Original Articles.

THE VITAL STATISTICS OF MASSACHUSETTS
FOR 1880.¹

BY CHARLES F. FOLSOM, M. D.

BETWEEN the census years 1875 and 1880 the increase of the population was 131,173, or 63,388 less than in the preceding period of five years, a fact largely due to the extreme industrial depression just gone by. With an increase of population to 1,783,085 from 1,651,912 in 1875, there were recorded in 1880, 44,217 births, 15,538 marriages, and 35,292 deaths, or 3922 more births, 1736 more marriages, and 3491 more deaths than in the previous year. The excess of living births over deaths was 8925, showing a natural increase of the population exceeding that of 1879 by 431.

The rates for the year to 1000 of population are: births 24.80; marriages 8.71; deaths 19.79; excess of births over deaths 5.01, showing a natural increase of the population much below the average, the rates of excess of birth-rate over death-rate for thirty years, in periods of five years, beginning with 1851, being 10.1; 11.6; 4.7 (8.3 excluding the years most influenced by the war); 7.9; 6.8; 5.6.

BIRTHS.

The birth-rate for 1880 is, although slightly higher than for the previous two years, 2.23 per 1000 lower than the average for thirty years or than any other years except 1863, 1864, 1865, 1878, and 1879, the decrease being most marked in those counties where there is the least concentration of foreign laborers; the birth-rate, too, is largest in the large towns, varying from nearly 30 per 1000 in towns of 50,000 population and over, to 16.94 in those of 2000 and under. By seasons, 23.3 per cent. of the births were in the first quarter of the year; 24.6 in the second; 26.3 in the third; 25.8 in the fourth; the same figures for a period of fifteen years being 23.03, 23.43, 26.75, and 26.79. There were 105.9 births of males to 100 of females, which is also the average for twenty-five years. The still-births of males are to those of females as 138 to 100, or for twenty-five years 149 to 100.

As regards parent-nativity, Barnstable County, at one extreme, shows five births of native parents to one of foreign; at the other, in Suffolk County, one third more is of foreign parentage than of native. Of the 778 illegitimate births Suffolk County has one half, although containing only one fifth of the population of the State.

MARRIAGES.

The marriage-rate is greater than for any other year since 1874, but 1.68 per 1000 less than the average for thirty years, and .17 less than the average of the three years most influenced by the war. It is nearly 2 per 1000 greater in the sixteen large towns than in the rest of the State, and generally speaking increasing with the concentration of the population. As usual, the greatest number of marriages, 1857, was in November, the least, 799, in March. The average relation of the seasons was maintained very closely,

¹ An abstract from the advanced sheets of the Thirty-Ninth Report to the Legislature of Massachusetts, relating to the Registry and Return of Births, Marriages, and Deaths in the Commonwealth for the Year Ending December 31, 1880. Prepared under the direction of the Secretary of the Commonwealth. Boston. Rand, Avery & Co., Printers to the Commonwealth.

21 per cent. of the marriages being in the first quarter, 25.82 in the second, 22.20 in the third, 30.98 in the fourth. The average age of 15,501 men married during the year was 28.9 years; of 13,121 men marrying for the first time 26.5 years; of 15,485 women married, 25.1 years; of 13,956 women marrying for the first time, 23.8 years. There were 12,419 bachelors married to maids, 702 bachelors to widows, 1534 widowers to maids, 807 widowers to widows. The youngest person married was 13 years old, the oldest 82.

DEATHS.

The number of deaths in 1880 (namely, 35,292) was considerably in excess of that of any year of the previous quarter of a century. The rate per 1000 of the population (19.79) was the greatest since 1876, was .53 greater than the average for thirty years, and .57 more than the rate of the last quinquenniad. It was exceeded only seven times since 1850, including the two years most influenced by the war. The death-rate was considerably greater than for either of the previous three years, but 1.03 less than the average for the five years 1871-1875. In the last decenniad it was exceeded four times, 1872, 1873, 1875, and 1876. Four years, 1871 and 1877-1879, showed lower rates, and in 1874 the percentage was the same as in 1880. Although these rates depend very largely upon the number of births, and therefore upon the number of infants in the population, the mortality of children under one year of age being from one fifth to one fourth of the total number of deaths, yet they are also largely influenced by various epidemics, which are chiefly fatal among children under five, their mortality being from one third to two fifths of the whole. The year has been, therefore, one of less than the average good health, and considerably lower than the previous three years in that respect. The very fatal epidemic of diphtheria has continued, with even a moderate increase over 1879; the diarrhoeal diseases of infants have caused much greater mortality than for the preceding two years, the infectious diseases generally have risen to a higher number, and pneumonia has been excessively fatal. The greater number of deaths in 1880 has been recorded at nearly all ages, but to the greatest extent in infants and young children.

The death-rates of the several counties were: Norfolk and Franklin 16.1; Berkshire 16.4; Plymouth 16.8; Hampshire and Middlesex 18.1; Worcester 18.9; Barnstable 19.0; Hampden 19.9; Essex 20.2; Bristol 21.4; Dukes and Nantucket 21.8; Suffolk 23.4; of the larger cities, Fall River 26.3; Holyoke 24.0; Boston 23.7; Gloucester and Salem 23.2; Lowell 22.0; New Bedford 21.9; Lawrence 21.6; Worcester 20.9; Chelsea 20.5; Lynn 19.5; Springfield 19.0; Taunton 18.6; Cambridge 18.0; Somerville 17.0; Newton 15.8; of the sixteen cities 22.1, and of the rest of the State 18.6; of towns of 20,000 to 30,000 population 20.95; of those of 10,000 to 20,000, 17.88; 5000 to 10,000, 18.34; 4000 to 5000, 17.48; 3000 to 4000, 16.90; 2000 to 3000, 16.99; 1000 to 2000, 16.71; less than 1000, 19.85.

The greatest monthly number of deaths (3584) was in August; July, September, December, March, April, October, May, November, January, and February following to 2497 in June; by quarters the percentages were 28.6 per cent. in the third, 24.5 in the fourth, 23.5 in the first, 23.4 in the second.

The deaths of females exceeded those of males in

1880 by 426 as compared with 514 in 1879. In 14 deaths the sex was not reported.¹ The death-rate of males has exceeded that of females in the four census years 1865–1880 by 2.1, .9, 1.3, and 1.0, the averages of the four years being, for males 20.8 and for females 19.5 per 1000 living. From the age of 20 upwards, and in the total number for all ages, the absolute number of deaths of females in the State is greater than that of males, especially during the ages from 20 to 30, while the opposite fact is true in the early years of life, which is most marked in infancy. The infant mortality was 20.4 of the whole, that of children under five years of age 34.6.

The average age at death varies very much in the different counties, dependent very largely upon the numbers of persons dying in the early years of life, and, consequently, upon the character of the population. The improvident and very poor, who have the largest families, show also the greatest infant mortality, which diminishes the average duration of life enormously, and they also are themselves exposed to causes of early death. As would be expected, therefore, the lowest average age at death for a period of thirty years is, in Suffolk County, 23.34, the highest in Dukes and Nantucket, 46.34, followed in order by Franklin, 38.58, Barnstable, 36.97, Plymouth, 36.24, Hampshire, 35.16, Berkshire, 33.64, Norfolk, 30.95, Worcester, 30.82, Bristol, 30.03, Essex, 29.30 (which is very nearly the same as that of the State, 29.35), Hampden, 27.94, Middlesex, 27.86.

CAUSES OF DEATH.

Of the 35,292 deaths reported in 1880 in the State, the causes of death failed to be certified in 745, or 2.13 per cent., leaving 34,547 in which the facts required by law were ascertained. The deaths reported with causes not specified diminish from year to year in number, and still more in their proportion to all the deaths reported, having dropped from 1464 in 1868 quite progressively to 775 in 1879, except that for 1872 and 1873 there was a rise. Of the 745 unspecified causes of death in 1880, there were 108 deaths from hæmorrhage, 86 from tumor, 34 from inflammation, and 517 in which the returns give not even a statement as to any of supposed causes of death. As compared with the population, the unspecified causes of death in 1880 were .42 per 1000, while they were .44 in 1879, and 1.06 in 1868.

There is a decided increase in zymotic and local diseases over the previous year, the constitutional diseases having been far less fatal than in 1879. The deaths from violence, also, were less numerous. Leaving out of consideration the unspecified causes of death, the "zymotic diseases"—those commonly considered to represent the sanitary condition of places—were 2.3 per cent. less than the average proportion for ten years; the constitutional .7 less, but also less than for either of the previous three years. The local diseases were 6.0 higher than the average per cent., developmental diseases 2.6 less, and violent deaths .5 less than the average.

The most destructive nine so-called *zymotic diseases*,

¹ According to United States census of 1880, the excess of females over males in the State was 66,205 (924,645 against 858,440) as compared with 63,146 in 1875, 63,011 in 1865, and 32,301 in 1855. The ratio of females to males in the population was in 1880 very nearly the same as in 1875, namely, 107.71 as compared with 107.95 in 1875, with 110.46 at the close of the war in 1865, and 105.87 in 1855.

or infection-diseases, caused a much larger number of deaths than in 1878 or 1879, although in comparison to the population, far less than in any of the previous years except 1871, and at a less rate per 1000 of population even than in that year. Whooping-cough and scarlet fever were much less fatal than common, and show a marked reduction as compared with 1879. The other prominent "infection-diseases" caused a larger number of deaths than in the previous year, the advance being most marked in cholera infantum and measles, but also very great in typhoid fever, 245 more deaths from the last-named disease having occurred than in 1879, and more than for any one year since 1875. There was also a marked increase in diphtheria and croup, making 1880 the third year in mortality from that cause. From the nine diseases the total number of deaths in 1880 was 381 less than the average for ten years, in spite of a largely increased population.

The *constitutional diseases*, less fatal in 1880 than usual, continue to show an increasing rate from cancer and decreasing mortality from consumption,—a fact which may be largely due to more accurate certifying of causes of death and better diagnosis.

The *principal local diseases* all caused more deaths than in 1879, and, with the exception of pleurisy, more than in any previous year. The increase has been most striking in bronchitis (chiefly in infants and very young children), and in Bright's disease and peritonitis (due, to a great extent, to more accurate diagnosis). Pneumonia has increased at a faster rate than the population, as have also apparently heart diseases. The increase from "convulsions," an obscure term, is not so great in proportion as the population; while insanity, apoplexy, and paralysis together mark a strikingly larger number of deaths.

In *developmental diseases* it is gratifying to find the obscure expression "teething" less from year to year, and that the latter years show a more favorable record in the decenniad than the earlier as regards still-born, "infantile," premature deaths, and deaths from child-birth.

The *violent deaths* caused in 1880 the least mortality of the decenniad; and this was most marked in the suicides and deaths by drowning, while the homicides were quite below the average. The deaths from poison were in great excess, and from railroad accidents more than in any other of the ten years except 1871.

The order of fatality of the twelve causes producing the greatest number of deaths places consumption easily at the head of the list as usual. Pneumonia is second, as it was the previous two years, and in 1874 and in 1875; it was third in 1872, 1873, 1876, and 1877, always a leading source of mortality in our State. Cholera infantum, from having steadily fallen from the second place in 1872 and 1873, the third in 1874 and 1875, the fourth in 1876 and 1877, fifth in 1878, and sixth in 1879, has risen in 1880 to the third. Heart disease, not always an exact term, was, as last year, fourth, having been only sixth to eighth in 1878 and the preceding six years. Diphtheria stands fifth, having declined from the second place in 1876 and 1877, and third in 1878 and 1879; if croup were included with it the deaths would be 2394 instead of 1769, and its place would be third. Old age is sixth, being fourth or fifth previously since 1872. Paralysis is now for the fourth year seventh. Cancer has risen from tenth, eleventh, and twelfth places to eighth, as it was also in 1879. "Cephalitis" was ninth in 1880; bronchitis,

as in 1879, eleventh. Typhoid fever showed an extraordinary decline from the fourth place in 1872, sixth in 1873, seventh in 1874, eighth in 1875 and 1876, ninth in 1877 and 1878, to *thirteenth* in 1879, and has now risen again to tenth.

In infancy and early childhood the diarrhoeal diseases of the hot months, diphtheria, pneumonia, and obscure diseases ("convulsions" and "cephalitis"), largely of the central nervous system and of the digestive organs, prevailed. From five to ten, infectious diseases were most fatal, obscure brain troubles and pneumonia following. From ten to fifteen consumption and typhoid fever appear as prominent causes of death. From fifteen to twenty consumption caused nearly one half of all deaths, and heart disease is prominent. From twenty to thirty consumption caused more than one half of all the deaths, and childbirth is fifth in order. In the next four decades of life pulmonary consumption, although first in order, occupies a position of progressively less importance. Pneumonia is second, and heart disease third. Typhoid fever becomes of less importance, Bright's disease, cancer, and apoplexy of more. Childbirth is the *sixth* from thirty to forty, and then ceases to be a leading cause of death. Over seventy, old age, pneumonia, paralysis, apoplexy, and heart diseases are the prominent five causes of death.

The deaths in 1880 between the ages of ten and fifteen were 611 as compared with 616 in 1879; at all other ages the deaths were more. Under the age of five they were 2051 more. From five to ten the excess was 51; 28 from fifteen to twenty; 313 from twenty to thirty; 177 from thirty to forty; 90 from forty to fifty; 226 from fifty to sixty; 277 from sixty to seventy; 143 from seventy to eighty; 336 for the ages of eighty and over.

DIPHTHERIA.

Thirty pages of the report are devoted to an analysis of the 18,714 deaths from diphtheria (including croup) in this State during the ten years ending in 1880, by years, months, ages, sex, and population, with the death record from that cause for each city and town in the State. There were 9249 deaths of males, 9459 of females; 747 in 1871; 753 in 1872; 745 in 1873; 913 in 1874; 1880 in 1875; 3294 in 1876; 3178 in 1877; 2517 in 1878; 2293 in 1879; 2394 in 1880; 2337 in November; 2307 in December; 2109 in January; 2098 in October; 1611 in February; 1560 in March; 1350 in April; 1269 in September; 1225 in May; 1045 in June; 916 in July; 887 in August.

The deaths under five years of age were 65 per cent. of those at all ages, and from five to ten they constituted 25 per cent.; 90 per cent. of the deaths occurred in children under ten years of age, or 95 per cent. under the age of fifteen, the decline from that age onward being progressive and quite marked. As compared with the population at the several ages, there was an annual average mortality of 69.96 per 10,000 under five years of age; of 28.33 from five to ten years; of 6.74 from ten to fifteen; of 1.52 from fifteen to twenty; and from .82 to .39 for all other ages.

The analysis of the deaths from diphtheria and croup for the ten years indicates a sudden rise in 1874, chiefly in Berkshire and Franklin counties, corresponding to the beginning of the severe epidemic in the northwestern part of the State, with independent lesser foci in Bristol, Middlesex, and Hampden, while the deaths

from that cause were less than the average of the previous three years in Barnstable, Essex, Dukes and Nantucket, Norfolk, Plymouth, Suffolk, and Worcester. In 1875 the epidemic in Berkshire and Franklin counties continued, and there was a marked rise in every other county in the State except the islands, where no deaths were reported from diphtheria or croup. In 1876, the epidemic had decidedly moderated in Franklin County and less so in Barnstable, while the increase in the rest of the State except the islands was very great, causing 3294 deaths, or 116 more than in the next year, from which time there has been a decline, Suffolk County alone having a greater number of deaths in 1880 than in any previous year.

Following the different towns in the list, it is seen that the mortality varied greatly from year to year in some; that in many it could hardly be said that there was any real epidemic; that the excessive mortality occurred in one season as in Florida, in two as in Nantucket, or scattered over any or nearly all of the ten years, and that contiguous towns were often visited by the disease with very different degrees of fatality. In the northern part of Berkshire County the epidemic was much more severe than in the southern part, while the opposite fact is true of the towns forming the Connecticut valley. The extremely small towns of Florida and Conway had the highest death-rates in Berkshire and Franklin counties, Easton (population, 3898) in Bristol, Haverhill (14,628) in Essex, Holyoke (16,260) in Hampden, Ware (4142) in Hampshire, Pepperell (1927) in Middlesex, Sharon (1330) in Norfolk, Plympton (755) in Plymouth, Chelsea (20,737) in Suffolk, Spencer (5451) in Worcester. The variations in the death-rates (0 to 34.96) and in the duration of the prevalence of the disease are excessive.

Leaving out the two very small counties, Dukes and Nantucket, the highest rates from diphtheria and croup are in rocky, bleak Essex, forming our northeast coast, and Hampden at the lower part of the valley of the Connecticut, largely on alluvial deposit; the most densely populated county of Suffolk, with the highest mortality from all causes in the State, comes next, followed by Berkshire, where the general conditions of health are the most favorable; Middlesex in the north and Bristol at the south are side by side in the table, as are Franklin, high up in the interior of the State, and Barnstable, the extreme cape. In the cities and towns, some of the decennial rates per 1000 by the census of 1875, representing annual average rates per 10,000, are (1) Florida 34.96; (329) Sheffield .45 (two small towns in the extreme north and south of Berkshire County); (6) Holyoke 22.82; (7) Nantucket 21.87; (8) Haverhill 20.24; (9) Williamstown 20.09; (15) Marblehead 17.72; (21) Gloucester 17.25; (22) Lynn 17.18; (36) Lowell 15.88; (37) Hull 15.82; (41) Waltham 15.45; (42) Lawrence 15.44; (44) Salem 15.26; (50) New Bedford 14.64; (52) Pittsfield 14.35; (58) Brookline 13.93; (68) Milton 13.15; (74) Beverly 12.79; (75) Plymouth 12.56; (77) Somerville 12.44; (80) Princeton 12.23; (81) Boston 12.21; (87) Winchester 11.71; (90) Fitchburg 11.64; (93) Springfield 11.43; (94) Dalton 11.37; (95) Cambridge 11.31; (101) Northampton 11.16; (104) South Abington 10.99; (108) Wayland 10.76; (109) Worcester 10.73; (111) Lenox 10.30; (113) Manchester 10.25; (114) Brockton 10.20; (123) Fall River 9.66; (130) Rockport 9.15; (146) Andover 8.44; (158) Winthrop 7.97; (163) Belmont 7.74; (168) Newburyport 7.58;

(176) Lexington 7.19; (179) Dedham 6.95; (187) Medford 6.49; (199) Woburn 6.27; (200) Revere 6.24; (201) Natick 6.20; (214) Concord 5.61; (227) Mattapoisett 5.14; (237) Duxbury 4.90; (242) Clinton 4.72; (248) Leominster 4.61; (256) Petersham 4.16; (261) Nahant 3.92; (267) Barnstable 3.72; (268) Provincetown 3.67; (296) Stockbridge 2.39; (300) Dunstable 2.21; (313) Great Barrington 1.59; (322) Wenham 1.10; (330) Lincoln 0.

The least average mortality is in the 83 small towns of less than 1000 inhabitants, namely 5.64; in those of 1000 to 2000 (98) it was 7.29; in 49 of 2000 to 3000, 8.02; in 33 of 3000 to 4000, 10.98; in 23 of 4000 to 5000, 9.49; in 30 of 5000 to 10,000, 11.30; in 12 of 10,000 to 20,000, 14.22; in 5 of 20,000 to 30,000, 13.65; in 3 of 30,000 to 40,000, 14.75; in 4 of 40,000 to 50,000, 11.96; in 1 of 341,919 (Boston), 12.21; in the State, 11.33.

The average of the death-rates of the towns having in their population the greatest proportion of young children was higher than in those having fewer of them; but there were many exceptions to that rule, and the town having the largest proportion of children under five years of age had a low death-rate from diphtheria and croup (5.26) while the town having the smallest proportion of children under five years of age had a rate of 21.87.

After the epidemic of diphtheria and croup, which reached its highest point in 1863, the deaths from that cause declined steadily from 8.17 per cent. of the total mortality to 2.5 in 1870, rising slightly to 2.7 in 1871. In 1875 the annual increase was great; and in the next two years the epidemic was at its greatest height, from which time there has been a steady decline to 6.78 per cent. in 1880. Diphtheria appeared first in our death-returns under that name for the first time in 1858, although it prevailed earlier in our State, and has been known to the world for at least twenty centuries. Many authorities consider it as the severe form of what has been known for many years as the disease "membranous croup." The two diseases are at least confused in practice, and are considered in the Report as belonging together.

REPORT ON PROGRESS OF THERAPEUTICS.¹

BY ROBERT AMORY, M. D. (HARV.), LONGWOOD, BROOKLINE.

BENZOIC ACID IN POLYARTHRITIS RHEUMATICA.

SENATOR,² in continuation of his observations with the use of this drug, remarks that benzoic acid or benzoate of soda has no remedial action of any value in chronic cases of arthritic rheumatism, nor in the subacute non-febrile attacks. Of twenty-two acute cases, however, in which he used this medicinal agent solely, one was relieved in two days, twenty in less than four days, and one in not less than eleven days, and none of these cases had any relapse or complication. Though it is the experience of the unprejudiced general practitioner that there are certain cases in which almost any simple method of treatment apparently produces a relief early in the attack, and to such a surprising degree that he is often led to believe that these exceptional cases would do well even without medicinal treatment, yet Senator, who was at one time rather

skeptical of the value of salicylic acid in rheumatism, seems to believe that the favorable result in the above twenty-two cases was clearly due to the administration of benzoic acid, and he was further convinced of this fact by another small group of cases, four in number, in which the use of salicylic acid had produced no remedial action, and yet afterwards its discontinuance and the administration of benzoic acid produced a rapid cure. In another group of six cases the use of benzoic acid was not followed by relief of symptoms, while the salicylic produced a beneficial effect. Fourteen cases were also treated by salicylic acid and benzoic acid together, in which he was inclined to give the preference to the use of the former. He recommends that benzoic acid, which can be given in very large doses (fifteen grammes, or four hundred and thirty grains, per diem), should be given in those cases in which salicylic acid has failed to give any relief.

BENZOIC ACID IN RHEUMATISM.

Senator³ finds that this remedy will speedily abbreviate an attack of articular rheumatism, provided it is unattended with fever and is not subacute; in these cases it seems to have but slight effect. No complication or relapse follows either this acid or its soda salt (benzoate of soda) after producing relief to rheumatic pains. He gives ten or twelve grammes of the acid and twelve to fifteen grammes of the benzoate of soda.

BROMIDE OF POTASSIUM IN INFANTILE DENTITION.

M. Peyraud⁴ recommends this drug for relief to the painful and troublesome processes of infantile dentition, and employs the following prescription:—

R̄ Bromide of potassium	2-3 grammes.
Honey	15-20 grammes.
Water	q. s.

After the solution has taken place heat and evaporate to a consistency of honey, adding alcohol to preserve the mixture. By rubbing this upon inflamed gums the mucous membrane is attacked and denuded, the hyperæmic circulation is diminished, the inflammation reduced, and the projecting points of the teeth will gradually pierce the gum, and the contemporaneous inflammation of the mouth will be subdued.

The internal use of this drug will likewise, in the author's experience, prevent or abate the convulsions incidental to teething infants. He also recommends the use of the bromide in dental caries, which it arrests, and acts as a substitute for the arsenical preparations commonly used by dentists. Into a little cyst of the eyelid M. Peyraud injected subcutaneously a strong solution of the bromide, which was followed by the complete disappearance of the cystic tumor.

M. Joffroy,⁵ basing his treatment on the ground that there is a hypersensibility of the mucous membrane of the larynx in the so-called spasm of the glottis after diphtheria, employed bromide of potassium in daily amounts of two grammes to overcome this hyperæsthesia. In two cases where asphyxia was threatened after tracheotomy had been performed, the spasm seemed controlled by the bromide, and death apparently was averted. He cautions against the use of this agent where there are complication of bronchitis or threatening paralysis of the glotto-pharyngeal and laryngeal muscles.

¹ Continued from page 399.

² Frerich's and Leyden's Zeitsch. f. klin. Med. i. p. 243; Centralbl. f. d. med. Wiss., May 1, 1880.

³ Zeitschrift für klin. Med., t. i.

⁴ Journal de Thérapeutique, 10 Juin, 1880.

⁵ Journal de Thérapeutique, October, 1879.