1890, and 1898-1907. The inaccuracy of this tabulated birth rate must be admitted. This arises from two main causes. In the first place, the registration of births, even in Massachusetts, is not complete, and was more defective in the earlier years, for which data are here presented. In the words of Dr. Francis A. Harris, who edited the sixty-seventh report of the births, marriages, and deaths in Massachusetts, for the year 1908—

Although the law applies to the registration of births, as well as to that of marriages and deaths, it is probable that the statistics of the births are less accurate than those of either of the other two classes. From the nature of things, marriages and deaths must be registered in order that the former may be solemnized or that interment be possible in case of deaths; but in the case of the births the inadequacy of penalty for neglect, ignorance of the law, as well as topographical conditions, tend to an incomplete registration. It is therefore likely that the number of births returned in Massachusetts in 1908 was less than the actual number which occurred, hence a lower birth rate, and comparisons between births and deaths inaccurate.

This inaccuracy was undoubtedly greater in the earlier years under consideration in this study.

But there is a further difficulty in computing the birth rate. What is generally known as the crude annual birth rate of a community is found by dividing the total number of births in that community by its total population. This method of computation is somewhat unsatisfactory for purposes of comparison, owing to the differing composition of various populations; but this matter is beyond the province of this study. Assuming that the crude rate is a reasonably safe basis for the present comparison, in order to find the average crude birth rate for each of the 32 cities in the following table for a decade, the proper method would be to divide the sum of the births for the decade by the sum of the annual populations for the same decade.

But no accurate figures are available as to the population of each city for each of the twenty years embraced in this study. The best that can be done is to divide the total number of births in each city during the two decades by the population of the city at the census year, which will afford the nearest approach to a mean population for each of the two decades. For this purpose the two Massachusetts censuses of 1885 and 1905 have been used. It is true that the census of 1905 does not fall at the middle of the decade for which it has been used as a basis of calculation, but no better population data were available, the Twelfth Census, 1900, being no better than that of Massachusetts for this purpose. The rate secured by this division, being divided by 10, gives some approximation to an average annual birth rate for each decade. The method being the same for all 32

cities, it does not interfere seriously with comparisons between them; and admitting a considerable margin of error in registration these birth rates have a certain comparative value.

As a result of the incomplete registration of births, not only is the birth rate itself rendered inaccurate, but the infant mortality rate is also affected in some degree. As already explained (p. 12), the generally accepted infant death rate is not the rate as measured by the living population under age 1, but is the ratio of infant deaths to births.

**COMPARISON OF INFANT MORTALITY, PER CENT OF POPULATION
FOREIGN-BORN, AND BIRTH RATE.**

The following table shows for the two periods the total population, the per cent of foreign-born in the population, the birth rate per 1,000 of the total population, and the death rate under 1 year per 1,000 births, for each of the 32 cities of the State:

BIRTH RATE PER 1,000 OF TOTAL POPULATION, DEATH RATE UNDER 1 YEAR OF
AGE PER 1,000 BIRTHS, AGGREGATE POPULATION, AND PER CENT OF FOREIGN
BORN IN 32 MASSACHUSETTS CITIES, 1885 AND 1905.

City.	Total population.		Per cent of foreign-born of total population.		Births per 1,000 total population.		Deaths under 1 year per 1,000 births.	
	1885. ^a	1905. ^b	1885. ^a	1905. ^b	1881-1890. ^c	1898-1907. ^d	1881-1890.	1898-1907.
Beverly.....	9,186	15,223	14.73	23.56	19.8	20.3	118.9	108.6
Boston.....	390,393	595,380	34.14	35.23	30.1	27.3	188.2	144.0
Brockton.....	20,783	47,794	19.40	25.68	23.6	21.2	146.9	109.5
Cambridge.....	59,658	97,434	32.16	32.70	28.9	26.5	172.3	130.1
Chelsea.....	25,709	37,289	25.60	37.23	25.1	28.2	166.9	133.2
Chicopee.....	11,516	20,191	39.79	39.21	31.1	37.6	176.1	178.4
Everett.....	5,825	29,111	20.86	28.60	33.6	26.0	131.9	121.5
Fall River.....	56,870	105,762	49.16	43.86	32.6	41.1	239.7	194.2
Fitchburg.....	15,375	33,021	23.98	34.82	31.2	29.6	134.3	137.4
Gloucester.....	21,703	26,011	32.32	32.93	26.4	23.7	138.8	135.2
Haverhill.....	21,795	37,830	19.09	23.42	26.4	23.6	157.1	121.1
Holyoke.....	27,895	49,934	49.79	39.59	42.1	31.6	168.1	187.8
Lawrence.....	38,862	70,050	43.94	46.08	30.2	30.1	213.9	181.2
Lowell.....	64,107	94,889	40.37	41.73	29.1	26.9	222.5	208.2
Lynn.....	45,867	77,042	21.30	28.52	25.8	21.8	140.7	133.0
Malden.....	16,407	38,037	26.41	28.91	28.9	22.1	133.4	129.3
Marlboro.....	10,941	14,073	26.17	23.39	30.7	21.3	154.6	124.0
Medford.....	9,042	19,686	23.38	22.75	22.4	22.1	130.9	101.5
New Bedford.....	33,393	74,362	30.71	42.70	28.9	34.0	177.7	172.2
Newburyport.....	13,716	14,675	19.00	19.01	22.9	21.1	152.7	111.3
Newton.....	19,759	36,827	27.81	29.07	22.1	21.2	111.9	112.8
North Adams.....	12,540	22,150	27.04	28.14	42.3	28.9	115.1	121.5
Northampton.....	12,896	19,957	26.01	24.76	23.4	21.4	135.7	122.4
Pittsfield.....	14,466	25,001	23.32	20.46	24.6	22.7	144.8	108.5
Quincy.....	12,145	28,076	30.34	34.26	34.9	27.3	124.0	111.9
Salem.....	28,090	37,627	27.05	29.56	24.9	27.1	180.6	166.5
Somerville.....	29,971	69,272	25.02	27.92	26.3	23.7	154.3	107.2
Springfield.....	37,575	73,540	23.79	25.21	27.3	22.6	157.3	125.4
Taunton.....	23,674	30,967	27.47	28.67	27.8	26.1	140.5	156.8
Waltham.....	14,609	26,282	27.47	28.23	25.1	19.5	131.7	103.1
Woburn.....	11,750	14,402	30.00	26.53	32.1	23.2	127.0	145.7
Worcester.....	68,389	128,135	29.51	32.38	31.0	26.7	155.6	137.1
Total.....	1,184,907	2,010,030	32.02	34.18	29.2	27.1	174.9	148.1
The State.....	1,942,141	3,003,680	27.13	30.56	26.2	25.0	160.4	141.7

^a From Census of Massachusetts, 1885, Vol. I, Part 1.

^b From Census of Massachusetts, 1905, Vol. I.

^c Average annual birth rate computed by dividing total number of births, 1881-1890, by ten times population at Census of Massachusetts, 1885.

^d Average annual birth rate computed by dividing total number of births, 1898-1907, by ten times population at Census of Massachusetts, 1905.

DECREASE IN INFANT MORTALITY.

Probably the first feature of the foregoing table to attract attention will be the decided decrease in the infant mortality rates for the State of Massachusetts and its 32 cities, the decrease for the State having been from an infant death rate of 160.4 per 1,000 births in the former decade to one of 141.7 in the latter ten-year period, and a corresponding decline in the case of the 32 cities from 174.9 to 148.1. Against the State's decrease of 18.7 in the infant death rate per 1,000 births, the 32 cities scored an even more marked decrease of 26.8 infant deaths per 1,000 births. In the case of the cities the decrease amounted to 15.3 per cent; in the case of the State, to but 11.7 per cent.

Before accepting this decrease at its apparent face value, two facts must be borne in mind: First, that improved methods of registration of vital statistics tend to bring the annual registrations of births closer to the actual number of births, and secondly, the fact that it was not until 1880 that the general court of Massachusetts ordained that births should be reported by physicians and midwives. Up to that time, even in Massachusetts, there was no such statutory requirement, and it is certain that as the years wore on the new law steadily came to be more generally observed. That would mean an increased percentage of birth-registrations, and by the consequent increase of the divisor (the number of births) a slow but sure decrease in the quotient of the division (the rate of infant deaths per 1,000 births). That there has been a decrease in infant mortality in Massachusetts in the last twenty years, there can be little doubt; it is a question, however, how far the material improvement of late years in the registration of births is responsible for the seeming material decrease shown in the preceding table.^a

PER CENT OF WOMEN GAINFULLY EMPLOYED AND PER CENT ILLITERATE, MARRIED, AND OF CHILD-BEARING AGE.

It would be desirable to classify by age groups the working female population of the places under investigation for the purpose of analyzing so far as possible the probable causes of their high or low infant mortality. In the case of the large number of cities included in the tables accompanying this article, however, and the great variety of occupations involved, the material for such a classification was not obtainable without an investigation for that especial purpose.

A great variety of conditions may affect the percentage of married women and the average age of the female population in any city. The nature of the principal occupation of the female population in any industrial town is by no means the only factor. Thus 20.3 per

^aThe number of births and deaths for each of the 32 cities studied, for each of the ten years embraced in the second decade considered in the foregoing table, will be found in the Appendix (p. 56 et seq.).

cent of the female cotton-mill operatives of 16 years and over in the United States in 1900 were married,^a thereby taking the lead of all factory employments in which large numbers of women are engaged. And yet, even in a city so preeminently a cotton-mill town as Fall River, in which nearly one-third the entire female population of 10 years and over in 1905 was at work in the cotton mills, the percentage of married women in that year was considerably lower than in many other large manufacturing towns of Massachusetts.

A comparison of the figures of the following table will show that in the main the percentages of married, widowed, and divorced women, and of women of child-bearing age held very uniform in 1885 and 1905 in most of the Massachusetts cities. The general uniformity is shown by the fact that in the 32 cities in question the ratio of married, widowed, and divorced women to the total female population of 10 years and over was 54.8 per cent in 1905, as compared with 54.9 per cent in 1885, and that the respective percentages for the State at large in these same years were 55.8 and 56.6. The same might be said of the ratios of women between ages 14 and 45, inclusive, the percentages for the 32 cities in 1905 and 1885, respectively, having been 55.7 and 56.6, and for the State at large 54.4 and 54.3.

These figures, therefore, while presented along with the other data under consideration, have little comparative significance, especially in view of the fact that it is impossible to say what proportion of either class are industrially employed.

NUMBER AND PER CENT OF FEMALES 10 YEARS OF AGE AND OVER IN 32 CITIES IN MASSACHUSETTS ENGAGED IN GAINFUL OCCUPATIONS AND NUMBER AND PER CENT OF ILLITERATES AND OF MARRIED, WIDOWED, OR DIVORCED WOMEN, WITH TOTAL FEMALE POPULATION AND NUMBER AND PER CENT OF FEMALES 14 TO 45 YEARS OF AGE, INCLUSIVE, 1885 AND 1905.

[Compiled from Census of Massachusetts, 1885 and 1905.]

1885.

Cities.	Female population 10 years of age and over.							Women of ages 14 to 45, inclusive.		
	Total.	Engaged in gainful occupations, domestic service not included.		Illiterates.		Married, widowed, or divorced.		Total female population.	Num-ber.	Per cent of total female population.
		Num-ber.	Per cent.	Num-ber.	Per cent.	Num-ber.	Per cent.			
Beverly.....	4,094	650	15.9	138	3.37	2,319	56.6	4,837	2,640	54.6
Boston.....	168,975	29,103	17.2	16,129	9.55	90,800	53.7	204,211	117,960	57.8
Brockton.....	8,459	1,593	18.8	342	4.04	5,288	62.5	10,385	6,059	58.3
Cambridge.....	25,049	3,818	15.2	2,400	9.58	13,691	54.7	31,049	17,121	55.1
Chelsea.....	11,200	1,415	12.6	339	3.03	6,499	58.0	13,570	7,565	55.7
Chicopee.....	5,086	1,654	32.5	1,087	21.37	2,688	52.9	6,159	3,415	55.4
Everett.....	2,411	226	9.4	60	2.49	1,494	62.0	2,944	1,598	54.3
Fall River.....	23,723	8,776	37.0	5,915	24.93	12,631	53.2	30,063	16,949	56.4
Fitchburg.....	6,343	1,114	17.6	608	9.59	3,718	58.6	7,873	4,248	54.0
Gloucester.....	7,890	676	8.6	563	7.14	4,726	59.9	9,980	5,291	53.0
Haverhill.....	9,336	2,161	23.1	573	6.14	5,697	61.0	11,340	6,433	56.7

^a Bureau of the Census, Statistics of Women at Work, p. 38.

NUMBER AND PER CENT OF FEMALES 10 YEARS OF AGE AND OVER IN 32 CITIES IN MASSACHUSETTS ENGAGED IN GAINFUL OCCUPATIONS AND NUMBER AND PER CENT OF ILLITERATES AND OF MARRIED, WIDOWED, OR DIVORCED WOMEN, WITH TOTAL FEMALE POPULATION AND NUMBER AND PER CENT OF FEMALES 14 TO 45 YEARS OF AGE, INCLUSIVE, 1885 AND 1905—Concluded.

1885—Concluded.

Cities.	Female population 10 years of age and over.						Women of ages 14 to 45, inclusive.			
	Total.	Engaged in gainful occupations, domestic service not included.		Illiterates.		Married, widowed, or divorced.		Total female population.	Number.	Per cent of total female population.
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.			
Holyoke.....	11,598	4,328	37.3	2,193	18.91	5,862	50.5	14,677	8,694	59.0
Lawrence.....	17,411	6,045	34.7	2,143	12.31	9,095	52.2	21,156	12,277	58.2
Lowell.....	29,916	11,275	37.7	3,853	12.88	15,408	51.5	35,590	21,154	59.4
Lynn.....	20,140	4,982	24.7	1,076	5.34	11,866	58.9	24,115	13,976	58.0
Malden.....	7,293	1,288	17.7	309	4.24	4,079	55.9	8,717	5,052	58.0
Marlboro.....	4,280	944	22.1	571	13.34	2,407	56.2	5,374	2,900	54.0
Medford.....	3,805	433	11.4	212	5.57	2,114	55.6	4,624	2,525	54.6
New Bedford.....	14,982	3,409	22.8	2,164	14.44	8,692	58.0	17,980	9,815	54.6
Newburyport.....	6,401	1,255	19.6	693	10.83	3,631	56.7	7,554	3,728	49.4
Newton.....	9,263	996	10.8	677	7.31	4,437	47.9	11,018	6,402	58.1
North Adams.....	5,173	1,158	22.4	501	9.68	2,897	56.0	6,481	3,617	55.8
Northampton.....	5,977	1,126	18.8	550	9.20	2,993	50.1	7,044	3,941	55.9
Pittsfield.....	6,140	1,200	19.5	351	5.72	3,231	52.6	7,596	4,100	54.0
Quincy.....	4,678	395	8.4	332	7.10	2,754	58.9	5,953	3,154	53.0
Salem.....	12,791	2,468	19.3	1,185	9.26	6,748	52.8	15,315	8,196	53.5
Somerville.....	12,754	1,474	11.6	754	5.91	7,407	58.1	15,781	8,806	55.1
Springfield.....	16,359	2,749	16.8	1,429	8.74	9,514	58.2	19,698	10,996	55.8
Taunton.....	10,099	1,873	18.5	913	9.04	5,708	56.5	12,146	6,605	54.4
Waltham.....	6,639	1,734	26.1	521	7.85	3,427	51.6	7,901	4,607	58.3
Woburn.....	4,595	582	12.7	492	10.71	2,706	58.9	5,848	2,963	50.7
Worcester.....	27,794	4,083	14.7	2,417	8.70	15,906	57.2	34,707	19,019	54.8
Total.....	510,654	104,983	20.6	51,490	10.08	250,434	54.9	621,686	351,806	56.6
The State.....	830,214	152,161	18.3	76,713	9.24	470,206	56.6	1,009,257	547,811	54.3

1905.

Beverly.....	6,474	1,156	17.9	138	2.13	3,781	58.4	7,673	4,063	53.0
Boston.....	252,157	59,861	23.7	13,666	5.42	134,208	53.2	305,071	173,874	57.0
Brockton.....	20,078	5,376	26.8	591	2.94	12,202	60.8	24,220	13,813	57.0
Cambridge.....	41,141	9,673	23.5	1,718	4.18	21,890	53.2	50,203	27,805	55.4
Chelsea.....	14,909	3,117	20.9	896	6.01	4,877	58.2	18,740	10,011	53.4
Chicopee.....	7,869	2,536	32.2	802	10.19	4,382	55.7	10,101	5,556	55.0
Everett.....	12,037	2,319	19.3	245	2.04	7,396	61.4	14,941	8,172	54.7
Fall River.....	43,586	16,839	38.6	6,582	15.10	23,291	53.4	55,375	30,278	54.7
Fitchburg.....	13,495	3,416	25.3	718	5.32	7,521	55.7	16,791	9,013	53.7
Gloucester.....	10,089	1,522	15.1	573	5.70	6,044	60.1	12,410	6,419	51.8
Haverhill.....	16,501	4,334	26.3	594	3.60	9,805	59.4	19,805	10,716	54.1
Holyoke.....	20,913	7,126	34.1	1,847	8.83	10,506	50.2	26,165	14,936	57.1
Lawrence.....	28,983	10,665	36.9	3,034	10.49	15,716	54.3	35,986	20,346	56.5
Lowell.....	41,598	15,215	36.6	2,913	7.00	21,721	52.2	50,019	28,784	57.5
Lynn.....	32,759	9,384	28.6	707	2.16	19,656	60.0	38,916	21,955	56.4
Malden.....	16,930	3,685	21.8	594	3.51	9,430	55.7	20,457	11,281	55.1
Marlboro.....	6,078	1,694	27.9	245	4.03	3,299	54.3	7,277	3,890	53.6
Medford.....	8,560	1,412	16.5	130	1.52	4,968	58.0	10,343	4,670	45.2
New Bedford.....	31,426	9,943	31.6	3,888	12.37	17,944	57.1	38,631	21,398	55.4
Newburyport.....	6,635	1,498	22.6	292	4.40	3,775	56.9	7,793	3,860	49.5
Newton.....	17,515	2,822	16.1	438	2.50	8,466	48.3	20,658	11,827	57.3
North Adams.....	9,207	2,551	27.7	628	6.82	5,154	56.0	11,501	6,266	54.5
Northampton.....	9,590	2,213	23.1	707	7.37	4,380	45.7	11,221	6,570	58.6
Pittsfield.....	10,840	2,696	24.9	420	3.87	5,826	53.7	12,926	7,268	56.2
Quincy.....	10,830	1,640	15.1	331	3.06	6,230	57.5	13,654	7,324	53.6
Salem.....	16,154	3,912	24.2	797	4.93	8,661	53.6	19,788	10,331	52.2
Somerville.....	30,083	5,831	19.4	750	2.40	17,862	59.4	36,514	19,875	54.4
Springfield.....	32,021	7,294	22.8	1,438	4.49	18,143	56.7	38,202	21,455	56.2
Taunton.....	13,066	2,925	22.4	1,007	7.71	7,272	55.7	15,922	8,308	52.1
Waltham.....	12,264	3,860	31.5	684	5.58	5,947	48.5	14,263	8,394	58.9
Woburn.....	5,927	1,061	17.9	252	4.25	3,200	54.1	7,313	3,714	50.8
Worcester.....	52,631	11,412	21.7	2,843	5.40	29,367	55.8	64,493	35,387	54.9
Total.....	852,266	218,988	25.7	50,468	5.92	466,729	54.8	1,037,372	577,563	55.7
The State.....	1,272,110	298,691	23.5	69,634	5.47	710,036	55.8	1,542,091	838,771	54.4

The omission is of little importance, however, in connection with this study. Precisely the same method of calculating the working female population having been applied to the 32 cities of Massachusetts for both 1885 and 1905, the figures for the two years are comparable. And, furthermore, as it is mainly with females engaged in manufacturing pursuits that any study of the relations of women's work and infant mortality has to deal, the method necessarily employed fully serves its purpose. It has seemed proper to explain the basis of calculation in order that the table in question and those which follow might give rise to no misunderstanding of their exact meaning. The tables dealing with these same 32 Massachusetts cities which follow have all been worked out on the same basis.^a

Attention must again be called to the fact that while the foregoing table presents the number and per cent of women of 10 years and over industrially employed, that number is not the fact necessary for an entirely satisfactory basis for discussion. What is really needed is an accurate statement of the number of married, widowed, and divorced women between the ages of 14 and 45 who are employed outside of their homes. The figures in the table are at best but an uncertain indication of what is the true situation in this regard.

In both tables all females of 10 years and over engaged in gainful occupations, other than "domestic service," are included.

The difference in ages of those persons classified as "children at work" in the two decades is to be noted. In the census of 1885 their ages were given as 10 to 13 years, and for 1905 as from 10 to 15 years. In so far as this slight difference in ages is concerned, that discrepancy is apparent rather than real, those working females of ages 14 and 15 not included under the classification of "children at work" in the 1885 figures being otherwise listed in their several occupations in the Massachusetts census for that year, whereas in view of the revised laws of the Commonwealth in 1905 they were not then numbered among the women employed, but included in the number of "children at work" between ages 10 to 15 years.

It will be seen that the illiteracy of the female population 10 years of age and over has been presented as indicative of the educational limitations of the population. While the female illiteracy is usually slightly higher than the illiteracy for the entire population, especially where there is a large per cent of foreign born, the difference is slight. But when the intelligence of motherhood is in question, it would seem to be the more significant factor.

An examination of the table discloses at once a situation practically parallel to that indicated for the larger area of the New England

^a A detailed table showing the general occupation groups included in the totals for women gainfully employed in the 32 cities studied, domestic service excluded, will be found in the Appendix (p. 59).

States, namely, there are present a number of interrelated significant factors, and it is not possible to select any one as dominant in the production of a high infant mortality rate or its opposite.

CITIES HIGHEST IN PER CENT OF WOMEN GAINFULLY EMPLOYED AND IN INFANT DEATH RATE.

In order to present the situation more clearly, the 10 cities which rank highest in respect to the two main factors under consideration, the per cent of women 10 years of age and over industrially employed and the infant death rate, have been presented in separate tables, which include the other chief factors under consideration in these Massachusetts towns, namely, the birth rate, the per cent of foreign born in the total population, and the per cent of illiteracy in the female population of 10 years and over.

It will be noted that two items have been omitted from this more critical consideration, namely, the per cent of women 10 years of age and over who are married, widowed, or divorced, and the per cent of all women who are between the ages of 14 and 45. It will be found on examination of the preceding table that the last-named point has no significance. The proportion of women between the ages of 14 and 45 is practically constant for each city at the two census periods, and even the variation between different cities is slight, with the exception of one or two residence towns of no importance in this discussion. Concerning the proportion of women 10 years of age and over who are married, widowed, or divorced, there are certain variations which will be noted later, but which do not appear to be of sufficient importance to necessitate its insertion in the tables below.

INFANT MORTALITY, BIRTH RATE, FOREIGN BORN IN TOTAL POPULATION, AND FEMALE ILLITERACY IN TEN MASSACHUSETTS CITIES HAVING HIGHEST PER CENT OF FEMALES 10 YEARS AND OVER GAINFULLY EMPLOYED.

1885.

Cities.	Per cent of females 10 years of age and over gainfully employed, 1885. ^a	Deaths under 1 year per 1,000 births, 1881-1890.	Births per 1,000 population, 1881-1890.	Per cent of foreign born of total population, 1885.	Per cent of illiterates in female population 10 years of age and over, 1885.
1. Lowell.....	37.7	222.5	29.1	40.37	12.88
2. Holyoke.....	37.3	168.1	42.1	49.79	18.91
3. Fall River.....	37.0	239.7	32.6	49.16	24.93
4. Lawrence.....	34.7	213.9	30.2	43.99	12.31
5. Chicopee.....	32.5	176.1	31.1	39.79	21.37
6. Waltham.....	26.1	131.7	25.1	27.47	7.85
7. Lynn.....	24.7	140.7	25.8	21.30	5.34
8. Haverhill.....	23.1	157.1	26.4	19.09	6.14
9. New Bedford.....	22.8	177.7	28.9	30.71	14.44
10. North Adams.....	22.4	115.1	42.3	27.04	9.68

INFANT MORTALITY, BIRTH RATE, FOREIGN BORN IN TOTAL POPULATION, AND FEMALE ILLITERACY IN TEN MASSACHUSETTS CITIES HAVING HIGHEST PER CENT OF FEMALES 10 YEARS AND OVER GAINFULLY EMPLOYED—Concluded.

1905.

Cities.	Per cent of females 10 years of age and over gainfully employed, 1905. ^a	Deaths under 1 year per 1,000 births, 1895-1907.	Births per 1,000 population, 1895-1907.	Per cent of foreign born of total population, 1905.	Per cent of illiterates in female population 10 years of age and over, 1905.
1. Fall River.....	38.6	194.2	41.1	43.86	15.10
2. Lawrence.....	36.9	181.2	30.1	46.08	10.49
3. Lowell.....	36.6	208.2	26.9	41.73	7.00
4. Holyoke.....	34.1	187.8	31.6	39.59	8.83
5. Chicopee.....	32.2	178.4	37.6	39.21	10.19
6. New Bedford.....	31.6	172.2	34.0	42.70	12.37
7. Waltham.....	31.5	103.1	19.5	28.23	5.58
8. Lynn.....	28.6	133.0	21.8	28.52	2.16
9. Marlboro.....	27.9	124.0	21.3	23.39	4.03
10. North Adams.....	27.7	121.5	28.9	28.14	6.82

^a Domestic service excluded.

BIRTH RATE, FOREIGN BORN IN TOTAL POPULATION, AND ILLITERACY AND EMPLOYMENT OF FEMALES IN TEN MASSACHUSETTS CITIES WITH HIGHEST INFANT MORTALITY RATES FOR TWO DECADES.

1881-1890.

Cities.	Deaths under 1 year per 1,000 births, 1881-1890.	Births per 1,000 population, 1881-1890.	Per cent of foreign-born of total population, 1885.	Per cent of illiterates in female population 10 years of age and over, 1885.	Per cent of females 10 years and over engaged in gainful occupations, 1885. ^a
1. Fall River.....	239.7	32.6	49.16	24.93	37.0
2. Lowell.....	222.5	29.1	40.37	12.88	37.7
3. Lawrence.....	213.9	30.2	46.08	12.31	34.7
4. Boston.....	188.2	30.1	34.14	9.55	17.2
5. Salem.....	180.6	24.9	27.06	9.26	19.3
6. New Bedford.....	177.7	28.9	30.71	14.44	22.8
7. Chicopee.....	176.1	31.1	39.79	21.37	32.5
8. Cambridge.....	172.3	28.9	32.15	9.58	15.2
9. Holyoke.....	168.1	42.1	49.79	18.91	37.3
10. Chelsea.....	166.9	25.1	25.60	3.03	12.6

1898-1907.

Cities.	Deaths under 1 year per 1,000 births, 1898-1907.	Births per 1,000 population, 1898-1907.	Per cent of foreign-born of total population, 1905.	Per cent of illiterates in female population 10 years of age and over, 1905.	Per cent of females 10 years and over engaged in gainful occupations, 1905. ^a
1. Lowell.....	208.2	26.9	41.73	7.00	36.6
2. Fall River.....	194.2	41.1	43.86	15.10	38.6
3. Holyoke.....	187.8	31.6	39.59	8.83	34.1
4. Lawrence.....	181.2	30.1	46.08	10.49	36.9
5. Chicopee.....	178.4	37.6	39.21	10.19	32.2
6. New Bedford.....	172.2	34.0	42.70	12.37	31.6
7. Salem.....	166.5	27.1	29.56	4.93	24.2
8. Taunton.....	156.8	26.1	28.67	7.71	22.4
9. Woburn.....	145.7	19.5	26.53	4.25	17.9
10. Boston.....	144.0	27.3	35.23	5.42	23.7

^a Domestic service excluded.

The exclusion of females employed in the group of occupations classed as "domestic service" was necessary in the foregoing table for the reason that the figures of the 1905 census by cities made no distinction between women who are doing their own housekeeping and those employed for compensation in any of the numerous occupations included under that general heading. The Massachusetts census for 1885 did so differentiate. But no distinction on these lines being available in the case of the 1905 figures, in order to place the returns for both census years on a common basis it was necessary to omit from the table all females so employed. The Twelfth Census puts the total number of females of 10 years of age and over employed in gainful occupations in Massachusetts at 28.1 per cent of the total female population of that age. In the above table, from which these women engaged in "domestic service" have been excluded, the percentage of females of that age employed in Massachusetts in 1905 was 23.5 per cent of the female population of 10 years and over. There is, therefore, an apparent difference of only 4.6 per cent in the two methods. The inclusion of women employed in domestic service for compensation in 1905, therefore, would probably have increased the total of 218,988 women 10 years of age and over gainfully employed in that year in the specified cities, as shown by the table, by from 4 to 5 per cent of the total population of 852,266 females of that age in those cities.

It is at once seen by comparison of these tables that the 6 cities of Fall River, Lawrence, Lowell, New Bedford, Holyoke, and Chicopee are found among the 10 highest, both as regards infant mortality and the employment of women. Again, as in the case of the 6 New England States discussed on pages 22 and 23, if we were to go no further, the indication would be that the high infant mortality is a direct result of the industrial employment of women. But reference to the earlier tables (pp. 28, 30, and 31) at once discloses that these same 6 cities are also among the 10 highest in per cent of foreign-born of the total population and in the per cent of female illiteracy. Not quite the same uniformity is found in regard to the birth rate. It has already been noted that the figures for the birth rate are by no means accurate, especially for the earlier period. In that decennium only Fall River, Holyoke, and Chicopee appear among the 10 highest. In the later period, however, Fall River, Chicopee, New Bedford, Holyoke, and Lawrence are all found among the 10 highest in respect to the birth rate.

The remaining 4 cities in the two tables show great irregularity, and the presence of other influential factors is evident. In other words, while there is a clear relationship between infant mortality and the other circumstances under consideration it is not an invariable relationship.

**CITIES LOWEST IN PER CENT OF WOMEN GAINFULLY EMPLOYED AND
IN INFANT DEATH RATE.**

The two following tables present the 15 cities which are lowest both for per cent of women gainfully employed and for infant mortality. It was desirable to consider 15 in this group rather than 10, as in the preceding tables, because a large number of strictly residence cities inevitably fall into this group. Hence the group was made larger, so that several cities industrial in character, but with a comparatively low mortality rate, might be included.

INFANT MORTALITY BIRTH RATE, FOREIGN BORN IN TOTAL POPULATION, AND
FEMALE ILLITERACY IN FIFTEEN MASSACHUSETTS CITIES HAVING LOWEST
PER CENT OF FEMALES 10 YEARS AND OVER GAINFULLY EMPLOYED.

1885.

Cities.	Per cent of females 10 years of age and over gainfully employed, 1885. ^a	Deaths under 1 year per 1,000 births, 1881-1890.	Births per 1,000 population, 1881-1890.	Per cent of foreign-born of total population, 1885.	Per cent of illiterates in female population 10 years of age and over, 1885.
1. Quincy.....	8.4	124.0	34.9	30.34	7.10
2. Gloucester.....	8.6	138.8	26.4	32.32	7.44
3. Everett.....	9.4	131.9	33.6	20.86	2.49
4. Newton.....	10.8	111.9	22.1	27.81	7.31
5. Medford.....	11.4	130.9	22.4	23.38	5.57
6. Somerville.....	11.6	154.3	26.3	25.02	5.91
7. Chelsea.....	12.6	166.9	25.1	25.60	3.03
8. Woburn.....	12.7	127.0	32.1	30.00	10.71
9. Worcester.....	14.7	155.6	31.0	29.51	8.70
10. Cambridge.....	15.2	172.3	28.9	32.16	9.58
11. Beverly.....	15.9	118.9	19.8	14.73	3.37
12. Springfield.....	16.8	157.3	27.3	23.79	8.74
13. Boston.....	17.2	188.2	30.1	34.14	9.55
14. Fitchburg.....	17.6	134.3	31.2	23.98	9.59
15. Malden.....	17.7	133.4	28.9	26.41	4.24

1905.

Cities.	Per cent of females 10 years of age and over gainfully employed, 1905. ^a	Deaths under 1 year per 1,000 births, 1898-1907.	Births per 1,000 population, 1898-1907.	Per cent of foreign-born of total population, 1905.	Per cent of illiterates in female population 10 years of age and over, 1905.
1. Quincy.....	15.1	111.9	27.3	34.26	3.06
2. Gloucester.....	15.1	135.2	23.7	32.93	5.70
3. Newton.....	16.1	112.8	21.2	29.07	2.50
4. Medford.....	16.5	101.5	22.1	22.75	1.52
5. Woburn.....	17.9	145.7	23.2	26.53	4.25
6. Beverly.....	17.9	108.6	20.3	23.56	2.13
7. Everett.....	19.3	121.5	26.0	28.60	2.04
8. Somerville.....	19.4	107.2	23.7	27.92	2.49
9. Chelsea.....	20.9	133.2	28.2	37.23	6.01
10. Worcester.....	21.7	137.1	26.7	32.38	5.40
11. Malden.....	21.8	129.3	22.1	28.91	3.51
12. Taunton.....	22.4	156.8	26.1	28.67	7.71
13. Newburyport.....	22.6	111.3	21.1	19.01	4.40
14. Springfield.....	22.8	125.4	22.6	25.21	4.49
15. Northampton.....	23.1	122.4	21.4	24.76	7.37

^a Domestic service excluded.

BIRTH RATE, FOREIGN BORN IN TOTAL POPULATION, AND ILLITERACY AND EMPLOYMENT OF FEMALES IN FIFTEEN MASSACHUSETTS CITIES HAVING LOWEST INFANT MORTALITY RATES.

1881 to 1890.

Cities.	Deaths under 1 year per 1,000 births, 1881-1890.	Births per 1,000 population, 1881-1890.	Per cent of foreign-born of total population, 1885.	Per cent of illiterates in female population 10 years of age and over, 1885.	Per cent of females 10 years of age and over engaged in gainful occupations, 1885. ^a
1. Newton.....	111.9	22.1	27.81	7.31	10.8
2. North Adams.....	115.1	42.3	27.04	9.68	22.4
3. Quincy.....	124.0	34.9	30.34	7.10	8.4
4. Woburn.....	127.0	32.1	30.00	10.71	12.7
5. Medford.....	130.9	22.4	23.38	5.57	11.4
6. Waltham.....	131.7	25.1	27.47	7.85	26.1
7. Everett.....	131.9	33.6	20.86	2.49	9.4
8. Malden.....	133.4	28.9	26.41	4.24	17.7
9. Fitchburg.....	134.3	31.2	23.98	9.59	17.6
10. Northampton.....	135.7	23.4	26.01	9.20	18.8
11. Gloucester.....	138.8	26.4	32.32	7.14	8.6
12. Taunton.....	140.5	27.8	27.75	9.04	18.5
13. Lynn.....	140.7	25.8	21.30	5.34	24.7
14. Pittsfield.....	144.8	24.6	23.32	5.72	19.5
15. Brockton.....	146.9	23.6	19.40	4.04	18.8

1898 to 1907.

Cities.	Deaths under 1 year per 1,000 births, 1898-1907.	Births per 1,000 population, 1898-1907.	Per cent of foreign-born of total population, 1905.	Per cent of illiterates in female population 10 years of age and over, 1905.	Per cent of females 10 years of age and over engaged in gainful occupations, 1905. ^a
1. Medford.....	101.5	22.1	22.75	1.52	16.5
2. Waltham.....	103.1	19.5	28.23	5.58	31.5
3. Somerville.....	107.2	23.7	27.92	2.49	19.4
4. Pittsfield.....	108.5	22.7	20.46	3.87	24.9
5. Beverly.....	108.6	20.3	23.56	2.13	17.9
6. Brockton.....	109.5	21.2	25.68	2.94	26.8
7. Newburyport.....	111.3	21.1	19.01	4.40	22.6
8. Quincy.....	111.9	27.3	34.26	3.06	15.1
9. Newton.....	112.8	21.2	29.07	2.50	16.1
10. Haverhill.....	121.1	23.6	23.42	3.60	26.3
11. North Adams.....	121.5	28.9	28.14	6.82	27.7
12. Everett.....	121.5	26.0	28.60	2.04	19.3
13. Northampton.....	122.4	21.4	24.76	7.37	23.1
14. Marlboro.....	124.0	21.3	23.39	4.03	27.9
15. Springfield.....	125.4	22.6	25.21	4.49	22.8

^a Domestic service excluded.

A study of these two groups of 15 cities shows, as might be anticipated, much less regularity than the preceding groups in respect to the factors under consideration. The first two groups presented are practically all large industrial cities. The second two groups are widely varied in respect to industries and general character.

Of the 15 cities with the lowest infant death rates in the earlier period, 7 appear among the 15 with the lowest percentage of fe-

males employed. In the later period, of the 15 cities with the lowest infant death rate, 9 appear among the 15 with the lowest percentage of females employed. In other words, a low percentage of women employed is not necessarily accompanied by a low infant death rate.

As regards the other tabulated items, on comparison with the table on page 36, in the earlier period it will be found that of the 15 cities lowest in respect to infant mortality, 8 are found among the 15 lowest for the birth rate, 7 are found among the 15 lowest for per cent of foreign-born, 10 are found among the 15 lowest for per cent of female illiteracy. In the later period, 12 are found among the 15 lowest for the birth rate, 13 are found among the 15 lowest for per cent of foreign-born, 11 are found among the 15 lowest for per cent of female illiteracy.

These comparisons indicate, superficially at least, that a more direct relation exists between infant mortality and the birth rate, the per cent of foreign-born, and the per cent of female illiteracy than between infant mortality and the employment of women.

It will be found on comparison of the tables immediately preceding with those on pages 33 and 34 that certain cities show notable irregularities. While in the earlier period the cities of Boston, Cambridge, and Chelsea appear among the 15 having the lowest per cents of women employed, they appear among the 10 highest with regard to infant mortality. In the later period the cities of Woburn and Taunton show a like situation. Of greater significance, however, are certain cities, which show a higher per cent of women industrially employed and a low infant death rate. In the earlier period the cities of Waltham, Lynn, and North Adams appear among the 10 cities having the highest per cent of women employed but are among the 15 lowest as regards infant mortality. In the later period, Waltham, Marlboro, and North Adams are among the 10 with the highest per cent of women employed but are among the 15 with the lowest infant death rates.

COMPARISON OF CITIES HIGH IN PERCENTAGE OF WOMEN GAINFULLY EMPLOYED AND WITH HIGH AND LOW INFANT MORTALITY.

To make clear this significant irregularity, the first 14 cities for each decade, according to the number of women industrially employed, were selected for presentation in a special table.

In order that a basis for comparison may be secured, by which to group them further, an arbitrary definition of "high" and "low" infant mortality has been set. For the earlier period, when the rate for the State of Massachusetts was 160.4 per 1,000 births, those cities with a rate over 165 per 1,000 have been considered as having a high rate, and those with a rate of 155 or less have been considered as

having a low rate. For the later period when the rate for the State of Massachusetts was 141.7 per 1,000, those cities having an infant death rate of over 145 per 1,000 have been considered as having a high rate, and those with a rate of 135 or less as having a low rate. These 14 cities were then classified on this basis as having high or low infant mortality rates. Two in each decade were omitted from further consideration because their mortality rates fell within the range of 10 points, which were so near to the average as to be excluded. The remaining 12 in each period are found to divide themselves into groups of 6 each, in respect to their infant death rate, and are presented, together with all related factors statistically available, in the following tables:

COMPARISON OF 12 INDUSTRIAL CITIES OF MASSACHUSETTS HAVING A HIGH PER CENT OF WOMEN AT WORK AS TO INFANT MORTALITY AND OTHER RELATED FACTORS, 1881 TO 1890.

6 CITIES WITH HIGH INFANT MORTALITY (RATE OF OVER 165 PER 1,000 BIRTHS).

Cities in order of per cent of females 10 years of age and over gainfully employed, 1885.	Total population, 1885.	Per cent of females 10 years of age and over gainfully employed 1885. ^a	Deaths under 1 year per 1,000 births, 1881-1890.	Births per 1,000 of total population, 1881-1890. ^b	Per cent of foreign born of total population, 1885.	Per cent of illiterates in female population 10 years of age and over, 1885.
1. Lowell.....	64,107	37.7	222.5	29.1	40.37	12.88
2. Holyoke.....	27,895	37.3	168.1	42.1	49.79	18.91
3. Fall River.....	56,870	37.0	239.7	32.6	49.16	24.93
4. Lawrence.....	38,862	34.7	213.9	30.2	43.99	12.31
5. Chicopee.....	11,516	32.5	176.1	31.1	39.79	21.37
6. New Bedford.....	33,393	22.8	177.7	28.9	30.71	14.44
Total.....	232,643	34.6	208.8	31.8	42.83	16.90
The State.....	1,942,141	18.3	160.4	26.2	27.13	9.24

^a Domestic service is excluded.

^b Calculated on population of cities at Massachusetts census of 1885.

6 CITIES WITH LOW INFANT MORTALITY (RATE OF LESS THAN 155 PER 1,000 BIRTHS).

Cities in order of per cent of females 10 years of age and over gainfully employed, 1885.	Total population, 1885.	Per cent of females 10 years of age and over gainfully employed, 1885.	Deaths under 1 year per 1,000 births, 1881-1890.	Births per 1,000 of total population, 1881-1890.	Per cent of foreign born of total population, 1885.	Per cent of illiterates in female population 10 years of age and over, 1885.
1. Waltham.....	14,609	26.1	131.7	25.1	27.47	7.85
2. Lynn.....	45,867	24.7	140.7	25.8	21.30	5.34
3. North Adams.....	12,540	22.8	115.1	42.3	27.04	9.68
4. Marlboro.....	10,941	22.1	154.6	30.7	26.17	13.34
5. Pittsfield.....	14,466	19.5	144.8	24.6	23.32	5.72
6. Brockton.....	20,783	18.8	146.9	23.6	19.40	4.04
Total.....	119,206	22.8	138.3	27.4	23.01	6.66

COMPARISON OF 12 INDUSTRIAL CITIES OF MASSACHUSETTS HAVING A HIGH PER CENT OF WOMEN AT WORK AS TO INFANT MORTALITY AND OTHER RELATED FACTORS, 1898 TO 1907.

6 CITIES WITH HIGH INFANT MORTALITY (RATE OF OVER 145 PER 1,000 BIRTHS).

Cities in order of per cent of females 10 years of age and over gainfully employed, 1905.	Total population, 1905.	Per cent of females 10 years of age and over gainfully employed, 1905.	Deaths under 1 year per 1,000 births, 1898-1907.	Births per 1,000 of total population, 1898-1907.	Per cent of foreign born of total population, 1905.	Per cent of illiterates in female population 10 years of age and over, 1905.
1. Fall River.....	105,762	38.6	194.2	41.1	43.86	15.10
2. Lawrence.....	70,050	36.9	181.2	30.1	46.08	10.49
3. Lowell.....	94,889	36.6	208.2	26.9	41.73	7.00
4. Holyoke.....	49,934	34.1	187.8	31.6	39.59	8.83
5. Chicopee.....	20,191	32.2	178.4	37.6	39.21	10.19
6. New Bedford.....	74,362	31.6	172.2	34.0	42.70	12.37
Total.....	415,188	35.8	189.2	33.4	42.81	10.93
The State.....	3,003,680	23.5	141.7	25.0	30.56	5.47

6 CITIES WITH LOW INFANT MORTALITY (RATE OF LESS THAN 135 PER 1,000 BIRTHS).

Cities in order of per cent of females 10 years of age and over gainfully employed, 1905.	Total population, 1905.	Per cent of females 10 years of age and over gainfully employed, 1905.	Deaths under 1 year per 1,000 births, 1898-1907.	Births per 1,000 of total population, 1898-1907.	Per cent of foreign born of total population, 1905.	Per cent of illiterates in female population 10 years of age and over, 1905.
1. Waltham.....	26,282	31.5	103.1	19.5	23.23	5.58
2. Lynn.....	77,042	28.6	133.0	21.8	23.52	2.16
3. Marlboro.....	14,073	27.9	124.0	21.3	23.39	4.03
4. North Adams.....	22,150	27.7	121.5	28.9	23.14	6.82
5. Brockton.....	47,794	26.8	109.5	21.2	25.68	2.49
6. Haverhill.....	37,830	26.3	121.1	23.6	23.42	3.60
Total.....	225,171	28.1	121.1	22.4	26.67	3.56

EARLIER PERIOD: 1881 TO 1890.

INDUSTRIES.

It will be seen at once that in the earlier period, 1881 to 1890, the high mortality group is the textile cities. The only notable exception is Holyoke, which is also the leading paper city of the State, that industry employing more persons than the cotton mills. The remaining cities are predominantly cotton cities, excepting Lawrence, where the worsted manufactures predominate.

As to the cities of the low mortality group, Waltham is the center of a great watch industry, but considerable cotton is manufactured. Lynn, Marlboro, and Brockton are distinctively shoe towns. North Adams manufactures both shoes and cotton. Pittsfield manufactures woolen goods in considerable quantities, but shows widely varied industries, such as woodworking and various branches of the metal trades.

POPULATION.

The cities of the high mortality group are much larger than those of the low mortality group. Certain cities in the two groups are fairly comparable, i. e., Lynn and Lawrence, Fall River and New Bedford, Brockton and Holyoke, or Marlboro, North Adams, and Chicopee. But the aggregate population for the 6 high mortality cities is 232,643, while that for the 6 low mortality cities is only 119,206, or almost exactly half that of the high mortality group.

PER CENT OF WOMEN OF 10 YEARS AND OVER GAINFULLY EMPLOYED.

Attention must again be called to the fact that the data presented under this heading are but a makeshift. The real essential is the number of actually employed mothers of children. In the absence of such data, all that can be done is to consider the figures for all women employed upon the assumption that the proportion of married women in that total is approximately proportionate to the number in the female population at large, a doubtful assumption to say the least. On that assumption, however, reference to the table on pages 30 and 31 indicates that out of the total of employed women in the group of low mortality cities a higher per cent of married women would be found than in the high mortality cities, for of the female population 10 years of age and over of Lynn, North Adams, Marlboro, and Brockton, respectively, 58.9 per cent, 56 per cent, 56.2 per cent, and 62.5 per cent are married. Each of these cities is above the average for the 32 cities, and Lynn and Brockton are above the average for the entire State of Massachusetts. On the other hand, Lowell, Fall River, Holyoke, Lawrence, and Chicopee are all below the average for the 32 cities or for the State of Massachusetts, showing per cents of married women of 51.5, 53.2, 50.5, 52.2, and 52.9, respectively.

All of the 12 cities are well above the average for the State as to the proportion of employed women. But in the 6 high mortality cities, the proportion is much higher than in the 6 low mortality cities.

BIRTH RATE.

All the cities in the high mortality group have a birth rate much above that for the State at large. Of the low mortality cities, four have a birth rate below that for the State at large, but two have an extremely high rate, which brings the rate for the group very slightly above that for the State at large.

INFANT DEATH RATE.

The infant mortality of the high mortality group is very much above not only the arbitrary limit set for this discussion, namely, 165 per 1,000, but is extreme in comparison to the infant mortality

rate for the 32 cities which embrace the major portion of the urban population of the State, 174.9 per 1,000 births. On the other hand, the rate for the low mortality group is not only low in comparison to the rate for the 32 cities, but is much below the rate for the State at large, 160.4 per 1,000, a rate in which the rural districts are included. The average rate for the 6 high mortality towns is indeed 70.5 per 1,000 higher than for the low mortality towns, a respectable death rate in itself.

FOREIGN BORN AND FEMALE ILLITERACY.

The per cents of foreign born and of female illiteracy show striking similarity, as is to be expected. The per cent of both factors is extremely high for the high mortality towns, and exceptionally low for the low mortality towns, being lower not only than the average for the 32 cities of the State, but for the State at large.

LATER PERIOD: 1898 TO 1907.

In the later period the relation of the two groups is practically the same. The only difference is the appearance of Haverhill in the low mortality group, in place of Pittsfield.

The preceding comparison shows clearly the complexity of the problem, and the unwisdom of hasty conclusions. Indeed, all statistical comparisons on this subject, unaccompanied by full information on many subjects not capable of statistical demonstration, must of necessity be inconclusive. A few observations, however, may not here be out of place.

POPULATION.

It seems that the size of towns exerts a certain influence. This is a view long held by students of the subject. Size alone, however, can not be determining, for when Holyoke with 49,934 people has an infant death rate of 187.8 per 1,000 births, while Brockton with 47,794 people has an infant death rate of only 109.5 per 1,000 births, or when Lawrence with a population of 70,050 has a death rate of 181.2 per 1,000 births, while Lynn with a population of 77,042 has an infant death rate of but 133 per 1,000 births, while Chicopee with only 20,191 people has a death rate of 178.4 per 1,000 births (later period), something else than the size of the town is the determining factor.

BIRTH RATE.

The fact that the birth rate is known to have been inaccurate in the earlier period (1881-1890) has already been noted. The figures for 1898 to 1907, however, may be said to be of value, and the high birth rate of the high mortality group presents a striking contrast to the rate for the low mortality group, though North Adams pre-

sents an exception. In this connection it should be noted that any error of understatement of the birth rate is likely to be considerably greater for the high than for the low mortality group, because the high mortality group of towns have a large foreign population and are to a considerable degree non-English speaking towns, while the low mortality towns have largely an American-born and English-speaking population. Hence complete registration would almost certainly serve to make the disparity between the two groups in this regard even greater than it is.

PER CENT OF WOMEN GAINFULLY EMPLOYED.

The difference in the per cent of women employed in the two groups is not nearly great enough to account for the great difference in infant mortality. Indeed, we have a group of towns which are above the average in the per cent of women employed, and far below it in regard to infant mortality. A causal relation can not, therefore, be said to be shown by this comparison.

FOREIGN-BORN AND FEMALE ILLITERACY.

The per cent of foreign-born and per cent of female illiteracy are clearly related, and may suggest a partial causal relation to infantile mortality.

One fact stands out clearly, however, in considering the two groups of cities, namely, the high mortality group is in general the textile towns, while the low mortality group is in general the shoe towns of the State of Massachusetts.

COMPARISON OF TEXTILE CITIES AND BOOT AND SHOE CITIES.

It is worth while, therefore, to examine in some detail the composition of the groups of female cotton-mill and boot and shoe operatives of Massachusetts, since these two industries are virtually contrasted in regard to the rate of infant mortality of the population which they employ.

The following tables present the main facts for these two groups:

NATIVITY AND PARENTAGE OF FEMALE COTTON-MILL OPERATIVES IN MASSACHUSETTS AND IN THE LEADING TEXTILE CITIES OF THAT STATE, 1905.

[From unpublished data furnished by the Massachusetts Bureau of Statistics, except the totals for the State, which are computed from the Census of Massachusetts, 1905, Vol. II, p. 69.]

NUMBER.

Female cotton-mill operatives.	The State.	Chicopee.	Fall River.	Fitchburg.	Holyoke.	Lawrence.	Lowell.	New Bedford.	Taunton.
Aggregate number.....	44,217	1,543	12,966	942	1,768	2,899	5,524	6,896	1,213
First generation:									
Native-born.....	17,110	418	5,335	306	735	1,183	1,865	2,084	568
Foreign-born.....	27,107	1,125	7,631	636	1,033	1,716	3,659	4,812	645
Second generation:									
Native father.....	3,606	63	836	56	137	246	476	363	131
Foreign father.....	40,611	1,480	12,130	886	1,631	2,653	5,048	6,513	1,082

NATIVITY AND PARENTAGE OF FEMALE COTTON-MILL OPERATIVES IN MASSACHUSETTS AND IN THE LEADING TEXTILE CITIES OF THAT STATE, 1905—Concl'd.

NUMBER—Concluded.

Female cotton-mill operatives.	The State.	Chicopee.	Fall River.	Fitchburg.	Holyoke.	Lawrence.	Lowell.	New Bedford.	Taunton.
Third generation:									
Both grandparents native.....	1,778	17	256	13	65	128	250	414	43
Both grandparents foreign.....	42,315	1,520	12,661	927	1,697	2,760	5,269	6,475	1,163
Grandparents mixed or unknown.....	124	6	49	2	6	11	5	7	2
Place of birth of father:									
Native—									
Born in Massachusetts.....	1,649	24	432	14	51	99	189	195	95
Born in other States.....	1,957	39	404	42	86	147	287	188	36
Foreign—									
Ireland.....	9,814	346	2,960	81	488	880	2,018	796	317
Canada, English.....	595	29	86	18	39	52	175	39	29
Canada, French.....	13,317	201	4,005	432	564	750	1,493	2,156	335
England.....	6,111	8	3,099	22	38	320	364	1,595	69
Germany.....	857	5	27	59	68	103	8	86	22
Scandinavia.....	112	.....	18	6	5	3	23	12	4
Italy.....	186	.....	57	13	.....	21	4	14	1
Poland.....	1,499	328	71	.....	42	63	78	38	28
Russia.....	460	6	68	186	6	33	26	36	8
Austria.....	2,936	546	142	8	324	136	262	311	114
Portugal.....	2,962	.....	1,268	.....	.....	70	266	1,207	111
Prince Edward Island.....	36	.....	4	.....	.....	12	11	.....	2
Newfoundland.....	18	1	7	.....	.....	.....	2	1	.....
Nova Scotia.....	142	1	26	2	.....	15	35	10	2
New Brunswick.....	119	.....	9	18	1	4	25	4	7
Scotland.....	843	2	224	36	43	94	91	13*	27
Wales.....	39	.....	18	1	.....	2	5	6	2
France.....	165	7	12	3	12	27	12	31	.....
Other countries.....	400	.....	29	1	1	68	210	38	4

PER CENT.

Aggregate number.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
First generation:									
Native-born.....	38.7	27.1	41.1	32.5	41.6	40.8	33.8	30.2	46.8
Foreign-born.....	61.3	72.9	58.9	67.5	58.4	59.2	66.2	69.8	53.2
Second generation:									
Native father.....	8.2	4.1	6.4	5.9	7.7	8.5	8.6	5.6	10.8
Foreign father.....	91.8	95.9	93.6	94.1	92.3	91.5	91.4	94.4	89.2
Third generation:									
Both grandparents native.....	4.0	1.1	2.0	1.4	3.7	4.4	4.5	6.0	3.5
Both grandparents foreign.....	95.7	98.5	97.6	98.4	96.0	95.2	95.4	93.9	96.3
Grandparents mixed or unknown.....	.3	.4	.4	.2	.3	.4	.1	.1	.2
Place of birth of father:									
Native—									
Born in Massachusetts.....	3.7	1.6	3.4	1.5	2.9	3.4	3.4	2.8	7.8
Born in other States.....	4.4	2.5	3.1	4.5	4.9	5.1	5.2	2.7	3.0
Foreign—									
Ireland.....	22.2	22.4	22.8	8.6	27.6	30.4	36.5	11.5	26.1
Canada, English.....	1.4	1.9	.7	1.9	2.2	1.8	3.2	.6	2.4
Canada, French.....	30.1	13.0	30.9	45.9	31.9	25.9	27.0	31.3	27.6
England.....	13.8	.5	23.9	2.3	2.1	11.0	6.6	23.1	5.7
Germany.....	1.9	.3	.2	6.3	3.8	3.6	.1	1.3	1.8
Scandinavia.....	.3	.....	.1	.6	.3	.1	.4	.2	.3
Italy.....	.4	.....	.4	1.4	.....	.7	.1	.2	.1
Poland.....	3.4	21.3	.6	.....	2.4	2.2	1.4	.6	2.3
Russia.....	1.0	.4	.5	19.8	.3	1.1	.5	.5	.7
Austria.....	6.6	35.4	1.1	.8	18.3	4.7	3.7	4.5	9.4
Portugal.....	6.7	.....	9.8	.....	.....	2.4	4.8	17.5	9.1
Prince Edward Island.....	.1	.....	(a)	.....	.....	.4	.2	.....	.2
Newfoundland.....	.1	.1	.1	.....	.....	.....	(a)	(a)	.....
Nova Scotia.....	.3	.1	.2	.....	.....	.5	.6	.1	.2
New Brunswick.....	.3	.....	.1	1.9	.1	.1	.5	.1	.6
Scotland.....	1.9	.1	1.7	3.8	2.4	3.2	1.7	1.9	2.2
Wales.....	.1	.....	.1	.1	.....	.1	.1	.1	.2
France.....	.4	.4	.1	.3	.7	.9	.2	.4	.....
Other countries.....	.9	.....	.2	.1	.1	2.1	3.8	.6	.3

* Less than one-tenth of 1 per cent.

NUMBER AND PER CENT OF FEMALE COTTON-MILL OPERATIVES IN SPECIFIED AGE GROUPS IN THE LEADING TEXTILE CITIES OF MASSACHUSETTS AND IN THE STATE, 1905.

[From Cotton Textile Industry, Vol. I, of this report, p. 45. Figures furnished by the Massachusetts Bureau of Statistics from data hitherto unpublished.]

NUMBER.

Age.	The State.	Chicopee.	Fall River.	Fitchburg.	Holyoke.	Lawrence.	Lowell.	New Bedford.	Taunton.
Under 16 years.....	2,794	73	832	79	169	152	232	411	65
16 to 24 years.....	22,265	839	6,167	569	1,032	1,283	2,219	3,542	696
25 to 44 years.....	16,430	562	5,122	270	506	1,199	2,496	2,634	403
45 to 64 years.....	2,657	68	828	24	60	256	560	304	48
65 years and over and unknown.....	71	1	17	.....	1	9	17	5	1
Total.....	44,217	1,543	12,966	942	1,768	2,899	5,524	6,896	1,213

PER CENT.

Under 16 years.....	6.3	4.7	6.4	8.4	9.5	5.2	4.2	5.9	5.4
16 to 24 years.....	50.3	54.4	47.6	60.4	58.4	44.3	40.2	51.4	57.4
25 to 44 years.....	37.2	36.4	39.5	28.7	28.6	41.4	45.2	38.2	33.2
45 to 64 years.....	6.0	4.4	6.4	2.5	3.4	8.8	10.1	4.4	3.9
65 years and over and unknown.....	.2	.1	.1	.....	.1	.3	.3	.1	.1
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

CONJUGAL CONDITION OF FEMALE COTTON-MILL OPERATIVES IN THE LEADING TEXTILE CITIES OF MASSACHUSETTS, 1905.

[From unpublished data furnished by the Massachusetts Bureau of Statistics, except the total for the State, which is from the Census of Massachusetts, 1905, Vol. II, p. 69.]

City.	Number.				Per cent.			
	Single and unknown.	Married.	Widowed and divorced.	Total.	Single and unknown.	Married.	Widowed and divorced.	Total.
The State.....	31,253	10,863	2,101	44,217	70.7	24.6	4.7	100.0
Chicopee.....	1,067	406	70	1,543	69.2	26.3	4.5	100.0
Fall River.....	8,751	3,615	600	12,966	67.5	27.9	4.6	100.0
Fitchburg.....	778	133	31	942	82.6	14.1	3.3	100.0
Holyoke.....	1,482	235	51	1,768	83.8	13.3	2.9	100.0
Lawrence.....	2,045	660	194	2,899	70.5	22.8	6.7	100.0
Lowell.....	3,560	1,531	433	5,524	64.5	27.7	7.8	100.0
New Bedford.....	4,737	1,879	280	6,896	68.7	27.2	4.1	100.0
Taunton.....	1,000	177	36	1,213	82.4	14.6	3.0	100.0

ILLITERACY OF FEMALE COTTON-MILL OPERATIVES IN THE LEADING TEXTILE CITIES OF MASSACHUSETTS, 1905.

[From unpublished data furnished by the Massachusetts Bureau of Statistics, except the total for the State, which is from the Census of Massachusetts, 1905, Vol. II, p. 69.]

City.	Total number of female operatives.	Number of illiterate female operatives.				Total.	Per cent of illiterate female operatives.			Percent of illiterate female operatives to total female operatives.
		Unable to read.	Unable to write.	Unable to read or write.	Unable to read.		Unable to write.	Unable to read or write.		
The State.....	44,217	2	495	5,193	5,690	(c)	8.7	91.3	12.9	
Chicopee.....	1,543	.....	75	211	286	.....	26.2	73.8	18.5
Fall River.....	12,966	1	140	1,606	1,747	0.1	8.0	91.9	13.5	
Fitchburg.....	942	.....	9	27	36	.....	25.0	75.0	3.8
Holyoke.....	1,768	.....	6	312	318	.....	1.9	98.1	18.0
Lawrence.....	2,899	.....	25	322	347	.....	7.2	92.8	12.0
Lowell.....	5,524	.....	63	621	684	.....	9.2	90.8	12.4
New Bedford.....	6,896	.....	13	891	904	.....	1.4	98.6	13.1
Taunton.....	1,213	1	14	137	152	.7	9.2	90.1	12.5	

^a Less than one-tenth of 1 per cent.

NATIVITY AND PARENTAGE OF FEMALE BOOT AND SHOE OPERATIVES OF MASSACHUSETTS, 1905.

[From Census of Massachusetts, 1905, Vol. II, p. 55.]

	Number.	Per cent.		Number.	Per cent.
Aggregate number.....	21,224	100.0	Place of birth of father—Concluded.		
First generation:			Foreign—Concluded.		
Native-born.....	16,734	78.8	Canada French.....	2,157	10.2
Foreign-born.....	4,490	21.2	England.....	755	3.6
Second generation:			Germany.....	324	1.5
Native father.....	8,027	37.8	Scandinavia.....	396	1.9
Foreign father.....	13,197	62.2	Italy.....	265	1.2
Third generation:			Poland.....	103	.5
Both grandparents native....	6,192	29.2	Russia.....	291	1.4
Both grandparents foreign....	14,835	69.9	Austria.....	46	.2
Grandparents mixed or unknown.....	197	.9	Portugal.....	77	.3
Place of birth of father:			Prince Edward Island....	123	.6
Native-born—			Newfoundland.....	105	.5
Massachusetts.....	4,710	22.2	Nova Scotia.....	970	4.6
Other States.....	3,317	15.6	New Brunswick.....	338	1.6
Foreign—			Scotland.....	262	1.2
Ireland.....	6,235	29.4	Wales.....	16	.1
Canada English.....	599	2.8	France.....	45	.2
			Other countries.....	90	.4

CONJUGAL CONDITION, AGE DISTRIBUTION, AND DEGREES OF ILLITERACY OF THE FEMALE BOOT AND SHOE OPERATIVES OF MASSACHUSETTS, 1905.

[From Census of Massachusetts, 1905, Vol. II, p. 55.]

	Number.	Per cent.		Number.	Per cent.
Aggregate number.....	21,224	100.0	Age periods—Concluded.		
Conjugal condition:			25 to 44 years.....	9,321	43.9
Single and unknown.....	15,613	73.6	45 to 64 years.....	1,894	8.9
Married.....	4,050	19.1	65 and over and unknown....	67	.3
Widowed and divorced....	1,561	7.3	Degree of illiteracy:		
Age periods:			Can not write.....	20	10.4
Under 15 years.....	633	3.0	Can neither read nor write..	172	89.6
16 to 24 years.....	9,309	43.9	Total.....	192	.9

The contrast between these two working forces is best emphasized by the fact that while in 1905, of the female cotton-mill operatives of the State, only 38.7 per cent were native-born, 78.8 per cent of the female shoe operatives were native-born. A marked difference in nativity of fathers also is shown. Of the shoe operatives, 37.8 per cent had native-born fathers, but of the cotton operatives only 8.2 per cent had native-born fathers.

The proportion of married women employed in the two industries does not differ very widely. The cotton industry shows 29.3 per cent of married, widowed, or divorced women employed, while of the boot and shoe operatives 26.4 per cent are married, widowed, or divorced.

The age distribution of the two industries, however, shows a considerable difference. If the number of operatives 16 to 44 years of age was considered, it would appear that the two working forces were practically identical in age composition, since of the boot and shoe operatives 87.8 per cent are of those ages, while of the cotton oper-

atives 87.5 fall in the same age group. But it will be found that while of the shoe operatives 43.9 per cent are 25 to 44 years of age, of the cotton operatives 37.2 per cent are of those ages. In other words, the shoe industry employs older women than the cotton industry. This is only to be expected, in view of the longer training required and the higher wages paid.

The greatest difference, however, is in the per cent of illiteracy of the two groups of women workers. The shoe operatives are practically a literate population, only 192, or 0.90 per cent, of the female shoe operatives of the State being reported as in any degree illiterate. Of the female cotton operatives, on the other hand, 5,690, or 12.9 per cent, were reported as illiterate. In other words, to each illiterate female shoe employee about 30 illiterate female cotton employees are found.

The difference between the economic condition of the two industries is emphasized by the difference in wages. In Bulletin 77, United States Bureau of Labor, pages 163-165, the wages of female closers-on for the State of Massachusetts in 1907 are shown as 19.4 cents per hour for a week averaging 52.69 hours, or a little over \$10 per full week, while female vampers are reported as averaging 26.01 cents per hour for an average week of 55.05 hours, or a little over \$14 for a full week. These occupations embrace the greater part of the female shoe operatives, though not all.

These wages serve to emphasize the well-known fact that the shoe trade is a highly paid industry. On the other hand, in the report on the cotton textile industry, issued also by the Bureau of Labor, it is shown that the largest number of female cotton-mill operatives in 46 representative factories in New England 78.5 per cent earned less than \$9 per week, while 55.5 per cent earned less than \$7 per week.^a Thus to the wide contrast between these groups of cities as to race, birth rate, and literacy is added a contrast quite as great in the wage-earning power of the people.

TEXTILE CITIES OF NEW ENGLAND OUTSIDE OF MASSACHUSETTS.

The following table, which exhibits the situation for a group of textile towns of New England outside of Massachusetts, giving the same data as have been presented for that State, so far as available, shows that the conditions in the Massachusetts textile towns are in no wise exceptional.

^a See Cotton Textile Industry, Vol. I of this report, p. 305.

DEATH RATE UNDER 1 YEAR FOR 1900 TO 1907, INCLUSIVE, IN FIVE NEW ENGLAND TEXTILE CITIES OUTSIDE OF MASSACHUSETTS, COMPARED TO THE NUMBER OF WOMEN OF 16 YEARS AND OVER, EMPLOYED IN MANUFACTURES, TOGETHER WITH TOTAL POPULATION, PROPORTION OF FOREIGN-BORN, AND BIRTH RATE.

State and city.	Total population, 1900. ^a	Per cent of foreign-born of total population, 1900. ^b	Total female population of 16 years and over, 1900.	Females 16 years of age and over employed in manufacturing in 1900.		Females 16 years of age and over at work in cotton mills, 1900.	Total births, 1900-1907.		Total deaths under 1 year, 1900-1907.	
				Number.	Per cent.		Number.	Average annual rate per 1,000 of total population. ^c	Number.	Death rate per 1,000 births.
Maine:										
Biddeford.....	16,145	44.28	^d 5,651	1,927	34.1	^e 1,500	4,289	37.95	829	193.3
Lewiston.....	23,761	39.20	^d 8,316	3,164	38.5	2,585	7,054	22.18	727	260.9
New Hampshire:										
Manchester.....	56,987	42.56	21,547	8,236	38.2	5,578	12,539	31.43	2,774	221.2
Rhode Island:										
Pawtucket.....	39,231	33.36	14,187	4,343	30.6	1,933	8,216	29.92	1,323	161.0
Woonsocket.....	28,204	44.38	9,508	2,635	27.7	1,092	8,228	41.68	1,287	156.4

^a Twelfth Census, 1900, Population, Part I, Table 8.

^b Computed from Twelfth Census, 1900, Population, Part I, Table 24.

^c Rate computed on population at Twelfth Census, 1900.

^d The reports of the Twelfth Census do not classify by ages the population of cities of less than 25,000, and there being no official age returns for the female population of Biddeford, Lewiston, Chicopee, and Burlington, the number of females 16 years of age and over in each of those cities has been estimated on the basis of 35 per cent of the total population in 1900, that having been, roughly speaking, the average ratio of females of 16 years of age and over to the total population of the New England States in 1900.

^e In default of United States Census returns regarding the number of women of 16 years of age and over employed in the cotton mills of this city in 1900, the numbers in question have been roughly estimated on the basis of the most reliable local information obtainable.

^f Figures are restricted to years 1906 and 1907, as prior to 1906 deaths for Lewiston were not separately reported.

In addition, at the close of this article will be found a detailed tabulation of the infant deaths and the deaths of children aged 1 to 4 years for the 13 New England cities studied by specific causes, as reported in the mortality returns of the United States Census Office for 1900 to 1908, inclusive.

CONCLUSION.

As noted at the beginning of this study, it has often been customary, in approaching statistically the subject of the employment of married women in its relation to infant mortality, to ignore the many other complex social and economic factors having a bearing upon the problem. The preceding tables show clearly that in the cities of New England certain of these factors which in the past have been ignored in the consideration of the problem are with fair uniformity coexistent with a high infant mortality rate; these being (1) a high proportion of foreign born, (2) a high female illiteracy, and (3) a high birth rate. These factors operate with equal force over large or small areas—that is, the results when the six New England States are regarded as units are not different than when individual cities of the

State of Massachusetts are studied as units, the degree of urbanization of the population taking the place of the size of towns, and accompanying the infant death rate with almost perfect regularity through the last three census periods.

The two other factors considered in this study relate themselves with less regularity to the infant death rate. The first of these is the size of cities. Large towns, in general, have rather higher rates than small towns, although, as already noted, this relationship is found not to be invariable. For example, in the decade 1898-1907 the city of Lynn, with a population of 77,042, had an infant death rate of but 133 per 1,000 births, while Lawrence, with a population of 70,050, had a death rate of 181.2 per 1,000; Brockton, with a population of 47,794, of only 109.5 per 1,000 births, while Chicopee, with a population of only 20,191, had an infant death rate of 178.4 per 1,000 births.

The second factor which is found, statistically speaking, associated very uncertainly, to say the least, with the infant death rate, is the subject of this study—the proportion of women engaged in extra-domestic occupations.

It is true that the six cities of Massachusetts having an extremely high infant death rate, have also a high proportion of women employed in extra-domestic occupations (see tables pp. 39 and 40). It is likewise true that these six cities with abnormal infant death rates have a considerably higher proportion of women so employed than the six industrial cities with low infant mortality rates presented with them for purposes of comparison. But the fact must not be lost sight of that, while the six cities with low infant death rates do show a smaller proportion of women industrially employed than the six high mortality cities, the per cent of women so employed in the six low mortality cities is a little higher than the per cent for the 32 cities shown on pages 30 and 31 and considerably higher than the per cent for the State of Massachusetts as a whole, while the infant mortality rate is not only lower than the rate for the 32 cities but is 19 per 1,000 less than the rate for the State at large, in which rural districts have been included. It will be seen that this result clearly disproves the contention that the extra-domestic employment of women is the dominant factor in determining the infant death rate so far as the Massachusetts cities are concerned.

It is desirable for a moment to revert to the real question of prime importance in the relation of women's work to infant mortality, namely, how many mothers of young children return to industrial employment outside of their homes before their infants have attained to the age of 1 year? Little accurate information is available, but the Report on the Condition of Woman and Child Wage-Earners

in the Cotton Textile Industry, to which previous reference has been made, shows that only 23, or 14.1 per cent, out of 163 married women working in cotton mills who were scheduled in New England had children under 3 years of age.^a The distribution of these 23 children by ages in detail is not shown; but it is obvious that the proportion of women working in the cotton mills who have infants (children under 1 year) at home must be very small at any particular time, and in no wise sufficient to account for the excessive infant mortality rate of the textile cities. The fact that the employment of mothers is not the chief factor in its determination is indicated conclusively by the detailed study of the infant mortality of Fall River during 1908, presented as Part II of this volume.

It has been noted repeatedly that the proportion which the number of foreign-born bears to the total population, the degree of urbanization, or size of cities, the birth rate, and the per cent of female illiteracy, bear, with few exceptions, a constant and striking relation to the infant death rate.

But it must not be inferred that these, any more than the extra-domestic employment of women, are the real causes which determine that death rate. All the factors discussed in this study are rather the indices of the true causes of high or low infant death rates, the causes themselves lying deep in the social and economic structure of the different population units under consideration.

These true causes have already received study abroad, and to a less degree have been investigated in the United States more recently, and a brief summary of the findings in the case will best serve to correlate the statistical facts presented in this paper with the conditions of whose presence they are the outward sign.

It is well again to emphasize the fundamental proposition, effectively stated by Doctor Newman, that "the causes of infant mortality are composite. It has been well said that every effect has an ancestry of causes. Preeminently is this the case in regard to infant mortality, which is due to a combination of factors closely interrelated."^b He

^aThe Report on the Condition of Woman and Child Wage-Earners in the Cotton Textile Industry (Vol. I of this report, pp. 1010 and 1032), to which previous reference has been made, shows that out of 407 married women living in the Massachusetts cotton-mill families visited in the course of the investigation of the Bureau of Labor only 101 married women were at work as wage-earners at the time of the visits, and that only 13, or 12.9 per cent, of these were mothers of children under 3 years of age. Out of 806 married women living in the New England families included in the same investigation 175 married women were at work, and only 23, or 14.1 per cent, had children under 3 years of age. Compare Men's Ready-Made Clothing, Volume II of this report, showing that only 9.9 per cent of the married women at work (not including home finishers) had children under 3 years of age; Glass Industry, Volume III, with 14.1 per cent; and Silk Industry, with 17.3 per cent.

^bNewman: Infant Mortality, p. 60.

further observes concerning the facts which seem to him to be indicated by a detailed examination of England's infant mortality statistics through many years:

1. Nearly one-half (about 48 per cent) of the infant deaths in towns occur in the first three months of life;

2. The chief fatality in these first three months is caused by prematurity and immaturity;

3. By far the greatest fatality in the remainder of the first year of life is due to inflammatory conditions of the lungs and to epidemic diarrhea; and

4. Infant mortality is not declining owing to the fact that while certain diseases have enormously decreased, prematurity, pneumonia, and epidemic diarrhea have, in spite of all advance in science, steadily increased, particularly in the towns and where the lamp of social life burns low.

Doctor Newsholme's observations, made in a recent official report,^a are, generally speaking, in agreement with Doctor Newman's statement of the salient facts, with the exception that Doctor Newsholme does not consider that there has been an absolute increase in England and Wales in deaths from prematurity. He states his conclusion thus: "There does not appear to be sufficient foundation for the statement that prematurity to an increasing extent is a cause of mortality in the English experience. There has probably been much transference of certification between different vague (related) causes of death, and it is safer to consider all these vague conditions together under a common heading. When this is done, evidence of increased death rate disappears."^b

Two additional observations by Doctor Newsholme should be added to the conclusions of Doctor Newman:

1. A high infant death rate in a given community implies in general a high death rate in the next four years of life, while low death rates at both age periods are similarly associated.^c

2. It is clear that the counties having high infant mortalities continue in general to suffer somewhat excessively throughout the first twenty years of human life, and that counties having low infantile mortalities continue to have relatively low death rates in the first twenty years of life, though the superiority is not so great at the later as at the earlier ages.^d

With these fundamental facts in mind it is possible to pass to a consideration of the true factors which influence infant mortality. The following statement of Doctor Newsholme, while referring to

^a Great Britain, Local Government Board, Supplement to Thirty-ninth Annual Report.

^b *Ibid.*, p. 35.

^c *Ibid.*, p. 13.

^d *Ibid.*, p. 17.

English conditions, is apparently almost equally applicable to the conditions prevalent in Massachusetts:

These [influences] may be classified into prenatal, acting through the mother and dependent on her health; natal, and still in large measure due to the condition of the mother, e. g., causes of difficult parturition, though the skill of the doctor or midwife is also largely concerned; and postnatal, which arise from environmental conditions.

It has been already seen that in the counties of England and Wales showing excessive or low infant mortality these different causes of high or low mortality are acting together to such an extent as to be almost inextricable. I prefer, therefore, for the present, to accept the tangle and to discuss the factors of infant mortality apart from any such attempt at separation.

Among the influences affecting infant mortality are the following. They are not given in order of importance.

1. The proportion of male to female births.
2. The proportion of legitimate to illegitimate births.
3. The magnitude of the birth rate, which may for the present purpose be otherwise put as the size of the family.
4. The number of stillbirths.
5. The quality of the help given at birth.
6. The age of the wife at marriage.
7. Poverty and social conditions.
8. The extra-domestic employment of married women.
9. Urban or rural conditions of life.
10. Domestic and municipal sanitation.
11. Conditions of housing.
12. Ignorance and fecklessness of mothers.

Obviously the above list is incomplete, and still more obviously the different factors overlap at various points.

It is beyond the province of this study to discuss in detail this complicated list of factors; but because of the bearing of certain of them upon the relation of the extra-domestic employment of married women to the infant death rate, these must be separately considered. It will be recalled that those factors statistically presented with the two just named were the proportion of foreign-born in the total population, the degree of urbanization of the population, the birth rate, and female illiteracy.

It may at first appear that two of these four factors, which were found to show an almost invariable statistical relation to the infant death rate of Massachusetts and of New England, namely, the proportion of foreign born and of female illiteracy, are unrelated to the determining influences listed by Doctor Newsholme. But a moment's observation will show that these two factors are but another expression of some of the most important factors named by him.

The newly arrived immigrant, especially if he be of a non-English speaking race, must usually begin at the bottom of the industrial ladder and, therefore, is usually poor. He crowds into cities, thus

rapidly increasing the degree of urbanization and the size of the cities. Owing to his ignorance, his poverty, and his low standard of life he is often found under the worst housing conditions which our cities afford. More than that, he not only lives in the worst houses, but in the worst districts of our cities, speaking from the sanitary viewpoint, and as if this is not enough, coupled with the unfair treatment which his adopted city gives him in the form of wretched housing and squalid streets, his wife, unused to the living conditions into which she finds herself thrust, is likely to be none too successful in her efforts to cope with the situation, and her house-keeping is often far from sanitary according to the standard necessary for urban health.

More than this, there is a distinct tendency to early marriage and large families among the foreign born, thus accentuating poverty, and owing to the custom among them of employing midwives, the quality of help given at birth is frequently far from good.

The proportion of foreign born in a given population also would serve in the absence of other data as an index of the ignorance of mothers, but in this case we have the high per cent of female illiteracy in the high mortality towns, a rough but valuable index of what Doctor Newsholme calls the "ignorance and fecklessness of mothers."

In other words, a high proportion of foreign born in a city, with its correlative, the per cent of female illiteracy, indicates with reasonable assurance that in that city—

(a) A large proportion of its population will live in poverty.

(b) A large proportion will live under the worst conditions as to, housing, domestic and municipal sanitation. This is likely to involve, it will be remembered, a bad milk supply and all the conditions of filth which are the powerful causes of epidemic diarrhea in infants.

(c) In such a city, with the preponderance of foreign traditions and standards, a large proportion of its women will marry young and bear large families.

(d) At birth too often the care given will be that of an ignorant midwife.

(e) After birth the mother, hampered by poverty and ignorance, often will have little idea how to care for her child.

It would seem, therefore, that at least some of Doctor Newsholme's conclusions as to the significance of these influences would be applicable equally to England or to Massachusetts. He finds that—

1. "Large families evidently do not necessarily imply a tendency to high infant mortality. The connection often observed between a high birth rate and a high rate of infant mortality probably is due in great part to the fact that large families are common among the poorest classes, and these classes are specially exposed to the degrading

influences producing excessive infant mortality.”^a Expressed in another form and applied to Massachusetts, the high birth rate of the Massachusetts cities having also a high death rate means that a large number of infants are born into conditions under which they can not survive.

2. As to the quality of help given at birth “there is much *prima facie* evidence pointing to negligent and careless attendance in child birth and to consequently excessive mortality not only of mothers but also of infants in early infancy.”^b

3. “Early motherhood is associated to a minor extent with a relatively high infant mortality.”

4. “Infant mortality is higher among the poor than among the well-to-do, although natural feeding of infants is probably more general among the former.”

5. “Infant mortality is always highest in crowded centers of population; but a high infant mortality can (by proper measures as to sanitation and housing) be avoided even under conditions of dense aggregation of population.”^c

6. “Infant mortality is highest in those counties where, under urban conditions of life, filthy privies are permitted, where scavenging is neglected, and where the streets and yards are to a large extent not ‘made up’ or ‘paved.’”^d

“Diarrhea is most prevalent where municipal sanitation is bad. It can not be entirely removed unless infants’ food is prepared under absolutely cleanly conditions.”

7. Doctor Newsholme quotes with approval in regard to the ignorance of mothers the following statement by Doctor Reid, county medical officer for Staffordshire:

“Of course there are many contributory causes of excessive infant mortality, most of which are preventable, but there is one which far exceeds all others in potency, namely, the prevailing ignorance among mothers as to the proper feeding of infants.”^e

An American authority on the diseases of children has recently reiterated this conclusion of Doctor Reid: “It is generally agreed that fully one-half of these infant deaths could be prevented by adequate measures of relief. In proof of this are two incontrovertible facts: First, the death rate among exclusively breast-fed babies is comparatively small. Second, the death rate among artificially fed babies, properly cared for and given the best artificial diet, is like-

^a Great Britain, Local Government Board, Supplement to Thirty-ninth Annual Report, p. 49.

^b *Ibid.*, p. 52.

^c *Ibid.*, p. 75.

^d *Ibid.*, p. 76.

^e *Ibid.*, p. 101.

wise small. Ignorance on the part of the mother is perhaps the greatest single factor in this annual slaughter of the innocents." ^a

It seems only reasonable to conclude that the presence of the conditions indicated above as productive of a high infant mortality are amply sufficient to account for the high mortality of the textile cities of Massachusetts, and that their absence in the great shoe cities, as indicated by the fact that the proportion of foreign-born is low, the illiteracy of the female population insignificant, and the wages in the dominant industry high, accounts for the relatively low infant mortality rates of those cities. That these factors are true indices of generally good conditions in the latter group is clearly shown by their general death rates. Brockton, with a general death rate of only 13.20 in 1900, was by far the healthiest city of its size in the entire East, and but 27 of all the 343 registration cities in the United States had a rate equally low. Lynn also had a comparatively low general death rate, and Haverhill, Marlboro, North Adams, and Waltham have all been well below the average general death rate of registration cities for many years. ^b

The point now to be considered is the English experience in regard to the employment of married women in extra-domestic occupations. It has been repeatedly emphasized that for the cities of Massachusetts accurate figures are not available, and in lieu of them the proportion of women of 10 years and over industrially employed has been taken as an index of the significance of this factor.

It was clearly shown that the statistics for the 32 cities of Massachusetts considered in detail in the preceding pages in no wise bear out the frequent assumption that the employment of married women is a major factor in determining the infant death rate. A detailed study of the infant mortality in Fall River, to which reference has been made, ^c likewise fails to support this contention.

In Great Britain the statement of Sir John Simon, already quoted, of that assumed relationship has been generally accepted without question until of late years. The interdepartmental committee on physical deterioration, however, which reported in 1904, although it cited much evidence which maintained its accuracy was, on the whole, rather noncommittal in its report, which stated that "though the facts seem to point to a strong presumption that it [excessive infant mortality] is also connected with the employment of mothers, the information is not so complete as might be desired." ^d In 1908,

^a J. H. Mason Knox, jr., In *Journal of the American Public Health Association*, January, 1911, p. 44.

^b See Massachusetts State Board of Health, Report for 1908, p. 812, and Twelfth Census, Vol. III, Part I, pp. 292-554.

^c See Part II of this volume.

^d Report of the Inter-Departmental Committee on Physical Deterioration, Vol. I, p. 45.

in commenting upon Doctor Simon's statements, Doctor Newman qualified them slightly: "We can not now, with the new facts and experience of half a century behind us, wholly subscribe to these conclusions."^a He admitted also that certain towns with a high infant mortality showed a low proportion of occupied women, and pointed out the complexity of the supposed relationship:

But the mere fact of extensive employment of women, and particularly of mothers in factories, can not be regarded as significant of itself. To gauge the effect of such employment on the children of such women, reference must be made to some of the following factors which play a part in the problem, namely, (a) the character and condition of the work, (b) the length of hours, (c) employment before and after childbirth, and (d) the sanitation of factories and workshops. To these also should be added the variations in the birth rate prevalent in different trades, the effect of certain industries upon maternity in the way of raising (if such be possible) or reducing the standard and practice of mothers as to the care of infants, and, lastly, the causes of the mothers' employment.

Doctor Newsholme, in a detailed analysis of the infant mortality statistics of England and Wales, has found that a study of the industries involved confirms the conclusion that the employment of married women is not a dominant factor, but reaches the reasonable conclusion that because it is not the greatest cause it does not follow that it is to be ignored.

It will thus be seen that this study, in indicating that the employment of women is not a controlling factor in determining the infant death rates of the cities of Massachusetts, is in exact agreement with the results of a careful analysis of English statistics through a long period.

APPENDIX.

TABLE I.—BIRTHS, AND DEATHS OF CHILDREN UNDER 1 YEAR OF AGE, IN 32 MASSACHUSETTS CITIES, 1898 TO 1907.

[Compiled by the Bureau of the Census.]

Year.	Beverly.		Boston.		Brockton.		Cambridge.		Chelsea.	
	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.
1898.....	291	36	16, 577	2, 569	871	118	2, 594	416	915	149
1899.....	266	40	16, 151	2, 401	915	100	2, 508	377	855	119
1900.....	322	34	16, 328	2, 400	945	115	2, 648	364	929	140
1901.....	277	24	15, 561	2, 289	902	102	2, 525	344	944	108
1902.....	293	28	15, 616	2, 269	934	80	2, 476	308	939	146
1903.....	283	40	15, 664	2, 181	918	88	2, 528	322	962	143
1904.....	300	26	15, 730	2, 219	992	113	2, 528	292	1, 056	128
1905.....	308	33	15, 661	2, 266	1, 119	109	2, 453	305	1, 225	159
1906.....	359	45	17, 062	2, 450	1, 171	129	2, 768	323	1, 251	155
1907.....	386	29	18, 229	2, 351	1, 354	154	2, 826	312	1, 439	154
Total	3, 085	335	162, 479	23, 395	10, 121	1, 108	25, 854	3, 363	10, 515	1, 401

^aNewman, Infant Mortality, p. 98.

INFANT MORTALITY IN MASSACHUSETTS.

TABLE I.—BIRTHS, AND DEATHS OF CHILDREN UNDER 1 YEAR OF AGE, IN 32 MASSACHUSETTS CITIES, 1898 TO 1907—Continued.

Year.	Chicopee.		Everett.		Fall River.		Fitchburg.		Gloucester.	
	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.
1898.....	738	146	708	93	4,726	780	940	142	651	105
1899.....	700	126	654	91	3,987	869	914	119	582	82
1900.....	752	157	781	103	4,327	885	1,013	157	667	78
1901.....	729	120	725	101	4,054	728	1,007	126	643	77
1902.....	787	144	747	101	4,341	893	937	135	635	90
1903.....	755	136	780	89	4,448	864	974	127	646	81
1904.....	766	111	756	78	4,514	806	968	112	601	86
1905.....	726	124	764	96	4,092	846	953	126	594	89
1906.....	805	137	789	82	4,333	812	986	163	598	80
1907.....	836	154	875	87	4,622	899	1,075	135	557	67
Total	7,594	1,355	7,579	921	43,444	8,382	9,767	1,342	6,174	835

Year.	Haverhill.		Holyoke.		Lawrence.		Lowell.		Lynn.	
	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.
1898.....	869	119	1,633	323	1,958	365	2,413	520	1,500	223
1899.....	892	104	1,692	257	1,786	404	2,415	555	1,533	189
1900.....	915	105	1,663	307	2,102	401	2,596	524	1,563	231
1901.....	819	86	1,634	292	1,921	354	2,794	547	1,567	196
1902.....	802	114	1,500	251	1,958	353	2,493	524	1,477	184
1903.....	877	101	1,512	326	2,045	361	2,519	662	1,569	204
1904.....	912	105	1,463	287	2,047	321	2,519	501	1,724	234
1905.....	834	106	1,514	268	2,089	413	2,500	494	1,698	256
1906.....	1,012	140	1,570	320	2,409	432	2,547	544	2,065	255
1907.....	977	101	1,610	334	2,761	414	2,704	537	2,110	262
Total	8,929	1,081	15,791	2,965	21,076	3,818	25,500	5,308	16,801	2,234

Year.	Malden.		Marlboro.		Medford.		New Bedford.		Newburyport.	
	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.
1898.....	848	128	336	32	365	53	2,048	387	282	34
1899.....	768	100	306	52	437	43	2,065	362	282	36
1900.....	764	118	279	59	446	59	2,230	439	314	39
1901.....	827	115	265	28	459	44	2,440	364	312	39
1902.....	800	96	289	35	416	44	2,437	446	350	54
1903.....	794	107	319	38	450	41	2,469	457	315	33
1904.....	820	91	282	28	433	44	2,620	448	328	26
1905.....	859	100	303	33	427	42	2,765	421	305	37
1906.....	883	120	321	39	454	35	2,949	462	299	31
1907.....	1,033	111	299	28	469	37	3,272	570	304	15
Total	8,396	1,086	2,999	372	4,356	442	25,295	4,356	3,091	344

TABLE I.—BIRTHS, AND DEATHS OF CHILDREN UNDER 1 YEAR OF AGE, IN 32 MASSACHUSETTS CITIES, 1898 TO 1907—Concluded.

Year.	Newton.		North Adams.		Northampton.		Pittsfield.		Quincy.	
	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.
1898.....	808	126	731	86	390	62	530	68	776	82
1899.....	767	95	612	84	387	31	495	59	707	108
1900.....	796	111	726	98	428	75	476	77	752	81
1901.....	752	89	674	94	399	50	502	60	709	65
1902.....	786	81	680	75	426	44	556	42	745	96
1903.....	766	71	654	72	447	47	562	60	773	76
1904.....	753	58	639	88	435	63	605	56	765	77
1905.....	749	93	584	65	453	57	598	59	767	82
1906.....	782	78	552	54	446	44	654	52	850	96
1907.....	841	78	545	61	452	49	700	83	832	94
Total	7,800	880	6,397	777	4,263	522	5,678	616	7,676	857

Year.	Salem.		Somerville.		Springfield.		Taunton.		Waltham.	
	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.
1898.....	954	128	1,570	196	1,584	221	772	109	500	59
1899.....	932	198	1,595	171	1,512	177	728	133	474	56
1900.....	994	191	1,570	224	1,560	258	788	161	516	64
1901.....	953	148	1,606	160	1,449	165	835	103	486	56
1902.....	937	136	1,583	160	1,592	194	756	93	512	44
1903.....	997	161	1,670	170	1,647	199	779	118	516	56
1904.....	1,076	171	1,625	168	1,624	213	811	126	535	47
1905.....	1,094	198	1,637	165	1,810	202	810	162	481	39
1906.....	1,128	179	1,769	185	1,816	220	885	142	551	55
1907.....	1,127	187	1,805	163	2,019	234	909	129	562	53
Total	10,192	1,697	16,430	1,762	16,613	2,083	8,073	1,266	5,133	529

Year.	Woburn.		Worcester.		Total for 32 cities.		The State.	
	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.	Births.	Deaths under 1 year.
1898.....	362	59	3,080	442	53,345	8,376	73,110	11,012
1899.....	363	54	3,070	422	51,350	8,014	70,457	10,532
1900.....	379	55	3,131	518	53,700	8,615	73,386	11,500
1901.....	292	44	3,291	419	52,353	7,552	71,976	9,952
1902.....	352	54	3,349	434	52,401	7,745	72,219	10,075
1903.....	330	40	3,501	474	53,459	7,872	73,584	10,269
1904.....	309	43	3,540	418	54,076	7,570	75,014	9,992
1905.....	312	35	3,510	503	53,994	7,967	75,022	10,519
1906.....	303	51	3,743	526	58,110	8,439	80,237	11,106
1907.....	334	51	3,998	535	61,862	8,514	85,001	11,293
Total.....	3,336	486	34,213	4,691	544,650	80,644	750,006	106,250

TABLE II.—FEMALE POPULATION 10 YEARS OF AGE AND OVER EMPLOYED IN GAINFUL OCCUPATIONS (DOMESTIC SERVICE NOT INCLUDED) IN 32 CITIES OF MASSACHUSETTS, BY OCCUPATIONS, 1885 AND 1905.

[Compiled from Census of Massachusetts, 1885 and 1905.]

City and year.	Number of females 10 years of age and over in each occupation or industry.										Total.	
	Gov-ern-ment.	Profes-sional service.	Per-sonal service.	Trade.	Trans-porta-tion.	Agri-cul-ture.	The fish-eries.	Manu-fac-tures.	La-bor-ers.	Appren-tices.		Chil-dren at work (10 to 15 years).
1885.												
Beverly.....	1	64	37	32	1			514			1	650
Boston.....	457	2,899	4,060	5,204	51	9		16,048	4	223	148	29,103
Brockton.....	4	116	72	117	1	1		1,269	1	4	8	1,593
Cambridge.....	32	441	460	487	26	7		2,325		27	13	3,818
Chelsea.....	6	172	140	272	3			818			4	1,415
Chicopee.....		58	44	30				1,509		4	9	1,654
Everett.....	1	36	10	39	2			137			1	226
Fall River.....	3	264	238	141		1		7,982	1	12	134	8,776
Fitchburg.....	9	101	32	69				894		3	6	1,114
Gloucester.....	8	141	76	80			7	354		4	6	676
Haverhill.....	1	156	106	143				1,739	1	8	7	2,161
Holyoke.....		148	84	90		6		3,973		2	25	4,328
Lawrence.....	10	200	159	229	3	3		5,392	8	14	27	6,045
Lowell.....	14	391	284	388	1	1		10,076	1	8	111	11,275
Lynn.....	17	280	230	384	4	1		4,055		3	8	4,982
Malden.....	14	148	146	120				852		2	6	1,288
Marlboro.....	2	61	29	30		1		812		5	4	944
Medford.....	6	60	35	76	1			253		2		433
New Bedford.....	10	217	184	187	2			2,739	5	7	58	3,409
Newburyport.....	2	115	72	84				972			10	1,255
Newton.....	14	228	95	75	4	1		563	1	6	9	996
North Adams.....		55	23	27		2		1,040			11	1,158
Northampton.....	47	114	29	47	2	4		877		2	4	1,126
Pittsfield.....	3	104	44	78		7		953		2	9	1,200
Quincy.....	4	90	40	61	1			193		5	1	395
Salem.....	23	226	212	252	5			1,713		6	31	2,468
Somerville.....	7	202	194	303	5			740		16	7	1,474
Springfield.....	15	282	259	258	1			1,905		14	15	2,749
Taunton.....	55	110	61	97				1,515	1	8	26	1,873
Waltham.....	5	82	41	92	3	1		1,495		2	13	1,734
Woburn.....	4	90	25	42	1			418			2	582
Worcester.....	127	496	261	385		7		2,772	1	25	9	4,083
The State.....	1,311	14,250	9,788	11,837	143	404	7	112,762	31	495	1,133	152,161
1905.												
Beverly.....	12	143	218	218	5	1		542		4	13	1,156
Boston.....	909	5,727	13,310	14,756	175	14	1	23,170	81	222	1,496	59,861
Brockton.....	29	311	505	759	5	2		3,660		13	92	5,376
Cambridge.....	103	1,023	2,188	1,785	27	3		4,267	3	48	226	9,673
Chelsea.....	32	269	437	692	19	1		1,573		3	9	3,117
Chicopee.....	11	117	97	184		1		2,006		4	116	2,536
Everett.....	15	244	448	645	5	1		914		10	37	2,319
Fall River.....	34	724	697	826	5	5		13,552		50	946	16,839
Fitchburg.....	25	304	333	379	5	6		2,201		4	160	3,416
Gloucester.....	14	214	314	307	7	4		627	1	5	29	1,522
Haverhill.....	31	328	403	586	4	3		2,914		10	55	4,334
Holyoke.....	17	443	458	471	3	2		5,344		20	368	7,126
Lawrence.....	33	407	445	839	4	2		8,356		24	555	10,665
Lowell.....	44	696	894	1,334	21			11,641		18	567	15,215
Lynn.....	40	555	1,034	1,339	24	6		6,189		26	171	9,384
Malden.....	38	397	621	735	11	1		1,827		13	42	3,685
Marlboro.....	5	131	94	169	2	5		1,218		5	65	1,694
Medford.....	16	199	267	406	7	1		495		3	18	1,412
New Bedford.....	40	456	697	707	7			7,445		40	551	9,943
Newburyport.....	6	144	225	176	1	1	2	922		2	19	1,498
Newton.....	47	503	787	414	10	5		990	5	7	54	2,822
North Adams.....	12	184	241	198	2	2		1,775		16	121	2,551
Northampton.....	85	282	385	208		1		1,178		10	64	2,313
Pittsfield.....	12	198	391	333		5		1,650		15	92	2,696
Quincy.....	16	250	317	351	6			662		13	25	1,640
Salem.....	55	375	565	596	10	1		2,146		12	152	3,912
Somerville.....	92	645	1,138	1,605	46	2		2,169		33	101	5,831
Springfield.....	71	759	1,374	1,386	13	2		3,453		36	200	7,294
Taunton.....	140	216	327	280	5			1,852		7	98	2,925
Waltham.....	110	311	467	369	13	6		2,547	1	7	29	3,860
Woburn.....	10	151	211	193	6	4		463	5	2	16	1,061
Worcester.....	426	1,226	1,713	1,993	8	3		5,670	1	50	322	11,412
The State.....	3,981	27,011	41,896	43,183	652	895	3	170,729	156	938	9,247	298,691

TABLE III.—SUMMARY OF BIRTHS AND SUMMARY OF DEATHS FROM SPECIFIED IN 11 NEW ENGLAND TEXTILE

[Compiled by the Bureau

Locality and year.	Births.	Deaths from all causes.		Disease of early infancy and congenital malformation.		Diarrhea, enteritis, and gastritis.		Convulsions.	
		Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.
Biddeford, Me.:									
1900.....	534	121	38	38	.....	40	7	5	1
1901.....	553	116	20	19	.....	44	2	3	1
1902.....	532	115	51	25	.....	39	5	5	4
1903.....	526	98	37	31	.....	18	2	4	1
1904.....	516	98	29	42	.....	16	3	3	1
1905.....	531	89	27	34	.....	19	1	5	2
1906.....	551	102	43	26	.....	32	4	2	2
1907.....	546	90	35	25	.....	21	1	4	2
Total.....	4,289	829	280	240	.....	229	25	31	14
Lewiston, Me.:									
1900.....	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
1901.....	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
1902.....	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
1903.....	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
1904.....	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
1905.....	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
1906.....	569	146	62	29	.....	39	12	3	1
1907.....	485	129	38	24	.....	50	6	3	2
Total.....	1,054	275	100	53	.....	89	18	6	3
Chicopee, Mass.:									
1900.....	752	159	55	32	1	52	13	8	1
1901.....	729	120	44	41	1	22	4	11	.....
1902.....	787	143	66	39	2	38	14	6	1
1903.....	755	137	69	35	.....	34	7	5	5
1904.....	766	109	31	25	.....	32	7	6	1
1905.....	726	124	42	25	.....	39	10	12	1
1906.....	805	138	40	38	.....	40	7	10	1
1907.....	836	155	81	49	2	42	14	13	3
Total.....	6,156	1,085	428	284	6	299	76	71	13
Fall River, Mass.:									
1900.....	4,327	885	280	244	.....	296	47	48	22
1901.....	4,054	728	191	218	.....	266	42	31	12
1902.....	4,341	893	344	250	.....	266	57	41	11
1903.....	4,448	864	293	266	1	287	49	35	14
1904.....	4,514	806	175	267	.....	270	28	42	9
1905.....	4,092	846	271	202	.....	312	54	37	11
1906.....	4,333	812	249	205	1	292	57	35	8
1907.....	4,622	899	316	213	1	395	78	30	10
Total.....	34,731	6,733	2,119	1,865	3	2,384	412	299	97
Holyoke, Mass.:									
1900.....	1,663	296	171	51	.....	117	21	5	2
1901.....	1,634	286	100	65	.....	80	11	9	2
1902.....	1,500	247	76	72	1	79	16	5	1
1903.....	1,512	312	106	85	1	109	8	5	3
1904.....	1,463	280	59	77	.....	105	8	3	4
1905.....	1,514	259	91	68	.....	72	10	5	1
1906.....	1,570	314	97	102	.....	83	12	6	3
1907.....	1,610	327	129	102	1	87	14	6	.....
Total.....	12,466	2,321	829	622	3	732	100	44	16
Lawrence, Mass.:									
1900.....	2,102	400	138	83	1	159	31	18	1
1901.....	1,921	346	95	68	.....	121	18	23	6
1902.....	1,958	351	148	64	1	99	20	19	7
1903.....	2,045	348	119	58	1	134	18	13	2
1904.....	2,047	320	104	73	2	111	16	13	2
1905.....	2,089	413	167	83	.....	170	33	15	6
1906.....	2,409	429	182	87	2	159	22	23	11
1907.....	2,761	405	151	72	1	158	29	19	1
Total.....	17,332	3,012	1,104	588	8	1,111	187	143	36

* Not including broncho-pneumonia.

CAUSES OF CHILDREN UNDER 1 AND FROM 1 TO 4 YEARS OF AGE, INCLUSIVE TOWNS, 1900 TO 1907.

of the Census.]

Nontuberculous meningitis		Pneumonia, bronchitis, and laryngitis. ^a		Tuberculosis (all forms).		Whooping cough		Measles.		All other causes.	
Under 1 year.	1 to 4 years	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.
5	7	8	8	1	1	2	-----	-----	-----	22	14
5	2	13	5	-----	-----	-----	1	-----	-----	32	9
8	11	15	15	1	-----	-----	-----	1	1	21	15
10	6	9	9	-----	2	9	6	-----	-----	17	11
8	4	11	7	-----	4	2	-----	-----	-----	16	10
5	5	9	4	2	1	1	-----	-----	-----	14	14
11	9	14	14	4	1	-----	1	2	2	11	10
8	14	16	3	3	2	-----	1	-----	-----	13	12
60	58	95	65	11	11	14	9	3	3	146	95
(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
8	5	10	9	-----	1	1	-----	6	10	50	24
9	7	8	3	6	2	1	-----	-----	-----	28	18
17	12	18	12	6	3	2	-----	6	10	78	42
13	7	27	14	2	6	2	-----	-----	1	23	12
14	6	8	6	1	4	3	6	-----	-----	20	17
16	5	12	8	1	1	1	-----	-----	2	30	33
8	6	19	9	1	1	3	2	1	1	31	38
10	6	12	2	1	3	1	-----	1	-----	21	12
2	4	10	7	3	3	1	-----	-----	2	32	15
10	5	10	9	3	-----	7	2	-----	1	20	15
4	6	19	10	1	2	1	1	2	5	24	38
77	45	117	65	13	20	19	11	4	12	201	180
27	28	93	63	9	15	8	5	6	10	154	90
26	25	46	35	8	6	-----	-----	1	1	132	70
25	26	100	70	7	9	15	9	5	18	184	144
22	19	90	61	11	11	9	2	3	8	141	128
23	19	74	34	6	7	1	1	1	6	122	71
24	15	115	68	9	16	14	12	7	23	126	72
21	19	94	50	7	7	11	10	4	7	143	90
10	24	94	68	6	15	10	5	-----	16	141	99
178	175	706	449	63	86	68	44	27	89	1,143	764
24	15	28	18	3	4	1	1	7	15	60	95
25	13	23	17	-----	6	8	11	-----	-----	76	40
11	5	11	6	6	6	-----	-----	2	-----	61	40
10	12	35	18	5	10	9	2	8	8	46	44
15	6	30	7	6	5	2	3	-----	-----	42	26
14	16	21	9	5	6	4	1	1	5	69	43
14	12	15	13	2	9	26	8	-----	3	66	37
13	12	20	20	2	2	5	-----	3	3	84	77
131	91	183	108	29	48	55	26	21	35	504	402
15	8	31	21	4	3	3	3	8	12	79	58
25	13	34	16	4	7	2	1	1	-----	68	34
31	6	53	34	3	10	10	8	3	11	69	51
23	6	29	16	7	7	8	3	3	6	73	60
13	15	38	24	7	5	4	1	1	-----	60	39
19	20	34	31	3	7	-----	1	8	15	81	54
11	24	48	29	6	7	19	13	1	11	75	67
16	11	36	21	4	6	6	2	4	8	90	72
153	103	303	192	38	52	52	32	29	63	595	431

^a Not separately reported.

TABLE III.—SUMMARY OF BIRTHS AND SUMMARY OF DEATHS FROM SPECIFIED IN 11 NEW ENGLAND TEXTILE

Locality and year.	Births.	Deaths from all causes.		Disease of early infancy and congenital malformation.		Diarrhea, enteritis, and gastritis.		Convulsions.	
		Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.
Lowell, Mass.:									
1900.....	2,596	525	166	140	2	178	26	26	14
1901.....	2,794	544	261	155	1	164	26	33	7
1902.....	2,493	523	219	160	.....	170	18	29	6
1903.....	2,519	557	182	143	.....	219	26	23	4
1904.....	2,519	499	175	143	.....	190	34	10	7
1905.....	2,500	496	194	119	.....	220	39	21	10
1906.....	2,547	545	208	124	.....	215	34	20	8
1907.....	2,704	535	163	151	1	211	29	20	2
Total.....	20,672	4,224	1,568	1,135	4	1,567	232	182	58
New Bedford, Mass.:									
1900.....	2,230	435	138	131	.....	162	21	23	7
1901.....	2,440	362	131	108	.....	127	8	16	8
1902.....	2,437	446	154	126	1	151	14	20	5
1903.....	2,469	448	280	117	2	162	24	15	14
1904.....	2,620	440	111	125	.....	169	17	25	7
1905.....	2,765	417	115	125	1	136	19	21	7
1906.....	2,949	461	154	145	.....	176	17	24	7
1907.....	3,272	538	125	128	.....	218	19	26	5
Total.....	21,182	3,547	1,208	1,005	4	1,301	139	170	60
Manchester, N. H.:									
1900.....	1,655	360	133	92	.....	134	20	24	6
1901.....	1,369	331	100	46	.....	129	14	11	4
1902.....	1,505	360	135	50	.....	115	11	14	9
1903.....	1,457	307	142	49	.....	117	26	14	8
1904.....	1,434	298	82	74	.....	99	13	9	2
1905.....	1,577	356	190	89	.....	132	19	6	8
1906.....	1,711	364	139	123	.....	97	10	7	2
1907.....	1,781	398	117	141	.....	102	9	15	3
Total.....	12,539	2,774	1,038	664	.....	925	122	100	42
Pawtucket, R. I.:									
1900.....	1,025	188	86	30	.....	61	11	3	.....
1901.....	1,019	147	45	38	.....	49	3	3	.....
1902.....	959	175	61	24	.....	44	10	2	3
1903.....	1,034	157	66	36	2	49	17	3	2
1904.....	1,064	156	45	33	.....	35	10	5	.....
1905.....	1,110	164	57	35	.....	54	6	2	.....
1906.....	1,058	155	62	35	.....	47	12	2	.....
1907.....	947	181	61	37	.....	63	11	3	1
Total.....	8,216	1,323	483	268	2	402	80	23	6
Woonsocket, R. I.:									
1900.....	960	210	73	29	1	107	18	5	3
1901.....	988	160	66	47	.....	74	11	2	1
1902.....	1,006	179	73	39	.....	66	9	1	3
1903.....	1,006	136	70	30	.....	45	13	1	.....
1904.....	1,035	125	39	29	1	41	4	2	1
1905.....	1,058	150	68	33	.....	73	13	1	.....
1906.....	1,093	183	57	44	.....	78	10	4	.....
1907.....	1,082	139	43	28	.....	75	6	3	1
Total.....	8,228	1,287	489	279	2	559	84	19	9

CAUSES OF CHILDREN UNDER 1 AND FROM 1 TO 4 YEARS OF AGE, INCLUSIVE, TOWNS, 1900 TO 1907—Concluded.

Nontuberculous meningitis.		Pneumonia, bronchitis, and laryngitis.		Tuberculosis (all forms).		Whooping cough.		Measles.		All other causes	
Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.	Under 1 year.	1 to 4 years.
21	21	69	48	7	6		1	1		83	48
29	22	51	42	6	6	9	6	2	17	95	134
26	28	57	39	5	7	2	5	3	6	71	110
24	25	46	44	2	6	11	5		1	89	71
19	25	59	41	14	7	3		9	10	52	51
16	33	45	33	12	21	10	7	3	5	50	46
16	25	79	55	6	6	4	4	5	13	76	63
6	14	63	33	8	4	8	6	1	5	67	69
157	193	469	335	60	63	47	34	24	57	583	592
18	17	34	33	4	6	4	10	7	5	52	39
12	17	41	37	6	12		1	3	1	49	47
16	16	51	34	5	7	12	4		3	65	70
17	21	50	40	4	14	12	5	2	8	69	152
9	13	31	16	5	7	5	4		2	71	45
10	10	37	19	5	9	3	5	1		79	45
10	22	39	24	2	24	6	5	2	3	57	52
17	15	62	25	6	11	2	8	1	3	78	39
109	131	345	228	37	90	44	42	16	25	520	489
20	15	24	31	8	9	1	2			57	50
26	12	27	17	9	8	11	1			72	44
25	11	66	33	8	6	3	2	2	2	77	61
10	17	39	29	7	4	12	6	1		58	52
17	6	33	18	6	7	4	3			56	33
33	56	22	17	8	9	2	3	2	9	62	69
26	22	31	22	6	6	12	9			62	68
14	15	30	21	7	6	13	10	2	6	74	47
171	154	272	188	59	55	58	36	7	17	518	424
11	9	17	10	9	8	1	2	2	7	54	39
12	6	11	6		2				1	33	27
20	7	24	14	5	3	6	3		3	50	18
10	8	18	9	2	3	5	4	2	1	32	20
8	3	20	7	6	2				1	49	22
2	4	14	10	6	4	3	3	1	3	47	27
7	8	18	8	2	7	5		1	3	38	24
3	1	20	12	9	8	1	2		1	45	25
73	46	143	76	39	37	21	14	6	20	348	202
11	5	13	10	9	1	5			1	31	34
2	10	8	8	6	6	1			3	20	27
5	7	21	14	7	3	1			1	39	36
1	3	21	9	2	2	8	5			28	38
5	6	14	11	6	1	2	1	2		24	14
3	2	10	14	5	9	2	1		2	20	27
2	4	26	10	4	3	2	2	1		27	28
1	2	8	6	1	4	3	1			20	23
30	39	121	82	40	29	24	10	6	7	209	227

TABLE IV.—SUMMARY OF TOTAL DEATHS (ALL AGES) FROM SPECIFIED

[Compiled by the Bureau

Locality and year.	All causes.	Diseases of early infancy and congenital malformations.			Diarrhea, enteritis, and gastritis.		
		Diseases of early infancy.	Congenital malformations.	Total.	Diarrhea and enteritis.	Gastritis.	Total
MAINE.							
Biddeford:							
1900.....	366	37	1	38	44	5	49
1901.....	327	18	1	19	50	3	53
1902.....	340	26	.....	26	44	.....	44
1903.....	306	29	2	31	20	1	21
1904.....	330	39	2	41	21	2	23
1905.....	284	33	1	34	23	1	24
1906.....	332	24	2	26	36	4	40
1907.....	344	23	2	25	22	1	23
Total.....	2,629	229	11	240	260	17	277
Lewiston:							
1900.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)
1901.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)
1902.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)
1903.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)
1904.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)
1905.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)
1906.....	555	24	5	29	53	2	55
1907.....	486	24	.....	24	59	.....	59
Total.....	1,041	48	5	53	112	2	114
MASSACHUSETTS.							
Chicopee:							
1900.....	405	31	1	32	71	.....	71
1901.....	340	40	3	43	29	2	31
1902.....	398	38	3	41	54	2	56
1903.....	404	34	1	35	43	6	49
1904.....	339	23	2	25	40	4	44
1905.....	356	22	4	26	48	6	54
1906.....	340	32	5	37	51	2	53
1907.....	416	45	5	50	58	4	62
Total.....	2,998	265	24	289	394	26	420
Fall River:							
1900.....	2,286	233	11	244	362	6	368
1901.....	1,979	211	8	219	322	7	329
1902.....	2,206	244	7	251	331	18	349
1903.....	2,342	254	13	267	352	20	372
1904.....	2,074	254	13	267	318	18	336
1905.....	2,109	190	12	202	373	17	390
1906.....	2,089	194	12	206	364	28	392
1907.....	2,384	192	22	214	489	28	517
Total.....	17,469	1,772	98	1,870	2,911	142	3,053
Holyoke:							
1900.....	990	46	5	51	142	6	148
1901.....	873	58	7	65	100	4	104
1902.....	769	66	7	73	104	4	108
1903.....	852	75	8	83	122	8	130
1904.....	832	69	8	77	119	6	125
1905.....	823	61	7	68	83	3	86
1906.....	907	98	5	103	99	3	102
1907.....	1,046	94	9	103	101	4	105
Total.....	7,092	567	56	623	870	38	908
Lawrence:							
1900.....	1,290	74	8	82	197	12	209
1901.....	1,130	64	5	69	150	7	157
1902.....	1,168	62	2	64	132	14	146
1903.....	1,144	55	6	61	153	12	165
1904.....	1,147	60	16	76	138	15	153
1905.....	1,384	69	14	83	204	9	213
1906.....	1,345	78	9	87	191	10	201
1907.....	1,450	68	7	75	198	9	207
Total.....	10,058	530	67	597	1,363	88	1,451

a Included in Androscoggin County.

CAUSES IN 11 NEW ENGLAND TEXTILE TOWNS 1900 TO 1907.

of the Census.]

Convulsions.	Non-tuberculous meningitis.	Pneumonia.	Bronchitis and laryngitis.			Tuberculosis (all forms).	Whooping cough.	Measles.	All other causes.
			Bronchitis.	Laryngitis.	Total.				
6	17	36	5	2	7	30	2	.....	181
4	13	17	10	2	12	39	1	.....	169
9	22	34	8	6	14	37	.....	2	152
5	17	24	10	1	11	37	15	.....	145
4	14	27	11	.....	11	36	2	.....	172
7	12	27	6	.....	6	29	1	.....	144
4	23	40	5	.....	5	37	1	4	152
7	41	33	3	.....	3	38	1	.....	173
46	159	238	58	11	69	283	23	6	1,288
(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
4	16	31	10	1	11	51	1	19	338
6	35	26	6	.....	6	56	1	.....	273
10	51	57	16	1	17	107	2	19	611
9	24	40	25	.....	25	47	1	2	154
11	20	25	10	.....	10	32	9	.....	159
8	25	25	13	.....	13	23	1	2	204
9	16	31	11	1	12	34	5	3	210
7	20	18	11	.....	11	43	1	1	169
13	12	25	6	.....	6	42	1	2	175
11	19	28	6	2	8	35	9	1	139
16	11	45	12	.....	12	39	2	7	172
84	147	237	94	3	97	235	29	18	1,352
73	68	163	114	5	119	216	13	17	1,005
47	62	107	60	11	71	173	.....	2	969
53	64	151	111	2	113	196	24	23	982
55	61	201	98	4	102	214	13	13	1,044
53	50	142	83	4	87	236	2	7	894
50	52	194	89	5	94	180	26	33	888
44	51	158	71	4	75	166	21	12	964
42	59	180	86	2	88	207	15	17	1,045
417	467	1,296	712	37	749	1,588	114	124	7,791
7	49	75	34	1	35	101	2	23	499
12	46	56	20	1	21	92	19	.....	458
7	26	41	17	.....	17	93	.....	3	401
9	28	71	25	.....	25	89	12	16	389
7	29	64	20	.....	20	112	5	.....	393
6	50	67	24	.....	24	92	5	8	417
10	34	72	13	.....	13	79	34	3	457
7	43	72	27	.....	27	96	5	7	581
65	305	518	180	2	182	754	82	60	3,595
24	31	92	36	2	38	126	7	21	660
31	48	90	36	2	38	115	3	1	578
26	43	117	42	.....	42	126	18	18	568
15	35	82	31	.....	31	124	12	9	610
17	34	109	35	1	36	130	6	1	585
22	79	129	40	.....	40	128	1	28	661
36	59	114	24	1	25	124	33	11	655
20	41	97	35	3	38	141	8	13	810
191	370	830	279	9	288	1,014	88	102	5,127

TABLE IV.—SUMMARY OF TOTAL DEATHS (ALL AGES) FROM SPECIFIED

Locality and year.	All causes.	Diseases of early infancy and congenital malformations.			Diarrhea, enteritis, and gastritis.		
		Diseases of early infancy.	Congenital malformations.	Total.	Diarrhea and enteritis.	Gastritis.	Total.
MASSACHUSETTS—continued.							
Lowell:							
1900.....	1,848	124	18	142	223	13	236
1901.....	2,041	150	7	157	208	16	224
1902.....	1,943	145	16	161	212	13	225
1903.....	1,943	130	14	144	265	11	276
1904.....	1,738	126	17	143	237	9	246
1905.....	1,901	98	21	119	271	17	288
1906.....	1,919	109	16	125	260	9	269
1907.....	2,062	133	18	151	244	15	259
Total.....	15,395	1,015	127	1,142	1,920	103	2,023
New Bedford:							
1900.....	1,325	124	6	130	193	8	201
1901.....	1,249	103	4	107	144	1	145
1902.....	1,364	122	5	127	178	4	182
1903.....	1,602	111	8	119	194	6	200
1904.....	1,366	114	12	126	182	16	198
1905.....	1,297	122	4	126	158	6	164
1906.....	1,367	139	5	144	197	5	202
1907.....	1,560	122	6	128	243	6	249
Total.....	11,120	957	50	1,007	1,489	52	1,541
NEW HAMPSHIRE.							
Manchester:							
1900.....	1,154	88	4	92	164	10	174
1901.....	1,077	39	9	48	154	7	161
1902.....	1,057	44	6	50	131	4	135
1903.....	1,065	42	6	48	151	12	163
1904.....	977	62	14	76	116	9	125
1905.....	1,296	74	15	89	158	7	165
1906.....	1,256	109	13	122	110	13	123
1907.....	1,234	130	10	140	116	4	120
Total.....	9,116	588	77	665	1,100	66	1,166
RHODE ISLAND.							
Pawtucket:							
1900.....	778	27	3	30	79	6	85
1901.....	664	35	4	39	59	10	69
1902.....	737	17	8	25	64	7	71
1903.....	602	25	13	38	75	6	81
1904.....	681	26	7	33	50	7	57
1905.....	725	32	5	37	67	3	70
1906.....	718	31	5	36	63	5	68
1907.....	841	29	8	37	76	5	81
Total.....	5,806	222	53	275	533	49	582
Woonsocket:							
1900.....	554	25	5	30	134	3	137
1901.....	479	42	4	46	92	5	97
1902.....	546	35	4	39	81	4	85
1903.....	489	27	4	31	62	5	67
1904.....	465	25	5	30	47	5	52
1905.....	489	30	3	33	92	4	96
1906.....	530	43	1	44	89	1	90
1907.....	444	24	4	28	85	1	86
Total.....	3,996	251	30	281	682	28	710

CAUSES, IN 11 NEW ENGLAND TEXTILE TOWNS, 1900 TO 1907—Concluded.

Convulsions.	Non-tuberculous meningitis.	Pneumonia.	Bronchitis and laryngitis.			Tuberculosis (all forms).	Whooping cough.	Measles.	All other causes.
			Bronchitis.	Laryngitis.	Total.				
41	63	162	85	4	89	201	1	1	912
43	70	198	69	1	70	174	15	22	1,068
43	75	160	73	.....	73	170	8	9	1,019
32	63	143	66	.....	66	152	16	1	1,050
19	55	138	65	1	66	156	3	19	893
32	94	133	63	.....	63	179	17	8	968
29	69	176	74	1	75	170	10	20	976
30	41	161	81	1	82	177	14	9	1,138
269	530	1,271	576	8	584	1,379	84	89	8,024
32	55	95	41	.....	41	118	14	14	625
25	42	69	51	2	53	160	1	4	643
25	47	95	60	5	65	130	17	5	671
30	50	110	56	5	61	143	17	11	861
35	32	81	32	.....	32	167	10	2	683
29	25	82	34	.....	34	140	10	1	686
32	42	67	44	.....	44	158	11	5	662
31	62	78	69	.....	69	152	10	5	763
239	355	677	387	12	399	1,168	90	47	5,597
32	49	95	38	1	39	131	3	.....	539
17	52	79	33	2	35	114	12	.....	559
28	51	106	55	1	56	91	6	5	529
24	32	90	37	2	39	99	18	1	551
12	33	73	32	.....	32	110	7	.....	509
15	154	76	20	1	21	122	6	12	636
9	72	84	35	6	41	111	21	.....	673
18	49	82	49	2	51	99	25	8	642
155	492	685	299	15	314	877	98	26	4,638
3	24	49	28	1	29	76	4	13	465
3	23	58	23	.....	23	74	.....	1	374
5	31	45	26	.....	26	75	9	4	446
6	22	41	25	.....	25	75	9	3	362
5	12	46	25	.....	25	75	.....	1	427
2	8	72	22	1	23	86	6	4	417
2	17	55	21	.....	21	73	5	5	436
4	7	66	27	.....	27	101	3	1	514
30	144	432	197	2	199	635	36	32	3,441
8	19	37	18	1	19	64	5	1	234
4	17	28	15	.....	15	59	1	3	209
5	14	43	19	2	21	73	1	1	264
1	6	44	19	3	22	68	13	.....	237
3	14	60	12	.....	12	72	3	3	216
1	11	39	12	.....	12	75	3	6	213
4	6	53	18	.....	18	75	4	1	235
4	4	39	8	1	9	43	4	.....	227
30	91	343	121	7	128	529	34	15	1,835

PART II.

INFANT MORTALITY AND ITS RELATION TO
THE EMPLOYMENT OF MOTHERS
IN FALL RIVER, MASS.—

INTRODUCTION AND SUMMARY.

PURPOSE OF THE INVESTIGATION.

The fact has often been the subject of comment both here and in other countries, notably in England, that in cities where a large proportion of the female population is industrially employed a high rate of infant mortality is almost always found. Nearly all of the cities which are centers of the textile industries are conspicuous for a high mortality at all ages, and especially for a high mortality under 1 year. Because of this almost constant relation of the extensive employment of women and a high infant mortality, it has often been assumed that the excessive infant death rates in industrial localities are chiefly due to the industrial employment of the mothers.

In order to test the validity of this assumption or to ascertain the real causes of the high infant mortality in such cases an investigation in detail of the conditions in a textile city where the industrial employment of women is almost exclusively in that industry seemed the most feasible method. Of all American textile cities, Fall River seemed to be the most suitable for such a study. In 1905 nearly 17,000, or 38.6 per cent of the females 10 years of age and over, were gainfully employed, and nearly 13,000, or 29.8 per cent, were employed in cotton mills. Of this number approximately one-third were married or widowed. The death rate at all ages in Fall River for the ten-year period 1900 to 1909 was 20.3 per 1,000 of population, and in 1908 it was 20.5. In the same ten-year period, out of every 100 deaths 38.4 were those of children under 1 year, and in 1908, 36.6 per cent were children under 1 year. The general death rate, it should be noted, was one of the highest prevailing in any northern city, and the same was true of the percentage of deaths under 1 year. The birth rate also was extraordinarily high, being 43 per 1,000 of population in 1908.

The striking feature of the Fall River infant mortality figures, not only in 1908 but in each year of the ten-year period 1900 to 1909 as well, is the great number of deaths due to diarrhea, enteritis, and gastritis, this group of causes being accountable for 38.3 per cent of all deaths under 1 year in 1908 and for 36.7 per cent during the ten-year period.

The main question of the investigation then was whether the high infant mortality in Fall River is due directly or indirectly in an important degree to the industrial employment of mothers. Such an investigation obviously involves a study of the causes of death among the children of mothers employed outside the home in comparison with the children of mothers at home. The direct effect of the mother's work outside the home and of the withdrawal of the

mother's care, if the effect was at all marked, should be apparent from a comparison of the deaths due to various causes among the two classes of children.

SCOPE AND METHOD OF THE INVESTIGATION.

For the purposes of the investigation the year 1908 was selected. Copies were made of the official records of all children dying under 1 year from any cause in Fall River, and of all stillbirths. Visits were then made to the homes of the children by experienced agents of the Bureau of Labor, and inquiries were made concerning the employment of the mother, the time of discontinuing work before the birth of the child, the time of resuming work after the birth of the child if work was resumed, the character of the feeding of the child, the care given to the child, especially during any absence of the mother at work, and various other matters tending to throw light in any way upon the direct or indirect causes of death. Much difficulty was found in tracing some of the families and in securing accurate information from the mother and other members of the family. Doctors were interviewed when possible for supplementary information.

Of the 859 children dying under 1 year in Fall River during 1908, the desired particulars were obtained concerning 580, and of the 227 stillborn children recorded, particulars were obtained concerning 165. Of the 580 children dying under 1 year whose families were interviewed, it was found that in the case of 266, or 45.9 per cent, the mothers during the period of pregnancy were at work outside the home, while in the case of 314 the mothers were not at any time during that period at work away from home. Of the 165 mothers of stillborn children who were traced, 69, or 41.8 per cent, had been employed at some time during pregnancy. For 279 of the children born living and for 62 of the stillborn the family could not be found and the information which is here available is therefore limited to the details given in the official records.

SUMMARY.

The first result of a study of Fall River infant mortality figures and a comparison with those of other localities is to establish beyond question the fact that the Fall River rates are excessive. In Fall River the death rate under 1 year per 1,000 births in 1908 was 177.6, while in 1910 in the borough of Manhattan it was 135, in Boston 126, in England and Wales (in 1908) 120, and in Blackburn, England, an important English textile city somewhat larger than Fall River, 157 (for a ten-year period). A comparison limited to a study of the per cent of deaths due to the more important causes quickly shows that the proportion of deaths due to diarrhea, enteritis, or gastritis in Fall River in 1908 was 37 per cent above that in the registration area of the United States in 1908, 37 per cent above that in the borough of Manhattan, and 46 per cent above that in Boston in 1910, 114 per

cent above that in England and Wales in 1908, and 131 per cent above that for ten years in Blackburn. A comparison on a more exact basis, death rates per 1,000 births, makes a very much more unfavorable showing for Fall River, its rate for diarrhea, enteritis, and gastritis being then, for the periods named above, 81 per cent above that for the borough of Manhattan, 105 per cent above that for Boston, 215 per cent above that of England and Wales, and 161 per cent above that of Blackburn, England, for a ten-year period.^a

Of the total deaths under 1 year, nearly one-quarter occurred in the first month of life, and of these over two-thirds (68.9 per cent) were due to premature birth, congenital defects, and debility ("marasmus," "debility," and "inanition"). The early age at which these deaths occurred and the constancy of the death rates at these ages and from the causes named (as is later shown, pp. 87, 88) indicate that the fundamental causes are to be found in antenatal conditions. It is especially significant, therefore, that for Fall River as a whole the proportion of deaths from these causes is not excessive, and that for the children of mothers who were at work outside the home during pregnancy the proportion was slightly less than that for the children of mothers who were at home and engaged only in housework.

In regard to the relation of the mother's work outside the home after childbirth to the high infant mortality in Fall River, a study of the results of this investigation shows that only 83, or 14.4 per cent of all children dying under 1 year concerning whom information was secured, were found to have been deprived of the mother's care because of her going to work.^b This per cent represents the extent of the possible effect of the mother's absence from home.

But the extent to which the nursing of the child was affected is smaller than even this figure indicates, for in only 41 cases, or 7.9 per cent of all those whose feeding was reported, was the mother's nursing in any way affected by her absence from home,^c and in the 42 other cases she either failed to nurse because of disinclination or inability or had discontinued nursing for reasons not in any way connected with her return to work.

^a For comparison with the Fall River figures of 1908 those for England and Wales in the same year are taken. In 1909 and 1910 the rates for England and Wales were considerably lower than in 1908, namely, 108.73 and 105.44 respectively per 1,000 births, and the death rates from diarrheal diseases were correspondingly lower (12.64 in both 1909 and 1910). For Manhattan Borough and for Boston figures for 1910 were taken as likely to be more nearly correct than those of earlier years. The rates in 1908 were, Manhattan Borough 136, Boston 149. Data for the borough of Manhattan and for Boston are from Bureau of the Census Bulletin 109, Mortality Statistics, 1910; data for England and Wales are from Seventy-First Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales, 1908; data for Blackburn are from Annual Reports upon the Health of Blackburn.

^b Based on a total of 578 reports as to mother's return to work.

^c Based on a total of 520 reports as to character of feeding.

But while the number and per cent of children affected by the mother's absence from home was small, yet the causes of death among this number as compared with the causes among children whose mothers remained at home show strikingly the fatal effect of the mother's absence and of the lack of her care and nursing. Thus, the proportion of deaths from diarrhea, enteritis, and gastritis among the children whose mothers went to work (62.7 per cent) was over 80 per cent in excess of that of the children whose mothers remained at home (34.6 per cent).

The real significance of this excess will not be fully realized until we recall the figures before given showing that for Fall River as a whole the death rate under 1 year from diarrhea, enteritis, and gastritis was two or three times what it was in many other localities.

The high infant mortality of Fall River as a whole clearly is not due, except in very small part, to the excessive rate among the children of mothers at work outside the home. For the proportion of deaths due to diarrhea, enteritis, and gastritis, 38.6 per cent of all, for the city as a whole, only falls to 34.6 per cent when the children of mothers at home are taken separately.

The causes of the excessive mortality under 1 year in Fall River among the children of mothers at home are to be found in the absence of nursing and in the improper feeding and improper care, of which there are many examples. The much higher mortality from diarrhea, gastritis, and enteritis among the children of the mothers who went to work after childbirth is plainly due chiefly to the greater extent of the absence of breast feeding and of the improper feeding with the additional evil influence of the withdrawal of the mother's care.

Among the mothers at home only 34 per cent of the children were nursed exclusively, while 24 per cent were given solid food, and for 16 per cent condensed milk was the principal food. Among the children of the mothers who went to work only 1.2 per cent were nursed exclusively, while 40 per cent were given solid food, and for 30.5 per cent condensed milk was the principal food. By both classes of mothers condensed milk was used more generally than fresh cow's milk. In over one-third of the cases where solid food was given its use was begun during the first week.

The large percentage of artificial feeding was found to be due to a considerable extent to deficiency of breast milk, which was much more frequent among the mothers at home than among those who went to work, but in many cases among the latter this artificial feeding was not due to a deficiency of breast milk, nor was it in any way a result of the mother's going to work.

The causes of the excessive infant mortality in Fall River may be summed up in a sentence as the mother's ignorance of proper feeding, of proper care, and of the simplest requirements of hygiene. To this all the other causes must be regarded as secondary.

CHAPTER I.

INFANT MORTALITY OF FALL RIVER.

CHAPTER I.

INFANT MORTALITY OF FALL RIVER.

INTRODUCTION.

Fall River is the largest cotton-manufacturing city in the United States and is given up almost exclusively to this single industry. Its population is composed very largely of persons either foreign born or of foreign parentage. Of the total female population in 1905, 44.4 per cent were foreign born, Fall River standing next to the highest among Massachusetts cities, while 15.1 per cent were illiterate, leading all Massachusetts cities in that respect. Of the female mill operatives almost 59 per cent were foreign born and 13.4 per cent were illiterate. Of the foreign races represented, the French Canadians are most numerous, and following in order are the Irish, English, and Portuguese.^a The population in 1908, the year of the present investigation, was approximately 112,500.^b

In Fall River, as in practically all cities where textiles manufacture is important, large numbers of women are employed in the cotton mills. In 1905 nearly 17,000, or 38.6 per cent of the females 10 years of age and over, were gainfully employed, and approximately 13,000, or 29.8 per cent, were employed in the cotton mills. Of this latter number, approximately one-third were married or widowed.^a The death rate at all ages in Fall River for the ten-year period 1900 to 1909 was 20.3 per 1,000 population, and in 1908, the year of the investigation, it was 20.5. In the same ten-year period out of every 100 deaths 38.4 were those of children under 1 year, and in 1908, 36.6 per cent were children under 1 year.^c Both in respect to its death rate and the percentage of deaths under 1 year Fall River has for many years stood nearly at the head of American cities.

The number of births recorded in Fall River in 1908 was 4,835 (not including 227 stillbirths). Based on a population of 112,500, the births recorded as above show a birth rate of 43 per 1,000 of population. It would appear from this extraordinarily high birth rate that few births could have been unrecorded during the year in question. In comparing birth rates the make-up of the population with reference to sex and marriage must be borne in mind, but in Fall River, as is usual in cities where a large proportion of the women are industrially employed, the percentage of married women in the population is somewhat below the average either for Massachusetts cities or for the country as a whole.

^a See pp. 43 et seq.

^b The figure given here is a mean of the State census of 1905 and of the United States census of 1910.

^c See p. 79.

The number of stillbirths recorded in 1908 was 227. Here, again, it is not possible to say that the figures are absolutely complete. It is generally believed that stillbirths are not as fully reported as are living births. It may be noted, however, that the number of stillbirths as here given is 4.5 per cent of the number of living births and stillbirths combined. Figures at all complete relative to stillbirths are not available for other cities in this country. The number of stillbirths reported in Blackburn, England, for the five-year period 1906 to 1910 shows that in that city the stillbirths constituted 5.6 per cent of the total living births and stillbirths combined.^a

The deaths under 1 year of children born living in 1908 numbered 859, of which 488 were males and 371 females. These figures, upon the basis of 4,835 births, as already given, show a death rate under 1 year per 1,000 births of 177.6.^b Whether the number of deaths as here given represents an absolutely complete record it is not possible definitely to say. An analysis of the causes of death and of the relative number dying from each cause shows a percentage of deaths from premature birth so low as to suggest either that some deaths from this cause were not reported or that, if reported, they have been included under congenital debility. In discussions of infant mortality it has more than once been noted that an error was often made because of the fact that infants dying within a few minutes or hours of birth were reported and buried as stillbirths, when an absolutely correct report would call for their registration both as births and deaths.^c It is not possible to say positively how many such errors have been made in the records of Fall River. It is, however, almost certain that a few errors of this sort were made.

So far as natural advantages are concerned, Fall River is distinctly desirable as a place of residence. The town is almost surrounded by water, it lies 200 feet above sea level, and is only 20 miles from the open sea. There are cool breezes throughout the summer and the nights are rarely warm. The city's water supply, because of a modern filtering plant, is considered exceptionally pure.

^a In the Annual Summary of Marriages, Births, and Deaths in England and Wales and in London for 1910 (p. xix) it is noted "that stillbirths in London in 1910 were 2.2 per cent of the total as against 2.3 per cent in the preceding year, when, however, only 51 per cent of the registered births were notified." This report further notes that "this percentage of stillbirths is generally exceeded in European towns. Thus, in the year 1909-10 the proportion was 2.8 per cent in Prague, 3.3 per cent in Breslau, Stockholm, and Milan, 3.7 per cent in Vienna and Munich, 3.9 per cent in Dresden, 4.4 per cent in Antwerp, 5.3 per cent in Brussels, and in Paris during the years 1896 to 1906 it averaged 8.6. Unfortunately these figures are of little value for comparative purposes owing to the varying definitions of stillbirths."

^b Bureau of the Census, Bulletin 109, Mortality Statistics, 1910, p. 18.

^c Compare Thirty-ninth Annual Report of the Local Government Board, 1909-10: Supplement on infant and child mortality, London, 1910, p. 26.

GENERAL DEATH RATE AND PER CENT OF DEATHS UNDER 1 YEAR IN FALL RIVER.

Before proceeding to a comparison of the mortality records of the children of mothers at home and mothers at work, it seems necessary to consider the infant mortality of Fall River as a whole and to make some comparison with other localities, in order that the general character of the rates may be understood and that the influences, other than the employment of the mother, tending to affect infant mortality may be clearly seen.

To what extent the infant mortality in Fall River is excessive and under what causes the excess is greatest must be judged by detailed comparison with other localities where rates are lower, and especially with other localities where a record for a series of years shows a former high rate substantially reduced by organized effort.

It has been seen that the general death rate in Fall River is larger than that in any other northern city, and that the percentage of all deaths which are under 1 year, 38.4 per cent (in the ten-year period 1900 to 1909), is almost the highest of any city. The mortality figures from year to year are brought out in the following table, which gives the death rates at all ages per 1,000 population, and number and per cent of deaths under 1 year and 1 to 4 years, inclusive, for the ten-year period 1900 to 1909.

TOTAL DEATHS AND DEATH RATES AT ALL AGES, PER 1,000 POPULATION, AND NUMBER AND PER CENT OF DEATHS UNDER 1 YEAR AND 1 TO 4 YEARS, INCLUSIVE, FALL RIVER, MASS., 1900 TO 1909.

[Total deaths are from Bureau of the Census Annual Reports on Mortality Statistics. Death rates per 1,000 are, for 1900 from Bureau of the Census Mortality Statistics, 1901-1904, page lxx; for 1901-1905 from Mortality Statistics, 1905, p. 66; for 1903-1909 and annual average, from Bulletin 109, p. 12. Number of deaths under 1 year and 1 to 4 years were furnished by the Bureau of the Census for this report. The per cent of total deaths under 1 year and 1 to 4 years was computed for this report.]

Year.	Total deaths, all ages.		Number of deaths.		Per cent of total deaths which were—	
	Number.	Per 1,000 population.	Under 1 year.	1-4 years, inclusive.	Under 1 year.	1-4 years, inclusive.
1900.....	2,286	21.8	885	280	38.7	12.2
1901.....	1,979	18.8	728	191	36.8	9.7
1902.....	2,206	21.0	893	344	40.5	15.6
1903.....	2,342	22.2	864	293	36.9	12.5
1904.....	2,074	19.6	806	175	38.9	8.4
1905.....	2,109	19.9	846	271	40.1	12.8
1906.....	2,089	19.2	812	249	38.9	11.9
1907.....	2,384	21.3	899	316	37.7	13.3
1908.....	2,346	20.5	859	340	36.6	14.5
1909.....	2,235	19.1	872	244	39.0	10.9
Total.....	22,050	.....	8,464	2,703	38.4	12.3
Average.....	2,205	20.3	846	270	38.4	12.3

It will be observed that the figures for the year 1908, the one selected for study, corresponded very closely with the average for the ten-year period, the death rate for all ages per 1,000 population be-

ing 20.5 in 1908, and 20.3 for the ten-year period. The per cent of the total deaths which were under 1 year, in 1908, was somewhat less than the average, being 36.6 as against 38.4 in the ten-year period.

GENERAL DEATH RATE AND PER CENT OF DEATHS UNDER 1 YEAR IN OTHER LOCALITIES.

During the ten-year period covered by the above table the general mortality rate for the registration area of the United States was 15.8 per 1,000 population; for Boston, Mass., 18.6; New York City, 18.3; and Philadelphia, 18.2.^a The deaths under 1 year of age as compared with the total deaths at all ages in the same ten-year period were for the registration area 19.4 per cent, Boston 20.6 per cent, New York City 22.0 per cent, and Philadelphia 19.9 per cent.^b

PER CENT OF DEATHS UNDER 1 YEAR DUE TO SPECIFIED CAUSES, FALL RIVER, 1900 TO 1909.

A comparison of the percentage of deaths under 1 year due to each cause for a period of ten years indicates that the year 1908 was fairly representative. In 1908, for example, 38.3 per cent of all deaths under 1 year were due to diarrhea, enteritis, and gastritis. The percentage for the ten-year period was 36.7, ranging from 29.8 per cent in 1902 to 43.9 per cent in 1907. The figures for each of the ten years 1900 to 1909 are shown in the following table:

NUMBER AND PER CENT OF DEATHS OF CHILDREN UNDER 1 YEAR FROM CERTAIN SPECIFIED CAUSES, FALL RIVER, MASS., 1900 TO 1909.

The number of deaths under 1 year due to the various causes as shown in this table was furnished by the Bureau of the Census. According to the practice of the Bureau of the Census prior to 1911, deaths from debility, atrophy, marasmus, malnutrition, inanition, etc., of children 3 months of age and over were tabulated under "Ill-defined or unknown," and only deaths from these causes under 3 months were included under "Congenital debility." In this table deaths from congenital debility, classified under this ruling, are included in the first class—"Diseases of early infancy and congenital malformations." In the tabulations which have been made of the Fall River deaths in 1908 for the purposes of this report all deaths under 1 year from debility, atrophy, marasmus, malnutrition, inanition, etc., are classified under "Congenital debility," according to the present practice of the Bureau of the Census and to foreign practice. Because of this difference in method the figures for 1908 in this table do not agree with those for 1908 as tabulated for the purposes of this report. The difference, however, affected only two classes—"Diseases of early infancy and congenital malformation" and "All other causes." The most important and significant cause—diarrhea, enteritis, and gastritis—is not at all affected.]

NUMBER.

Year.	Deaths under 1 year due to—									
	Diseases of early infancy and congenital malformation.	Diarrhea, enteritis, and gastritis.	Convulsions.	Non-tuberculous meningitis.	Pneumonia, bronchitis, and laryngitis.	Tuberculosis (all forms).	Whooping cough.	Measles.	All other causes.	Total, all causes.
1900.....	244	296	48	27	112	9	8	6	135	885
1901.....	218	266	31	26	59	8	.....	1	119	728
1902.....	250	266	41	25	136	7	15	5	148	893
1903.....	266	287	35	22	117	11	9	3	114	864
1904.....	267	270	42	23	94	6	1	1	102	806
1905.....	202	312	37	24	143	9	14	7	98	846
1906.....	205	292	35	21	113	7	11	4	124	812
1907.....	213	395	30	10	123	6	10	.....	112	899
1908.....	182	329	40	7	134	9	15	7	137	859
1909.....	187	393	31	10	121	6	7	1	116	872
Total..	2,234	3,106	370	195	1,152	78	90	35	1,205	8,464

^a Bureau of the Census Bulletin 109, Mortality Statistics, 1910, pp. 10, 12.

^b Compiled from Bureau of the Census Annual Reports on Mortality Statistics.

NUMBER AND PER CENT OF DEATHS OF CHILDREN UNDER 1 YEAR FROM CERTAIN SPECIFIED CAUSES, FALL RIVER, MASS., 1900 TO 1909—Concluded.

PER CENT.

Year.	Deaths under 1 year due to—									
	Diseases of early infancy and congenital malformation.	Diarrhea, enteritis, and gastritis.	Convulsions.	Non-tuberculous meningitis.	Pneumonia, bronchitis, and laryngitis.	Tuberculosis (all forms).	Whooping cough.	Measles.	All other causes.	Total, all causes.
1900.....	27.6	33.4	5.4	3.1	12.6	1.0	0.9	0.7	15.3	100.0
1901.....	29.9	36.5	4.3	3.6	8.1	1.1	.....	.1	16.3	100.0
1902.....	28.0	29.8	4.6	2.8	15.2	.8	1.7	.5	16.6	100.0
1903.....	30.8	33.2	4.1	2.5	13.5	1.3	1.0	.4	13.2	100.0
1904.....	33.1	33.5	5.2	2.9	11.7	.7	.1	.1	12.6	100.0
1905.....	23.9	36.9	4.4	2.8	16.9	1.1	1.6	.8	11.6	100.0
1906.....	25.2	36.0	4.3	2.6	13.9	.9	1.3	.5	15.3	100.0
1907.....	23.7	43.9	3.3	1.1	13.7	.7	1.1	.....	12.5	100.0
1908.....	21.2	38.3	4.7	.8	15.6	1.0	1.7	.8	15.9	100.0
1909.....	21.4	45.1	3.6	1.1	13.9	.7	.8	.1	13.3	100.0
Total..	26.4	36.7	4.4	2.3	13.6	.9	1.1	.4	14.2	100.0

DEATH RATES UNDER 1 YEAR PER 1,000 BIRTHS OF MALES AND FEMALES, BY CAUSES.

While the main purpose of the present investigation was to compare in detail infant mortality among the children of mothers at home and of those engaged in industrial work outside the home, death rates on the usual basis of per 1,000 births can not be computed for those two classes, but only for the total number of male and female deaths under 1 year in Fall River. Of the 4,835 children born in Fall River during 1908, 2,472 were males and 2,362 females, and of 1 the sex was unknown. In the following table the death rates per 1,000 births have been computed for each sex according to cause of death, using the foregoing figures as a basis and assuming that the 1 child of unknown sex was a male.

NUMBER OF DEATHS UNDER 1 YEAR, AND DEATH RATES PER 1,000 BIRTHS, FOR EACH SEX, BY CAUSE OF DEATH, FALL RIVER, MASS., -1908.

Cause of death.	Number of deaths under 1 year.			Death rate per 1,000 births.		
	Males.	Females.	Total.	Males.	Females.	Total.
Premature birth.....	24	25	49	9.7	10.6	10.1
Congenital debility and injury at birth....	113	77	190	45.7	32.6	39.3
Congenital malformation.....	12	6	18	4.9	2.5	3.7
Diarrhea, enteritis, and gastritis.....	194	135	329	78.5	57.2	68.1
Convulsions.....	26	14	40	10.5	5.9	8.3
Nontuberculous meningitis.....	1	6	7	.4	2.5	1.4
Pneumonia, bronchitis, and laryngitis.....	79	55	134	31.9	23.3	27.7
Tuberculosis (all forms).....	5	4	9	2.0	1.7	1.9
Whooping cough.....	6	9	15	2.4	3.8	3.1
Measles.....	2	5	7	.8	2.1	1.4
All other causes.....	26	35	61	10.5	14.8	12.6
Total.....	488	371	859	197.3	157.0	177.6

The striking feature of the above table is the much higher death rate for males than for females, the rate for males from all causes being 26 per cent in excess of that for females. This excess in the male rate is apparent for all of the important causes of death. For the diseases of earliest infancy (premature birth, congenital debility and injury at birth, and congenital malformation) the excess in the male rate is 32 per cent, while for diarrhea, enteritis, and gastritis, and for pneumonia, bronchitis, and laryngitis the excess is 37 per cent. This excess in the infant death rate of males is not peculiar to Fall River. The report of the registrar-general, covering the experience of England and Wales in 1909, showed similarly an excess of 24 per cent in the mortality rate for males under 1 year, and an excess for all the principal causes of death except whooping cough.^a

DEATH RATES UNDER 1 YEAR PER 1,000 BIRTHS, BY AGE AND CAUSE.

It is possible also to compute the death rates per 1,000 births according to age at death and cause of death, and thus to show the relative importance of the various causes of death at each age. In the following table is given the number of deaths occurring under 1 month, under 3 months, at 3 months and under 6 months, and at 6 months and over, and for the total, by each principal cause of death, and rates per 1,000 births are shown in the same detail. As has already been pointed out, the high death rate (68.1) due to diarrhea, enteritis, and gastritis stands out as the most striking feature, congenital debility accounting for a rate of 39.3 per 1,000 and pneumonia, bronchitis, and laryngitis for a rate of 27.7.

NUMBER OF DEATHS AT DIFFERENT AGES UNDER 1 YEAR, AND DEATH RATES PER 1,000 BIRTHS, BY CAUSE OF DEATH, FALL RIVER, MASS., 1908.

NUMBER.

Cause of death.	Under 1 month.	Under 3 months.	3 months and under 6 months.	6 months and over.	Total.
Premature birth.....	42	48	.....	1	49
Congenital debility and injury at birth.....	78	116	45	29	190
Congenital malformation.....	15	16	1	1	18
Diarrhea, enteritis, and gastritis.....	20	80	117	132	329
Convulsions.....	16	20	8	12	40
Nontuberculous meningitis.....	2	4	2	1	7
Pneumonia, bronchitis, and laryngitis.....	14	36	32	66	134
Tuberculosis (all forms).....	.....	.....	3	6	9
Whooping cough.....	.....	5	3	7	15
Measles.....	.....	1	1	5	7
All other causes.....	9	24	15	22	61
Total.....	196	350	227	282	859

^a Seventy-second Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales, 1909. London, 1911. P. xlvii.

NUMBER OF DEATHS AT DIFFERENT AGES UNDER 1 YEAR, AND DEATH RATES PER 1,000 BIRTHS, BY CAUSE OF DEATH, FALL RIVER, MASS., 1908—Concluded.

RATE PER 1,000 BIRTHS.

Cause of death.	Under 1 month.	Under 3 months.	3 months and under 6 months.	6 months and over.	Total.
Premature birth.....	8.7	9.9	.....	0.2	10.1
Congenital debility and injury at birth.....	16.1	24.0	9.3	6.0	39.3
Congenital malformation.....	3.1	3.3	.2	.2	3.7
Diarrhea, enteritis, and gastritis.....	4.1	16.6	24.2	27.3	68.1
Convulsions.....	3.3	4.1	1.7	2.5	8.3
Nontuberculous meningitis.....	.4	.8	.4	.2	1.4
Pneumonia, bronchitis, and laryngitis.....	2.9	7.4	6.6	13.7	27.7
Tuberculosis (all forms).....	.....	.....	.6	1.3	1.9
Whooping cough.....	.....	1.0	.6	1.5	3.1
Measles.....	.....	.2	.2	1.0	1.4
All other causes.....	1.9	5.0	3.1	4.5	12.6
Total.....	40.5	72.3	46.9	58.4	177.6

PER CENT OF DEATHS UNDER 1 YEAR DUE TO SPECIFIED CAUSES, FALL RIVER AND REGISTRATION AREA OF THE UNITED STATES.

Death rates under 1 year per 1,000 births are not available either for the registration area of the United States or for the individual cities, but a comparison can be made of the per cent of total deaths under 1 year which are due to the individual causes. Such a comparison is made between the registration area of the United States and Fall River, covering the year 1908, in the following table:

NUMBER AND PER CENT OF DEATHS UNDER 1 YEAR DUE TO CERTAIN SPECIFIED CAUSES, FALL RIVER, MASS., AND REGISTRATION AREA OF THE UNITED STATES.

[Figures for registration area of United States are compiled from Bureau of the Census Bulletin 109, Mortality Statistics, 1910.]

Cause of death.	Deaths under 1 year, registration area, United States, 1908.		Deaths under 1 year, Fall River, Mass., 1908.	
	Number.	Per cent of total, all causes.	Number.	Per cent of total, all causes.
Premature birth.....	16,441	12.1	49	5.7
Congenital debility.....	25,913	19.0	184	21.4
Injuries at birth.....	3,110	2.3	6	.7
Congenital malformation.....	6,525	4.8	18	2.1
Diarrhea, enteritis, and gastritis.....	38,033	27.9	329	38.3
Convulsions.....	5,295	3.9	40	4.7
Nontuberculous meningitis.....	2,640	1.9	7	.8
Pneumonia, bronchitis, and laryngitis.....	19,341	14.2	134	15.6
Tuberculosis (all forms).....	2,246	1.6	9	1.0
Whooping cough.....	2,761	2.0	15	1.7
Measles.....	1,162	.9	7	.8
All other causes.....	12,965	9.5	61	7.1
Total, all causes.....	136,432	100.0	859	100.0

^a According to the practice of the Bureau of the Census prior to 1911, deaths from debility, atrophy, marasmus, malnutrition, inanition, etc., of children 3 months of age or over were tabulated under "ill-defined and unknown," and only deaths from these causes under 3 months were included under "congenital debility." In order to make the figures for the registration area comparable with those for Fall River, an estimate has been made of those dying at 3 months and over on the assumption that in the entire registration area the deaths under 3 months from these causes have the same relation to the total deaths from these causes as they were found to bear in Fall River in 1908. That the result is approximately correct is indicated by the fact that in 1910 (the first year in which full information was available) the number of deaths from these causes in the registration area in the first, second, and third months of life bore almost precisely the same relation to each other as in Fall River in 1908. This computation changes the per cent of deaths due to "congenital debility" in the registration area from 11.6 to 19, and those due to "ill-defined and unknown" causes from 16.9 to 9.5.

The foregoing table shows the relative importance of each cause of death both in the registration area and in Fall River, Mass., in 1908. It will be seen that Fall River shows a striking excess of deaths from diarrhea, enteritis, and gastritis, 38.3 per cent of all being from that cause, while in the registration area the corresponding percentage was only 27.9. An excess is also shown of deaths due to pneumonia, bronchitis, and laryngitis, the percentage in the registration area being 14.2, while in Fall River it was 15.6.

Concerning the first four causes as given in the table, a word of explanation should be given. The causes taken together are sometimes classified as prematurity and immaturity. Deaths from these causes are very largely in the first month, and from three of the causes approximately three-fourths are in the first week. The difficulty of distinguishing between the first two causes, premature birth and congenital debility, makes it somewhat unsatisfactory to consider these causes separately. Taking the four causes together it will be seen that in the registration area they account for 38.2 per cent of the deaths under 1 year, while in Fall River they include 29.9 per cent. It is extremely probable that the lower percentage of deaths due to premature birth as reported in Fall River is due to the fact that some cases of premature birth were reported under the head "congenital debility." There are indications, however, that a certain number of cases which were reported as stillbirths should strictly speaking have been reported as births and likewise as deaths from premature birth. It will be evident that such an omission would tend to depress the infant mortality rate in Fall River, for each such omission means an omission, first, from the deaths, which numbered 859, and, second, from the births, which numbered 4,835.

**PER CENT OF DEATHS UNDER 1 YEAR DUE TO SPECIFIED CAUSES
AND DEATH RATES PER 1,000 BIRTHS, FALL RIVER AND ENGLAND
AND WALES.**

A comparison of the causes of infant mortality in Fall River upon the basis of the per cent of such deaths due to each cause shows the relative importance of the various causes, but does not permit such an accurate comparison of the death rates from each cause as is desirable. From death rates computed according to the number per 1,000 births in Fall River, accurate comparisons can be made with the rates in localities where detailed information and rates by causes are available. The annual reports of the registrar-general of the United Kingdom have for a long period contained elaborately detailed information concerning infant mortality. In the following table the death rates under 1 year per 1,000 births, and the per cent of deaths due to each cause of the total deaths under 1 year are shown for England and Wales and Fall River, 1908, in comparison. Inasmuch as the death

rate under 1 year per 1,000 births was 177.6 in Fall River and 120.4 in England and Wales, it is evident that the comparison is between a city with a high death rate, on the one hand, and the entire area of a country with a relatively low death rate on the other, and comparison of the two sets of figures should clearly indicate those causes of death which are accountable for much of the excessive death rate in Fall River.

COMPARISON OF PER CENT OF DEATHS UNDER 1 YEAR, AND DEATH RATES DUE TO CERTAIN SPECIFIED CAUSES, PER 1,000 BIRTHS, FALL RIVER, MASS., AND ENGLAND AND WALES.

[Figures for England and Wales are compiled from Seventy-first Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales, 1908.]

Cause of death.	Per cent of deaths from each cause of total deaths under 1 year.		Death rates under 1 year per 1,000 births.	
	England and Wales, 1908.	Fall River, 1908.	England and Wales, 1908.	Fall River, 1908.
Premature birth.....	16.5	5.7	19.9	10.1
Congenital debility, etc.....	14.0	22.1	16.8	39.3
Congenital malformation.....	5.6	2.1	6.7	3.7
Diarrhea, enteritis, and gastritis.....	17.9	38.3	21.6	68.1
Convulsions.....	9.0	4.7	10.8	8.3
Nontuberculous meningitis.....	1.5	.8	1.8	1.4
Pneumonia, bronchitis, and laryngitis.....	17.1	15.6	20.6	27.7
Tuberculosis (all forms).....	3.9	1.1	4.7	1.9
Whooping cough.....	4.2	1.7	5.0	3.1
Measles.....	1.6	.8	1.9	1.4
All other causes.....	8.8	7.1	10.6	12.6
Total.....	100.0	100.0	120.4	177.6

Here, as in the preceding table, the excessive mortality from diarrhea, enteritis, and gastritis in Fall River is clearly indicated. While in England and Wales only 17.9 per cent of the deaths were due to that cause, in Fall River 38.3 per cent were from the same cause. When the death rates per 1,000 births are considered, the extraordinary excess in Fall River stands out even more strikingly, being 68.1, as against the rate of 21.6 for England and Wales. For pneumonia, bronchitis, and laryngitis the rate in Fall River is 27.7, while that in England and Wales was only 20.6. When the first three causes are compared, Fall River again shows a marked excess, and this in spite of the fact that the rates from premature birth and congenital malformation were much lower than for England and Wales. It is probable that the very high rate for congenital debility, etc., is due to the fact that under that cause are grouped some cases of premature birth and some cases which should properly have been reported under some of the diarrheal diseases. For a number of the minor causes the rates in Fall River are seen to be lower than for England and Wales as a whole. Some of these differences are, of course, due to a difference in practice of reporting the cause of death or to actual defects in such reports.

PER CENT OF DEATHS UNDER 1 YEAR DUE TO SPECIFIED CAUSES, AND DEATH RATES PER 1,000 BIRTHS, FALL RIVER AND BLACKBURN, ENGLAND.

When the infant mortality rates of an entire country like England and Wales are taken, it is evident that some factors may be influential which are not active in an industrial city such as Fall River. It is desirable, therefore, to compare the experience of Fall River with that of an English textile city, and Blackburn is taken for the purpose. The population of Blackburn is about 135,000, somewhat greater than that of Fall River; its industries are almost exclusively textile and employ very large numbers of women; its mortality experience has been tabulated for a long period of years. In the following table a comparison is made between the infant mortality experience of Blackburn in the ten-year period 1901 to 1910, and in 1910 with that of Fall River in 1908:

COMPARISON OF PER CENT OF DEATHS UNDER 1 YEAR, AND DEATH RATES DUE TO CERTAIN SPECIFIED CAUSES, PER 1,000 BIRTHS, IN FALL RIVER, MASS., AND IN BLACKBURN, ENGLAND.

[Figures for Blackburn are compiled from Annual Reports upon the Health of Blackburn.]

Cause of death.	Per cent of deaths from each cause of total deaths under 1 year.			Death rates under 1 year per 1,000 births.		
	Blackburn, 1901-1910.	Blackburn, 1910.	Fall River, 1908.	Blackburn, 1901-1910.	Blackburn, 1910.	Fall River, 1908.
Premature birth.....	13.8	15.7	5.7	21.7	21.4	10.1
Congenital debility and injury at birth.....	10.6	11.7	22.1	16.7	15.9	39.3
Congenital defects.....	4.3	4.5	2.1	6.8	6.1	3.7
Diarrhea, enteritis, and gastritis.....	16.6	15.0	38.3	26.1	20.4	68.1
Convulsions.....	5.5	6.5	4.7	8.6	8.8	8.3
Pneumonia, bronchitis, and laryngitis.....	19.2	20.4	15.6	30.1	27.8	27.7
Tuberculosis (all forms).....	5.9	4.7	1.1	9.3	6.4	1.9
All other causes.....	24.0	21.4	10.4	37.8	29.2	18.5
Total.....	100.0	100.0	100.0	157.1	136.0	177.6

It will be seen that here, as in the comparison between the infant-mortality rates of Fall River and England and Wales, the Fall River rates are excessive and the excess is almost entirely due to the great number of deaths from diarrhea, enteritis, and gastritis. The death rate from this cause in Fall River was three times that in Blackburn in 1910 and more than two and one-half times that in Blackburn in the ten-year period 1901 to 1910. Another important difference is in the mortality from premature birth, congenital debility, and congenital defects. Here, again, the rate in Fall River is considerably in excess of that in Blackburn. It is probable that this is due in large part to the inclusion under congenital debility of a considerable number of deaths which, more accurately reported, would have been placed under diarrhea, enteritis, and gastritis.

The death rates for pneumonia, bronchitis, and laryngitis are almost precisely the same in Blackburn and in Fall River, but in both places the rate is considerably higher than that shown for England and Wales in a preceding table.

DEATH RATES AT DIFFERENT AGES UNDER 1 YEAR PER 1,000 BIRTHS BY CAUSES, FALL RIVER AND ENGLAND AND WALES.

The comparisons of the preceding tables have shown in what causes the infant-mortality rates of Fall River were excessive. A somewhat clearer understanding of the character of the excess in rates may be obtained by a comparison of the age at death as well as the cause of death. Such a comparison is made between England and Wales and Fall River in the table which follows:

COMPARISON OF DEATH RATES AT DIFFERENT AGES UNDER 1 YEAR PER 1,000 BIRTHS, BY CAUSE OF DEATH, FALL RIVER, MASS., AND ENGLAND AND WALES, 1908.

[Figures for England and Wales are compiled from Seventy-first Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales, 1908.]

Cause of death.	England and Wales, 1908.					Fall River, 1908.				
	Under 1 month.	Under 3 months.	3 months and under 6 months.	6 months and over.	Total under 1 year.	Under 1 month.	Under 3 months.	3 months and under 6 months.	6 months and over.	Total under 1 year.
Premature birth....	18.0	19.6	0.2	.....	19.9	8.7	9.9	.....	0.2	10.1
Congenital debility and injury at birth.....	7.7	12.4	2.8	1.6	16.8	16.1	24.0	9.3	6.0	39.3
Congenital malformation.....	5.0	6.0	.4	.3	6.7	3.1	3.3	.2	.2	3.7
Diarrhea, enteritis, and gastritis.....	1.2	6.3	7.5	7.8	21.6	4.1	16.6	24.2	27.3	68.1
Convulsions.....	4.1	7.0	2.2	1.5	10.8	3.3	4.1	1.7	2.5	8.3
Non tuberculous meningitis.....	.1	.3	.5	1.0	1.8	.4	.8	.4	.2	1.4
Pneumonia, bronchitis, and laryngitis.....	1.6	6.1	5.0	9.4	20.6	2.9	7.4	6.6	13.7	27.7
Tuberculosis (all forms).....	.1	.7	1.5	2.5	4.7	.....	.....	.6	1.3	1.9
Whooping cough.....	.1	1.1	1.3	2.7	5.0	.....	1.0	.6	1.5	3.1
Measles.....	.....	.1	.1	1.7	1.9	.....	.2	.2	1.0	1.4
All other causes.....	2.4	4.8	2.1	3.9	10.6	1.9	5.0	3.1	4.5	12.6
Total.....	40.3	64.4	23.6	32.4	120.4	40.5	72.3	46.9	58.4	177.6

According to the foregoing table it will be seen that both in England and Wales and in Fall River the death rate during the first month of life was 40 per 1,000 births. During the first three months the Fall River rate was 72.3 as against 64.4 in England and Wales, an excess of over 12 per cent. In the second three months an even greater excess is found, the Fall River rate being nearly double that of England and Wales. The Fall River death rate for age 6 months and under 1 year was more than 80 per cent in excess of that in England

and Wales. Taking all causes together, it is seen, therefore, that the rates under 1 month are practically the same, under 3 months the excess is small, but at all ages above 3 months the excess is very great.

A comparison of the deaths due to diarrhea, enteritis, and gastritis shows an excessive death rate, increasing in each successive age group, but in a considerably greater degree than for all causes. Here it is especially noticeable that even in the first month of life the Fall River death rate from diarrhea, enteritis, and gastritis is more than three times as great as that of England and Wales.

This comparison of deaths at different ages and by causes suggests that the deaths under 1 month are least of all due to preventable causes, that the operation of such preventable causes begins to be effective in the second and third months of life, and reaches its maximum in the third to the twelfth month. The comparative constancy of the rate under 1 month is probably to be accounted for in large part by two causes: (1) The great majority of those children who die during the first month are not well and strong at birth and therefore do not begin life with a fair chance to survive, even under fairly favorable conditions. In so far as the causes of death are correctly reported, practically all of those dying from premature birth, congenital debility, or congenital malformations are of this class. (2) While much variation exists in the percentage of children breast fed as between different localities and different age groups, this variation would be least during the first month of life. So far as the death rate under 1 month is influenced by these two causes, it will be seen that here less than in any other of the age groups an improvement could be expected as a result of the betterment of domestic or municipal sanitation, the conditions of housing, or in the instruction of the mothers as to proper feeding and care.

**DEATH RATES AT DIFFERENT AGES UNDER 1 YEAR PER 1,000 BIRTHS,
BY CAUSES, FALL RIVER, AND BLACKBURN, ENGLAND.**

A similar comparison of the death rates in Fall River with those in Blackburn leads to much the same conclusions. The rates for Blackburn during the first month are somewhat in excess of those for Fall River. At ages 3 to 6 months, and 6 months and over, the Fall River rates are very greatly excessive, and, as elsewhere seen, the excesses are to be accounted for almost entirely by excessive rates from the diarrheal diseases. The figures for Blackburn are shown in the following table.

DEATH RATES AT DIFFERENT AGES UNDER 1 YEAR, PER 1,000 BIRTHS, BY CAUSE OF DEATH, BLACKBURN, ENGLAND, 1910.

[Compiled from Annual Report upon the Health of Blackburn for the year 1910.]

Cause of death.	Number of deaths.					Rate per 1,000 births.				
	Under 1 month.	Under 3 months.	3 months and under 6 months.	6 months and over.	Total under 1 year.	Under 1 month.	Under 3 months.	3 months and under 6 months.	6 months and over.	Total under 1 year.
Premature birth.....	57	62	1	-----	63	19.3	21.1	0.3	-----	21.4
Congenital debility..	13	21	13	10	44	4.4	7.1	4.4	3.4	14.9
Injury at birth.....	3	3	-----	-----	3	1.0	1.0	-----	-----	1.0
Congenital defects..	11	13	2	3	18	3.7	4.4	.7	1.0	6.1
Diarrhea, enteritis, and gastritis.....	1	13	19	28	60	.3	4.4	6.5	9.5	20.4
Convulsions.....	15	20	5	1	26	5.1	6.8	1.7	.3	8.8
Non-tuberculous meningitis.....	-----	-----	3	7	10	-----	-----	1.0	2.4	3.4
Pneumonia, bronchitis, and laryngitis.....	4	22	14	46	82	1.4	7.5	4.7	15.6	27.8
Tuberculosis (all forms).....	-----	5	6	8	19	-----	1.7	2.0	2.7	6.4
Whooping cough.....	-----	1	2	3	6	-----	.3	.7	1.0	2.0
Measles.....	-----	1	-----	8	9	-----	.3	-----	2.7	3.1
All other causes.....	32	44	9	8	61	10.9	14.9	3.1	2.7	20.7
Total.....	136	205	74	122	401	46.1	69.5	25.1	41.4	136.0

EXCESSIVE INFANT DEATH RATES IN FALL RIVER LARGELY DUE TO PREVENTABLE CAUSES.

The foregoing comparisons between Fall River and localities having a more favorable infant mortality rate have indicated that wherever death rates are excessive the excess is largely to be accounted for by a high rate from diarrheal diseases. This is more clearly brought out if a comparison is made of death rates from diarrheal and from nondiarrheal diseases, as in the following table:

COMPARISON OF DEATH RATES PER 1,000 BIRTHS FROM DIARRHEA, ENTERITIS, AND GASTRITIS, AND FROM NONDIARRHEAL DISEASES IN FALL RIVER AND IN OTHER LOCALITIES.

Locality.	Death rate under 1 year per 1,000 births.			Per cent of excess of Fall River death rate under 1 year per 1,000 births over that of specified locality.		
	Diarrhea, enteritis, and gastritis.	Non-diarrheal diseases.	All causes.	Diarrhea, enteritis, and gastritis.	Non-diarrheal diseases.	All causes.
Fall River, 1908.....	68.1	109.5	177.6	-----	-----	-----
Manhattan Borough, 1908.....	37.6	97.0	134.6	81	13	32
Boston, 1910.....	33.2	92.8	126.0	105	18	41
England and Wales, 1908.....	21.6	98.7	120.3	215	11	48
Blackburn, England, 1901-1910.....	26.1	130.9	157.0	161	a 20	13

a Per cent of excess of Blackburn over Fall River rate.

This much greater excess in death rates from diarrheal diseases than in death rates from other causes of itself shows that such excessive rates are largely preventable. The additional fact that

wherever rates are excessive the greatest differences exist at 3 and under 6 months and at 6 months and over shows again that to a considerable extent the high rates are due to preventable causes.

CAUSES OF INFANT DEATHS WHICH ARE MOST LARGELY PREVENTABLE AS SHOWN BY ENGLISH EXPERIENCE.

Here, again, it is possible to throw light upon the situation by turning to English experience, where figures are available covering a period of years, to show the causes where organized effort has resulted in the greatest improvement in the infant death rates. The first of the following tables gives the death rates at different ages under 1 year per 1,000 births and the relative mortality figures, by causes, for England and Wales in 1901 to 1904 and in each succeeding year up to 1909. The second table shows the per cent of reduction in death rates at different ages between 1901-1904 and 1909, by causes.

DEATH RATES AT DIFFERENT AGES UNDER 1 YEAR, PER 1,000 BIRTHS, AND RELATIVE MORTALITY FIGURES, 1901 TO 1909, ENGLAND AND WALES.

[Compiled from Annual Reports of the Registrar-General of Births, Deaths, and Marriages in England and Wales.]

Developmental and wasting diseases (premature birth, congenital defects, want of breast milk, injury at birth, and atrophy, debility, and marasmus).

Year.	Death rate per 1,000 births.				Relative mortality figures. (1901-1904=100.)			
	Under 3 months.	3 months and under 6 months.	6 months and over.	Total.	Under 3 months.	3 months and under 6 months.	6 months and over.	Total.
1901 to 1904	39.43	3.92	2.28	45.63	100	100	100	100
1905	38.91	3.55	2.02	44.48	99	91	89	97
1906	39.26	3.48	2.03	44.77	100	89	89	98
1907	38.02	3.35	1.81	43.18	96	85	79	95
1908	37.96	3.43	1.98	43.37	96	88	87	95
1909	37.57	3.19	1.97	42.73	95	81	86	94
Average	38.83	3.63	2.10	44.56	.....	.....	.....	.....

Diarrheal diseases (diarrhea, enteritis, gastro-enteritis, gastro-intestinal catarrh, gastritis, and gastric catarrh).

1901 to 1904	7.26	8.81	9.88	25.95	100	100	100	100
1905	6.69	7.85	8.83	23.37	92	89	89	90
1906	8.82	11.04	12.77	32.63	122	125	129	126
1907	4.46	4.67	4.93	14.06	61	53	50	54
1908	6.34	7.47	7.80	21.61	87	85	79	83
1909	4.64	4.69	4.92	14.25	64	53	50	55
Average	6.67	7.88	8.75	23.30	.....	.....	.....	.....

Convulsions.

1901 to 1904	9.27	3.16	2.51	14.94	100	100	100	100
1905	7.98	2.39	1.92	12.29	86	76	76	82
1906	7.74	2.37	1.71	11.82	83	75	68	79
1907	7.25	2.20	1.61	11.06	78	70	64	74
1908	7.03	2.19	1.53	10.75	76	69	61	72
1909	6.44	1.97	1.49	9.90	69	62	59	66
Average	8.17	2.64	2.03	12.84	.....	.....	.....	.....

DEATH RATES AT DIFFERENT AGES UNDER 1 YEAR, PER 1,000 BIRTHS, AND RELATIVE MORTALITY FIGURES, 1901 TO 1909, ENGLAND AND WALES—Concluded.

Tuberculosis (all forms).

Year.	Death rate per 1,000 births.				Relative mortality figures. (1901-1904=100.)			
	Under 3 months.	3 months and under 6 months.	6 months and over.	Total.	Under 3 months.	3 months and under 6 months.	6 months and over.	Total.
1901 to 1904	0.99	1.91	3.21	6.11	100	100	100	100
1905.....	.84	1.54	2.79	5.17	85	81	87	85
1906.....	.76	1.54	2.62	4.92	77	81	82	81
1907.....	.71	1.32	2.51	4.54	72	69	78	74
1908.....	.69	1.46	2.50	4.65	70	76	78	76
1909.....	.58	1.19	2.23	4.00	59	62	69	65
Average.....	.84	1.63	2.83	5.30	.....	.....	.....	.....

Pneumonia, bronchitis, and laryngitis.

1901 to 1904	6.41	5.81	11.34	23.56	100	100	100	100
1905.....	5.63	5.14	10.74	21.51	88	88	95	91
1906.....	4.72	4.43	9.22	18.37	74	76	81	78
1907.....	6.84	5.61	10.98	23.43	107	97	97	99
1908.....	6.14	5.02	9.40	20.56	96	86	83	87
1909.....	5.11	4.57	9.55	19.23	80	79	84	82
Average.....	6.01	5.33	10.58	21.93	.....	.....	.....	.....

All other causes.

1901 to 1904	7.03	4.91	12.08	24.02	100	100	100	100
1905.....	6.51	4.29	10.53	21.33	93	87	87	89
1906.....	6.32	4.09	9.58	19.99	90	83	79	83
1907.....	6.09	4.15	10.51	21.35	95	85	87	89
1908.....	6.27	4.05	9.17	19.49	89	82	76	81
1909.....	5.78	3.59	9.25	18.62	82	73	77	78
Average.....	6.63	4.42	10.82	21.87	.....	.....	.....	.....

All causes.

1901 to 1904	70.39	28.52	41.30	140.21	100	100	100	100
1905.....	66.56	24.76	36.83	128.15	95	87	89	91
1906.....	67.62	26.95	37.93	132.50	96	94	92	95
1907.....	63.97	21.30	32.35	117.62	91	75	78	83
1908.....	64.43	23.62	32.38	120.43	92	83	78	86
1909.....	60.12	19.20	29.41	108.73	85	67	71	78
Average.....	67.14	25.55	37.12	129.81	.....	.....	.....	.....

PER CENT OF REDUCTION IN DEATH RATES AT DIFFERENT AGES UNDER 1 YEAR, PER 1,000 BIRTHS, BETWEEN 1901-1904 AND 1909, ENGLAND AND WALES, BY CAUSES.

[Compiled from Annual Reports of the Registrar-General of Births, Deaths, and Marriages in England and Wales.]

Cause of death.	Per cent of total deaths due to specified cause, 1901-1904.	Per cent of reduction in death rates, 1909, over average, 1901-1904.			
		Under 3 months.	3 months and under 6 months.	6 months and over.	Total under 1 year.
Developmental and wasting diseases ^a	33	5	19	14	6
Diarrheal diseases ^b	19	36	47	50	45
Convulsions.....	11	31	38	41	34
Tuberculosis (all forms).....	4	41	38	31	35
Pneumonia, bronchitis, and laryngitis.....	17	20	21	16	18
All other causes.....	17	18	27	23	22
Total.....	100	15	33	29	22

^a Includes premature birth, congenital defects, want of breast milk, injury at birth, atrophy, debility, and marasmus.

^b Includes diarrhea, enteritis, gastroenteritis, gastrointestinal catarrh, gastritis, and gastric catarrh.

The foregoing table shows in the most striking way the reduction in death rates under 1 year that have been brought about in England and Wales since 1901. It will be seen that for the group of causes accountable for the largest percentage of deaths under 1 year, developmental and wasting diseases, scarcely any improvement has been made. For this group of causes the rate at all ages under 1 year in 1909 shows an improvement of only 6 per cent, and under 3 months (the most important age group for these causes) an improvement of only 5 per cent.

Another striking feature brought out by the last section of the table is that while the greatest percentage of reduction has been secured in death rates from diarrheal diseases, 45 per cent, the improvement in practically all of the other causes also is very great, namely, 34 per cent for convulsions, 35 per cent for tuberculosis, 18 per cent for pneumonia, bronchitis, and laryngitis, and 22 per cent for all other causes. The numbers represented by the deaths from convulsions and tuberculosis are, of course, relatively small. The numbers represented, however, by the deaths from pneumonia, bronchitis, and laryngitis and all other causes are large and relatively important.

It should here be pointed out that the significance of these figures is not affected by the greater accuracy of reports in recent years and the resulting transference to their correct causes of deaths formerly incorrectly or indefinitely reported. The improvement in rates for all diseases was 22 per cent. Except for developmental and wasting diseases an improvement but little less than this was effected in the rate for each of the classes of causes given. It is evident, therefore, that there has been a very real improvement all along the line, and that the rates of former years for practically all causes were unnecessarily high.

CHAPTER II.

MOTHER'S WORK BEFORE CHILDBIRTH IN
RELATION TO STILLBIRTHS AND
INFANT MORTALITY.

CHAPTER II.

MOTHER'S WORK BEFORE CHILDBIRTH IN RELATION TO STILL-BIRTHS AND INFANT MORTALITY.

CAUSES OF DEATH UNDER 1 YEAR FOR CHILDREN OF MOTHERS AT HOME AND OF MOTHERS AT WORK.

In pursuance of the plan of investigation, the attempt was made to visit the homes of each of the mothers of the 859 infants who died during the year and to ascertain certain details concerning her occupation, her time of discontinuing work before the birth of the child, and of resuming work after the birth of the child, the character of her work, and the character of the feeding and of the care given the child, etc. In the cases of 279 children the families could not be traced, and detailed information outside of that shown in the death record is not available. In 266 cases it was found that prior to the birth of the child the mother was at work outside the home, while in 314 cases the mother's work was limited to household duties or other work which was carried on entirely at home. It should be noted that this classification is based entirely upon the mother's employment previous to the birth of the child and has no relation to the mother's return to work or to the character or place of her employment after the birth of the child. For each of these three classes the deaths have been tabulated by causes, and the result is given in the following table, which shows also for each class the per cent of the total number of children dying from each specified cause:

NUMBER AND PER CENT OF DEATHS UNDER 1 YEAR DUE TO CERTAIN SPECIFIED CAUSES, CLASSIFIED ACCORDING TO EMPLOYMENT OF MOTHER BEFORE CHILD-BIRTH.

Cause of death.	Number of deaths.				Per cent of total.			
	Mothers at home.	Mothers at work.	Mothers not found.	Total.	Mothers at home.	Mothers at work.	Mothers not found.	Total.
Premature birth.....	16	20	13	49	5.1	7.5	4.7	5.7
Congenital debility and injuries at birth.....	78	56	56	190	24.8	21.0	20.0	22.1
Congenital malformation.....	8	4	6	18	2.5	1.5	2.2	2.1
Diarrhea, enteritis, and gastritis.....	111	113	105	329	35.4	42.5	37.6	38.3
Convulsions.....	22	10	8	40	7.0	3.8	2.9	4.7
Nontuberculous meningitis.....	1	1	5	7	.3	.4	1.8	.8
Pneumonia, bronchitis, and laryngitis.....	51	44	39	134	16.2	16.5	14.0	15.6
Tuberculosis (all forms).....	3	.....	6	9	1.0	.....	2.2	1.1
Whooping cough.....	4	.....	11	15	1.3	.....	3.9	1.7
Measles.....	.....	.....	7	7	.....	.....	2.5	.8
All other causes.....	20	18	23	61	6.4	6.8	8.2	7.1
Total.....	314	266	279	859	100.0	100.0	100.0	100.0

Reference to the table shows that both for children of mothers at home and of mothers at work the most important cause of death was diarrhea, enteritis, and gastritis. For the children of mothers at work this group of causes is responsible for 42.5 per cent of the total deaths, while of the children of mothers at home it was the cause of 35.4 per cent. When comparison is made of the group of causes especially influenced by the condition of the mother before the birth of the child, namely, the diseases of early infancy and congenital malformations, it will be seen that the mothers at home make the poorer showing, 32.4 per cent of the children of such mothers having died from these causes, while only 30 per cent of the children of mothers at work died from these causes. Deaths from convulsions accounted for 7 per cent of the deaths of the children of mothers at home as compared with 3.8 per cent of the deaths of children of mothers at work. This difference, however, can not be regarded as significant. It is not at all improbable that some of these deaths are actually due to diarrheal diseases. It may be observed that if the two causes, diarrhea, enteritis, and gastritis, and convulsions are combined the excess for children of mothers at work is slight.

Here, then, at the outset it appears clear that the chief difference between the children of mothers at home and of mothers at work outside the home before childbirth is in the excess of deaths from diarrhea, enteritis, and gastritis among the children of mothers at work. It is necessary, however, to bear in mind that the majority of mothers in this latter group would not return to work outside the home after childbirth, but would remain at home to nurse and care for the child. A careful study of these two groups later on will show whether the excessive mortality from diarrhea, enteritis, and gastritis is confined to the children of mothers who returned to work outside the home after childbirth and while the child was living, or extends as well to the children of those mothers who remained at home.

In order to judge whether the mortality of the children for whom detailed information was secured indicates conditions in any considerable degree different from those of the children whose families were not traced, it is necessary to examine the causes of death of the children in the latter group. Such a comparison shows that for the diseases of early infancy and congenital malformation the percentage of this class was somewhat below that of either children of mothers at home or children of mothers at work. For diarrhea, enteritis, and gastritis the percentage falls approximately midway between that of the other two classes. For pneumonia, bronchitis, and laryngitis the percentage is somewhat lower than for either of the other classes, the percentage of deaths from miscellaneous diseases being somewhat larger than that in either of the other classes. The indications from

these figures are therefore that the conditions of the children whose families were not traced were not more unfavorable than those of either of the other classes.

COUNTRY OF BIRTH OF MOTHERS OF CHILDREN DYING UNDER 1 YEAR AND STILLBORN, FOR MOTHERS AT HOME AND MOTHERS AT WORK.

A further comparison of the children whose families were not traced with the other two classes, and an indication of the representative character of those cases for which details were secured may be made by a study of the country of birth of mother. In the following table the three classes are compared according to the country of birth of mother, the figures being given not only for the children born alive, but also for the 227 stillborn children. This table shows that in the group of mothers not found, the children of non-English-speaking mothers are slightly in excess of their proportions in the other groups. The excess, however, does not seem sufficiently large to be especially significant.

COUNTRY OF BIRTH OF MOTHERS OF CHILDREN BORN LIVING AND STILLBORN FOR MOTHERS AT HOME, MOTHERS AT WORK, AND MOTHERS NOT FOUND.

Country of birth of mother.	Mothers at home before childbirth.				Mothers at work before childbirth.			
	Born alive.	Stillborn.	Total number.	Per cent.	Born alive.	Stillborn.	Total number.	Per cent.
United States.....	61	39	100	24.4	51	21	72	21.5
England.....	17	10	27	6.6	23	13	36	10.7
Scotland.....	3	.....	3	.....	.....	.....	.....	.....
Ireland.....	10	1	11	2.7	10	1	11	3.3
Canada.....	88	21	109	26.6	52	20	72	21.5
Azores.....	111	15	126	30.7	110	10	120	35.8
Poland.....	9	3	12	2.9	12	1	13	3.9
Russia.....	5	7	12	2.9	3	.....	3	.9
Italy.....	6	.....	6	1.5	3	2	5	1.5
Austria.....	1	.....	1	.3	.....	1	1	.3
Germany.....	3	.....	3	.7	1	.....	1	.3
France.....	.....	.....	.....	.....	.....	.....	.....	.....
Syria.....	.....	.....	.....	.....	1	.....	1	.3
Total.....	314	96	410	100.0	266	69	335	100.0

Country of birth of mother.	Mothers not found.				Total.			
	Born alive.	Stillborn.	Total number.	Per cent.	Born alive.	Stillborn.	Total number.	Per cent.
United States.....	51	20	71	21.0	163	80	243	22.4
England.....	12	1	13	3.8	52	24	76	7.0
Scotland.....	1	.....	1	.3	4	.....	4	.4
Ireland.....	4	2	6	1.8	24	4	28	2.6
Canada.....	71	21	92	27.2	211	62	273	25.2
Azores.....	114	11	125	37.0	335	36	371	34.2
Poland.....	15	3	18	5.3	36	7	43	4.0
Russia.....	2	.....	2	.6	10	7	17	1.6
Italy.....	3	1	4	1.2	12	3	15	1.4
Austria.....	4	.....	4	1.2	5	1	6	.5
Germany.....	1	.....	1	.3	5	.....	5	.5
France.....	1	.....	1	.3	1	.....	1	.1
Syria.....	.....	.....	.....	.....	1	.....	1	.1
Total.....	279	59	338	100.0	859	224	1,083	100.0

• Not including 3, country of birth of mother not reported.

Since apparently the 580 children for whom detailed information was secured may be taken as fairly representative of the entire 859 dying under 1 year, we may proceed with the study of the living conditions and of the causes of death of the children of mothers at work outside the home as compared with those of the children of mothers at home.

The importance in Fall River of the mothers industrially employed outside the home before childbirth, as related to the infant mortality in 1908, is indicated by the fact that of the 580 reported 266, or 45.9 per cent, were so employed, and 314, or 54.1 per cent, were at home.

The importance of the mothers employed outside the home after childbirth and while the child was living, as related to the infant mortality of Fall River, is indicated by the fact that of the 578 reported, 83, or 14.4 per cent, were so employed. This number is subject to further qualification in certain respects, because of the fact that out of this 83 only 41 were at the time just prior to their return to work nursing their children. The other 42 had either never nursed their children or had previously discontinued nursing for reasons having no relation to their return to work.

CAUSES OF DEATHS UNDER 1 YEAR, BY AGE AT DEATH, FOR CHILDREN OF MOTHERS AT HOME AND MOTHERS AT WORK.

Work on the part of the mother before the birth of the child, whether in the home or industrially, if involving strain or exhaustion, and especially if continued too near childbirth, might be expected to increase—

1. Stillbirths, and deaths due to—
2. Premature birth,
3. Congenital malformation and defects,
4. Congenital debility,
5. Other diseases, but in less degree.

The causes of death above named are chiefly important in earliest infancy, and if the mother's work before the birth of the child was a seriously injurious influence in any considerable number of cases, that fact should be disclosed in a study and comparison of the deaths of children of the two classes, mothers at home and mothers at work. The following table affords opportunity for such a comparison, giving the number and per cent dying from each cause who died under 1 week, 1 week and under 2 weeks, under 1 month, and during each successive period in the first year of life:

NUMBER AND PER CENT OF DEATHS AT DIFFERENT AGES UNDER 1 YEAR, DUE TO CERTAIN SPECIFIED CAUSES, CLASSIFIED ACCORDING TO EMPLOYMENT OF MOTHER PREVIOUS TO BIRTH OF CHILD.

NUMBER.

Cause of death.	Under 1 week.	1 week and under 2 w'ks.	Under 1 mo.	1 mo. and under 2 mos.	2 mos. and under 3 mos.	3 mos. and under 4 mos.	4 mos. and under 5 mos.	5 mos. and under 6 mos.	6 mos. and over.	Total.
MOTHERS AT HOME.										
Premature birth.....	13	1	15	1						16
Congenital debility.....	17	6	37	7	5	6	9	1	13	78
Congenital malformation.....	5	1	6			1			1	8
Diarrhea, enteritis, and gastritis.....		1	5	8	19	9	8	15	47	111
Convulsions.....	2	2	6		1	3	3		9	22
Nontuberculous meningitis.....								1		1
Pneumonia, bronchitis, and laryngitis.....	1		7	4	3	4	5	3	25	51
Tuberculosis (all forms).....						1	1		1	3
Whooping cough.....									4	4
Measles.....										
All other causes.....		1	2	4	5	1	1	1	6	20
Total.....	38	12	78	24	33	25	27	21	106	314
MOTHERS AT WORK.										
Premature birth.....	12		16	3	1					20
Congenital debility.....	8	2	17	8	6	6	4	5	10	56
Congenital malformation.....	3		3		1					4
Diarrhea, enteritis, and gastritis.....		2	10	8	11	16	17	11	40	113
Convulsions.....	3	1	5	2			1		2	10
Nontuberculous meningitis.....						1				1
Pneumonia, bronchitis, and laryngitis.....			3	6	3	2	2	5	23	44
Tuberculosis (all forms).....										
Whooping cough.....										
Measles.....										
All other causes.....	1	1	5	2		1	1	1	8	18
Total.....	27	6	59	29	22	26	25	22	83	266
MOTHERS NOT FOUND.										
Premature birth.....	10		11	1					1	13
Congenital debility.....	9	5	24	6	6	6	4	4	6	56
Congenital malformation.....	5		6							6
Diarrhea, enteritis, and gastritis.....		2	5	7	7	13	18	10	45	105
Convulsions.....	2	2	5	1		1			1	8
Nontuberculous meningitis.....	1		2		2				1	5
Pneumonia, bronchitis, and laryngitis.....	1	1	4	2	4	1	6	4	18	39
Tuberculosis (all forms).....							1		5	6
Whooping cough.....				2	3	2		1	3	11
Measles.....					1			1	5	7
All other causes.....	1		2	3	1	2	3	4	8	23
Total.....	29	10	59	22	24	25	32	24	93	279
TOTAL MOTHERS.										
Premature birth.....	35	1	42	5	1				1	49
Congenital debility.....	34	13	78	21	17	18	17	10	29	190
Congenital malformation.....	13	1	15		1	1			1	18
Diarrhea, enteritis, and gastritis.....		5	20	23	37	38	43	36	132	329
Convulsions.....	7	5	16	3	1	4	4		12	40
Nontuberculous meningitis.....	1		2		2	1		1	1	7
Pneumonia, bronchitis, and laryngitis.....	2	1	14	12	10	7	13	12	66	134
Tuberculosis (all forms).....						1	2		6	9
Whooping cough.....				2	3	2		1	7	15
Measles.....					1			1	5	7
All other causes.....	2	2	9	9	6	4	5	6	22	61
Total.....	94	28	196	75	79	76	84	67	282	859

100 INFANT MORTALITY AND EMPLOYMENT OF MOTHERS.

NUMBER AND PER CENT OF DEATHS AT DIFFERENT AGES UNDER 1 YEAR, DUE TO CERTAIN SPECIFIED CAUSES, CLASSIFIED ACCORDING TO EMPLOYMENT OF MOTHER PREVIOUS TO BIRTH OF CHILD—Concluded.

PER CENT.

Cause of death.	Under 1 week.	1 week and under 2 w'ks.	Under 1 mo.	1 mo. and under 2 mos.	2 mos. and under 3 mos.	3 mos. and under 4 mos.	4 mos. and under 5 mos.	5 mos. and under 6 mos.	6 mos. and over.	Total.
MOTHERS AT HOME.										
Premature birth.....	81.3	6.3	93.8	6.3						100.0
Congenital debility.....	21.8	7.7	47.4	9.0	6.4	7.7	11.5	1.3	16.7	100.0
Congenital malformation.....										
Diarrhea, enteritis, and gastritis.....		.9	4.5	7.2	17.1	8.1	7.2	13.5	42.3	100.0
Convulsions.....	9.1	9.1	27.3		4.5	13.6	13.6		40.9	100.0
Nontuberculous meningitis.....										
Pneumonia, bronchitis, and laryngitis.....	2.0		13.7	7.8	5.9	7.8	9.8	5.9	49.0	100.0
Tuberculosis (all forms).....										
Whooping cough.....										
Measles.....										
All other causes.....		5.0	10.0	20.0	25.0	5.0	5.0	5.0	30.0	100.0
Total.....	12.1	3.8	24.8	7.6	10.5	8.0	8.6	6.7	33.9	100.0
MOTHERS AT WORK.										
Premature birth.....	60.0		80.0	15.0	5.0					100.0
Congenital debility.....	14.3	3.6	30.4	14.3	10.7	10.7	7.1	8.9	17.9	100.0
Congenital malformation.....										
Diarrhea, enteritis, and gastritis.....		1.8	8.8	7.1	9.7	14.2	15.0	9.7	35.4	100.0
Convulsions.....	30.0	10.0	50.0	20.0			10.0		20.0	100.0
Nontuberculous meningitis.....										
Pneumonia, bronchitis, and laryngitis.....			6.8	13.6	6.8	4.5	4.5	11.4	52.3	100.0
Tuberculosis (all forms).....										
Whooping cough.....										
Measles.....										
All other causes.....	5.6	5.6	27.8	11.1		5.6	5.6	5.6	44.4	100.0
Total.....	10.2	2.3	22.2	10.9	8.3	9.8	9.4	8.3	31.2	100.0
MOTHERS NOT FOUND.										
Premature birth.....	76.9		84.6	7.7					7.7	100.0
Congenital debility.....	16.1	8.9	42.9	10.7	10.7	10.7	7.1	7.1	10.7	100.0
Congenital malformation.....										
Diarrhea, enteritis, and gastritis.....		1.9	4.8	6.7	6.7	12.4	17.1	9.5	42.9	100.0
Convulsions.....										
Nontuberculous meningitis.....										
Pneumonia, bronchitis, and laryngitis.....	2.3	2.3	10.3	5.1	10.3	2.3	15.4	10.3	46.2	100.0
Tuberculosis (all forms).....										
Whooping cough.....				18.1	27.3	18.1		9.1	27.3	100.0
Measles.....										
All other causes.....	4.3		8.7	13.0	4.3	8.7	13.0	17.4	34.8	100.0
Total.....	10.4	3.6	21.1	7.9	8.6	8.9	11.5	8.6	33.3	100.0
TOTAL MOTHERS.										
Premature birth.....	71.4	2.0	85.7	10.2	2.0				2.0	100.0
Congenital debility.....	17.9	6.8	41.1	11.1	8.9	9.5	8.9	5.3	15.3	100.0
Congenital malformation.....	72.2	5.6	83.3		5.6	5.6			5.6	100.0
Diarrhea, enteritis, and gastritis.....		1.5	6.1	7.0	11.2	11.6	13.1	10.9	40.1	100.0
Convulsions.....	17.5	12.5	40.0	7.5	2.5	10.0	10.0		30.0	100.0
Nontuberculous meningitis.....										
Pneumonia, bronchitis, and laryngitis.....	1.5	.7	10.4	9.0	7.5	5.2	9.7	9.0	49.2	100.0
Tuberculosis (all forms).....										
Whooping cough.....				13.3	20.0	13.3		6.7	46.7	100.0
Measles.....										
All other causes.....	3.3	3.3	14.8	14.8	9.8	6.6	8.2	9.8	36.1	100.0
Total.....	10.9	3.3	22.8	8.7	9.2	8.8	9.8	7.8	32.8	100.0

IMPORTANCE OF DEATHS UNDER 3 MONTHS AMONG CHILDREN OF MOTHERS AT HOME AND MOTHERS AT WORK.

It will be seen from the above table that 11 per cent of the deaths occurred during the first week of life, 3.3 per cent during the second week, nearly 23 per cent during the first month, and nearly 41 per cent during the first three months. The leading cause of the fatality of the first three months is prematurity and immaturity, represented in the table by the first three causes. Together these were accountable for over 51 per cent of the total deaths which occurred during that period. By far the greatest number of deaths, nearly one-half of those which occurred during the remainder of the first year, were due to diarrheal diseases, and for over 19 per cent pneumonia, bronchitis, and laryngitis were accountable.

A comparison of the children of mothers at home and of mothers at work shows that when all causes of death are considered a slightly greater percentage of the children of mothers at home died during the first week, during the first month, and during the first three months of life. This will be best seen in the following table:

PERCENT OF DEATHS FROM ALL CAUSES UNDER 1 YEAR OCCURRING UNDER 1 WEEK, UNDER 1 MONTH, AND UNDER 3 MONTHS, FOR CHILDREN OF MOTHERS AT HOME AND OF MOTHERS AT WORK.

Work of mother before birth of child.	Per cent of total deaths under 1 year which occurred—		
	Under 1 week.	Under 1 month.	Under 3 months.
Children of mothers at home.....	12.1	24.8	42.9
Children of mothers at work.....	10.2	22.2	41.4

The above comparison applies to deaths from all causes. A somewhat greater difference unfavorable to the children of mothers at home is found when a similar comparison is made of the deaths due to diseases of early infancy (premature birth, congenital debility and injury at birth, and congenital malformation). The very considerable excess in two of the three periods before used, under 1 week and under 1 month, will be seen in the brief comparison which follows:

PER CENT OF DEATHS FROM DISEASES OF EARLY INFANCY UNDER 1 YEAR OCCURRING UNDER 1 WEEK, UNDER 1 MONTH, AND UNDER 3 MONTHS, FOR CHILDREN OF MOTHERS AT HOME AND OF MOTHERS AT WORK.

Work of mother before birth of child.	Per cent of total deaths under 1 year due to diseases of early infancy which occurred—		
	Under 1 week.	Under 1 month.	Under 3 months.
Children of mothers at home.....	34.3	56.9	69.6
Children of mothers at work.....	28.8	45.0	68.8

The figures of the foregoing comparisons do not, of course, mean that there is no injurious effect resulting from the employment of mothers outside the home, but they do seem to show that in the diseases of earliest infancy where the injurious effect should be noticeable, the more favorable showing is for the children of mothers at work. Before accepting such a conclusion, even tentatively, it will be necessary to analyze with especial care the stillbirths and the deaths due to the three causes which have been grouped as diseases of early infancy, and to endeavor to trace their relation to the character of the mother's work, whether at home or in the mill, and to the number of cases in which work was continued nearly to the time of childbirth.

STILLBIRTHS IN RELATION TO THE MOTHER'S WORK BEFORE CHILD-BIRTH.

It will be of interest first to compare for mothers at home and mothers at work the number of stillbirths with the total number of children born, including stillbirths. The total number of stillbirths was 227 and the number of children born living who died under 1 year was 859, the stillborn therefore constituting 20.9 per cent of the total children dying under 1 year, including stillborn. In the following table the number and per cent of stillborn, classified according to the occupation of the mother, are presented in comparison with the total number dying under 1 year, including stillborn.

NUMBER AND PER CENT OF STILLBORN CHILDREN FOR MOTHERS AT HOME AND MOTHERS AT WORK.

Work of mother before birth of child.	Total children, including stillborn.	Stillborn.	
		Number.	Per cent of total children.
Mothers at home:			
At housework only.....	396	94	23.7
At other work.....	8	2	25.0
At no work.....	6		
Total.....	410	96	23.4
Mothers at work outside the home before birth of child:			
At millwork.....	309	66	21.4
At other work.....	26	3	11.5
Total.....	335	69	20.6
Mothers not found.....	341	62	18.2
Grand total.....	1,086	227	20.9

It will be seen from the foregoing table that a slightly higher percentage of stillborn children is found in the case of mothers at home, 23.4 per cent of the deaths of the children of mothers at home being stillbirths, while for the children of mothers at work only 20.6 per

cent were stillbirths. In order to ascertain whether the apparently greater importance of stillbirths among the children of mothers at home is due to the greater severity of work as compared with millwork or with other causes, it will be necessary to examine in detail the causes to which the stillbirths were apparently due.

An attempt was made by inquiry in the home to ascertain, in as many cases as possible, anything in the work of the mother, her condition, or the conditions in the home to which the stillbirth of the child might reasonably be attributed. In the case of married women at work it is difficult to distinguish between the strain of the millwork and that of home duties. Few of the married women operatives are wholly exempt from household duties. In quite a number of cases it was noted that a mother not only worked in the mill, but did all of the housework, including washing and ironing, for the family. In very many of the cases no fact or group of facts was found which could be singled out as a probable cause of the stillbirth. In a considerable number of cases, however, certain facts were found which it was probable were the causes of the stillbirth of the child.

In considering the conditions which might be regarded as the causes of the stillbirths which occurred, it is found that two lead all the others in importance, namely, sickness or ill health of the mother and the mother's work, including under that term not only the character of the work but also the continuance of active work of any kind up to the time of childbirth. Even with all the facts known, it is obvious that it is extremely difficult in many cases definitely to distinguish the cause of the stillbirths. The severity of the mother's work, its continuance too long, and the question of ill health often overlap. The ill health may be due to constitutional frailness, to accidents, or indiscretions, or improper treatment of a previous childbirth, or to the severity of the work either in the mill or in the home. In the table which follows an attempt has been made to classify as accurately as possible the stillbirths which were traceable to cause under that cause which seems most largely responsible for the result. Cases have been classified under mother's work whenever it seemed reasonably probable that the work was the determining cause. In several cases, as will be shown later, the work was doubtless a disturbing factor, although clearly of less importance than some other one. The cases as given in the following table present all those traceable to cause from reports covering 72 mothers at home, 69 of whom were at housework only, 2 at other work in the home, and 1 at no work during the period of pregnancy, and 61 mothers at work, 58 of whom were engaged in millwork and 3 at other work outside the home.

CAUSES TO WHICH STILLBIRTHS WERE APPARENTLY TRACEABLE, FOR MOTHERS AT HOME AND MOTHERS AT WORK, CLASSIFIED ACCORDING TO CHARACTER OF WORK.

Work of mother before birth of child.	Stillbirths apparently traceable to—							Total stillbirths of which apparent cause was ascertained.	
	Con- genital mal- formations.	Injury at birth or diffi- cult birth.	Acci- dent, shock, or special worry of mother before birth.	Sick- ness or ill health of mother.	Syph- ilis.	Births in rapid suc- cession.	Mother's work.		
							Char- acter of work.		Con- tinued too near child- birth.
Mothers at home:									
Housework only.....	1	1	5	19	.....	2	a 10	2	a 40
No work.....	.....	.....	.....	1	.....	.....	.....	.....	1
Mothers at work outside the home before birth of child:									
Millwork.....	2	2	2	12	1	1	b 7	2	b 29
Other work.....	.....	.....	.....	2	.....	.....	.....	.....	2

^a Includes 3 cases where mother was employed in mill, but where stillbirth was due directly to housework at home (2 cases of washing and lifting and 1 of plain overwork 2 months after leaving mill).

^b Not including 3 cases where mother was employed in mill, but where stillbirth was due directly to housework at home (2 cases of washing and lifting and 1 of plain overwork 2 months after leaving mill).

It will be seen from this table that in the case of the mothers at home the stillbirth could be traced to the mother's work in only 9 cases, the cause in 7 cases being the severity or unsuitable character of the work, and in 2 cases the continuance of the work too near childbirth. In addition to the 7 stillbirths due to the character of the mother's work, it should be noted that there were 3 cases where the mother had been employed in the mill during pregnancy but where the stillbirth was due directly to housework at home after leaving the mill. The 7 stillbirths apparently traceable to the mother's work constituted, it may be pointed out, 12 per cent of the total of 58 mothers at millwork from whom detailed information was secured. Among the mothers at home in 10 cases the stillbirth was apparently traceable to the character of the mother's work, and in 2 cases to its continuance too near childbirth. These 10 cases, it should be said, included 3 cases of mothers who had been employed in the mill but had given up millwork in expectation of childbirth and were engaged only in housework. These 10 cases constitute 13 per cent of the 75 mothers at home (72 at home plus 3 at work in mill and later at home).

Comparing further the per cent of stillbirths traceable to sickness or ill health of the mother, it is seen that the 12 cases among mothers at work constituted 22 per cent of the total for whom reports were received, and the 20 cases among mothers at home constituted 27 per cent of the total mothers at home.

As to other causes of stillbirth, alcoholism does not appear to have importance. During the whole period of the investigation, extending

over four and one-half months, only 6 mothers were found who gave positive evidence of being addicted to drink.

The two comparisons from the foregoing table would seem to indicate that so far as stillbirths are traceable to a cause, the work of the mother in the mill and sickness or ill health of the mother so employed were not responsible for stillbirths in any greater degree among the mothers at work than among the mothers at home. It is necessary to point out, however, that the facts as presented here can hardly have an exact value, as the causes can not be known of a certainty in all these cases. Moreover, it is probably true that in a number of cases the reported sickness or ill health of the mother at home was due to former employment in the cotton mill, although it is necessary to say that no such case was identified among any of the mothers included in this table. Furthermore, sickness and ill health are not uncommon among women who are not employed in severe labor, either in the factory or in the home, and many such cases are due to obscure causes. Some also, as here, among both mothers at work and mothers at home are due to accidents or improper treatment of previous births.

The length of time before the birth of the child that the mother stopped work is usually regarded as having an important relation to the condition of both the mother and child. The influence would, of course, be equally important with reference to children born living and to stillbirths. In its relation to stillbirths, however, another point is of the first importance. In a number of cases among the stillbirths included in this report the mother was reported as having worked up to the day of the child's birth. In one case this represented a stillbirth at four and a half months, in several cases at five months, and in other cases at six and seven months. It is obvious that in such cases the work up to the last day has not the same importance and does not show the same indiscretion on the part of the mother as it would in the case of an eight or nine months' child. For this reason it was clear that a tabulation according to the length of time before the birth of the child that the mothers stopped work would be misleading, and such a table is not here presented for still-born children.

In order that the conditions of the mother's work which have been regarded as responsible for the stillbirths may be clearly seen, the facts in detail for such cases are shown in the following paragraphs:

MOTHERS AT HOME BEFORE BIRTH OF STILLBORN CHILD.

Housework only; work continued to day of child's birth; stillbirth at 5 months probably due to strain of reaching in washing woodwork at home, on day of child's birth. Mother, French Canadian.

Housework only; work continued to day of child's birth; stillbirth probably due to lifting heavy boiler from stove on day of child's birth. Mother, English.

Housework only; work continued to day of child's birth; mother shook three carpets, which was apparently the cause of premature birth of child. Mother, American.

Housework only; work continued to day of child's birth, including weekly washing for a large family; washing the cause of stillbirth of child. Mother, American.

Housework only; work continued to within 1 week of child's birth; stillbirth (premature) of child probably due to strain of cleaning windows at home. Mother, French Canadian.

Housework only; work continued to within a few days of child's premature birth; mother never strong; stillbirth of child probably due to strain of mother in housework. Mother, American.

Housework only; stillbirth of child probably due to hard work of mother continued until day of confinement. Mother, French Canadian.

Housework only; work continued until day of child's birth; work continued too long probable cause of stillbirth. Mother, Russian.

Housework only; work continued to day of child's birth; work continued too long probable cause of stillbirth. Mother, American.

MOTHERS AT WORK IN COTTON MILL BEFORE BIRTH OF STILLBORN CHILD.

Speeder tender; gave up millwork 2 weeks before child's birth; constant standing at work and work continued too long probable cause of stillbirth; mother in poor health. Mother, French Canadian.

Speeder tender; gave up millwork 1 month before child's birth; mother of short stature and worked on tallest speeders; has uterine disease. Mother, American.

Spinner, 8 sides; continued at millwork until day of child's premature birth; mother not strong; work requires too much standing for her. Mother, French Canadian.

Weaver, 8 looms; continued at millwork until day of child's premature birth; mother frail; work too heavy for her; had four or five fainting attacks before child's birth. Mother, American.

Weaver, 8 looms; gave up millwork 2 weeks before child's birth; mother's work required constant standing, a possible cause of premature birth. Mother, French Canadian.

Weaver, 8 looms; gave up millwork 2 weeks before child's birth; work required constant standing, a possible cause of the stillbirth of child. Mother, Canadian French.

Weaver, 8 looms; gave up millwork 2 months before child's birth; mother subject to backache and pains in legs, probably due to constant standing while at work, also the probable cause of stillbirth of child. Mother, American.

Warper tender; worked in mill until day of child's birth; stillbirth probably due to work continued too long; mother reported her health good before birth of child. Mother, American.

Speeder tender, 4 sides; gave up millwork 2 weeks before child's birth; stillbirth probably due to work continued too long; mother reported her health good before birth of child. Mother, Portuguese.

Warper tender; gave up millwork 2 weeks before child's birth, but kept up the housework until day of child's premature birth; mother strained herself lifting wash-tubs at home; work in the mill also involved some strain; twins (other one lived 1 day). Mother, American.

Spinner, 6 sides; gave up millwork 3½ months before child's birth; "day baby was born, washed 2 lines of clothes;" twins, other one lived, being ninth and tenth children in 15 years. Mother, Portuguese.

Warper tender; gave up millwork 2 months before child's birth; mother's neurasthenia and debility with overwork at home caused premature birth; has 1 child living; 2 others died under 1 year. Mother, French Canadian.

DEATHS UNDER 3 MONTHS IN RELATION TO THE MOTHER'S WORK BEFORE CHILDBIRTH.

Any especially injurious effect of the work of the mother during pregnancy upon the condition of the child might be expected to show itself, if not in stillbirths, in an excessive number of deaths in the early weeks of life. The great majority of deaths due to certain causes are at a very early age; thus, in Fall River in 1908, 71 per cent of the deaths from premature birth occurred during the first week and 86 per cent during the first month. Similarly, 72 per cent of the deaths from congenital malformation were in the first week and 83 per cent in the first month. The extent to which deaths from other causes are influenced by antenatal conditions will be suggested by the percentage of deaths occurring in the early weeks of life. In the following table is shown the per cent of the total deaths under 1 year due to certain causes which occurred "under 1 week," "under 2 weeks," "under 1 month," and "under 3 months." The causes of death are arranged according to the percentage of deaths occurring under 3 months.

PER CENT OF TOTAL DEATHS UNDER 1 YEAR DUE TO CERTAIN CAUSES WHICH OCCURRED UNDER 1 WEEK, UNDER 2 WEEKS, UNDER 1 MONTH, AND UNDER 3 MONTHS.

Cause of death.	Total deaths from specified causes.	Per cent of total deaths from specified causes which occurred—			
		Under 1 week.	Under 2 weeks.	Under 1 month.	Under 3 months.
Premature birth.....	49	71	73	86	98
Congenital malformation.....	18	72	78	83	89
Congenital debility.....	190	18	25	41	61
Convulsions.....	40	18	30	40	50
Nontuberculous meningitis.....	7	14	14	28	57
All causes not here named.....	61	3	7	15	39
Pneumonia, bronchitis, and laryngitis.....	134	2	2	10	27
Whooping cough.....	15	.....	.....	.....	33
Diarrhea, enteritis, and gastritis.....	329	.....	2	6	24
Measles.....	7	.....	.....	.....	14
Total, all causes.....	859	11	14	23	41

It will be seen from this table that next to premature birth and congenital malformation the cause having its largest percentage of deaths in the early weeks of life was congenital debility, 18 per cent of the deaths from this cause occurring under 1 week, 41 per cent under 1 month, and 61 per cent under 3 months. Of the deaths from convulsions, 18 per cent were in the first week and 50 per cent in the first three months. Deaths from nontuberculous meningitis are relatively unimportant, but 57 per cent of them were in the first three months. Of the other causes of death, no one had as much as 50 per cent during the first three months. Of the two most important classes, pneumonia, bronchitis, and laryngitis with 134

deaths had only 10 per cent during the first month and 27 per cent during the first three months, and diarrhea, enteritis, and gastritis with 329 deaths had only 6 per cent during the first month and only 24 per cent during the first three months. The percentage of deaths during the first three months from diarrhea, enteritis, and gastritis, although lower than that from any other cause except measles, is of special significance. During that period a larger per cent of children than at any other time would naturally be breast fed, and thus the least exposed to those influences which are directly the cause of diarrhea, enteritis, and gastritis.

DISEASES OF EARLY INFANCY IN RELATION TO THE MOTHER'S WORK BEFORE CHILDBIRTH.

The condition of the children at birth, which may be taken as an index of the effect of antenatal influences, will be indicated by the percentage of total deaths which were due to the diseases of early infancy (premature birth, congenital malformation, and congenital debility under three months). A comparison is made in the following table for the children of mothers at home and of mothers at work.

PER CENT OF TOTAL DEATHS UNDER 1 YEAR (NOT INCLUDING STILLBIRTHS) WHICH WERE DUE TO DISEASES OF EARLY INFANCY (PREMATURE BIRTH, CONGENITAL MALFORMATION, AND CONGENITAL DEBILITY UNDER 3 MONTHS) FOR CHILDREN OF MOTHERS AT HOME AND OF MOTHERS AT WORK.

Work of mother before birth of child.	Total deaths, all causes.	Deaths due to diseases of early infancy.				Total.	
		Prema-ture birth.	Congen-ital malfor-mation.	Congen-ital debility under 3 months.	Number.	Per cent of total deaths, all causes.	
Mothers at home.....	314	16	8	49	73	23.2	
Mothers at work outside the home.....	266	20	4	31	55	20.7	
Total.....	580	36	12	80	128	22.1	

From these figures it appears that while deaths from premature birth and congenital malformations together were relatively more numerous among the children of mothers at work, yet when the deaths from congenital debility under three months are added, the children of mothers at home made a distinctly unfavorable showing—23.2 per cent against 20.7 per cent.

CONDITION OF CHILD AT BIRTH IN RELATION TO THE MOTHER'S WORK BEFORE CHILDBIRTH.

The large per cent of children dying from various causes during the early weeks of life suggests that many of the children were not well and strong at birth, due, perhaps, among other causes, to the injurious influence of the mother's work. In the course of the investigation an attempt was made by questioning the mothers of

the children to ascertain the number of those dying under 1 year who at birth were not well and strong. Information so obtained, while based in many cases upon the statement of the physician to the mother, would in many other cases rest largely upon the mother's judgment. In the following table the information secured as indicated is presented, the table giving the number and per cent of children dying under 1 year (not including stillbirths) from specified causes who were reported as not well and strong at birth. The facts are presented for the children in two groups according as the mother was at home or at work outside the home before the child's birth. Within these two groups the children are arranged according to cause of death. In the case of deaths from premature birth and congenital malformation it is apparent that all the children were born not well and strong. Deaths from congenital debility are presented separately, inasmuch as it is evident that so far as deaths from this cause are properly recorded a large percentage should be found reported as not well and strong at birth.

NUMBER AND PER CENT OF CHILDREN DYING UNDER 1 YEAR (NOT INCLUDING STILLBIRTHS), FROM SPECIFIED CAUSES, WHO WERE REPORTED AS NOT WELL AND STRONG AT BIRTH, ACCORDING TO WORK OF MOTHER.

Cause of death.	Total children dying under 1 year.	Children not well and strong at birth.	
		Number.	Per cent.
Mothers at home:			
Premature birth and congenital malformation.....	24	24	100.0
* Congenital debility.....	77	46	59.7
All other causes.....	206	45	21.8
Total, all causes.....	306	115	37.6
Mothers at work:			
Premature birth and congenital malformation.....	24	24	100.0
Congenital debility.....	53	30	56.6
All other causes.....	178	51	28.6
Total, all causes.....	255	105	41.2

According to this table, 59.7 per cent of the children of mothers at home dying from congenital debility were reported as not well and strong at birth. Of the children of mothers at work dying from the same cause, 56.6 per cent were reported as not well and strong at birth. Of the children of mothers at home dying from all other causes (excluding premature birth and congenital malformation), 21.8 per cent were reported as not well and strong at birth as compared with 28.6 per cent of the children of mothers at work. Taking together all the children of mothers at home, 37.6 per cent were reported as not well and strong at birth as against 41.2 per cent of the children of mothers at work.

Apparently, then, antenatal conditions of some kind have resulted in a slightly larger percentage of children not well and strong at birth among the group "children of mothers at work" than among the

children of mothers at home. Among the children dying of congenital debility, however, where the fact should be especially noticeable, the percentage is slightly higher for children of mothers at home.

Examining the two groups "mothers at home" and "mothers at work outside the home" more in detail with reference to the work of the mother, a comparison may be made of the children not well and strong at birth (including both those born living and the stillborn) in relation to the whole number of children dying under 1 year, including stillborn. Such a comparison is made in the table which follows, the work of the mothers at home being classified as "housework only," "other work," and "no work," and the work of the mothers outside the home being classified as "cotton-mill work" and "other work."

NUMBER AND PER CENT OF TOTAL CHILDREN DYING UNDER 1 YEAR (INCLUDING STILLBORN) WHO WERE REPORTED AS WELL AND STRONG AT BIRTH, NOT WELL AND STRONG AT BIRTH, AND STILLBORN, ACCORDING TO WORK OF MOTHER BEFORE BIRTH OF CHILD.

Work of mother before birth of child.	Number.				Per cent.			
	Children well and strong at birth.	Children not well and strong at birth.		Total.	Children well and strong at birth.	Children not well and strong at birth.		Total.
		Born living.	Still-born.			Born living.	Still-born.	
Mothers at home:								
At housework only.....	182	112	93	^a 387	47.0	29.0	24.0	100.0
At other work.....	5	1	2	8	62.5	12.5	25.0	100.0
At no work.....	4	2	1	7	57.1	28.6	14.3	100.0
Total.....	191	115	96	^a 402	47.5	28.6	23.9	100.0
Mothers at work outside the home before birth of child:								
At cotton-mill work.....	136	96	65	^b 297	45.8	32.3	21.9	100.0
At other work.....	14	9	4	^c 27	51.9	33.3	14.8	100.0
Total.....	150	105	69	^d 324	46.3	32.4	21.3	100.0
Grand total.....	341	220	165	^e 726	47.0	30.3	22.7	100.0

^a Not including 8, child's condition not reported. ^c Not including 2, child's condition not reported.

^b Not including 9, child's condition not reported. ^d Not including 11, child's condition not reported.

^e Not including 19, child's condition not reported.

Here, as in the preceding comparison, a slightly larger per cent of the children of mothers at work are found reported as not well and strong at birth. This excess is slightly increased if the comparison be restricted to the two more important classes, "mothers at housework only" and "mothers at millwork." For the former class 53 per cent of the children were reported as not well and strong at birth, and for the latter class 54.2 per cent. The significance in these figures appears to be not in the slight excess of children not well and strong at birth for the mothers at work, but in the fact that for the mothers at home the percentage is practically as high, plainly indicating that if there is an injurious effect of millwork, there must also be in many of these cases an effect almost in the same degree injurious resulting from the work at home. In making this state-

ment it is, of course, necessary to remember that to an extent which can not be accurately measured the group "mothers at home" includes women who were in early life engaged in millwork and are perhaps still subject to the effect upon their health of this earlier work.

Perhaps quite as important as the character of the work of the mother is the length of time before birth of child that the mother stopped work. For the mothers at home the question is difficult of an answer which is of value. A very large number reported that housework was continued up to the day of birth. For very many of these this did not mean severe or long-continued work. For others the hardest kind of work was reported, and premature births and stillbirths could be traced directly to this cause. For the most part, however, the time of discontinuance of work before the birth of the child can not be regarded as significant as here reported in the cases of mothers at home. For the mothers at work, however, conditions are quite different. Here in nearly all cases the mothers were employed outside the home in cotton-mill work, and continued at their usual mill duties up to the day shown in the table.

In the following table the number and per cent of children who were not well and strong at birth are shown for mothers at home and mothers at work, the classification being according to the length of time before the birth of the child that the mother's work was discontinued.

NUMBER AND PER CENT OF TOTAL CHILDREN DYING UNDER 1 YEAR (INCLUDING STILLBORN) WHO WERE REPORTED AS NOT WELL AND STRONG AT BIRTH FOR MOTHERS AT HOME AND MOTHERS AT WORK, ACCORDING TO LENGTH OF TIME BEFORE BIRTH OF CHILD THAT MOTHER STOPPED WORK.

Length of time before birth of child that mother stopped work.	Mothers at home.					Mothers at work outside the home before birth of child.				
	Total children, including still-born.	Children not well and strong at birth.				Total children, including still-born.	Children not well and strong at birth.			
		Number.					Number.			
		Born living.	Still-born.	Total.	Per cent.		Born living.	Still-born.	Total.	Per cent.
Under 4 days.....	271	71	59	130	48.0	14	6	5	11	78.6
4 days and under 1 week.....	5	2	.....	2	40.0	2	1	1	2	100.0
1 week and under 2 weeks.....	33	11	9	20	60.6	11	3	2	5	45.5
2 weeks and under 3 weeks.....	7	1	3	4	57.1	32	11	10	21	65.6
3 weeks and under 1 month.....	1	1	.....	1	100.0	5	.....	3	3	60.0
1 month and under 2 months.....	5	2	.....	2	40.0	31	10	5	15	48.4
2 months and under 3 months.....	2	1	.....	1	50.0	54	14	10	24	44.4
3 months and under 4 months.....	3	1	.....	1	33.3	37	9	8	17	45.9
4 months and under 5 months.....	1	1	.....	1	100.0	28	11	3	14	50.0
5 months and under 6 months.....	1	.....	1	1	100.0	16	6	3	9	56.3
6 months and over.....	9	5	.....	5	55.6	73	28	11	39	53.4
Total.....	338	96	72	168	49.7	303	99	61	160	52.8
Time of stopping work not reported.....	64	19	24	51	79.7	21	6	8	14	66.7
Total.....	^a 402	115	96	219	52.5	^b 324	105	69	174	53.0

^a Not including 8 children, condition at birth not reported.
^b Not including 11 children, condition at birth not reported.

For the mothers at home it will be seen that in 271 out of 338 cases reported work was continued up to within 4 days of childbirth, while for the mothers at work outside the home out of 303 cases reported, 14 worked up to within 4 days, 27 less than 2 weeks, and 64, or 21 per cent of all, less than 1 month. For the mothers at home the per cent of the children who were not well and strong at birth was not higher than the average, even in the group working up to within 4 days of childbirth. For the mothers at work outside the home the per cent of children not well and strong at birth in the group "under 4 days" was 78.6, for the group "2 weeks and under 3 weeks" 65.6, and for the group "3 weeks and under 1 month" 60. Apparently those continuing work up to within a month or less of childbirth show an excessive percentage of children not well and strong at birth. In all the groups discontinuing work at an earlier date the percentages were below the average, save in the last two groups, where it was only slightly in excess.

In connection with the condition of the child's health at birth the question as to racial influence may be raised. Quite a large number of races are represented in the children tabulated in the preceding tables, but for only a few of the races are the numbers sufficiently large to be considered at all significant. In the following table the facts in regard to the condition of child at birth are tabulated, the two groups "mothers at home" and "mothers at work" being subdivided according to the country of birth of mother.

NUMBER AND PER CENT OF TOTAL CHILDREN DYING UNDER 1 YEAR (INCLUDING STILLBORN) WHO WERE REPORTED AS NOT WELL AND STRONG AT BIRTH, FOR MOTHERS AT HOME AND MOTHERS AT WORK, ACCORDING TO COUNTRY OF BIRTH OF MOTHER.

Country of birth of mother.	Number.				Per cent.			
	Children well and strong at birth.	Children not well and strong at birth.		Total.	Children well and strong at birth.	Children not well and strong at birth.		Total.
		Born living.	Still-born.			Born living.	Still-born.	
Mothers at home:								
United States.....	34	25	39	^a 98	34.7	25.5	39.8	100.0
England.....	10	7	10	27	37.0	26.0	37.0	100.0
Scotland.....	1	2	.....	3	33.3	66.7	.....	100.0
Ireland.....	6	3	1	^b 10	60.0	30.0	10.0	100.0
Canada.....	49	37	21	^a 107	45.8	34.6	19.6	100.0
Azores.....	78	30	15	^c 123	63.4	24.4	12.2	100.0
Poland.....	5	4	3	12	41.7	33.3	25.0	100.0
Russia.....	4	1	7	12	33.3	8.3	58.4	100.0
Italy.....	4	2	.....	6	66.7	33.3	.....	100.0
Austria.....	.....	1	.....	1	.....	100.0	.....	100.0
Germany.....	2	1	.....	3	66.7	33.3	.....	100.0
Total.....	193	113	96	^d 402	48.0	28.1	23.9	100.0

^a Not including 2, condition not reported.

^b Not including 1, condition not reported.

^c Not including 3, condition not reported.

^d Not including 8, condition not reported.

NUMBER AND PER CENT OF TOTAL CHILDREN DYING UNDER 1 YEAR (INCLUDING STILLBORN) WHO WERE REPORTED AS NOT WELL AND STRONG AT BIRTH, FOR MOTHERS AT HOME AND MOTHERS AT WORK, ACCORDING TO COUNTRY OF BIRTH OF MOTHER—Concluded.

Country of birth of mother.	Number.			Total.	Per cent.			Total.
	Children well and strong at birth.	Children not well and strong at birth.			Children well and strong at birth.	Children not well and strong at birth.		
		Born living.	Still-born.			Born living.	Still-born.	
Mothers at work:								
United States.....	25	25	21	^a 71	35.2	35.2	29.6	100.0
England.....	9	13	13	^a 35	25.8	37.1	37.1	100.0
Ireland.....	5	4	1	^a 10	50.0	40.0	10.0	100.0
Canada.....	22	26	20	^b 68	32.4	38.2	29.4	100.0
Azores.....	78	28	10	^b 116	67.2	24.2	8.6	100.0
Poland.....	7	4	1	^a 12	58.4	33.3	8.3	100.0
Russia.....	3			3	100.0			100.0
Italy.....		3	2	5		60.0	40.0	100.0
Austria.....			1	1			100.0	100.0
Bavaria.....	1			1	100.0			100.0
Syria.....	1			1	100.0			100.0
Total.....	151	103	69	^c 323	46.7	31.9	21.4	100.0

^a Not including 1, condition not reported.
^b Not including 4, condition not reported.

^c Not including 12, condition not reported.

For both mothers at home and mothers at work the largest percentages of children well and strong at birth were reported for Portuguese mothers, 63.4 per cent of the children of mothers at home being well and strong, and 67.2 per cent of the children of mothers at work. For the French Canadian mothers, the next most important group, 45.8 per cent of the children of mothers at home were well and strong, and 32.4 per cent of the children of mothers at work. For the American mothers, the next most important group, 34.7 per cent of the children of mothers at home were well and strong, and 35.2 per cent of the children of mothers at work, the figures being considerably below the average of their respective groups. Likewise, for the children of English mothers the percentages of children well and strong at birth were decidedly below the average. While the numbers represented are small, it may be noted that a high percentage of children well and strong was reported among mothers at home for Irish, Italian, and German mothers.

The possibility of a relation between the health and strength of the child at birth and the number of children born to the mother has been suggested. Comparison may here be made for both mothers at home and mothers at work of the number and per cent of stillborn and the number and per cent of living children not well and strong at birth, according to the size of family; that is, according to whether the children here reported were the mother's first born, second born, third born, etc. This information, it should be said, is not available for

the full number of children, and possibly is only approximately correct. It is not unlikely that for some of the larger families the number of children born was not fully reported.

The figures here shown indicate generally whether any considerable difference exists between the groups "children of mothers at home" and "children of mothers at work" as to the size of family, which may account for the percentage of children not well and strong at birth.

NUMBER AND PER CENT OF TOTAL FIRST BORN, SECOND BORN, THIRD BORN, ETC., CHILDREN DYING UNDER 1 YEAR (INCLUDING STILLBORN) WHO WERE REPORTED AS NOT WELL AND STRONG AT BIRTH, FOR MOTHERS AT HOME AND MOTHERS AT WORK.

	Number.				Per cent.			
	Children well and strong at birth.	Children not well and strong at birth.		Total.	Children well and strong at birth.	Children not well and strong at birth.		Total.
		Born living.	Still-born.			Born living.	Still-born.	
Mothers at home:								
First born.....	9	17	20	46	19.6	37.0	43.5	100.0
Second born.....	17	14	15	46	37.0	30.4	32.6	100.0
Third born.....	32	14	10	56	57.1	25.0	17.9	100.0
Fourth born.....	20	9	10	39	51.3	23.1	25.6	100.0
Fifth born.....	21	8	7	36	58.3	22.2	19.4	100.0
Sixth born.....	22	9	7	38	57.9	23.7	18.4	100.0
Seventh born.....	18	3	7	28	64.3	10.7	25.0	100.0
Eighth born.....	15	5	6	26	57.7	19.2	23.1	100.0
Ninth born.....	7	10	2	19	36.8	52.6	10.5	100.0
Tenth born.....	1	4	3	8	12.5	50.0	37.5	100.0
Over tenth born.....	11	10	4	25	44.0	40.0	16.0	100.0
Total.....	173	103	91	367	47.1	28.1	24.8	100.0
Mothers at work outside the home:								
First born.....	27	18	18	63	42.8	28.6	28.6	100.0
Second born.....	26	18	9	53	49.1	34.0	17.0	100.0
Third born.....	20	12	9	41	48.7	29.3	22.0	100.0
Fourth born.....	11	8	8	27	40.7	29.6	29.6	100.0
Fifth born.....	14	5	4	23	60.9	21.7	17.4	100.0
Sixth born.....	10	7	4	21	47.6	33.3	19.0	100.0
Seventh born.....	10	6	4	20	50.0	30.0	20.0	100.0
Eighth born.....	6	8	5	19	31.6	42.1	26.3	100.0
Ninth born.....	3	4	1	8	37.5	50.0	12.5	100.0
Tenth born.....	3	5	2	10	30.0	50.0	20.0	100.0
Over tenth born.....	8	3	3	14	57.1	21.4	21.4	100.0
Total.....	138	94	67	299	46.2	31.4	22.4	100.0

Comparing the children of mothers at home, it will be seen that while 52.9 per cent of the entire number were not well and strong at birth, out of the first born children 80.5 per cent were not well and strong. This represented the largest percentage of children not well and strong at birth of any group except that among the small number (only 8) of tenth children, 87.5 per cent. Of the second and the ninth children 63 per cent were not well and strong. Among all the other groups the percentage not well and strong was above, or approximately equal to, the average, the lowest percentage (35.7) being found among the seventh children.

Among the children of the mothers at work outside the home the figures tell a somewhat different story. Of the first born children 57.2 per cent were not well and strong as compared with 53.8 per cent among all the children of mothers at work. The percentage of children not well and strong appears above the average for tenth, eighth, ninth, and fourth born children, although for all of these groups the numbers which furnish the basis for the percentages are a great deal smaller than the number of first born children reported. The lowest percentage (39.1) of children not well and strong at birth was found among the fifth children, although the percentage among children over the tenth is only a little higher.

The explanation of the more unfavorable showing for the first and second born children of mothers at home as compared with the first and second born children of mothers at work is not apparent. In nearly all other cases the percentage of children well and strong at birth is higher among the children of mothers at home than in the corresponding groups of children of mothers at work, in a number of groups the difference being quite marked.

The computation of the average number of children born to the mothers included in the foregoing table shows for the mothers at home 5.1 children per mother, and for the mothers at work 4.3. This suggests that the mothers at work outside the home were of an average younger age than the mothers at home, and this indication is strengthened by the fact which will appear from the next table, that among the mothers at home the first-born children constituted 12.5 per cent of the total children reported, while among the mothers at work they constituted 21.1 per cent of all reported, an excess for the mothers at work appearing also in the percentage of second-born children.

The following table shows the percentages of the several classes of children (those well and strong at birth, not well and strong at birth, and stillborn) who were first-born, second-born, third-born, etc., children. It will be seen that uniformly the mothers at work show an average smaller number of children.

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NUMBER AND PER CENT OF TOTAL CHILDREN WELL AND STRONG AT BIRTH, NOT WELL AND STRONG AT BIRTH, AND STILLBORN WHO WERE FIRST-BORN, SECOND-BORN, THIRD-BORN, ETC., CHILDREN, FOR MOTHERS AT HOME AND MOTHERS AT WORK.

NUMBER.

	Mothers at home.					Mothers at work.				
	Living.			Still-born.	Total at home.	Living.			Still-born.	Total.
	Well and strong at birth.	Not well and strong at birth.	Total living.			Well and strong at birth.	Not well and strong at birth.	Total living.		
First born.....	9	17	26	20	46	27	18	45	18	63
Second born.....	17	14	31	15	46	26	18	44	9	53
Third born.....	32	14	46	10	56	20	12	32	9	41
Fourth born.....	20	9	29	10	39	11	8	19	8	27
Fifth born.....	21	8	29	7	36	14	5	19	4	23
Sixth born.....	22	9	31	7	38	10	7	17	4	21
Seventh born.....	18	3	21	7	28	10	6	16	4	20
Eighth born.....	15	5	20	6	26	6	8	14	5	19
Ninth born.....	7	10	17	2	19	3	4	7	1	8
Tenth born.....	1	4	5	3	8	3	5	8	2	10
Over tenth born.....	11	10	21	4	25	8	3	11	3	14
Total.....	173	103	276	91	367	138	94	232	67	299
Average number of children.....	5.3	5.3	5.3	4.3	5.1	4.2	4.4	4.3	4.4	4.3

PER CENT.

First born.....	5.2	16.5	9.4	22.0	12.5	19.6	19.1	19.4	26.9	21.1
Second born.....	9.8	13.6	11.2	16.5	12.5	18.8	19.1	19.0	13.4	17.7
Third born.....	18.5	13.6	16.7	11.0	15.3	14.5	12.8	13.8	13.4	13.7
Fourth born.....	11.6	8.7	10.5	11.0	10.6	8.0	8.5	8.2	11.9	9.0
Fifth born.....	12.1	7.8	10.5	7.7	9.8	10.1	5.3	8.2	6.0	7.7
Sixth born.....	12.7	8.7	11.2	7.7	10.5	7.2	7.4	7.3	6.0	7.0
Seventh born.....	10.4	2.9	7.6	7.7	7.6	7.2	6.4	6.9	6.0	6.7
Eighth born.....	8.7	4.9	7.2	6.6	7.1	4.3	8.5	6.0	7.5	6.4
Ninth born.....	4.0	9.7	6.2	2.2	5.2	2.2	4.3	3.0	1.5	2.7
Tenth born.....	.6	3.9	1.8	3.3	2.2	2.2	5.3	3.4	3.0	3.3
Over tenth born.....	6.4	9.7	7.6	4.4	6.8	5.8	3.2	4.7	4.5	4.7
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

It has appeared from the foregoing tables that in a comparison of the condition at birth of children of mothers at home and mothers at work approximately the same percentages were not well and strong at birth. Inquiries were made attempting to trace, so far as possible, any apparent relation between the child's condition at birth and the mother's work. Such relationship, however, except in a small proportion of cases, is difficult to trace, for the causes responsible for cases of premature birth, congenital malformation, or a condition of weakness at birth are often exceedingly obscure and very complex. It can not be supposed that what is here presented is more than suggestive of the causes which are operating in the two classes, "mothers at home" and "mothers at work," to produce a condition of weakness or ill health in the child at birth. The cases in which a causal relation could be traced are presented in the following table:

CAUSES TO WHICH CHILD'S CONDITION (NOT WELL AND STRONG) AT BIRTH WERE APPARENTLY TRACEABLE FOR MOTHERS AT HOME AND MOTHERS AT WORK, CLASSIFIED ACCORDING TO CHARACTER OF WORK.

Work of mother before birth of child.	Children dying under 1 year.	Child's condition at birth apparently traceable to—							Total cases of which apparent cause was ascertained.	
		Congenital malformations.	Injury at birth or difficult birth.	Accident, shock, or special worry of mother before birth.	Sickness or ill health of mother.	Syphilis.	Births in rapid succession.	Mother's work.		
								Character of work.		Continued too near childbirth.
Mothers at home:										
Housework only.....	302	7	14	4	14	1	4	a 9	a 53	
Other work.....	6									
No work.....	6									
Mothers at work outside the home before birth of child:										
Millwork.....	243	1	1	3	15	1	1	b 11	9	
Other work.....	23	2	1					1	5	

^a Includes 5 cases where mother was employed outside the home, but where child's condition at birth was due directly to housework and washing at home.

^b Not including 5 cases where mother was employed outside the home, but where child's condition at birth was due directly to housework and washing at home; includes also 1 case where home work was reported as especially heavy.

It will be seen from this table that of the 302 children dying under 1 year whose mothers were engaged in housework at home, the condition of 53 children not well and strong at birth was traced to an apparent cause. The child's condition in 14 cases was due to injury at birth or difficult birth; in 14 cases to the sickness or ill health of the mother, and in 9 cases to the character of the mother's work. These 9 cases, however, include 5 cases where the mother was employed during pregnancy outside the home, but where it could be stated definitely that the child's condition at birth was due directly to overwork at home after leaving the mill. In these cases the overwork of special importance was heavy washing and lifting in connection therewith.

Of the 243 children of mothers engaged in millwork outside the home, 42 cases of children not well and strong at birth could be traced to an apparent cause. In 15 cases this cause was the sickness or ill health of the mother, in 11 cases it was the character of the mother's work, and in 9 cases where it did not appear that the character of the mother's work was especially unsuitable and injurious, it did appear quite clearly that it was continued so long and so near childbirth as to be directly responsible for the child's weakness or ill health at birth.

In order that the reader may see clearly the conditions of the mothers' work before childbirth, which have been regarded as probably responsible for the cases of children born not well and strong, the facts in detail for such cases are set forth in the following paragraphs.

MOTHERS AT HOME BEFORE BIRTH OF CHILD.

Housework only; work continued to day of child's birth; mother frail; housework too severe; child died of infantile debility at 13 days. Mother, French Canadian.

Housework only; work continued to day of child's birth; mother not strong, but did housework for family of 11; eighteenth child, 11 living, 3 died under 1 year, and 3 died over 1 year but under 4 years; child had little vitality; died of debility at 1 month. Mother, Polish.

Housework only; work continued to day of child's birth; mother frail and anemic; does all work alone, including washing and ironing; child never strong; ninth child, 4 living; died of cholera infantum at 1 month 7 days. Mother, Portuguese.

Dressmaking at home and all housework, including washing and ironing, for large family up to within 7 days of child's birth; ninth child, 7 living; child died of gastro-enteritis at 3 months. Mother, French Canadian.

MOTHERS AT WORK OUTSIDE THE HOME BEFORE BIRTH OF CHILD.

Cleaning and washing; continued work until day of child's birth; did washing and lifted tubs of water twice the week baby was born; premature birth; age at death, 4 days. Mother; English.

Spinner; time of giving up millwork not reported; did big washing the day before child's birth (twin) at 8 months; premature birth; age at death, 1 month. Mother, French Canadian.

Spinner; time of giving up millwork not reported; did big washing the day before child's birth (twin) at 8 months; premature birth; age at death 1 month, 2 days. Mother, French Canadian.

Weaver; continued work until day of child's birth; premature birth; age at death, 2 days. Mother, native-born French Canadian.

Spooler; gave up millwork 3 months before child's birth; stood all the time; did washing and all her own housework up to day of child's birth; premature birth; age at death, 19 days. Mother, Portuguese.

Spinner; continued work until day of child's birth; mother had one hip enlarged; child died of congenital malformation at 2 days. Mother, American.

Spinner, 8 sides; continued at millwork until 2 weeks before child's birth; work continued too long probable cause of child's debility; died of congenital debility at 1 day. Mother, American.

Weaver, 8 looms; continued at millwork until 1 month before child's birth; hard work and constant standing probable cause of debility of child; died of congenital debility at 2 days. Mother, Irish.

Weaver, 8 looms; continued at millwork until 2 months before child's birth; did all work at home between mill hours; work at mill involved constant standing; child died of congenital debility at 3 months. Mother, French Canadian.

Spinner, 10 sides; continued at millwork until 2 weeks before child's birth; constant standing and work continued too long probable cause of child's debility; died of congenital debility at 2 days. Mother, American.

Weaver, 8 looms; continued at millwork until 2 weeks before child's birth; constant standing and work continued too long probable cause of child's debility; died of congenital debility at 1 month 6 days. Mother, American.

Housework in boarding house; continued work until 2 weeks before child's birth; died of congenital debility at 25 days. Mother, Irish.

Drawing-frame tender, 4 frames; continued work until 2 weeks before child's birth; died of congenital debility at 5 months. Mother, French Canadian.

Weaver, 6 looms; gave up millwork 6 months before child's birth, but did housework until day of child's birth; mother has kidney trouble, which is aggravated by

constant standing; does her own washing and housework and lifts tubs of water; child died of congenital debility at 2½ months. Mother, Portuguese.

Speeder tender, 2 frames; gave up millwork 3 months before child's birth; a short woman; complains of work, which involves constant reaching; child died of congenital debility at 1 day. Mother, English.

Speeder tender; gave up millwork 6 months before child's birth; work involves constant standing; has varicose veins of legs; child died of congenital debility at 1 day. Mother, English.

Spinner, 8 sides; continued at millwork until 2 weeks before child's birth; work continued too long probable cause of child's condition; child died of cholera infantum at 21 days. Mother, Portuguese.

Weaver, 8 looms; continued at millwork until 1 week before child's birth; mother anemic and not strong; work requires constant standing; child died of enteritis at 5 months. Mother, Italian.

Spooler; continued at millwork until less than 1 week before child's birth; did housework after mill hours; was not strong, only half fed, and maltreated by drunken husband; child died of cholera infantum at 3 months. Mother, French Canadian.

Spinner, 11 sides; gave up millwork 4 months before child's birth; mother's health poor, has symptoms of uterine disorder; work involves too great a strain; doctor said she was not strong enough for millwork; child died of diarrhea at 5 months. Mother, French Canadian.

Spinner; continued at millwork until 2 weeks before child's birth; does housework also; child died of cholera infantum at 4 months 5 days. Mother, Portuguese.

Speeder tender, 2 frames; continued at millwork until 1 week before child's birth; work continued too long probable cause of condition of child; child died of convulsions at 1 month 22 days. Mother, American.

Spinner, 8 sides; continued at millwork until 2 weeks before child's birth; constant standing and work continued too long probable cause of child's condition; child died of pneumonia at 3 months 24 days. Mother, Portuguese.

Weaver, 8 looms; gave up millwork 6 months before child's birth; work involves strain and constant standing; has milk legs; child died of pneumonia at 9 months 16 days. Mother, American.

Spooler; gave up millwork 2 months before child's birth; constant standing and work continued too long probable cause of child's condition; works hard at home; in poor health; child died of bronchitis at 2 months. Mother, French Canadian.

Speeder tender; continued at millwork until 2 weeks before child's birth; work continued too long probable cause of child's condition; child died of pleurisy at 4 months 17 days. Mother, English.

Spinner, 10 sides; continued at millwork until 2 weeks before child's birth; mother's health not good; stands most of time and work is very hard; child died of pulmonary congestion at 2 days. Mother, French Canadian.

CONCLUSION AS TO RELATION OF MOTHER'S WORK BEFORE CHILD-BIRTH TO INFANT MORTALITY.

Summarizing, then, the results of the study of the effect upon the children of the mother's employment before childbirth, the conclusion must be reached that in Fall River, as indicated by the one year's experience, no marked differences are discoverable between the children of mothers at home and those of mothers at work outside the home. A slightly larger per cent of stillbirths was reported for the mothers at home, but the per cent of the stillbirths which could be

traced to the mother's work was the same for mothers at home and for mothers at work. The percentage of total deaths due to diseases of early infancy (indicating prematurity, immaturity, or defects) was higher for the children of mothers at home than for the children of mothers at work. The percentage of children not well and strong at birth (stillbirths included) was almost exactly the same for mothers at home and for mothers at work. When stillbirths are excluded, however, the mothers at work show a slightly higher percentage of children not well and strong at birth. It would appear then that the conditions which were found existing do not indicate that the work of the mother in the cotton mill before childbirth was producing results noticeably different from the work of mothers at home. It must be borne in mind, however, that the two classes, mothers at work and mothers at home, are not sharply defined and that the group, mothers at home, includes a considerable number of women who were formerly engaged in millwork and whose physical condition may still be affected in some degree by such earlier employment.

CHAPTER III.

MOTHER'S WORK OUTSIDE THE HOME AFTER
CHILDBIRTH IN RELATION TO
INFANT MORTALITY.

CHAPTER III.

MOTHER'S WORK OUTSIDE THE HOME AFTER CHILDBIRTH IN RELATION TO INFANT MORTALITY.

PROPORTION OF MOTHERS WHO WENT TO WORK AFTER CHILDBIRTH.

Although all the children of the group, mothers at work, were subject in greater or less degree to the unfavorable influence of the mother's work during pregnancy, only a small part were affected by the mother's employment outside the home after the child's birth and while the child was living. In the discussion which has already been presented an attempt has been made to ascertain the possible effect of this employment as related to stillbirths, premature births, and to children who were not well and strong at birth. It is not possible to trace to the mother's work during pregnancy any of the other causes of death, although it is not unlikely that a certain additional number not possible of identification were also unfavorably affected by the mother's work before childbirth in ways having relation to the deaths under 1 year.

The effect upon the infant mortality of the mother's work outside the home after childbirth is limited by the percentage of mothers who went into such employment while the child was living. Taking the group, mothers at work, as a whole, only 78, or 29.5 per cent, of the 264 for whom detailed information was secured returned to work outside the home while the child was living. The remaining number either did not return at all or, for one reason or another, postponed their return until after the death of the child. In addition, of the 314 mothers at home for whom information was secured, 5 went to work outside the home while the child was living. Taking together all the mothers in the two classes for whom reports were secured, it will thus be seen that 83, or 14.4 per cent, of the entire 578 went to work outside the home during the life of the child. The number and per cent of the mothers at work before birth of child who returned to work outside the home during the child's life are shown in the table which follows:

NUMBER AND PER CENT OF MOTHERS OF CHILDREN DYING UNDER 1 YEAR WHO
WENT TO WORK OUTSIDE THE HOME AFTER BIRTH OF CHILD AND WHILE CHILD
WAS LIVING.

Employment of mother after birth of child and while child was living.	Mothers at home before birth of child.		Mothers at work outside the home before birth of child.		Mothers at home and mothers at work.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Went to work outside the home.....	5	1.6	78	29.5	83	14.4
Did not go to work outside the home.....	309	98.4	186	70.5	495	85.6
Total.....	314	100.0	^a 264	100.0	^a 578	100.0

^a Not including 2 not reporting whether mother went to work.

**COUNTRY OF BIRTH AND NUMBER OF CHILDREN BORN OF MOTHERS
WHO WENT TO WORK AFTER CHILDBIRTH.**

These figures quite naturally give rise to the questions: Who are the mothers who returned to work? Are they of the same races? Are they younger or older than those who did not return to work? The next table has been prepared in an attempt to throw light upon these questions. It shows the larger families of the mothers at home as compared with the mothers that worked outside the home. Thus, taking all races, mothers at home had borne, on the average, 5.5 children, while the mothers at work showed an average of 4.4. On the other hand, when the group, mothers at work outside the home before birth of child, is examined it is found that those mothers who returned to work after the birth of the child and while the child was living had, on the average, borne a larger number of children than the mothers who remained at home, the number being 4.8 per mother for those who returned to work as against 4.2 per mother for those who did not return to work.

Among those who returned to work nearly all the races are represented in much the same proportions as in the whole group of mothers at work. While it is apparent from the smaller number of children which they had borne that for the groups as a whole the mothers at work were younger than the mothers at home, yet among those mothers who returned to work in certain cases the average number of children is so large as to indicate women no longer young. Thus, the 18 French-Canadian mothers show an average of 7.1 children, the 6 English mothers 6.8 children, and the 4 Irish mothers 6.3. The Portuguese mothers, 27 in number, showed an average of only 3.4 children. This comparatively low average was no doubt due to the fact that the Portuguese cotton-mill operatives in Fall River are largely recent immigrants, and as most of them came to this country seeking work in the cotton mill it is, of course, to be expected that they are nearly all comparatively young.

The table showing the country of birth of the mother and the average number of children born for mothers at home and mothers at work follows:

COUNTRY OF BIRTH AND AVERAGE NUMBER OF CHILDREN BORN OF MOTHERS AT HOME AND OF MOTHERS AT WORK.

Country of birth of mother.	Mothers at home before and after birth of child.		Mothers at work outside the home before birth of child.						Total, mothers at home and mothers at work.	
			Did not return to work.		Returned to work after birth of child.		Total, mothers at work.			
	Number.	Average number of children.	Number.	Average number of children.	Number.	Average number of children.	Number.	Average number of children.	Number.	Average number of children.
United States.....	a 58	4.0	b 37	4.3	b 13	3.5	a 50	4.1	g 108	4.0
England.....	b 16	5.3	b 16	3.9	6	6.8	b 22	4.7	a 38	4.9
Scotland.....	3	6.0							3	6.0
Ireland.....	b 9	4.6	6	4.8	4	6.3	10	5.4	b 19	5.0
Canada.....	85	5.9	b 34	5.1	a 18	7.1	d 51	5.8	d 136	5.9
Azores.....	a 108	6.0	d 76	3.7	f 27	3.4	e 103	3.6	t 211	4.8
Poland.....	9	7.6	7	4.3	4	4.0	11	4.2	20	5.7
Russia.....	5	5.0	2	5.0	1	8.0	3	6.0	8	5.4
Italy.....	6	5.5	2	2.0	1	5.0	3	3.0	9	4.7
Austria.....	1	1.0							1	1.0
Germany.....	3	4.0	1	14.0			1	14.0	4	6.5
Syria.....					1	2.0	1	2.0	1	2.0
Total.....	c 303	5.5	c 180	4.2	e 75	4.8	h 255	4.4	f 558	5.0

a Not including 2 mothers, children not reported.
 b Not including 1 mother, children not reported.
 c Not including 6 mothers, children not reported.
 d Not including 3 mothers, children not reported.
 e Not including 8 mothers, children not reported.
 f Not including 5 mothers, children not reported.
 g Not including 4 mothers, children not reported.

h Not including 14 mothers, children not reported and 2 mothers not reporting as to work after child-birth.
 i Not including 10 mothers, children not reported.
 j Not including 20 mothers, children not reported and 2 mothers not reporting as to work after child-birth.

LENGTH OF TIME AFTER CHILDBIRTH WHEN MOTHER WENT TO WORK.

In connection with the return to work of the mother during the life of the child, the age of the child is of importance. For mothers at home the principal importance of the resumption of work would be as affecting the mother's own health rather than that of the child directly. With the children of the mothers at work, however, the return to work means the withdrawal of the mother's immediate care, and in many cases a necessary shortening of the period of breast feeding, with a consequent substitution of less suitable kinds of food, of food improperly or carelessly prepared, or in irregular feeding. The length of time after the birth of child, and while the child was living, before the mother returned to work is shown for both mothers at home and mothers at work in the following table.

LENGTH OF TIME AFTER BIRTH OF CHILD AND WHILE CHILD WAS LIVING BEFORE MOTHER RETURNED TO WORK.

Length of time after birth of child (and while child was living) before mother returned to work.	Mothers at home.		Mothers at work outside the home previous to birth of child.			
	Number.	Per cent.	Mill work.	Other work.	Total number.	Per cent.
Under 4 days.....	24	11.0				
4 days and under 1 week.....	55	25.1				
1 week and under 2 weeks.....	95	43.4		2	2	2.5
2 weeks and under 3 weeks.....	25	11.4	4		4	4.9
3 weeks and under 1 month.....	9	4.1	4	1	5	6.2
1 month and under 2 months.....	5	2.3	14	3	17	21.0
2 months and under 3 months.....	^a 4	1.8	^b 17		^b 17	21.0
3 months and under 4 months.....	(^c)		^b 13	1	^b 14	17.3
4 months and under 5 months.....			9		9	11.1
5 months and under 6 months.....	^e 2	.9	^d 4		^d 4	4.9
6 months and over.....			9		9	11.1
Total reported.....	^e 219	100.0	^f 74	7	^f 81	100.0
Mother died at birth of child.....	6		2	1	3	
Child died before mother returned to work.....	42		168	15	183	
Time of return to work not reported.....	40		3	1	4	
Grand total.....	^g 307		^f 247	24	^f 271	

^a Not including 2 mothers at home before birth of child who entered mill after childbirth.

^b Including 2 mothers at home before birth of child who entered mill after childbirth.

^c Not including 1 mother at home before birth of child who entered mill after childbirth.

^d Including 1 mother at home before birth of child who entered mill after childbirth.

^e Not including 5 mothers at home before birth of child who entered mill after childbirth.

^f Including 5 mothers at home before birth of child who entered mill after childbirth.

^g Not including 5 mothers at home before birth of child who entered mill after childbirth; in addition, in 2 cases mothers did no work before or after birth of child.

It will be seen that while a great majority of the mothers at home resumed work within 1 month after the birth of child, only a small percentage of the mothers at work outside the home returned to work within so short a time.

In many of the cases where the mother at home resumed her home work soon after the birth of the child, the statement would be misleading without reference to the help given by a relative, a nurse, or a servant during a limited period. The following statement will show the character of this help for the mothers at home:

CHARACTER OF HOUSEHOLD HELP IN THE CASE OF MOTHERS AT HOME WHO RESUMED THEIR WORK SOON AFTER BIRTH OF CHILD.

Length of time after birth of child (and while child was living) before mother resumed work.	Number of mothers.	Number who had help.	Character of help.
Under 4 days.....	24	3	Grandmother.
4 days and under 1 week.....	55	3	Mother.
		2	Daughters.
1 week and under 2 weeks.....	95	1	Sister.
		7	A woman.
		9	Mother.
		2	Husband.
		2	Daughter.
		1	Relatives.
		1	Sister-in-law.
		1	Neighbor.
		2	Trained nurse.
		10	A woman.
2 weeks and under 3 weeks.....	25	3	Relatives.
		2	"Help."
3 weeks and under 1 month.....	9	1	Servant and nurse.
		1	Mother.

CARE OF CHILD DURING MOTHER'S ABSENCE AT WORK.

Of the first importance in relation to the return of the mother to work is the question of who cared for the child in the mother's absence. Of the 83 mothers who went to work outside the home during the life of the child, information in regard to care in the mother's absence was not secured for 7, but for the remaining 76 the information secured showed that in 25 cases, or 32.9 per cent, the care was by the grandmother; in 22, or 28.9 per cent, by some other relative of the mother; and in 29, or 38.2 per cent, by a friend, neighbor, or hired attendant. In 13 cases the care was by an older sister of the child. Except for the necessary withdrawal of the breast feeding, it probably can not be assumed that the care of the child by its grandmother or other adult relative was necessarily inferior to that of the mother, for, as will be seen in connection with the study of feeding, the evidences of ignorance and carelessness in feeding are conspicuous in very many cases where the mother was at home, as well as in many cases where the mother was at work. These evidences are also conspicuous among the older mothers with a large number of children, as well as among those where the child included in this report was the first born.

While it would be, perhaps, too much to assume that the character of care given to those children looked after by a friend, a neighbor, or who were boarded out was always inferior to that of the mother or a relative, yet it may fairly be stated that in many cases it was not the proper care. One case which came to the attention of the agents during the course of this investigation will serve to show the character of the care received by some of the children who were boarded out. In the case in question, a Portuguese woman was found in charge of 4 children under 1 year of age, while the mothers were working out. The woman had lost during the year covered by the investigation her eleventh child, 10 others having died at various ages under 5 years. The last one, she stated, had been nursed throughout its life, the feeding being given "whenever it cried." It was also given crackers and milk from the day of its birth. The woman was at the time of the visit of the agent making her living taking care of babies of other mothers who worked in the mill. Inasmuch as the woman in question had lost a child under 1 year of age during the period covered by the investigation and was at home during the life of that child, the illustration will also serve to show the kind of care given by many mothers to their own children when they were at home and able to give the child personal attention.

CAUSES OF DEATHS OF CHILDREN OF MOTHERS AT HOME AND OF MOTHERS WHO WENT TO WORK.

In the table which follows the causes of death of the children of mothers who went to work outside the home are shown in comparison with the causes in the case of (1) the children of the mothers who were at home both before and after childbirth, and (2) the children of the mothers who were at work outside the home before the birth of child but did not return to work after childbirth.

NUMBER AND PER CENT OF CHILDREN DYING UNDER 1 YEAR FROM CERTAIN SPECIFIED CAUSES, CLASSIFIED ACCORDING TO THE MOTHER'S WORK BEFORE AND AFTER CHILDBIRTH.

NUMBER.

Employment of mother after birth of child and while child was living.	Diseases of early infancy and congenital malformation.	Diarrhea, enteritis, and gastritis.	Convulsions.	Non-tuberculous meningitis.	Pneumonia, bronchitis, and laryngitis.	Tuberculosis (all forms), whooping cough, measles.	All other causes.	Total, all causes.
Mothers at home before birth of child and not going to work.....	102	^a 106	22	1	51	7	20	^a 309
Mothers at work outside the home before birth of child, but did not return to work after childbirth.....	67	66	8	1	29	.....	15	186
Mothers at work outside the home before birth of child and returned to work after childbirth.....	13	^b 52	2	.....	13	.....	3	^b 83
Total.....	182	224	32	2	^c 95	7	38	^c 580

PER CENT.

Mothers at home before birth of child and not going to work.....	33.0	34.3	7.1	0.3	16.5	2.3	6.5	100
Mothers at work outside the home before birth of child, but did not return to work after childbirth.....	36.0	35.5	4.3	.5	15.6	.....	8.1	100
Mothers at work outside the home before birth of child and returned to work after childbirth.....	15.7	62.7	2.4	.....	15.7	.....	3.6	100

^a Not including 5 children of mothers at home before birth of child who went to work outside the home after childbirth.

^b Including 5 children of mothers at home before birth of child who went to work outside the home after childbirth.

^c Including 2 children not reported whether mother returned to work after childbirth.

EXCESSIVE DEATHS FROM DIARRHEA, ENTERITIS, AND GASTRITIS AMONG CHILDREN OF MOTHERS WHO WENT TO WORK.

Comparing the causes of death of the three classes of children, the striking similarity between the two groups of children whose mothers were at home after childbirth is first to be noted. Diarrhea, enteritis, and gastritis were accountable for 34.3 per cent of the deaths among the children of mothers at home both before and after childbirth, and 35.5 per cent among the children of mothers who were at work outside the home before the birth of child but who did not return to work after childbirth. The deaths from diseases of early infancy constituted 33 per cent in the former group and 36 per cent

in the latter group. On the other hand, turning to the children of mothers at work after childbirth, it is found that 62.7 per cent of all deaths were due to diarrhea, enteritis, and gastritis.

It will be noticed that the per cent of deaths due to diseases of early infancy and congenital malformations are much higher among the children of mothers who did not return to work. The explanation of the difference in this latter case is in the fact that most of the children dying from this group of causes died within the early weeks of life before it was possible for the mother to leave the home and go to work.^a

COUNTRY OF BIRTH OF MOTHER AND CAUSE OF DEATH OF CHILDREN OF MOTHERS AT HOME AND OF MOTHERS WHO WENT TO WORK.

The causes of death according to the country of birth of mother are shown in detail in the following table, the facts being presented separately for the children of mothers at home and the children of mothers who went to work after childbirth.

NUMBER OF CHILDREN DYING UNDER 1 YEAR FROM CERTAIN SPECIFIED CAUSES, BY COUNTRY OF BIRTH OF MOTHER.

Country of birth of mother.	Diseases of early infancy and congenital malformations.	Diarrhea, enteritis, and gastritis.	Convulsions.	Nontuberculous meningitis.	Pneumonia, bronchitis, and laryngitis.	Tuberculosis (all forms), whooping cough, and measles.	All other causes.	Total, all causes.
MOTHERS AT HOME.								
United States.....	38	29	7	.....	11	3	10	98
England.....	13	6	6	.....	2	.....	7	34
Scotland.....	2	.....	1	.....	.....	.....	.....	3
Ireland.....	8	2	1	1	2	.....	2	16
Canada.....	47	44	5	.....	18	3	2	119
Azores.....	49	84	6	.....	42	.....	8	189
Poland.....	4	2	2	.....	5	.....	3	16
Russia.....	1	3	2	.....	.....	.....	1	7
Italy.....	5	2	.....	.....	.....	.....	1	8
All others.....	2	.....	.....	1	.....	1	1	5
Total.....	169	172	30	2	80	7	35	495
MOTHERS AT WORK OUTSIDE THE HOME.								
United States.....	4	6	.....	.....	2	.....	2	14
England.....	.....	6	.....	.....	.....	.....	.....	6
Scotland.....	.....	.....	.....	.....	.....	.....	.....	.....
Ireland.....	2	1	1	.....	.....	.....	.....	4
Canada.....	2	15	.....	.....	3	.....	.....	20
Azores.....	5	19	1	.....	6	.....	1	32
Poland.....	.....	3	.....	.....	1	.....	.....	4
Russia.....	.....	1	.....	.....	1	.....	.....	1
Italy.....	.....	1	.....	.....	.....	.....	.....	1
All others.....	.....	.....	.....	.....	1	.....	.....	1
Total.....	13	52	2	.....	13	.....	3	83

^a For the per cent of deaths in the early weeks of life, by causes, see page 107.

NUMBER OF CHILDREN DYING UNDER 1 YEAR FROM CERTAIN SPECIFIED CAUSES,
BY COUNTRY OF BIRTH OF MOTHER—Concluded.

Country of birth of mother.	Diseases of early infancy and congenital malformations.	Diarrhea, enteritis, and gastritis.	Convulsions.	Nontuberculous meningitis.	Pneumonia, bronchitis, and laryngitis.	Tuberculosis (all forms), whooping cough, and measles.	All other causes.	Total all causes.
TOTAL MOTHERS AT HOME AND MOTHERS AT WORK.								
United States.....	42	35	7	.....	13	3	12	112
England.....	13	12	6	.....	2	.....	7	40
Scotland.....	2	.....	1	.....	.....	.....	.....	3
Ireland.....	10	3	2	1	2	.....	2	20
Canada.....	49	59	5	.....	^a 22	3	.....	^a 140
Azores.....	54	103	7	.....	48	.....	9	221
Poland.....	4	5	2	.....	^a 7	.....	3	^a 21
Russia.....	1	4	2	.....	.....	.....	1	8
Italy.....	5	3	.....	.....	.....	.....	1	9
All others.....	2	.....	.....	1	1	1	1	6
Total.....	182	224	32	2	^b 95	7	38	^b 580

^a Including 1 not reported whether mother went to work after childbirth.^b Including 2 not reported whether mother went to work after childbirth.

The significant facts of the foregoing table will be brought out somewhat more clearly by a comparison for the two classes of children of the per cent dying from diarrheal diseases. This is shown in the brief table which follows:

NUMBER AND PER CENT OF CHILDREN DYING UNDER 1 YEAR FROM DIARRHEA ENTERITIS, AND GASTRITIS, BY COUNTRY OF BIRTH OF MOTHER, FOR CHILDREN OF MOTHERS AT HOME AND CHILDREN OF MOTHERS WHO WENT TO WORK AFTER CHILDBIRTH.

[This table does not include the children whose mothers were not found in this investigation, and the percentage figures therefore differ slightly from those in the table on page 95.]

Country of birth.	Children of mothers at home after childbirth.			Children of mothers who went to work outside the home after childbirth.			Total, children of mothers at home and mothers at work.		
	Deaths, all causes.	Deaths from diarrhea, enteritis, and gastritis.		Deaths, all causes.	Deaths from diarrhea, enteritis, and gastritis.		Deaths, all causes.	Deaths from diarrhea, enteritis, and gastritis.	
		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.
United States.....	98	29	29.6	14	6	42.9	112	35	31.3
England.....	34	6	17.6	6	6	100.0	40	12	30.0
Scotland.....	3	.....	.....	.....	.....	.....	3	.....	.....
Ireland.....	16	2	12.5	4	1	25.0	20	3	15.0
Canada.....	119	44	37.0	20	15	75.0	^a 140	59	42.1
Azores.....	189	84	44.4	32	19	59.4	221	103	46.6
Poland.....	16	2	12.5	4	3	75.0	^a 21	5	23.8
Russia.....	7	3	42.9	1	1	100.0	8	4	50.0
Italy.....	8	2	25.0	1	1	100.0	9	3	33.3
All others.....	5	.....	.....	1	.....	.....	6	.....	.....
Total.....	495	172	34.6	83	52	62.7	^b 580	224	38.6

^a Including 1 not reported whether mother went to work after childbirth.^b Including 2 not reported whether mother went to work after childbirth.

CHARACTER OF FEEDING AND CAUSE OF DEATH OF CHILDREN OF MOTHERS AT HOME AND OF MOTHERS WHO WENT TO WORK.

It will be of special interest to examine the character of the feeding of the children in the three groups, to ascertain whether there was a difference in feeding such as might account for the very high proportion of deaths from diarrhea, enteritis, and gastritis among the children of mothers who went to work outside the home. In the following table the children, classified in three groups according to the employment of the mother after childbirth, are presented so as to show the number who were nursed exclusively, the number nursed partly, and the number not nursed at all.

In comparing the feeding in this table one point should not be overlooked. As the most important point of distinction between the groups is in the fact that in one group the mother returned to work while the child was living and in the other two she did not return to work during the life of the child, it necessarily follows that in one group some food other than the mother's milk was necessary in practically every case, while in the other groups where the mother was at home breast feeding, if milk was present, was possible in practically every case.

NUMBER AND PER CENT OF CHILDREN DYING UNDER 1 YEAR WHO WERE NURSED EXCLUSIVELY, NURSED PARTLY, AND NOT NURSED AT ALL, CLASSIFIED ACCORDING TO THE MOTHER'S WORK BEFORE AND AFTER CHILDBIRTH.

Employment of mother after birth of child and while child was living.	Number.				Per cent.			
	Nursed exclusively.	Nursed partly.	Artificial food exclusively.	Total.	Nursed exclusively.	Nursed partly.	Artificial food exclusively.	Total
Mothers at home before birth of child and not going to work	93	^a 104	^b 79	^c 276	33.7	37.7	28.6	100.0
Mothers at work outside the home before birth of child, but did not return to work after childbirth	56	60	46	^d 162	34.6	37.0	28.4	100.0
Mothers at work outside the home before birth of child and returned to work after childbirth	1	^e 50	^f 31	^g 82	1.2	61.0	37.8	100.0
Total	150	214	156	^h 520	28.8	41.2	30.0	100.0

^a Not including 4 children of mothers at home before birth of child who went to work outside the home after childbirth.

^b Not including 1 child of mother at home before birth of child who went to work outside the home after childbirth.

^c Not including 5 children of mothers at home before birth of child who went to work outside the home after childbirth; not including 33, character of feeding not reported.

^d Not including 24 children, character of feeding not reported.

^e Including 4 children of mothers at home before birth of child who went to work outside the home after childbirth.

^f Including 1 child of mother at home before birth of child who went to work outside the home after childbirth.

^g Including 5 children of mothers at home before birth of child who went to work outside the home after childbirth; not including 1, character of feeding not reported.

^h Not including 58 children, character of feeding not reported and 2 not reported whether mother went to work after childbirth.

In the foregoing table, as in the comparison of causes of death, the striking fact is the substantial similarity between the two groups—children of mothers at home before the birth of child and not going to work and children of mothers at work outside the home before

birth of child but not returning to work after childbirth. In the former group 33.7 per cent of the children were nursed exclusively and 37.7 per cent were nursed partly. In the latter group 34.6 per cent were nursed exclusively and 37 per cent were nursed partly. For the children of mothers at work outside the home, however, it is seen that a much smaller per cent was breast fed and that consequently artificial food was given to a much greater number, only 1.2 per cent being nursed exclusively and 61 per cent being nursed partly. Among the two groups of children whose mothers did not go to work after childbirth 28.6 per cent and 28.4 per cent were never nursed at all, while of the 82 children whose mothers went to work 37.8 per cent were never breast fed.

NUMBER AND PER CENT OF CHILDREN DYING UNDER 1 YEAR FROM DIARRHEA, SIVELY, NURSED PARTLY, AND NURSED NOT AT ALL, CLASSIFIED NUMBER.

Character of food.	Mothers at home after child-birth—		
	Who were at home before childbirth.		
	Deaths from diarrhea, enteritis, and gastritis.	Deaths from other causes.	Deaths from all causes.
Nursing exclusively.....	21	72	93
Nursing, with other food.....	51	53	104
Artificial food exclusively.....	31	48	79
Total.....	103	173	276

PER CENT.

Nursing exclusively.....	20.4	41.6	33.7
Nursing, with other food.....	49.5	30.6	37.7
Artificial food exclusively.....	30.1	27.7	28.6
Total.....	100.0	100.0	100.0

For all the children taken together only 28.8 per cent were nursed exclusively, 41.2 per cent were nursed partly, and 30 per cent had only artificial food.^a For those children dying from diarrhea, enteritis, and gastritis only 17.9 per cent were nursed exclusively, while for

^a In Blackburn, England, in 1910, out of 1,225 children visited after they had reached the age of 6 months, 577, or 47.1 per cent, were found to be wholly or partly breast fed. In 1911 a slightly larger proportion, 49.6 per cent, was found to be breast fed. (Annual Report upon the Health of Blackburn [England] for the Year 1910, p. 41; 1911; p. 40.) The per cent who were breast fed, wholly or partly, among those dying under 1 year is considerably lower, 33.6 in 1910 and 45.1 in 1911. The percentages are also much below those of Fall River. The figures for Blackburn in 1910 and 1911 follow:

From the foregoing comparisons it has been shown that for the two groups of children whose mothers were at home after childbirth the percentage of deaths from diarrheal diseases and the percentage of children who were breast fed was practically the same, but that for the children whose mothers were at work outside the home deaths from diarrheal diseases were greatly excessive and artificial foods were substituted for breast feeding to a much greater extent. A comparison of the character of the child's feeding in relation to the cause of death may serve to throw further light on the high infant mortality of Fall River. In the following table these facts are presented, the children being grouped in the three classes as in the preceding tables.

ENTERITIS, AND GASTRITIS AND OTHER CAUSES, WHO WERE NURSED EXCLUDING ACCORDING TO THE MOTHER'S WORK BEFORE AND AFTER CHILDBIRTH.

NUMBER.

Mothers at home after childbirth—						Mothers who went to work outside the home after childbirth.			Total.		
Who were at work outside the home before childbirth.			Total.			Deaths from diarrhoea, enteritis, and gastritis.	Deaths from other causes.	Deaths from all causes.	Deaths from diarrhoea, enteritis, and gastritis.	Deaths from other causes.	Deaths from all causes.
Deaths from diarrhoea, enteritis, and gastritis.	Deaths from other causes.	Deaths from all causes.	Deaths from diarrhoea, enteritis, and gastritis.	Deaths from other causes.	Deaths from all causes.						
17	39	56	38	111	149	1	.....	1	39	111	150
28	32	60	79	85	164	33	17	50	112	102	214
18	28	46	49	76	125	18	13	31	67	89	156
63	99	162	166	272	438	52	30	82	218	302	520

PER CENT.

27.0	39.4	34.6	22.9	40.8	34.0	1.9	.....	1.2	17.9	36.8	28.8
44.4	32.3	37.0	47.6	31.2	37.4	63.5	56.7	61.0	51.4	33.8	41.2
28.6	28.3	28.4	29.5	27.9	28.5	34.6	43.3	37.8	30.7	29.5	30.0
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

those dying from other causes 36.8 per cent were breast fed. The relation between deaths from diarrheal diseases and artificial feeding is clearly shown. For all classes of children a much lower percentage

CHARACTER OF THE FEEDING OF CHILDREN DYING UNDER 1 YEAR OF AGE. BLACKBURN, ENGLAND, 1910 AND 1911.

Character of feeding.	Number.		Per cent.	
	1910	1911	1910	1911
Breast fed only	78	92	24.5	20.0
Breast fed partly	29	115	9.1	25.1
Artificial feeding	212	252	66.5	54.9
Total reported.....	319	459	100.0	100.0

of breast feeding was found among those dying from diarrhea, enteritis, and gastritis than among those dying from other causes.

Among all classes of children of mothers at home after childbirth the constancy of the percentage of those who were given artificial food exclusively is noticeable, the range being only from 27.7 to 30.1. For the children of mothers who went to work the percentage given artificial food exclusively was much greater.

NUMBER AND PER CENT OF CHILDREN DYING UNDER 1 YEAR FROM DIARRHEA, CLASSIFIED ACCORDING TO MOTHER'S

NUMBER.

Character of food.	Mothers at home after child-birth—		
	Who were at home before childbirth.		
	Deaths from di-arrhea, enteritis, and gas-tritis.	Deaths from other causes.	Deaths from all causes.
Nursing exclusively.....	21	72	93
Cow's milk.....	5	21	26
Cow's milk and nursing.....	8	8	16
Condensed milk.....	12	15	27
Condensed milk and nursing.....	9	9	18
Proprietary foods.....	7	6	13
Proprietary foods and nursing.....	12	8	20
Other foods (usually solid foods) with any or all of preceding.....	7	6	13
Other foods (usually solid foods) with any or all of preceding and nursing.....	22	28	50
Total.....	103	173	276

PER CENT.

Nursing exclusively.....	20.4	41.6	33.7
Cow's milk.....	4.9	12.1	9.4
Cow's milk and nursing.....	7.8	4.6	5.8
Condensed milk.....	11.7	8.7	9.8
Condensed milk and nursing.....	8.7	5.2	6.5
Proprietary foods.....	6.8	3.5	4.7
Proprietary foods and nursing.....	11.7	4.6	7.2
Other foods (usually solid foods) with any or all of preceding.....	6.8	3.5	4.7
Other foods (usually solid foods) with any or all of preceding and nursing.....	21.4	16.2	18.1
Total.....	100.0	100.0	100.0

Of all the children combined, breast feeding was the food of the greatest number, 28.8 per cent; fresh cow's milk (without breast feeding) was the food of 9.8 per cent; condensed milk of 10.2 per cent, and proprietary food of only 3.5 per cent. Condensed milk was more largely used than fresh cow's milk, whether we consider those foods separately or as combined with nursing.

In the foregoing tables the food given has been classified in three groups according to whether the child was nursed exclusively, nursed partly, or given artificial food exclusively. The relation of feeding to the cause of death is shown in greater detail in the following table. Here the precise character of the artificial food is shown in some detail. The distinction has been preserved between those who were nursed partly and those who were given artificial food exclusively.

ENTERITIS, AND GASTRITIS, WHO WERE GIVEN EACH SPECIFIED KIND OF FOOD, WORK BEFORE AND AFTER CHILDBIRTH.

NUMBER.

Mothers at home after childbirth—						Mothers who went to work outside the home after childbirth.			Total.		
Who were at work outside the home before childbirth.			Total.			Deaths from diarrhea, enteritis, and gastritis.	Deaths from other causes.	Deaths from all causes.	Deaths from diarrhea, enteritis, and gastritis.	Deaths from other causes.	Deaths from all causes.
Deaths from diarrhea, enteritis, and gastritis.	Deaths from other causes.	Deaths from all causes.	Deaths from diarrhea, enteritis, and gastritis.	Deaths from other causes.	Deaths from all causes.						
17	39	56	38	111	149	1	-----	1	39	111	150
4	13	17	9	34	43	5	3	8	14	37	51
4	4	8	12	12	24	8	2	10	20	14	34
7	8	15	19	23	42	6	5	11	25	28	53
3	6	9	12	15	27	9	5	14	21	20	41
2	3	5	9	9	18	-----	-----	-----	9	9	18
8	-----	8	20	8	28	3	2	5	23	10	33
5	4	9	12	10	22	7	5	12	19	15	34
13	22	35	35	50	85	13	8	21	48	58	106
63	99	162	166	272	438	52	30	82	218	302	520

PER CENT.

27.0	39.3	34.6	22.9	40.8	34.0	1.9	-----	1.2	17.9	36.8	28.8
6.3	13.1	10.5	5.4	12.5	9.8	9.6	10.0	9.8	6.4	12.3	9.8
6.3	4.0	4.9	7.2	4.4	5.5	15.4	6.7	12.2	9.2	4.6	6.5
11.1	8.1	9.3	11.4	8.5	9.6	11.5	16.7	13.4	11.5	9.3	10.2
4.8	6.1	5.6	7.2	5.5	6.2	17.3	16.7	17.1	9.6	6.6	7.9
3.2	3.0	3.1	5.4	3.3	4.1	-----	-----	-----	4.1	3.0	3.5
12.7	-----	4.9	12.0	2.9	6.4	5.8	6.7	6.1	10.6	3.3	6.3
7.9	4.0	5.6	7.2	3.7	5.0	13.5	16.7	14.6	8.7	5.0	6.5
20.6	22.2	21.6	21.1	18.4	19.4	25.0	26.7	25.6	22.0	19.2	20.4
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Probably the most striking feature of the table is the large extent to which solid foods were used, 6.5 per cent of the children being given solid foods (without nursing), and 20.4 per cent being given solid food and at the same time being nursed. The statement that the child was fed on solid food does not in most cases mean that this was the principal article of food, but that along with cow's milk or

condensed milk or nursing it was regularly given, in very many cases, as will be seen later, the solid food being given beginning with the day of birth.^a

When the children of mothers at work are compared with the other groups, the difference in the character of the food given is rather noticeable. The same percentage of the children were fed on fresh cow's milk (9.8 per cent) although when we consider those who were given cow's milk and at the same time nursed, a much greater use of cow's milk is found among the mothers at work than among the mothers at home. The use of condensed milk is also more general among the mothers at work than among the mothers at home. The use of condensed milk among the mothers at home also exceeded the use of cow's milk. While 24.4 per cent of the mothers at home admitted giving solid food, among the mothers at work the percentage rose to 40.2.

The relation of the artificial feeding to deaths from diarrhea, enteritis, and gastritis is here brought out again by the excess of the artificial feeding among the children who died from the diarrheal diseases as compared with the children dying from other causes. The difference is noticeable among all the classes of children shown in the table.

In the following table the character of the feeding is shown in connection with the causes of death given in somewhat greater detail.

NUMBER AND PER CENT OF CHILDREN DYING UNDER 1 YEAR FROM SPECIFIED CAUSES, BY CHARACTER OF FOOD.

[This table includes only the 520 children the character of whose feeding was reported; the percentage figures therefore differ slightly from those of the tables on pages 95 and 130.]

NUMBER.

Character of food.	Pre-mature birth.	Congenital debility and injuries.	Congenital malformations.	Diarrhea, enteritis, and gastritis.	Convulsions.	Non-tuberculous meningitis.	Pneumonia, bronchitis, and laryngitis.	Tuberculosis (all forms).	Whooping cough.	Measles.	All other causes.	Total.
MOTHERS AT HOME.												
Nursing exclusively..	13	33	2	38	9	.....	41	1	2	.....	10	149
Cow's milk	2	16	3	9	4	.....	5	.....	.....	.....	4	43
Cow's milk and nursing.....	.....	3	1	12	.....	.....	7	.....	.....	.....	1	24
Condensed milk.....	.....	11	.....	19	1	.....	8	1	.....	.....	2	42
Condensed milk and nursing.....	.....	7	.....	12	.....	1	1	1	.....	.....	5	27
Proprietary foods.....	.....	4	.....	9	.....	.....	3	.....	.....	.....	2	18
Proprietary foods and nursing.....	.....	1	4	.....	20	2	1	.....	.....	.....	.....	28
Other foods (usually solid foods) with any or all of preceding.....	1	5	.....	12	2	.....	1	.....	.....	.....	1	22
Other foods (usually solid foods) with any or all of preceding and nursing.....	.....	19	.....	35	8	.....	13	2	.....	.....	8	85
Total.....	17	102	6	166	26	2	79	5	2	.....	33	438

^a See page 156.

NUMBER AND PER CENT OF CHILDREN DYING UNDER 1 YEAR FROM SPECIFIED CAUSES, BY CHARACTER OF FOOD—Concluded.

NUMBER—Concluded.

Character of food.	Pre-mature birth.	Congenital debility and injuries.	Congenital malformations.	Diarrhea, enteritis, and gastritis.	Convulsions.	Non-tuberculous meningitis.	Pneumonia, bronchitis, and laryngitis.	Tuberculosis (all forms).	Whooping cough.	Measles.	All other causes.	Total.
MOTHERS AT WORK OUTSIDE THE HOME.												
Nursing exclusively.....				1								1
Cow's milk.....		1		5			2					8
Cow's milk and nursing.....				8			2					10
Condensed milk.....		5		6								11
Condensed milk and nursing.....		1		9			3				1	14
Proprietary foods.....												
Proprietary foods and nursing.....		1		3			1					5
Other foods (usually solid foods) and any or all of preceding.....		2		7			1				2	12
Other foods (usually solid foods) and any or all of preceding and nursing.....		2		13	2		4					21
Total.....		12		52	2		13				3	82
MOTHERS AT HOME AND MOTHERS AT WORK.												
Nursing exclusively.....	13	33	2	39	9		41	1	2		10	150
Cow's milk.....	2	17	3	14	4		7				4	51
Cow's milk and nursing.....		3	1	20			9				1	34
Condensed milk.....		16		25	1		8	1			2	53
Condensed milk and nursing.....		8		21		1	4	1			6	41
Proprietary foods.....		4		9			3				2	18
Proprietary foods and nursing.....	1	5		23	2	1	1					33
Other foods (usually solid foods) with any or all of the preceding.....	1	7		19	2		2				3	34
Other foods (usually solid foods) with any or all of the preceding and nursing.....		21		48	10		17	2			8	106
Total.....	17	114	6	218	28	2	92	5	2		36	520

PER CENT.

Character of food.	Pre-mature birth.	Congenital debility and injuries.	Congenital malformations.	Diarrhea, enteritis, and gastritis.	Convulsions.	Non-tuberculous meningitis.	Pneumonia, bronchitis, and laryngitis.	Tuberculosis (all forms).	Whooping cough.	Measles.	All other causes.	Total.
MOTHERS AT HOME AND MOTHERS AT WORK.												
Nursing exclusively.....	8.7	22.0	1.3	26.0	6.0		27.3	0.7	1.3		6.7	100.0
Cow's milk.....	3.9	33.3	5.9	27.5	7.8		13.7				7.8	100.0
Cow's milk and nursing.....		8.8	2.9	58.8			26.5				2.9	100.0
Condensed milk.....		30.2		47.2	1.9		15.1	1.9			3.8	100.0
Condensed milk and nursing.....		19.5		51.2		2.4	9.8	2.4			14.6	100.0
Proprietary foods.....		22.2		50.0			16.7				11.1	100.0
Proprietary foods and nursing.....	3.0	15.2		69.7	6.1	3.0	3.0					100.0
Other foods (usually solid foods) with any or all of the preceding.....	2.9	20.6		55.9	5.9		5.9				8.8	100.0
Other foods (usually solid foods) with any or all of the preceding and nursing.....		19.8		45.3	9.4		16.0	1.9			7.5	100.0
Total.....	3.3	21.9	1.2	41.9	5.4	.4	17.7	1.0	.4		6.9	100.0

The excessive percentage of deaths from diarrhea, enteritis, and gastritis has been seen in the comparisons already made. The excess, it has been noted, is especially great in the case of the children of mothers at work outside the home after childbirth; thus, 63.4 per cent of all deaths among such children were from diarrheal diseases, while among the children of mothers at home after childbirth only 37.9 per cent were from diarrheal diseases. Large differences are found, varying with the character of the feeding, this being true both among the children of mothers at home and among the children of mothers at work. These differences will appear more clearly if the percentage of all deaths which were due to diarrhea, enteritis, and gastritis be used as the basis of comparison. Such a comparison is made in the table which follows, the children being arranged in the same three groups already used, according to the employment of the mother after childbirth, and the feeding being classified as nursing exclusively, nursing with other food, and artificial food exclusively.

PER CENT OF TOTAL DEATHS DUE TO DIARRHEA, ENTERITIS, AND GASTRITIS ALL, CLASSIFIED ACCORDING TO MOTHER'S

[This table includes only the 520 children the character of whose feeding was reported; the

Character of food.	Mothers at home after childbirth—		
	Who were at home before childbirth.		
	Deaths, all causes.	Deaths from diarrhea, enteritis, and gastritis.	
		Number.	Per cent of deaths, all causes.
Nursing exclusively.....	93	21	22.6
Nursing, with other food.....	104	51	49.0
Artificial food exclusively.....	79	31	39.2
Total.....	276	103	37.3

The lowest percentage of deaths from diarrheal diseases uniformly appears among children who were breast fed exclusively,^a the percentage for all classes of breast-fed children being 26.0 as against 42.9 per cent among children who had only artificial food and 52.3 per cent among those who were breast fed and given other food also. This very considerable number of deaths from diarrheal diseases among children who were given only mother's milk ought not to excite surprise, although it is doubtless unnecessarily large.

Even among breast-fed children the channels of possible infection are numerous. Where only breast milk is given and there is no possibility of infection through unclean food infection might easily be introduced by means of the fingers or articles put into the mouth, both of which would often be unclean from dust or dirt from the clothing, the furniture, or the floor. All this would be true even in homes where a fair standard of living and of hygiene was maintained. The dangers in overcrowded, insanitary dwellings located in insanitary surroundings would be greatly increased.

AMONG CHILDREN NURSED EXCLUSIVELY, NURSED PARTLY, AND NOT NURSED AT WORK BEFORE AND AFTER CHILDBIRTH.

percentage figures therefore differ slightly from those of the tables on pages 95 and 130.]

Mothers at home after childbirth—						Mothers who went to work outside the home after childbirth.			Total.		
Who were at work outside the home before childbirth.			Total.			Deaths, all causes.	Deaths from diarrheal diseases, enteritis, and gastritis.		Deaths, all causes.	Deaths from diarrheal diseases, enteritis, and gastritis.	
Deaths, all causes.	Deaths from diarrheal diseases, enteritis, and gastritis.		Deaths, all causes.	Deaths from diarrheal diseases, enteritis, and gastritis.			Number.	Per cent of deaths, all causes.		Number.	Per cent of deaths, all causes.
	Number.	Per cent of deaths, all causes.		Number.	Per cent of deaths, all causes.						
56	17	30.4	149	38	25.5	1	1	100.0	150	39	26.0
60	28	46.6	164	79	48.2	50	33	66.0	214	112	52.3
46	18	39.1	125	49	39.2	31	18	58.1	156	67	42.9
162	63	38.9	438	166	37.9	82	52	63.4	520	218	41.9

^a The exception among children of mothers at work may properly be ignored in this connection, as there was only a single instance.

It will be noticed that the percentage of deaths from diarrheal diseases was uniformly highest among children given nursing and other food, even higher than among those who had artificial food exclusively.

The children of mothers at work, when compared with the children of mothers at home, show an excessive percentage of deaths from

PER CENT OF TOTAL DEATHS DUE TO DIARRHEA, ENTERITIS, AND GASTRITIS
TO MOTHER'S WORK BEFORE

[This table includes only the 520 children the character of whose feeding was reported; the

Character of food.	Mothers at home after child-birth—		
	Who were at home before childbirth.		
	Deaths, all causes.	Deaths from diarrhoea, enteritis, and gastritis.	
Number.		Per cent of deaths, all causes.	
Nursing exclusively.....	93	21	22.6
Cow's milk.....	26	5	19.2
Cow's milk and nursing.....	16	8	50.0
Condensed milk.....	27	12	44.4
Condensed milk and nursing.....	18	9	50.0
Proprietary foods.....	13	7	53.8
Proprietary foods and nursing.....	20	12	60.0
Other foods (usually solid foods) with any or all of preceding.....	13	7	53.8
Other foods (usually solid foods) with any or all of preceding and nursing.....	50	22	44.0
Total.....	276	103	37.3

Taking all classes of children, those using fresh cow's milk showed much the lowest percentage of diarrheal deaths (next to those who were breast fed exclusively), the figures being 27.5 per cent against 45.3 per cent for solid food and nursing, the next higher, and 47.1 per cent for condensed milk. The highest, 69.7 per cent, was for proprietary foods and nursing, the next highest being 58.8 for cow's milk and nursing.

When the children of mothers at work are studied a somewhat different order appears, cow's milk exclusively and solid food and nursing both showing a very high percentage of diarrheal deaths. For the former class, however, it should be noted that the figures are rather small, as indeed they are for all the classes in the mothers at work group. It is probable that the much more unfavorable showing

diarrheal diseases regardless of the character of the food, suggesting that a lack of care or improper care, as well as the difference in the feeding, played an important part. Further light may be had on the relation of the percentage of diarrheal deaths to the character of the food, if the food is studied more in detail.

AMONG CHILDREN GIVEN EACH SPECIFIED KIND OF FOOD, CLASSIFIED ACCORDING AND AFTER CHILDBIRTH.

percentage figures therefore differ slightly from those of the tables on pages 95 and 130.]

Mothers at home after childbirth—						Mothers who went to work outside the home after childbirth.				Total.	
Who were at work outside the home before childbirth.			Total.							Deaths from diarrhea, enteritis, and gastritis.	
Deaths, all causes.	Deaths from diarrhea, enteritis, and gastritis.		Deaths, all causes.	Deaths from diarrhea, enteritis, and gastritis.		Deaths, all causes.	Deaths from diarrhea, enteritis, and gastritis.		Deaths, all causes.	Deaths from diarrhea, enteritis, and gastritis.	
	Number.	Per cent of deaths, all causes.		Number.	Per cent of deaths, all causes.		Number.	Per cent of deaths, all causes.		Number.	Per cent of deaths, all causes.
56	17	30.4	149	38	25.5	1	1	100.0	150	39	26.0
17	4	23.5	43	9	20.9	8	5	62.5	51	14	27.5
8	4	50.0	24	12	50.0	10	8	80.0	34	20	58.8
15	7	46.7	42	19	45.2	11	6	54.5	53	25	47.1
9	3	33.3	27	12	44.4	14	9	64.3	41	21	51.2
5	2	40.0	18	9	50.0	-----	-----	-----	18	9	50.0
8	8	100.0	28	20	71.4	5	3	60.0	33	23	69.7
9	5	55.5	22	12	54.5	12	7	58.3	34	19	55.9
35	13	37.1	85	35	41.2	21	13	61.9	106	48	45.3
162	63	38.9	438	166	37.9	82	52	63.4	520	218	41.9

for cow's milk here is due to inferior quality and especially inferior care of the milk. A similar explanation may also account for the more unfavorable showing for condensed milk. It is likely that the lack of the mother's care, as well as the lack of her nursing, is an important factor here.

For all classes of food (except proprietary foods and nursing, which is a very small group) the children of mothers at work show a higher percentage of diarrheal diseases than do the children of mothers at home, the difference being quite marked.

Here, as in the shorter table preceding, a higher percentage of diarrheal deaths is shown among the children who had artificial food and nursing than among those who had only artificial food, and the excess is noticeable for nearly all classes of food.

CHARACTER OF FEEDING AND COUNTRY OF BIRTH OF MOTHERS AT HOME AND OF MOTHERS WHO WENT TO WORK.

In connection with the extent to which the children were breast fed and the extent to which some of the other foods were used, it will be of interest to study the country of birth of the mothers, as some of the kinds of feeding are peculiar to certain races. The following table shows the character of the feeding by country of birth of mother:

CHARACTER OF FOOD OF CHILDREN DYING UNDER 1 YEAR, BY COUNTRY OF BIRTH OF MOTHER.

NUMBER.

Character of food.	United States.	Eng-land.	Scot-land.	Ire-land.	Can-ada.	Azores.	Po-land.	Rus-sia.	Italy.	All other.	To-tal.
MOTHERS AT HOME.											
Nursing exclusively	25	8	1	3	41	57	10	1	3		149
Cow's milk	14	4		3	8	8	3	2		1	43
Cow's milk and nursing	3	1		1	8	8	1	1	1		24
Condensed milk	12	1			8	20		1			42
Condensed milk and nursing..	5	3		5	7	6			1		27
Proprietary foods.....	6	2			8	1				1	18
Proprietary foods and nursing.	7	5		2	9	4				1	28
Other foods (usually solid foods) with any or all of the preceding	4	2	1		1	13		1			22
Other foods (usually solid foods) with any or all of the preceding and nursing	8				12	60		1	2	2	85
Total.....	84	26	2	14	102	177	14	7	7	5	438
MOTHERS AT WORK OUTSIDE THE HOME.											
Nursing exclusively		1									1
Cow's milk	1				3	4					8
Cow's milk and nursing	1				2	5	1		1		10
Condensed milk	3			2	6						11
Condensed milk and nursing..	3	2			4	2	2			1	14
Proprietary foods.....											
Proprietary foods and nursing.	3	2									5
Other foods (usually solid foods) with any or all of the preceding	2	1				7	1	1			12
Other foods (usually solid foods) with any or all of the preceding and nursing	1			2	5	13					21
Total.....	14	6		4	20	31	4	1	1	1	82
MOTHERS AT HOME AND MOTHERS AT WORK.											
Nursing exclusively	25	9	1	3	41	57	10	1	3		150
Cow's milk	15	4		3	11	12	3	2		1	51
Cow's milk and nursing	4	1		1	10	13	2	1	2		34
Condensed milk	15	1		2	14	20		1			53
Condensed milk and nursing..	8	5		5	11	8	2		1	1	41
Proprietary foods.....	6	2			8	1				1	18
Proprietary foods and nursing.	10	7		2	9	4				1	33
Other foods (usually solid foods) with any or all of the preceding	6	3	1		1	20	1	2			34
Other foods (usually solid foods) with any or all of the preceding and nursing	9			2	17	73		1	2	2	106
Total.....	98	32	2	18	122	208	18	8	8	6	520

CHARACTER OF FOOD OF CHILDREN DYING UNDER 1 YEAR, BY COUNTRY OF BIRTH OF MOTHER—Concluded.

PER CENT.

Character of food.	United States.	England.	Scotland.	Ireland.	Canada.	Azores.	Poland.	Russia.	Italy.	All other.	Total.
MOTHERS AT HOME AND MOTHERS AT WORK.											
Nursing exclusively.....	25.6	28.1	50.0	16.7	33.6	27.4	55.6	12.5	37.5	.....	28.8
Cow's milk.....	15.4	12.5	.....	16.7	9.0	5.8	16.7	25.0	.....	16.7	9.8
Cow's milk and nursing.....	4.1	3.1	.....	5.6	8.2	6.3	11.1	12.5	25.0	.....	6.5
Condensed milk.....	15.4	3.1	.....	11.1	11.5	9.6	.....	12.5	.....	.....	10.2
Condensed milk and nursing.....	8.2	15.6	.....	27.8	9.0	3.8	11.1	.....	12.5	16.7	7.9
Proprietary foods.....	6.1	6.3	.....	.....	6.6	5	.....	.....	.....	16.7	3.5
Proprietary foods and nursing.....	10.2	21.9	.....	11.1	7.4	1.9	.....	.....	.....	16.7	6.3
Other foods (usually solid foods) with any or all of the preceding.....	6.1	9.4	50.0	.....	.8	9.6	5.6	25.0	.....	.....	6.5
Other foods (usually solid foods) with any or all of the preceding and nursing.....	9.2	.....	.....	11.1	13.9	35.1	.....	12.5	25.0	33.3	20.4
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Ignoring the groups with a total of 8 or less, the Polish mothers led all others in nursing, 55.6 per cent of their children being breast fed exclusively, against 33.6 per cent of the French Canadians and 27.4 per cent of the Portuguese. Only 16.7 per cent of the Irish children were nursed exclusively.

In the use of cow's milk the Polish mothers are in the lead, with 27.8 per cent, the Irish coming next with 22.3 per cent, the Portuguese mothers being last with only 12.1 per cent.

The Irish mothers appear as using condensed milk most generally (38.9 per cent), the Americans being next with 23.6 per cent.

The Portuguese mothers led all others in the use of solid foods, 44.7 per cent of all admitting giving them either with or without breast feeding. A considerable number of cases were also found among the French Canadians and the Americans.

DURATION OF BREAST FEEDING OF CHILDREN OF MOTHERS AT HOME AND OF MOTHERS WHO WENT TO WORK.

In the tables which have been given the character of the feeding has been described covering the whole of the child's life. It will be of interest to see how long breast feeding either alone or combined with other feeding was continued. This is shown in the following table, the feeding being tabulated in three classes: Nursing exclusively, nursing with other food, and artificial foods exclusively. The totals in each column represent the total children who were living in the specified period and whose feeding was known.

DURATION OF BREAST FEEDING OF CHILDREN NURSED EXCLUSIVELY AND NURSED PARTLY.
NUMBER.

Character of food.	Children the character of whose food was as specified up to and during—							
	1st week.	2d week.	3d week.	4th week to end of 1st month.	2d month.	3d month.	4th month to end of 6th month.	7th month to end of 12th month.
MOTHERS AT HOME.								
Nursing exclusively.....	126	115	103	91	80	58	44	21
Nursing, with other food.....	21	20	19	17	19	15	11	14
Artificial foods exclusively.....	49	49	48	43	44	44	39	19
Total.....	196	184	170	151	143	117	94	54
MOTHERS AT WORK OUTSIDE THE HOME.								
Nursing exclusively.....	49	49	45	42	35	27	5	.....
Nursing, with other food.....	3	3	5	7	9	12	19	3
Artificial foods exclusively.....	31	31	33	34	36	35	41	33
Total.....	83	83	83	83	80	74	65	36
TOTAL MOTHERS AT HOME AND MOTHERS AT WORK.								
Nursing exclusively.....	309	290	264	233	202	144	71	29
Nursing, with other food.....	45	44	47	48	54	55	55	26
Artificial foods exclusively.....	162	155	159	152	162	153	166	109
Total.....	516	489	470	433	418	352	292	164

PER CENT.

MOTHERS AT HOME.								
Nursing exclusively.....	64.3	62.5	60.6	60.3	55.9	49.6	48.6	38.9
Nursing, with other food.....	10.7	10.9	11.2	11.3	13.3	12.8	11.7	25.9
Artificial foods exclusively.....	25.0	26.6	28.2	28.5	30.8	37.6	41.5	35.2
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
MOTHERS AT WORK OUTSIDE THE HOME.								
Nursing exclusively.....	59.0	59.0	54.2	50.6	43.8	36.5	7.7	.....
Nursing, with other food.....	3.6	3.6	6.0	8.4	11.3	16.2	29.2	8.3
Artificial foods exclusively.....	37.3	37.3	39.8	41.0	45.0	47.3	63.1	91.7
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
MOTHERS AT HOME AND MOTHERS AT WORK.								
Nursing exclusively.....	59.9	59.3	56.2	53.8	48.3	40.9	24.3	17.7
Nursing, with other food.....	8.7	9.0	10.0	11.1	12.9	15.6	18.9	15.8
Artificial foods exclusively.....	31.4	31.7	33.8	35.1	38.8	43.5	56.8	66.5
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Of the 516 for whom the character of feeding was reported, 59.9 per cent were breast fed exclusively in the first week, while 8.7 per cent were nursed partly and 31.4 per cent were given artificial foods exclusively. Among those who were nursed and had other food are a considerable number who were given crackers or bread. Those who died without feeding are not included here.

The percentages for the second, third, and fourth weeks show a gradual falling off in the number breast fed exclusively, and in the second month only 48.3 per cent were so fed, the percentage breast fed partly having increased to 12.9 and the percentage given artificial food exclusively having increased to 38.8.

During the fourth to sixth months only 24.3 per cent were breast fed exclusively and after the sixth month the proportion had fallen to 17.7 per cent, two-thirds then being fed on artificial food exclusively.

Of the children of mothers at work a smaller percentage was breast fed exclusively even in the first week, and a smaller percentage was breast fed partly, the figures for the two combined being 62.6 per cent for the mothers at work and 75.0 per cent only for the mothers at home. A similar condition prevailed in the second week, but after that the breast feeding among the mothers who were going to work diminished much more rapidly than among the mothers at home.

MOTHER'S EXCUSE OR REASON FOR NOT NURSING.

In view of the large number of children who were not nursed at all or were nursed for only a part of their lives, it becomes important to ascertain how far this condition was due to the mother's employment outside the home and how far to other causes. The mother's own excuse or reason for not nursing in cases where the child was nursed only part of its life or not at all is shown in the following table:

MOTHER'S EXCUSE OR REASON FOR NOT NURSING CHILD IN CASES WHERE CHILD WAS NURSED ONLY PART OF ITS LIFE OR NOT AT ALL.

Mother's excuse or reason for not nursing child.	Mothers at home after child-birth—			Mothers who went to work outside the home after child-birth.	Total.
	Who were at home before child-birth.	Who were at work outside the home before child-birth.	Total.		
Nursed exclusively.....	93	56	149	1	150
Nursed entire life, but with other foods.....	51	20	71	.....	71
Nursed partly—until discontinued on account of—					
Mother sick.....	5	3	8	.....	8
Sore breast.....	2	4	4	.....	5
Mother again pregnant.....	5	4	9	.....	9
Baby sick.....	8	4	12	.....	12
Milk deficient.....	29	19	48	.....	58
Disinclination of mother.....	.....	2	2	.....	2
Going to work.....	.....	a 1	a 1	.....	39
Reason not reported.....	4	5	9	.....	9
Total.....	53	40	93	50	143
Nursed not at all:					
Mother died.....	2	3	5	.....	5
Mother sick.....	4	4	8	.....	8
Sore breast.....	4	1	5	.....	6
Baby sick.....	4	2	6	.....	6
No milk.....	33	28	61	.....	77
Milk deficient.....	18	3	21	.....	22
Disinclination of mother.....	3	.....	3	.....	3
Milk present; no reason given for not nursing.....	b 9	5	b 14	.....	b 25
Not reported whether milk was present.....	2	.....	2	.....	4
Total.....	79	46	125	31	156
Grand total.....	c 276	d 162	e 438	f 82	g 520

a Went to work for a few days only.
 b Including 7 children who "refused to nurse."
 c Not including 33, character of feeding not reported.
 d Not including 24, character of feeding not reported.
 e Not including 57, character of feeding not reported.
 f Not including 1, not nursed at all but exact character of feeding not reported. Mother went to work at 6 months.
 g Not including 58, character of feeding not reported, and 2 not reported whether mother went to work after childbirth.

It will be observed that for the 218 mothers at home who nursed a part of the time only or not at all, the principal excuses or reasons for not nursing were: No milk or milk deficient, 59.6 per cent, and illness or disability of mother or child, 26.1 per cent. For 14, or 6.4 per cent, it was reported that milk was present, but no good reason for not nursing could be given. For the 81 mothers who went to work who nursed only a part of the time or not at all, the most important cause was naturally the intention to go to work, which was given by 39, or 48.1 per cent. Next in importance as a reason was "no milk or milk deficient," 33.3 per cent. In the case of 11, or 13.6 per cent, it was admitted that milk was present, but no good reason was given for not nursing.

The illness or disability of the mother or child as a reason for not nursing was a much more important cause with the mothers at home than with the mothers at work. This, however, is what one would expect, inasmuch as mothers seriously ill would, of course, be unable to go to work. It is not at all unlikely that a similar reason explains the excess of those reporting no milk or milk deficient among the mothers at home. The degree of ill health might result in a deficiency of milk and also cause the mother to remain at home, even though the incapacity might not be sufficient to cause it to be reported as the main reason for not nursing.

If the two classes, "disinclination of mother" and "milk present, no reason given for not nursing," be regarded as the same, this reason is practically of the same importance among the mothers at home and the mothers at work, 8.7 per cent in the case of the former and 13.6 per cent in the case of the latter.

It is probable that in some of the cases where the mother reported no milk or milk deficient the actual reason for the failure to nurse the child was her own ignorance or disinclination. The experience of physicians has shown that such reports can not be accepted as conclusive, and that in many cases where the mother states that she has no milk for her child a fair trial proves the contrary. Thus in the course of this investigation a physician, speaking of several years' experience in Fall River, said: "I have never had a case where there was a deficiency of breast milk, though almost every mother I have had has told me that she could not nurse her child. On inducing them to try I have had no failures."

The disinclination of the mother does not appear as an acknowledged reason of failure to nurse the child save in 5 cases (including 3 among mothers at home and not nursing at all). It is almost certain however, that this was the real reason in others of the 28 cases where milk was present and a more or less unsatisfactory reason for not nursing was given.

“Going to work” was given as an excuse or reason for shortening the period of nursing in only 40 cases, or 13.4 per cent of the total number who nursed only a part of the time or not at all. In these cases the breast feeding which was given for a time was discontinued because the mother went to work outside the home. In the 1 case where the mother went to work but continued nursing exclusively, it is clear that the child would be unfavorably affected by the necessarily infrequent feeding. These cases, it may be noted, constituted 7.9 per cent of the total of 520 for whom information in regard to feeding was obtained. The significance of this percentage is in the fact that it shows what part of the entire number of children had their period of nursing shortened by the fact that the mother went to work outside the home.

In the other cases where the mother went to work while her child was living (42 in number) it will be seen that the reasons given for not nursing are such that breast feeding could not have been affected even if the return to work had been postponed or even abandoned.

It will be of interest to present more in detail the facts in the 28 cases where breast milk was present but no good reason for not nursing was given. In these cases the 12 mothers at home had borne an average of 4.2 children; the 11 mothers who returned to work, 4.3 children; and the 5 mothers who had been at work outside the home before childbirth, but who did not return to work later, 4.8 children.

These averages include the children which were the subject of this investigation.

These 28 cases are presented more in detail in the following table:

MOTHER'S EXCUSE OR REASON FOR NOT NURSING CHILD IN CASES WHERE BREAST MILK WAS PRESENT, WITH CHARACTER OF FOOD GIVEN, CAUSE OF DEATH, AND AGE AT DEATH.

Race of mother.	Condition of child at birth.	Mother's reason for not nursing child.	Food given child.	Cause of death of child.	Age at death.
MOTHERS AT HOME.					
French Canadian.	Not well....	Child refused.....	Cow's milk, bottled.	Infant debility....	18 days.
Portuguese....	.....do.....	.....do.....	.....do.....	Marasmus.....	20 days.
Do.....	Well and strong.	.....do.....	Condensed milk and crackers.	.....do.....	2 months.
Do.....	.....do.....	.....do.....	Condensed milk....	Bronchitis.....	3 months.
French Canadian.	.....do.....	.....do.....	Cow's milk.....	Gastroenteritis....	4 months.
Portuguese....	.....do.....	.....do.....	Condensed milk....	Cholera infantum.	5 months.
Do.....	.....do.....	.....do.....	Condensed milk and crackers.	Heat prostration and rachitis.	6 months.
American....	Not strong..	Disinclination of mother.	Cow's milk.....	La grippe.....	3 months, 29 days.
Do.....	.....do.....	.....do.....	Condensed milk....	Natural causes....	6 months.
Do.....	Delicate....	.....do.....	Cow's milk.....	Cholera infantum.	7 months.
Portuguese....	Well.....	Not reported.....	Cow's milk and crackers.	Gastroenteritis....	16 days.
Irish.....	Not well....	Doctor thought milk not good enough (mother thought otherwise).	Cow's milk.....	Broncho-pneumonia.	3 months 20 days.

MOTHER'S EXCUSE OR REASON FOR NOT NURSING CHILD IN CASES WHERE BREAST MILK WAS PRESENT, WITH CHARACTER OF FOOD GIVEN, CAUSE OF DEATH, AND AGE AT DEATH—Concluded.

Race of mother.	Condition of child at birth.	Mother's reason for not nursing child.	Food given child.	Cause of death of child.	Age at death.
MOTHERS RETURNED TO WORK.					
Portuguese...	Well and strong.	Went to work at 2 weeks.	Cow's milk and condensed milk; solid food.	Gastroenteritis....	4½ months
Do.....	do.....	do.....	do.....	Pneumonia.	7 months.
Irish.....	Sick.....	Went to work at 3 weeks.	Condensed milk.....	Infantile debility..	25 days.
French Canadian.	Not well....	Went to work at 1 month.	do.....	Debility.....	1 month
Do.....	Well and strong.	do.....	Cow's milk.....	Cholera infantum.	7 days. 2 months.
Portuguese.....	do.....	do.....	do.....	Enterocolitis.....	4 months.
French Canadian.	Not reported.	do.....	Condensed milk.....	Debility.....	1½ months.
Portuguese...	Not well and strong.	Went to work at 2 months.	Cow's milk and crackers and bread.	Marasmus.....	8 months.
Polish.....	Well and strong.	do.....	Cow's milk; bread and milk.	Enterocolitis.....	6 months.
French Canadian.	do.....	do.....	Cow's milk.....	Pneumonia.....	9½ months.
Russian.....	do.....	Went to work at 4 months.	Cow's milk; crackers in water or milk.	Cholera infantum.	8 months.
MOTHERS DID NOT RETURN TO WORK.					
Irish.....	Not well.....	do.....	Cow's milk.....	Inanition.....	2 days.
American.....	do.....	do.....	do.....	General weakness.	Do.
Do.....	do.....	do.....	do.....	Pulmonary congestion.	Do.
French Canadian.	do.....	do.....	do.....	Spina bifida.....	5 days.
American.....	do.....	Disinclination of mother.	Condensed milk.....	Abscess.....	21 days.

Of the 28 mothers reporting that breast milk was present but that the child was not nursed at all, 11 were mothers who later went to work. The period which elapsed before their going to work in these cases was as follows: Two at two weeks, 1 at three weeks, 4 at one month, 3 at three months, and 1 at four months. In 8 of these cases the excuse given was that the mother expected to return to work within a short time. It is clear that such a reason can not be accepted as expressing the full truth when the return to work was postponed one and even two months. In one case where the return to work took place in three weeks the excuse frankly given was the disinclination of the mother.

It will thus be seen from a study of the circumstances in the case of the mothers who went to work that while in the majority (62 per cent) of the cases the nursing of the child was continued as long as possible as the exclusive method of feeding, yet in a very considerable proportion of the cases (13.4 per cent) there was an entire absence of nursing, which must be regarded as due either to the ignorance or disinclination of the mother.

CAUSE OF DEATH AND AGE AT DEATH OF CHILDREN WHOSE MOTHERS WENT TO WORK.

As has been seen, out of the 266 mothers classified as at work before childbirth, only 78, or 29.3 per cent, returned to work under one year and while the child was living. In an attempt to trace the cause of death in these cases the children have been grouped in two classes, those reported as born strong and healthy, who numbered 61, and those reported as apparently not strong and healthy at birth, of whom there were 12.^a In 5 cases the child's condition at birth was not reported. In the following table these two classes are presented separately, the recorded cause of death and the age of the child at death being given:

CAUSE OF DEATH AND AGE AT DEATH OF CHILDREN OF MOTHERS WHO RETURNED TO WORK DURING CHILD'S LIFE.

Cause of death.	Age of child at death.					Total under 1 year.	Per cent of total deaths due to specified cause.
	Under 1 month.	1 month and under 3 months.	3 months and under 6 months.	6 months and under 9 months.	9 months and under 12 months.		
Child born strong and healthy:							
Diarrhea, enteritis, and gastritis.....		4	15	10	7	36	59.0
Convulsions.....			1		1	2	3.3
Marasmus.....			2	4	1	7	11.5
Congenital debility.....			1			1	1.6
Pneumonia and bronchitis.....			3	8	1	12	19.7
Suffocation.....		1	1	1		3	4.9
Total.....		5	23	23	10	61	100.0
Child not strong and healthy at birth:							
Diarrhea, enteritis, and gastritis.....		2	5	3		10	81.8
Convulsions.....				1		1	9.1
Marasmus.....						1	9.1
Congenital debility.....		1					
Pneumonia and bronchitis.....							
Suffocation.....							
Total.....		3	5	4		12	100.0

It will be seen that in this group of mothers who returned to work after childbirth, only 16.4 per cent of the children were not well and strong at birth as compared with 37.6 per cent in the group mothers at home and 51.1 per cent in the remainder of the group mothers at work before birth of child (that is, mothers who did not return to work). Making allowance for the many children not well and strong at birth who died during the early weeks of life and before the mother was able to return to work outside the home, it would appear that the mothers of the more delicate children quite generally remained at home.

^a In addition 5 mothers classified as at home before the birth of the child went to work after childbirth. Three of these children were reported well and strong at birth; the condition of 1 was not reported.

Of the children not well at birth it will be noted that 18.2 per cent died of marasmus and congenital debility and that diarrheal diseases accounted for the deaths of all the others, 81.8 per cent. Of the children well and strong at birth 59.0 per cent died of diarrhea, enteritis, and gastritis, and 19.7 per cent of pneumonia and bronchitis, as compared with 38.3 per cent and 15.6 per cent dying from the same causes among all the children dying under one year in Fall River. The excess from these causes would be due at least in part to the dropping off of the deaths from such causes as premature birth, congenital malformation, and debility, which naturally diminish rapidly in importance after the first month.

CHARACTER OF FEEDING BEFORE AND AFTER MOTHER WENT TO WORK OF CHILDREN WHOSE MOTHERS WENT TO WORK UNDER ONE MONTH.

An examination of the details concerning some of the cases where the mother returned to work may help to explain the causes of death. Of the mothers who returned to work outside the home, 11 returned during the first month after childbirth and 18 during the second month.

Of the mothers of the children reported as born strong and healthy, only 9 returned to work outside the home within a month of the child's birth and while the child was living. Of these 1 was at ten days, 4 at two weeks, 3 at three weeks, and 1 at four weeks. No child of these mothers died under one month. Of the mothers of the children apparently not strong and healthy at birth, 2 returned to work outside the home within a month of the child's birth. One of these children died at 25 days, the other at one month and eight days. It will be especially worth while to examine the details in regard to the lives of these 11 children, for during the first month the maximum percentage of breast feeding will be found, and any improper feeding there found will be representative of similar conditions affecting an increasing proportion of the children in later months.

CHILDREN WHOSE MOTHERS RETURNED TO WORK UNDER ONE MONTH.

Mother returned to work as dressmaker outside the home at nine days; child died at one month and eight days of gastroenteritis (and malnutrition); child not nursed at all, milk absent; fed on cow's milk (not bottled) scalded; child sick all its life; mother had tuberculosis of the hip; cared for by friend in mother's absence. Mother, French Canadian.

Mother returned to housework and sewing outside the home at 10 days; child died at six months of pneumonia; from the beginning was breast fed once at night, at other times fed with cup and spoon on undiluted cow's milk (not bottled) from grocery; child cared for by its aunt in mother's absence. Mother, Portuguese.

Mother returned to work in mill at two weeks; child died at six months of bronchitis; breast fed exclusively two weeks, then at night, but during day given con-

densed milk "when baby cried;" bottle "cleaned once or twice every day;" child strong at birth, but weakened by lack of fresh air and improper food; cared for by neighbor. Mother, Syrian.

Mother returned to work in mill at two weeks; child died at four and one-half months of gastroenteritis; not nursed at all, although mother had milk; fed on condensed milk and cow's milk (not bottled); long-tube bottle used, "washed when needed;" "table food" at four months; grandmother cared for child in mother's absence; Coderre's Infant's Sirup. Mother, Portuguese.

Mother returned to work in mill at two weeks; child died at seven months of pneumonia; child not nursed at all, although mother had milk; fed on condensed milk and cow's milk (not bottled) from grocery, also bread and crackers; child dressed too warmly and kept in hot rooms and seldom taken out of doors; cared for by neighbor in mother's absence. Mother, Portuguese.

Mother returned to work in mill at two weeks; child died at four months of bronchitis; fed exclusively on cow's milk (not bottled) from grocery; mother's milk deficient; child strong at birth and gained steadily at first, but kept in close quarters without fresh air, which debilitated it; cared for by its grandmother in mother's absence. Mother, Portuguese.

Mother returned to work in mill at three weeks; child died at eight months of bronchitis; child nursed exclusively for three weeks, then given condensed milk, and at four months crackers and milk; mother's milk deficient; fed every hour; "always hungry;" not taken out of doors, "too cold;" child cared for by its sister in mother's absence. Mother, French Canadian.

Mother returned to work in mill at three weeks; child died at five months of gastroenteritis; child nursed exclusively two weeks; mother's milk then deficient and child was nursed at night and given Eskay's Food, barley water, and white of egg for four and one-half months; began to fail when mixed feeding was given; sick two months; cared for by neighbor in mother's absence. Mother, English.

Mother returned to work in mill at three weeks; child died at one month and five days of suffocation, mother lying on child; child not nursed at all, given cow's milk with crackers soaked in hot water or milk; in mother's absence cared for by woman with whom she boarded; illegitimate child. Mother, Portuguese.

Mother returned to housework in boarding house at three weeks; child died at 25 days of infantile debility; not nursed at all, although mother had milk; was boarded out and fed exclusively on condensed milk; sick from birth; illegitimate child; mother only 16 or 17 years old. Mother, Irish.

Mother returned to work in mill at four weeks; child died at three months of pneumonia; nursed exclusively two weeks, then given condensed milk; Gover's Soothing Sirup given; child not taken out of doors often; cared for by a friend of mother in mother's absence. Mother, French Canadian.

It would ordinarily be assumed, in the absence of the detailed information given above, that the primary cause of death in the case of each of these 11 children was the employment of the mother outside the home and her consequent inability to care for the child in its early infancy. An examination of the details given above shows that except in the two cases where breast feeding continued up to the time of the mother's return to work, and possibly in one other case—that is, in 8 out of the 11 cases—improper feeding began while the mother was at home and before her return to work necessitated the withdrawal of her care. Thus, in 4 cases there was no breast feeding although the mother had milk; in 3 cases breast feeding was only partial and

always discontinued unnecessarily before the mother's return to work; in 2 other cases where milk was absent the records show improper feeding or care from the beginning.

The character of the improper feeding may be pointed out in detail. In all the cases where cow's milk was used the milk was purchased from the grocery (unbottled) or delivered at the door from cans. In the 4 cases where there was no breast feeding although it was possible, one child was given cow's milk (not bottled); one, cow's milk and solid food; one, cow's milk and condensed milk, using the long-tube bottle; and the fourth used cow's and condensed milk and solid food from the beginning. Of the 3 who were breast fed only a part of the time prior to the mother's return to work, one received cow's milk, undiluted, another condensed milk, and the third Eskay's Food, barley water, and white of egg. In the case of the 2 children who were breast fed up to the time of the mother's return to work, there was also a similar history of improper feeding and care, in one case the child being given condensed milk whenever it cried, and its bottle being cleaned "once or twice every day." In the other case condensed milk was given every hour with solid food at 4 months.

It would thus appear that the beginning of improper feeding and unintelligent care in almost all of these cases preceded the mother's return to work, and that even in those cases where feeding other than nursing did not begin until the withdrawal of the mother's care it was still apparent that she must have been responsible for the character of the feeding.

In 5 cases the lack of sufficient fresh air is noted. While in some of these cases it is clear that this was due to the belief that exposure to cold air was injurious, in some of the cases at least it is probable that it was due directly to the mother's absence and inability to take the child out of doors. The debility certain to result from improper feeding and the lack of fresh air would naturally tend to render the children easy victims of bronchitis or pneumonia, the recorded cause of death in 6 of the 11 cases.

CHARACTER OF FEEDING BEFORE AND AFTER MOTHER WENT TO WORK OF CHILDREN WHOSE MOTHERS WENT TO WORK IN THE SECOND MONTH.

An examination of the histories of the 18 children whose mothers returned to work in the second month does not disclose quite so bad a record of improper feeding and care. Twelve went to work at one month, 2 at five weeks, 2 at six weeks, 1 between six and seven weeks, and 1 at seven weeks. Fourteen were reported well and strong at birth, 3 not well, and the condition of 1 was not reported. The details of the individual cases are given in the following paragraphs.

CHILDREN OF MOTHERS WHO RETURNED TO WORK OUTSIDE THE HOME IN SECOND MONTH.

Mother returned to work in mill at one month; child died at 2 months and 7 days of enterocolitis; child nursed exclusively one month, then fed on cow's milk from grocery; child began to fail when mother went to work; Coderre's Infant's Sirup given; garbage stood in an uncovered barrel, swarming with flies; grandmother cared for child in mother's absence. Mother, Portuguese.

Mother returned to work in mill at one month; child died at 3 months and 10 days of marasmus; nursed exclusively three weeks, then cow's milk, malted milk, and special food doctor gave; child failed from time mother stopped nursing; grandmother cared for child in mother's absence. Mother, American.

Mother returned to work in mill at one month; child died at 3 months of cholera infantum; nursed exclusively one month, then fed cow's milk; child cared for by its sister during mother's absence. Mother, French Canadian.

Mother returned to work in mill at one month; child died at 5 months and 15 days of cholera infantum; child nursed exclusively one month, then given cow's milk; began to fail after mother returned to work; child cared for by its sister in mother's absence. Mother, French Canadian.

Mother returned to work in mill at one month; child died at 2 months and 24 days of gastroenteritis; nursed exclusively one month, then nursing and given condensed milk; dirty tenement, and flies everywhere; cared for by father, who was at home with sore foot. Mother, English.

Mother returned to work in mill at six weeks; child died at 7 months of enterocolitis; nursed exclusively six weeks, then nursed morning, noon, and night and given cornstarch pudding; cared for by grandmother in mother's absence. Mother, Portuguese.

Mother returned to work in mill at six weeks; child died at 8 months and 3 days of gastroenteritis; nursed four months (three months by woman with whom mother lived), then given cow's milk; crackers given from birth; cared for by woman with whom mother boarded. Mother, Portuguese.

Mother returned to work in mill at seven weeks; child died at 8 months of pneumonia; child nursed seven weeks, then given condensed milk or Eskay's Food, nursing being continued at night for one month longer; bread soaked in water given from day of birth; cared for by grandmother in mother's absence. Mother, Portuguese.

Mother returned to work in mill at one month; child died at 1 month and 7 days of debility; child not nursed at all, although mother had milk; mother expected to go to work; child fed exclusively on cow's milk; not well and strong at birth; cared for by 12-year-old sister in mother's absence. Mother, French Canadian.

Mother returned to work in mill at one month; child died at 2 months of cholera infantum; not nursed at all, although mother had milk; mother was going to work; child fed exclusively on cow's milk from grocery; cared for by friend in mother's absence. Mother, French Canadian.

Mother returned to work in mill at one month; child died at 4 months of enterocolitis; child not nursed at all, although mother had milk; fed exclusively on cow's milk; cared for by neighbor in mother's absence. Mother, Portuguese.

Mother returned to work in mill at one month; child died at 1 month and 15 days of debility; child not nursed at all, although mother had milk; mother obliged to return to work; child fed on condensed milk; child cared for by its sister in mother's absence. Mother, French Canadian.

Mother returned to work in mill at one month; child died at 3 months and 13 days of marasmus; not nursed at all, milk absent; fed exclusively on modified milk; child cared for by its aunt in mother's absence. Mother, American.

Mother returned to work in mill at one month; child died at 8 months of marasmus; child not nursed at all; milk absent; fed exclusively on cow's milk; cared for by grandmother in mother's absence. Mother, American.

Mother returned to work in shoe house at five weeks; child died at 3 months of cholera infantum; child not nursed at all; milk absent; fed on cow's milk and condensed milk; long-tube nursing bottle used; Gavin's Soothing Sirup given; cared for by neighbor in mother's absence. Mother, French Canadian.

Mother returned to work in mill at five weeks; child died at 2 months of gastroenteritis; child not nursed at all; mother said she had no milk, but had boasted that she would return to work in six weeks; child given condensed milk; not reported who cared for child during mother's absence. Mother, Irish.

Mother returned to work in mill at one month; child died at 2 months of cholera infantum; not nursed at all; milk absent; fed on cow's milk from grocery, and condensed milk; never strong; cared for by friend in mother's absence. Mother, French Canadian.

Mother returned to work in mill at six or seven weeks; child died at 3 months of gastroenteritis; nursed exclusively three months; given Mrs. Winslow's Soothing Sirup; was not strong at birth; cared for by its little sister during mother's absence, but mother was at home during child's sickness. Mother, English.

The study of the feeding of these 18 children is scarcely less interesting than that of the children whose mothers returned to work under 1 month.

In 4 cases the mother had breast milk, but did not nurse her child at all because she expected to return to work. One of these children was given condensed milk and 3 cow's milk (not bottled). The causes of death were, 2 debility and 2 diarrheal diseases.

In 5 cases the entire absence of breast milk was reported as the reason of artificial feeding from the first. Except in 1 case where modified milk was used, there were indications of improper feeding; in 3 cases condensed milk was given, and in 1 case the long-tube nursing bottle was used. Marasmus was the reported cause of death in 2 cases and diarrheal diseases in 3 cases.

In 8 of the cases nursing was continued up to the time of the mother's return to work (in 5 cases longer), but in 2 of these cases crackers or bread soaked in water were given from the day of birth. Of the 5 cases where nursing was continued after the mother's return to work, in 2 solid food was given from birth as above stated, in 1 other corn starch pudding was given, and in 1 condensed milk. Cow's milk (not bottled) was used in the other cases.

It would thus appear that here, as with the children whose mothers returned to work under 1 month, the beginning of improper feeding and unintelligent care in the majority of the cases preceded the mother's return to work.

The lack of sufficient fresh air is noted in several cases. It assumes especial importance in the one case where the child died of pneumonia.

USE OF SOOTHING SIRUP.

One cause which has an unfavorable effect on the child is the habit of giving soothing sirup. Several cases were reported of an overdose of soothing sirup which it was believed had relation to the death of the child. Nine varieties of soothing sirups were found in use in Fall River, all, according to the printed directions, to be given in elastic doses, all containing dangerous narcotics, and all having names which were designed to be reassuring to the mothers. Some were called soothing sirup, others Mother's Treasure, Children's Comfort, etc.

Of the mothers visited in the course of the investigation inquiry was made in each case as to the use of soothing sirups. It is probable that the full extent of the practice was not shown by the figures given. Among the mothers at home after the birth of child, 65 reported the use of soothing sirups, 318 reported that none was given, and in 197 cases information could not be secured. Among mothers at work outside the home after child was born, 18 had used soothing sirup, 53 did not use soothing sirup, and in 12 cases the information was not secured. It would appear, then, that the use of soothing sirup was more general among the mothers at work than with the mothers at home.

CHILDREN FED ON SOLID FOOD.

When the character of the feeding of the children is studied, reports show so many cases of solid food given—usually crackers or bread and water or milk—even from the day of birth, that it seems of special interest to examine in detail all the conditions under which such food was given, to what extent breast feeding was also possible and was practiced, and what other food was also given. The attitude of one English medical health officer in regard to the giving of solid food to infants in the first months of life was strikingly shown by the statement in a recent report. The Annual Report upon the Health of Blackburn, England, in the year 1910 notes ^a that among children dying under 1 year in that city during 1910 "one child was fed on milk and biscuits. This child died; an inquest was held and a verdict was returned that death was due to improper feeding." One hundred and thirty-nine children, or over 25 per cent of all those dying under 1 year in Fall River in 1908, and concerning whom information was obtained, died under circumstances similar to the above, except that in many of the Fall River cases the giving of solid food began in the first week of life.

^a Page 33.

The facts in regard to the children fed on solid food are summarized in the following table, children of mothers at home after childbirth and of mothers at work after childbirth being shown separately:

CHARACTER OF FEEDING, OTHER THAN SOLID FOOD, OF CHILDREN FED ON SOLID FOOD, FOR CHILDREN OF MOTHERS AT HOME AND FOR CHILDREN OF MOTHERS WHO WENT TO WORK AFTER CHILDBIRTH.

Character of feeding (including also in all cases solid food).	Mothers at home after childbirth.	Mothers at work outside of home after childbirth.
Breast feeding entire life (and other food apparently entirely unnecessary).....	36	8
Breast feeding and cow's milk.....	20	5
Breast feeding and condensed milk.....	21	5
Breast feeding and cow's and condensed milk.....	4	1
Breast feeding and proprietary foods.....	5	2
No breast feeding:		
Cow's milk chiefly.....	6	6
Condensed milk chiefly.....	6	2
Cow's and condensed milk chiefly.....	7	2
Proprietary foods chiefly.....	1	.....
Cow's milk and proprietary foods chiefly.....	.....	1
Condensed milk and proprietary foods chiefly.....	.....	1
	20	12
Total.....	106	33

This table shows that in 44 cases (36 among the mothers at home and 8 among the mothers who went to work) solid food was given even when the mother was able to and did nurse her child up to the time of its death and when other food was entirely unnecessary. This, of course, was because the mother believed that the addition of the solid food—usually crackers or bread and water or milk—was beneficial to the child. The giving of solid food began in many cases very early in the life of the child. In 41 cases among the mothers at home (38 Portuguese, 2 French Canadians, and 1 Italian) and in 6 cases among the mothers who went to work (all save 1 Portuguese) such feeding began in the first week. This giving of solid food to very young babies is apparently peculiar to the Portuguese mothers, although 16 French Canadian and 15 American mothers were found following the same practice. The following table shows the race or country of birth of the mothers who reported the use of solid food:

RACE OR COUNTRY OF BIRTH OF MOTHERS GIVING SOLID FOOD.

Race of mother.	Mothers at home.	Mothers at work.	Total.
Portuguese.....	73	20	93
French Canadian.....	11	5	16
American.....	12	3	15
English.....	1	1	2
Irish.....	.....	2	2
Canadian.....	2	.....	2
German.....	2	.....	2
Italian.....	2	.....	2
Russian.....	2	1	3
Polish.....	.....	1	1
Scottish.....	1	.....	1
Total.....	106	33	139

The race or country of birth of those mothers who nursed their babies up to the time of death, but at the same time were giving solid food, is shown in the following statement:

RACE OR COUNTRY OF BIRTH OF MOTHERS NURSING AND GIVING SOLID FOOD.

Race of mother.	Mothers at home.	Mothers at work.	Total.
Portuguese	30	6	36
French Canadian	2	2	4
American	1	.....	1
Irish	1	.....	1
German	1	.....	1
Italian	1	.....	1
Total	36	8	44

The excuses given by mothers for not nursing are shown in the following table:

REASONS OR EXCUSES GIVEN FOR NOT NURSING CHILDREN, FOR CHILDREN NOT BREAST FED AT ALL OR ONLY PARTLY AND WHO WERE GIVEN SOLID FOOD.

Reasons or excuses given for not nursing children.	Mothers at home—		Mothers at work outside the home after birth of child—	
	Children not breast fed at all.	Children breast fed part but not all the time.	Children not breast fed at all.	Children breast fed part but not all the time.
Mother sick or died	1	1	1	2
Child refused breast	2	.....	.....	.....
Sore breast	1	.....	.....	1
Milk reported absent	8	.....	6	.....
Milk reported deficient	4	19	.....	4
Mother again pregnant .....	.....	4	.....	2
Milk disagreed .....	.....	1	.....	.....
Child had sore mouth .....	.....	1	.....	.....
Mother went (or was going) to work outside	4	13	2	4
Not reported	3	6	.....	2
Total	23	45	9	15

Especially interesting are the excuses given by the mothers for not nursing their children where the children were breast fed only partly or not at all. The large proportion of the mothers at work who reported milk absent as compared with the mothers at home suggests that perhaps the desire to return to work may have prevented a fair trial at nursing. Such an explanation is in accord with the failure to even begin nursing which has already been shown among the mothers returning to work (p. 147 et seq.).

The condition at birth, the character of the feeding in detail, the recorded cause of death, the age at death, and the race of mother of all the children who were reported as fed on solid food are shown for each child in the following table:

CONDITION AT BIRTH, CHARACTER OF FEEDING, RECORDED CAUSE OF DEATH, AGE AT DEATH, AND RACE OF MOTHER OF CHILDREN FED ON SOLID FOOD AND DYING UNDER 1 YEAR.

Mothers at home after childbirth.

No.	Child's condition at birth.	Child's feeding.		Cause of death as recorded.	Age at death.	Race or country of birth of mother.
		Breast feeding.	Other feeding.			
1	Premature.	None; milk absent.	Malted milk; crackers soaked in milk, from birth.	Inanition ..	2 months...	Portuguese.
2	Frail.....	14 days.....	Crackers and milk once a day. (Insufficient fresh air.)	Marasmus ^a	14 days....	Do.
3	Well and strong.	None; mother too sick.	Condensed milk, Standard, and crackers in water from day of birth.	....do. ^b	21 days....	Do.
4	Do.....	None; would not take breast.	Condensed milk whenever hungry; crackers in water after 4 weeks.	....do.....	2 months...	Do.
5	Delicate....	2½ months; whenever it cried.	Crackers in hot water, when 3 weeks old, "whenever it wanted them." (Insufficient fresh air.)	....do. ^b	2½ months..	Do.
6	Well and strong.	2 months, 21 days; whenever it cried.	Crackers "immediately"....	....do.....	2 months, 21 days.	Do.
7	Do.....	2 months exclusively, 1 month partly; milk weak.	Condensed milk; bread in water 3 times a day after 2 months. (Insufficient fresh air.)	....do. ^c	3 months...	Do.
8	Do.....	3 months, 3 days; whenever hungry.	Crackers and bread in water from time of birth.	....do.....	3 months, 3 days	Do.
9	Frail.....	3½ months ..	Crackers and bread, soaked, 3 times a day from birth.	....do.....	3½ months..	Italian.
10	(d)	2 weeks; then a gain pregnant.	Condensed milk, Standard, after 2 weeks; crackers and milk from first.	....do. ^b	4 months...	Portuguese.
11	Not well and strong.	2 months....	Cow's milk and Mellin's Food after 2 months; flour and milk given. (Coderre's Infant's Sirup.)	....do.....	....do.....	French Canadian.
12	Well and strong.	4 months.	Crackers in milk after 2 months.	....do.....	4 months, 1 day.	Portuguese.
13	Do.....	None; no nipple.	Condensed milk and cow's milk boiled; "Pabies" after 1 month.	....do.....	4 months, 22 days.	English.
14	Do.....	None; milk deficient.	Condensed milk whenever it cried; crackers for a little while, discontinued on doctor's orders.	....do. ^b	4 months, 28 days.	Portuguese.
15	Do.....	5 months; whenever it cried.	Bread soaked in soup or water, after 3 months.	....do. ^e	5 months...	Do.
16	Do.....	....do.....	Bread soaked in water, twice a day from birth. (Insufficient fresh air.)	....do. ^f....	....do.....	Do.
17	Do.....	For a time; mother weak.	Condensed milk, Standard; crackers in milk or water when few days old. (Insufficient fresh air.)	....do.....	....do.....	Do.

^a Improper care and feeding contributory.

^b Improper feeding contributory.

^c Pneumonia contributory.

^d Condition not reported.

^e Sixteenth child in 16 years; 5 living; 3 died under 1 year, and 7 in 1 to 4 years.

^f Intestinal catarrh contributory.

CONDITION AT BIRTH, CHARACTER OF FEEDING, RECORDED CAUSE OF DEATH, AGE AT DEATH, AND RACE OF MOTHER OF CHILDREN FED ON SOLID FOOD AND DYING UNDER 1 YEAR—Continued.

Mothers at home after childbirth—Continued.

No.	Child's condition at birth.	Child's feeding.		Cause of death as recorded.	Age at death.	Race or country of birth of mother.
		Breast feeding.	Other feeding.			
18	Well and strong.	6 months, 6 days; whenever it cried.	Crackers soaked in water, from time of birth.	Marasmus..	6 months, 6 days.	Portuguese.
19	Not well and strong.	3 months exclusively, 3 months, 11 days partly; milk deficient.	Cow's milk, boiled; crackers and milk in second month.	.....do.....	6 months, 11 days.	Do.
20	Well and strong.	A few months; twin; mother too weak.	Condensed milk, Standard, whenever it cried; crackers in milk or water when few days old. (Insufficient fresh air.)	.....do.....	7 months...	Do.
21	Do.....	7 months; whenever it cried.	Crackers soaked in water, 3 times a day from birth.	.....do.....	.....do.....	Do.
22	Delicate....	8 months....	Crackers in condensed milk, Standard, and boiling water, 3 times a day all its life.	.....do.....	8 months...	Do.
23	Not well and strong.	None; milk absent.	Condensed milk and cow's milk (not bottled) whenever it cried; crackers, potatoes and gravy, and sago after 6 months.	.....do.....	8 months, 12 days.	American.
24	Well and strong.	11 months...	Crackers soaked in water and egg beaten up, after 3 months.	.....do.....	11 months..	Portuguese.
25	Do....	3 weeks; then stopped because baby had sore mouth.	After 3 weeks Mellin's Food every time it cried; milk crackers in hot water and sugar "soon as born."	.....do.....	.....do.....	Do.
26	(b)	None; milk absent.	Cow's milk (not bottled); fed with cup and spoon; crackers after second day.	Cholera infantum.	15 days....	Native-born French Canadian.
27	Well and strong.	None.....	Milk (boiled) from own cow; started to give it milk crackers; then taken sick and died. (Filthy tenement; many flies; strong odor from privies in yard.)	Acute gastroenteritis.	16 days....	Portuguese.
28	Not well and strong.	17 days.....	Crackers soaked in water, from day of birth. (Very old house and very filthy, with bad odor.)	Gastritis...	17 days....	Do.
29	Weak.....	None; milk deficient.	Condensed milk, crackers, and other food.	Cholera infantum.	21 days....	Do.
30	Well and strong.	8 days; sore breasts.	Condensed milk after 8 days; crackers and milk a few times after 8 days.	Gastroenteritis.	28 days....	Do.
31	Frail.....	1 month....	Crackers and bread and milk from birth.	Diarrhea...	1 month....	Do.
32	Well and strong.	1 month, 12 days.	Sometimes a little crackers or bread soaked in hot water and sugar.	Gastroenteritis.	1 month, 12 days.	Do.
33	Do.....	1 month, 14 days; whenever it cried.	Crackers soaked in water, from birth. (Mrs. Winslow's Soothing Sirup.)	.....do.....	1 month, 14 days.	Do.
34	Frail.....	6 weeks, 1 day.	Condensed milk 6 weeks, 1 day; cow's milk and crackers after first week.	Cholera infantum.	1½ months..	French Canadian.
35	Not well and strong.	2 months, 1 day.	Crackers occasionally from day of birth.	Gastroenteritis.	2 months, 1 day.	Portuguese.
36	Well and strong.	2½ months; whenever it cried.	Bread in water or in herb tea from day of birth.	.....do.....	2½ months..	Do.

• Malnutrition contributory.

• Condition not reported.

CONDITION AT BIRTH, CHARACTER OF FEEDING, RECORDED CAUSE OF DEATH, AGE AT DEATH, AND RACE OF MOTHER OF CHILDREN FED ON SOLID FOOD AND DYING UNDER 1 YEAR—Continued.

Mothers at home after childbirth—Continued.

No.	Child's condition at birth.	Child's feeding.		Cause of death as recorded.	Age at death.	Race or country of birth of mother.
		Breast feeding.	Other feeding.			
37	Not well and strong; probably syphilitic.	2 months....	Condensed milk and Mellin's Food after 2 months; crackers and hot water from birth; fed whenever it cried.	Cholera infantum.	2½ months..	Native-born French Canadian.
38	Well and strong.	2 months, 19 days.	Crackers when only a few days old.	Enterocolitis.	2 months, 19 days.	Portuguese.
39	Not well and strong.	None; mother died.	Cow's milk (boiled) whenever it cried; crackers soaked in water, twice a day from birth.	.....do.....	2 months, 23 days.	Do.
40	Well and strong.	3 months....	Bread in water when a few days old.	Cholera infantum.	3 months...	Do.
41	Do.....	None; sore breast.	Cow's milk (boiled); crackers in water, or bread in milk from day of birth.	Gastroenteritis.	3 months, 2 days.	Do.
42	Do.....	None; milk insufficient.	Cow's milk (boiled) first two months, then condensed milk, Standard; crackers in water from day of birth. (Dirty tenement; many flies.)	.....do.....	.....do.....	Do.
43	Do.....	3 months, 25 days.	Rolled crackers soaked in warm water, 3 times a day from first month.	Indigestion followed by convulsions.	3 months, 25 days.	French Canadian.
44	Do.....	4 months; whenever it cried.	Bread soaked in milk after a few weeks old.	Cholera infantum.	4 months...	Portuguese.
45	Delicate....	4 months, 5 days.	Crackers and milk 3 times a day after 1 month. (Corderre's Infant's Sirup.)	.....do.....	4 months, 5 days.	Do.
46	Not well and strong.	None; milk absent.	Cow's milk, whenever it cried, with warm water poured over; bottles not thoroughly cleansed; crackers and bread after first few weeks.	.....do.....	5 months...	Do.
47	Well and strong.	2 months only; milk insufficient.	Condensed milk (Lion brand) after 2 months; also wine, biscuit, and milk at 3 months.	Enteritis...	5 months, 11 days.	French Canadian.
48	Not well and strong.	4½ months; then mother was sick.	After 4½ months, cow's milk; after 4 months, cookies and milk 3 times a day.	Gastroenteritis.	6 months...	Do.
49	Well and strong.	2 months; milk insufficient.	Cow's milk (not bottled), boiled, after 2 months; crackers in milk after a few weeks.	Enterocolitis.	.....do.....	Portuguese.
50	Do.....	4 months....	Cow's milk, scalded, after 4 months; crackers soaked in milk after 1 month.	Enteritis...	.....do.....	Canadian.
51	Do.....	3 months; again pregnant.	Condensed milk and cow's milk (not bottled), boiled, after 3 months, 4 days; fed whenever it waked or cried; crackers soaked in water when first born, later baby refused them.	Cholera infantum.	6 months, 4 days.	Portuguese.
52	Do.....	7 months....	Crackers and milk after 4 months.	Diarrhea...	7 months...	French Canadian.
53	Do.....	3 months; milk insufficient.	Condensed milk after 3 months; crackers in water with salt, butter, and mint from day of birth; nursing bottles washed in coffee before using. (Chickens in the house; privies in front of door; flies everywhere.)	Gastroenteritis.	.....do.....	Portuguese.
54	Do.....	None; milk absent.	Cow's milk boiled; "everything except meat" after 3 or 4 months.	Cholera infantum.	.....do.....	Native-born French Canadian.

CONDITION AT BIRTH, CHARACTER OF FEEDING, RECORDED CAUSE OF DEATH, AGE AT DEATH, AND RACE OF MOTHER OF CHILDREN FED ON SOLID FOOD AND DYING UNDER 1 YEAR—Continued.

Mothers at home after childbirth—Continued.

No.	Child's condition at birth.	Child's feeding.		Cause of death as recorded.	Age at death.	Race or country of birth of mother.
		Breast feeding.	Other feeding.			
55	Well and strong.	7 months; whenever it cried.	Cornstarch pudding morning and night after 1 week.	Acute gastroenteritis.	7 months...	Portuguese.
56	Do	7 months....	Bread and milk porridge 3 times a day after 3 months.	Enterocolitis.	.....do.....	Do.
57	Do	15 days exclusively; 6½ months partly; milk insufficient for twins.	After 15 days, condensed milk; fed also crackers soaked in water whenever it cried; washed bottle in cool water and shook sand in it. (Badly kept tenement; many flies; strong odor from privies.)	Cholera infantum.	.....do.....	Do.
58	Do	4 months exclusively; 2 months, 3 weeks partly; milk deficient; fed whenever it cried.	Cow's milk (not bottled) after 4 months; wine crackers in water once a day at 4 months.	.....do.....	.....do.....	French Canadian.
59	Do	5 months; milk insufficient.	Cow's milk (not bottled) after 5 months; at 2 months crackers in milk.	Gastroenteritis.	7½ months..	Portuguese.
60	Do	4 months; again pregnant.	Condensed milk, Standard, after 4 months, whenever it cried; long-tube bottle used; crackers dipped in water and wine twice daily from birth.	.....do.....	7 months, 18 days.	Do.
61	Do	None; milk absent.	Cow's and condensed milk (boiled); given lady fingers (sponge cake) and died next day.	Cholera infantum.	8 months...	Russian.
62	Do	15 days exclusively; 7½ partly; milk insufficient for twins.	After 15 days condensed milk; fed also crackers soaked in water whenever it cried; washed bottle in cool water and shook sand in it. (Badly kept tenement; many flies; strong odor from privies.)	.....do.....	.....do.....	Portuguese.
63	Do	None; milk absent.	Condensed milk and cow's milk, sago, and crackers and milk after 6 months; long-tube nursing bottle, washed 2 or 3 times a day.	Gastroenteritis.	8 months, 2 days.	American.
64	Do	5 months; again pregnant.	After 5 months condensed milk, Eagle; also milk crackers in condensed milk.	.....do.....	9 months, 1 day.	Native-born Irish.
65	Do	7 months exclusively; 2½ months partly, when it cried.	Cow's milk and condensed milk after 8 months and "table food" at 7 months.	Enterocolitis.	9½ months..	American.
66	(a)	None.....	Cow's milk; crackers from time it was born.	Cholera infantum.	10 months..	Portuguese.
67	Well and strong.	10 months 2 days; fed usually when it cried.	Crackers in water when 2 or 3 days old; before it died was eating what the family had.	Gastroenteritis.	10 months, 2 days.	Do.
68	Do	10 months, 10 days.	Crackers and bread after 4 months.	Cholera infantum.	10 months, 10 days.	Do.
69	Do	10 months, 11 days.	Crackers and bread and milk after 4 months.	.....do.....	10 months, 11 days.	French Canadian.

^a Condition not reported.

CONDITION AT BIRTH, CHARACTER OF FEEDING, RECORDED CAUSE OF DEATH, AGE AT DEATH, AND RACE OF MOTHER OF CHILDREN FED ON SOLID FOOD AND DYING UNDER 1 YEAR.—Continued.

Mothers at home after childbirth—Continued.

No.	Child's condition at birth.	Child's feeding.		Cause of death as recorded.	Age at death.	Race or country of birth of mother.
		Breast feeding.	Other feeding.			
70	Well and strong.	2 weeks; milk deficient.	Condensed milk and Eskay's Food whenever it cried, after 2 weeks; nursing bottles "washed when necessary;" solid food given after 4 months.	Cholera infantum.	10 months, 25 days.	American.
71	Do.....	11 months...	Bread and cow's milk or water from birth.	Acute gastroenteritis.	11 months..	Portuguese.
72	Do.....	7 months; again pregnant; when it cried.	Cow's milk (with cup and spoon) after 7 months; bread and milk and cracker porridge from birth.	Enteritis...	11 months, 4 days.	Do.
73	Not well and strong.	1 month.....	Crackers soaked in water, from birth.	Convulsions	1 month....	Do.
74	Do.....	1 month, 22 days; whenever it cried.	Crackers soaked in milk from first week. (Dirty house; uncovered garbage; many flies.)	.....do.....	1 month, 22 days.	Native-born Irish.
75	Well and strong.	1½ months exclusively, 2 months partly; milk insufficient.	Cow's milk, boiled, after 1½ months; crackers, soaked, from day of birth; fed whenever it cried.	.....do.....	3½ months..	Portuguese.
76	Do.....	None.....	Condensed milk; sago also given.	.....do.....	4 months...	Scotch.
77	Do.....	3 weeks; "milk made baby sick."	Milk powder after 3 weeks; crackers soaked in hot water and milk powder once a day from birth; fed when it seemed hungry and cried.	.....do.....	7 months...	Portuguese.
78	Do.....	8 months, 11 days.	Fruit given.....	Convulsions from dentition and worms.	8 months, 11 days.	French Canadian.
79	Do.....	2½ months exclusively, 1½ months partly.	Cow's milk (not bottled) after 2½ months; crackers and bread 3 times a day after 2 months; fed whenever it cried.	Convulsions	4 months...	Portuguese.
80	Do.....	4 months, 2 days.	Oatmeal gruel a few days before death. (Gauvin's Sirup of Aniseed.)	.....do.....	4 months 2 days.	Do.
81	Do.....	3 months; milk insufficient.	Cow's milk and condensed milk; soups in 7th month; fed whenever hungry. (Gauvin's Sirup of Aniseed.)	.....do.....	7 months...	French Canadian.
82	Do.....	1½ months; whenever it cried.	Crackers and milk.....	Pneumonia ^a	1½ months..	Portuguese.
83	Weak.....	2 months; whenever it cried.	Sometimes a little cracker in hot water.	Bronchitis..	2 months...	Do.
84	Well and strong.	3 months...	Condensed milk, Standard; milk crackers with milk from day of birth; long-tube bottle used. At 3 months went to work for 1 week.	Pneumonia ^b	5 months, 5 days.	Do.
85	Do.....	2 months; milk deficient.	Condensed milk after 2 months; milk and cornstarch, also bread boiled in sweetened water after 2 months; long rubber-tube bottles.	.....do.....	4 months...	French Canadian.

^a This is the eleventh child lost by this mother, 10 others having died over 1 year but under 5 years. She makes her living taking care of babies of other women who work in the mills. Was caring for 4 under 1 year at time of agent's visit.

^b Child caught cold at 3 months and was not well afterwards.

CONDITION AT BIRTH, CHARACTER OF FEEDING, RECORDED CAUSE OF DEATH, AGE AT DEATH, AND RACE OF MOTHER OF CHILDREN FED ON SOLID FOOD AND DYING UNDER 1 YEAR—Continued.

Mothers at home after childbirth—Continued.

No.	Child's condition at birth.	Child's feeding.		Cause of death as recorded.	Age at death.	Race or country of birth of mother.
		Breast feeding.	Other feeding.			
86	Well and strong.	7 months...	Cow's milk (not bottled), boiled, from birth; crackers in milk or water after 3 months. (Mrs. Winslow's Soothing Sirup; insufficient fresh air.)	Bronchopneumonia.	7 months...	Portuguese.
87	Do.....	7 months; milk insufficient after 3 months.	Condensed milk, boiled; milk and flour gruel once a day after 3 months. (Insufficient fresh air.)	.....do.....	.....do.....	Canadian.
88	Do.....	4 months; milk deficient.	Cow's milk after 4 months; bread and milk after 6 months. (Insufficient fresh air; too much clothing.)	Pneumonia	.....do.....	Portuguese.
89	Do.....	None; milk absent.	Cow's milk and condensed milk, boiled; crackers and bread after 6 months.	.....do.....	8 months...	Do.
90	Do.....	3 months exclusively, 6 months partly.	Condensed milk after 3 months; soup after 6 months. (Insufficient fresh air.)	.....do.....	9 months...	Do.
91	Not strong.	6 months exclusively, 3 months, 4 days partly; milk deficient.	Cow's milk (scalded) and Ellenbury's Food after 6 months; also table food of all kinds after 6 months. (Insufficient fresh air.)	Bronchitis.	9 months, 4 days.	American.
92	Well and strong.	3 months; again pregnant.	Cow's milk (not bottled), boiled; crackers and water from day of birth. (Filthy tenement; flies everywhere.)	Bronchopneumonia.	10 months..	Portuguese.
93	Do.....	11 months...	Crackers in water or cow's milk after 5 months.	Pneumonia. ^a	11 months..	Do.
94	Do.....	11 months, 8 days.	Bread and crackers and cow's milk after 7 months. (Insufficient fresh air.)	Pneumonia	11 months, 8 days.	Do.
95	Do.....	9 months; milk failed.	Cow's milk after 9 months; crackers and milk and soups and broths after 3 months.	.....do. ^b	11 months, 27 days.	Do.
96	Do.....	10 months...	Crackers and milk after 5 months. (Insufficient fresh air.)	Whooping cough.	10 months..	German.
97	Do.....	.....do.....	Last month or two had a little milk or bread and butter, a cookie, or lollypop. (Dr. Hand's Colic Cure.)	.....do.....	10 months, 4 days.	Do.
98	Do.....	2 months, 9 days.	Crackers soaked in water, from day of birth.	Natural causes.	2 months, 9 days.	Portuguese.
99	Delicate....	5 months...	Crackers soaked in cow's milk or water and sugar night and morning after 2 months.	.....do.....	5 months...	Do.
100	Well and strong.	3 months; milk then deficient.	Cow's milk (not bottled); crackers crumbled in milk after 3 months.	.....do.....	.....do.....	American.
101	Do.....	3 months exclusively, 3 months partly; milk insufficient.	Cow's milk, boiled; porridge of crackers or bread and milk at 5 months. (Bodie's Soothing Sirup; too much clothing.)	.....do.....	6 months...	Italian.
102	Not well and strong.	2 months; milk insufficient.	Cow's milk, boiled, after 4 months; crackers with milk from birth.	Rachitis e..	.....do.....	Portuguese.
103	Well and strong.	None; would not take milk.	Condensed milk whenever it cried; one cracker every day from birth.	Heat prostration and rachitis.	.....do.....	Do.

^a Caught cold at 4 months; not well again.

^b Malnutrition contributory.

^c Improper feeding contributory.

CONDITION AT BIRTH, CHARACTER OF FEEDING, RECORDED CAUSE OF DEATH, AGE AT DEATH, AND RACE OF MOTHER OF CHILDREN FED ON SOLID FOOD AND DYING UNDER 1 YEAR—Continued.

Mothers at home after childbirth—Concluded.

No.	Child's condition at birth.	Child's feeding.		Cause of death as recorded.	Age at death.	Race or country of birth of mother.
		Breast feeding.	Other feeding.			
104	Well and strong.	6 months; milk then deficient.	Cow's milk after 6 months; bread, crackers, and milk after 6 months.	Septicemia from accident.	7 months, 20 days.	Russian.
105	Do	8 months, 5 days, whenever it cried.	Crackers soaked in water, from birth.	Accidental scalding.	8 months, 5 days.	Portuguese.
106	Do	9 months....	Crackers soaked in cow's milk after 5 months. (Insufficient fresh air—not taken out—"It was winter.")	La grippe..	9 months...	American.

Mothers at work after childbirth.

107	Well and strong.	2 months exclusively; went to work at 2 months.	Condensed milk after 2 months; potatoes, bread, and milk used for a while. (Coderre's Infant's Sirup.)	Marasmus..	6 months...	Portuguese.
108	Do.....	None; milk absent; went to work at 3 months.	Cow's milk, scalded, Eskay's Food, and barley water; crackers, bread and zwieback; began to waste away at 3 months; all food disagreed.	.....do.....	7 months...	Do.
109	Not well and strong.	None; milk present, but "Had to go to work;" went to work at 2 months.	Cow's milk (bottled) when it cried; crackers and bread boiled in water and crackers in milk, boiled, after 1 month. Grandmother cared for child in mother's absence.	.....do.....	8 months...	Do.
110	Well and strong.	3 weeks exclusively, 2 months partly; milk deficient; fed when it cried; went to work at 6 months.	Condensed milk and cow's milk after 3 weeks; bread and milk, also rolled crackers after 1 month. (Finley's Teething Powders.)	.....do.....	8 months, 10 days.	Irish.
111	Do.....	3 months exclusively, 1 month partly; mother went to work in mill at 3 months; grandmother then cared for child.	Condensed milk after 3 months; milk biscuit 3 times a day after 2 weeks.	Gastroenteritis.	4 months...	French Canadian.
112	Do.....	.....do.....	Cow's milk (not bottled), scalded, after 3 months; crackers in milk after 3 months.	Cholera infantum.	.....do.....	Portuguese.
113	Do.....	None; milk present, but went to work in mill after 2 weeks.	Cow's milk and condensed milk; table food after 4 months. Cared for by grandmother in mother's absence; long-tube bottles used; "washed when needed." (Coderre's Infant's Sirup.)	Gastroenteritis.	4½ months..	Do.

CONDITION AT BIRTH, CHARACTER OF FEEDING, RECORDED CAUSE OF DEATH, AGE AT DEATH, AND RACE OF MOTHER OF CHILDREN FED ON SOLID FOOD AND DYING UNDER 1 YEAR—Continued.

Mothers at work after childbirth—Continued.

No.	Child's condition at birth.	Child's feeding.		Cause of death as recorded.	Age at death.	Race or country of birth of mother.
		Breast feeding.	Other feeding.			
114	Well and strong.	3 months; milk deficient; mother went to work after 3 months.	Condensed milk after 3 months; crackers in milk after 3 months. (Filthy tenement; flies everywhere; cared for by a friend in mother's absence.)	Gastroenteritis.	5½ months.	Portuguese.
115	Do.....	None; milk absent.	Condensed milk whenever it cried; porridge of crackers and milk after 3 months. Mother went to work in mill after 5 months; child cared for by friend.	.....do.....	6 months.	English.
116	Do.....	None, although milk was present.	Cow's milk (not bottled), boiled, whenever it cried; nursing bottle washed when empty; bread and milk after 4 months. Mother went to work in mill after 2 months; child then cared for by neighbor.	Enterocolitis.	.....do.....	Polish.
117	Not well and strong.	None; milk absent.	Malted milk and condensed milk; "Pabics" 3 times a day after 3 months. Mother went to work after 2 months; child then cared for by friend.	Gastroenteritis.	6½ months.	American.
118	Do.....	4 months exclusively, 1 month partly; fed whenever it cried; stopped to work in mill.	Condensed milk after 4 months; crackers and bread in milk after 4 months.	.....do.....	7 months.	French Canadian.
119	(a)	5 months exclusively, 2 months partly; mother went to work in mill after 5 months.	Crackers and tea or milk or coffee after 5 months. Cousin cared for child in mother's absence.	Acute gastroenteritis.	.....do.....	Portuguese.
120	Well and strong.	3 months; went to work in mill after 3 months.	Mellin's Food and cow's milk (not bottled) whenever it cried; after 9 months began to eat bread, potatoes, and whatever it wanted. Cared for by neighbor in mother's absence.	Cholera infantum.	10 months, 27 days.	Native-born Irish.
121	Not well and strong.	3 months; again pregnant.	Cow's milk (not bottled), scalded, after 3 months; bread and milk porridge after 1 month. Mother went to work in mill after 4 months; child then cared for by its sister.	.....do.....	7 months.	French Canadian.
122	Well and strong.	1½ months exclusively, 5½ months partly; went to work in mill after 1½ months.	Cornstarch pudding twice a day after 1½ months. Grandmother cared for child in mother's absence.	Enterocolitis.	.....do.....	Portuguese.

• Condition not reported.

CONDITION AT BIRTH, CHARACTER OF FEEDING, RECORDED CAUSE OF DEATH, AGE AT DEATH, AND RACE OF MOTHER OF CHILDREN FED ON SOLID FOOD AND DYING UNDER 1 YEAR—Continued.

Mothers at work after childbirth—Continued.

No.	Child's condition at birth.	Child's feeding.		Cause of death as recorded.	Age at death.	Race or country of birth of mother.
		Breast feeding.	Other feeding.			
123	Well and strong.	3 months; mother went to work in mill at 3 months.	Cow's milk (bottled), boiled, after 3 months; crackers in hot water and sugar after 3 months. Child cared for by grandmother in mother's absence.	Cholera infantum.	7 months ..	Portuguese.
124	Do	None; milk absent.	Cow's milk (not bottled) whenever it cried; crackers soaked in water and milk twice a day from birth. Mother went to work in mill after 7 months; child then cared for by neighbor.	Gastroenteritis, marasmus contributory.	7 months, 22 days.	Do.
125	Do	None, although milk was present.	Cow's milk (bottled), scalded; crackers soaked in water and milk after 5 months. Mother went to work in mill after 4 months; child then cared for by its sister.	Cholera infantum.	8 months...	Russian.
126	Do	4 months (1 by mother, 3 by nurse); mother went to work in mill after 1½ months.	Cow's milk (not bottled), boiled, whenever it cried, after 4 months; crackers from birth. Child cared for by friend in mother's absence.	Acute gastroenteritis.	8 months, 3 days.	Portuguese.
127	Do	None; milk absent.	Condensed milk; crackers in water twice a day after 3 months. Mother went to work in mill at 7 months; child then cared for by its aunt.	Diarrhea...	9 months...	Do.
128	Do	3 months; mother went to work in mill after 2 months.	Cow's milk (bottled), boiled, whenever it cried after 3 months; crackers after 1 month. Cared for by friend in mother's absence.	Cholera infantum.	.....do.....	Do.
129	Do	4 months exclusively, 5 months partly; mother went to work in mill after 4 months.	Condensed milk after 4 months; crackers from day of birth.	.....do.....	.....do.....	French Canadian.
130	Do	4 months; mother went to work in mill at 4 months; milk then insufficient.	Cow's milk, boiled, after 4 months; doctor advised condensed milk, but it disagreed and was stopped; crackers in water after 4 months; "wouldn't eat much of anything else." Neighbor cared for child in mother's absence.	Acute gastritis.	10 months..	Portuguese.
131	Do	2 months exclusively, 3½ months partly; mother went to work in mill irregularly after 2 months.	Cow's milk, undiluted, after 2 months; fed whenever it cried; crackers soaked in milk or water from birth. Child cared for by neighbor in mother's absence.	Convulsions.	4½ months..	Do.

CONDITION AT BIRTH, CHARACTER OF FEEDING, RECORDED CAUSE OF DEATH AGE AT DEATH, AND RACE OF MOTHER OF CHILDREN FED ON SOLID FOOD AND DYING UNDER 1 YEAR—Concluded.

Mothers at work after childbirth.

No.	Child's condition at birth.	Child's feeding.		Cause of death as recorded.	Age at death.	Race of country of birth of mother.
		Breast feeding.	Other feeding.			
132	Well and strong.	3 months exclusively, 2½ months partly; mother went to work in mill after 5½ months.	Powdered crackers, boiling water, and condensed milk after 3 months. Grandmother cared for child in mother's absence.	Convulsions.	9 months, 7 days.	Irish.
133	Do.....	4 months exclusively, after 4 months partly; mother went to work in mill at 4 months.	Condensed milk, Standard, after 4 months; crackers and condensed milk 3 times a day after 4 months. Grandmother cared for child in mother's absence.	Pneumonia	5 months, 25 days.	Portuguese.
134	Do.....	None, although milk was present; mother went to work in mill at 2 weeks.	Condensed milk and cow's milk; bread and crackers with cow's milk. In sufficient fresh air; a neighbor cared for child in mother's absence.	.....do.....	7 months...	Do.
135	Do.....	7 months exclusively, after that partly; mother went to work in mill at 7 months.	After 3 months cornstarch pudding once, and later twice a day; cow's milk after 7 months. Grandmother cared for child in mother's absence.	Bronchopneumonia.	7 months, 17 days.	Do.
136	Do.....	2½ months; mother went to work in mill at 7 weeks.	Condensed milk or Eskay's Food after 2½ months; bread soaked in water from day of birth. Grandmother cared for child in mother's absence. (Insufficient fresh air.)	Pneumonia	8 months...	Do.
137	Do.....	3 weeks; milk deficient; mother went to work in mill at 3 weeks.	Condensed milk after 3 weeks; crackers and milk after 4 months. Child cared for in mother's absence by its sister. (Insufficient fresh air.)	Bronchitis and pneumonia.	.....do.....	French Canadian.
138	Do.....	None; mother went to work in mill at 3 weeks.	Crackers soaked in milk or water; other food not reported. A friend cared for child in mother's absence.	Suffocation.	1 month, 5 days.	Azores.
139	Do....	None; milk deficient.	Cow's milk, undiluted; bread and milk after 4 months. Mother went to work in mill at 6 months; child then cared for by grandmother.	.....do.....	7 months, 5 days.	American.

CONCLUSION AS TO RELATION OF MOTHER'S WORK AFTER CHILD-BIRTH TO INFANT MORTALITY.

To sum up, then, such conclusions as clearly appear from the study of Fall River experience in regard to the relation of the mother's work outside the home after childbirth to the high infant mortality in that city, only 83, or 14.4 per cent of all children dying under 1 year concerning whom information was secured, were found to have been deprived of the mother's care because of her going to work. This per cent represents the extent of the possible effect of the mother's absence from home.

But the extent to which the nursing of the child was affected is smaller than even this figure indicates, for in only 41 cases, or 7.9 per cent of all those whose feeding was reported, was the mother's nursing in any way affected by her absence from home, and in the 42 other cases she either failed to nurse because of disinclination or inability, or had discontinued nursing for reasons not in any way connected with her return to work.

But while the number and per cent of children affected by the mother's absence from home was small, yet the causes of death among this number as compared with the causes among children whose mothers remained at home, show strikingly the fatal effect of the mother's absence and of the lack of her care and nursing. Thus, the proportion of deaths from diarrhea, enteritis, and gastritis among the children whose mothers went to work (62.7 per cent) was over 80 per cent in excess of that of the children whose mothers remained at home (34.6 per cent).

The real significance of this excess will not be fully realized until we recall the figures before given, showing that for Fall River as a whole the death rate under 1 year from diarrhea, enteritis, and gastritis was two or three times what it was in many other localities.

The high infant mortality of Fall River as a whole clearly is not due, except in very small part, to the excessive rate among the children of mothers at work outside the home. For the proportion of deaths due to diarrhea, enteritis, and gastritis, 38.6 per cent of all, for the city as a whole, only falls to 34.6 per cent when the children of mothers at home are taken separately.

The causes of the excessive mortality under 1 year in Fall River among the children of mothers at home are to be found in the absence of nursing and in the improper feeding and improper care, of which there are many examples. The much higher mortality among the children of the mothers who went to work after childbirth is plainly due chiefly to the greater extent of the absence of breast feeding and of the improper feeding and the additional evil influence of the withdrawal of the mother's care.

Among the mothers at home only 34 per cent of the children were nursed exclusively, while 24 per cent were given solid food, and for 16 per cent condensed milk was the principal food. Among the children of the mothers who went to work only 1.2 per cent were nursed exclusively, while 40 per cent were given solid food, and for 30.5 per cent condensed milk was the principal food. By both classes of mothers condensed milk was used more generally than fresh cow's milk. In over one-third of the cases where solid food was given its use was begun during the first week.

The large percentage of artificial feeding was found to be due to a considerable extent to deficiency of breast milk, which was much more frequent among the mothers at home than among those who went to work, but in many cases among the latter this artificial feeding was not due to a deficiency of breast milk, nor was it in any way a result of the mothers going to work.

The causes of the excessive infant mortality in Fall River may be summed up in a sentence as the mother's ignorance of proper feeding, of proper care, and of the simplest requirements of hygiene. To this all the other causes must be regarded as secondary.

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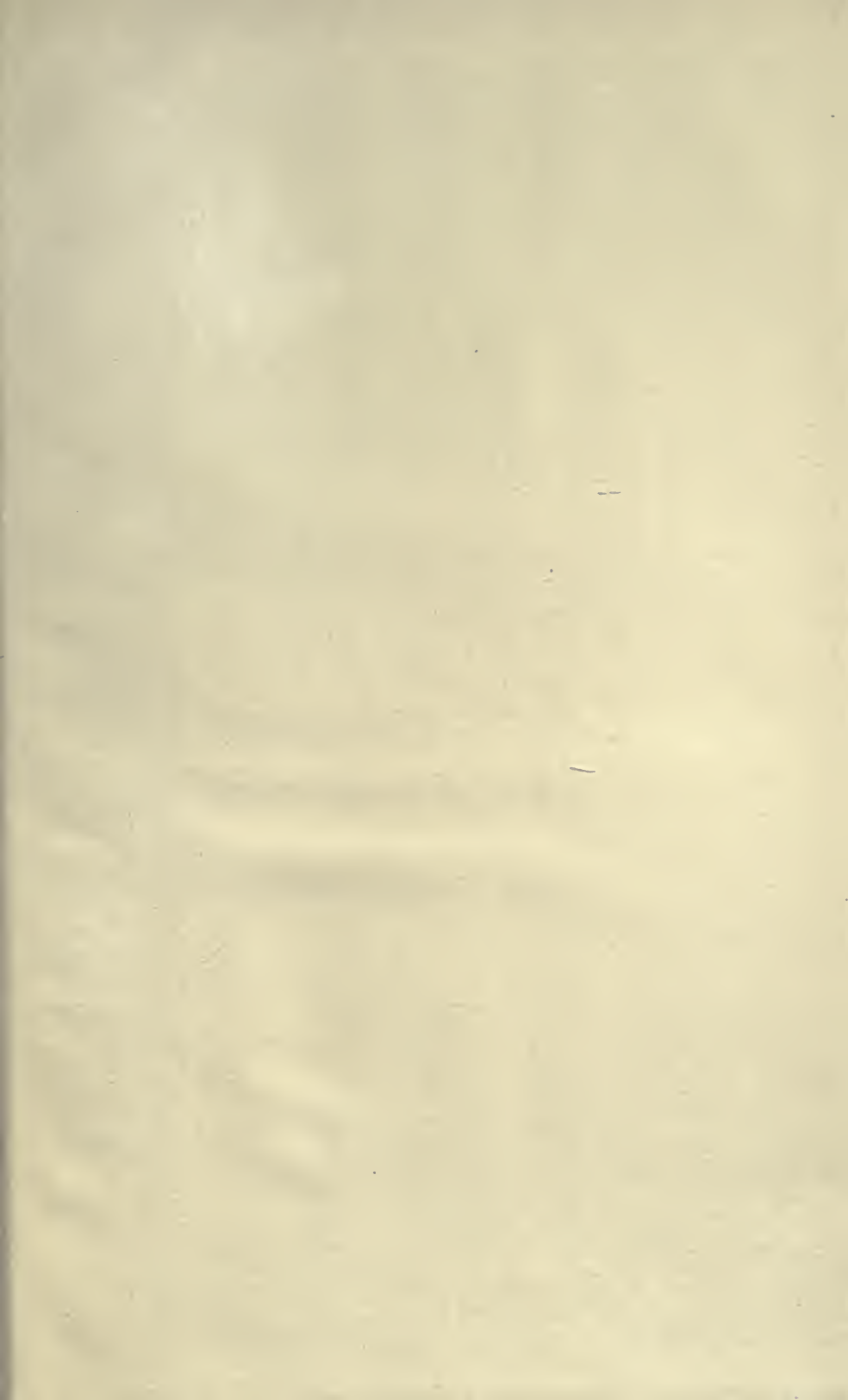
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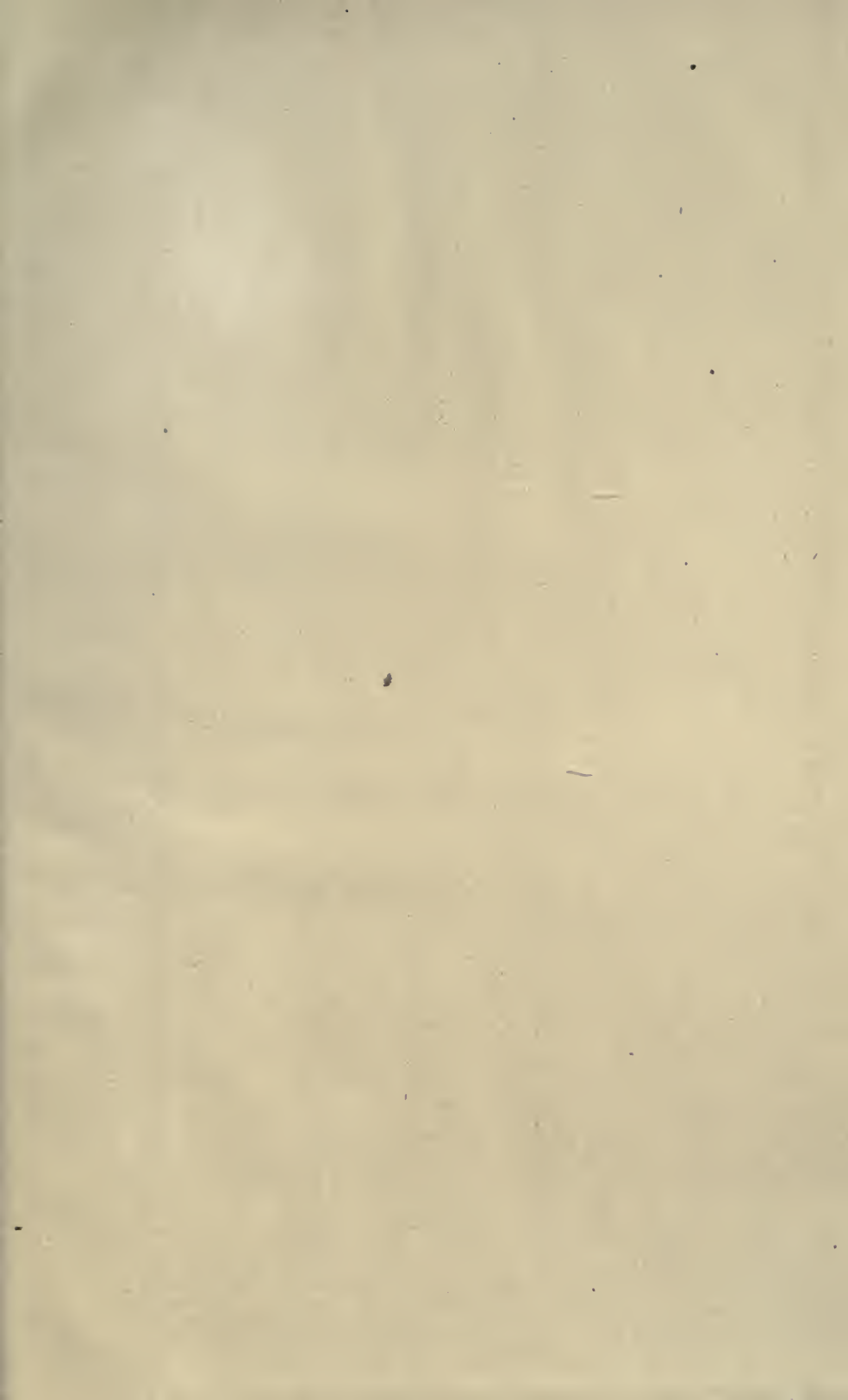
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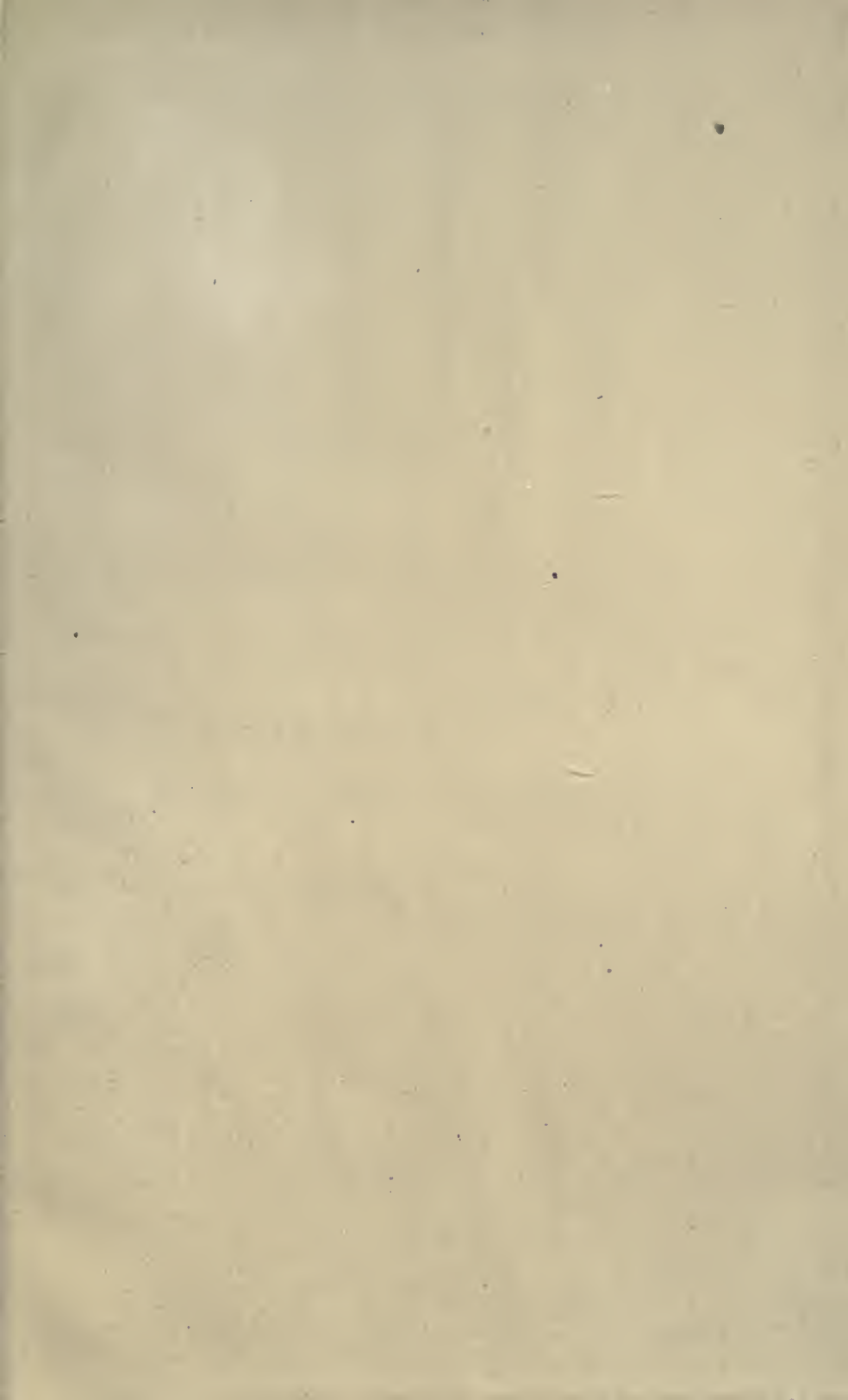
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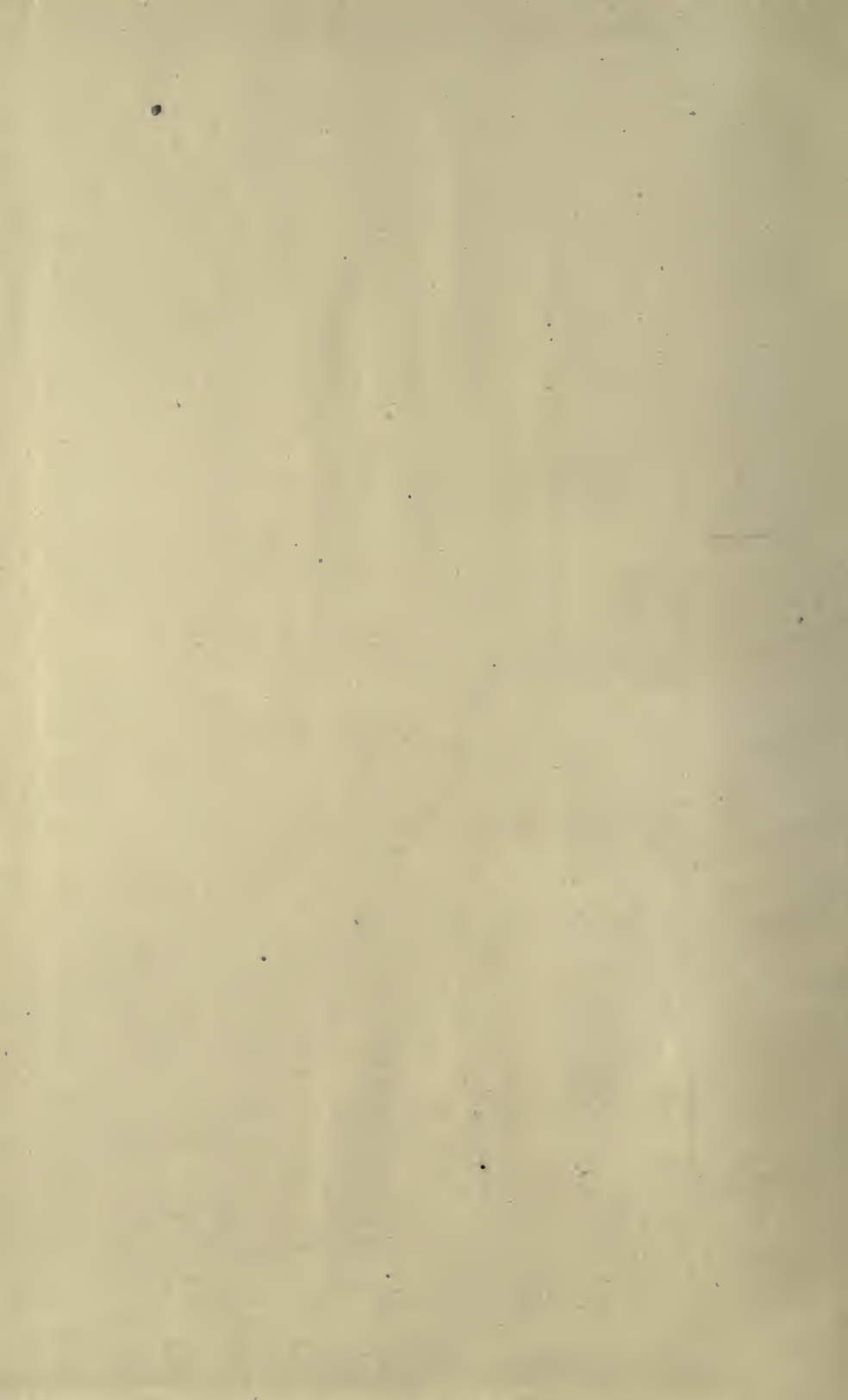
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Women's work in relation to infant mortality, Dr. Greenhow's conclusions as to.....		17, 18











The first part of the document discusses the general principles of the proposed system, which is designed to be both efficient and equitable. It is intended to provide a framework for the management of public resources, ensuring that they are used in a way that benefits the community as a whole.

The second part of the document details the specific measures that will be implemented to achieve these goals. These include the establishment of a central authority to oversee the system, the creation of a network of local committees, and the implementation of a series of regulations to govern the use of resources.

The third part of the document addresses the potential challenges that may arise in the implementation of the system. It discusses the need for public support, the importance of transparency, and the role of education in ensuring that the system is understood and accepted by the community.

The fourth part of the document provides a summary of the key points discussed and offers a final conclusion. It emphasizes the need for continued monitoring and evaluation of the system to ensure that it remains effective and responsive to the needs of the community.