Letter of the president of the Board.

LETTER OF THE PRESIDENT OF THE BOARD.

OFFICE OF THE BOARD OF HEALTH,
NEW HAVEN, March 21, 1881.

To the Honorable Court of Common Council of the City of New Haven:

GENTLEMEN: I herewith submit to your Honorable Body the Eighth Annual Reports of the Health Officer and of the Clerk of the Board of Health, for the year ending December 31, 1880.

With the presentation of previous Annual Reports, I have called the attention of your Honorable Body to the difference in the death-rate in the different wards of our city, to the functions of Health Boards in general, and to their relations to our wealth and prosperity.

New Haven has still the proud distinction of having "the lowest death-rate of any seaport of its size in the world" (so far as I can learn), but that it is practicable to considerably reduce this already low rate, I as firmly believe as I do in any other fact demonstrated by science. The work of reduction has already begun and is now going on as a part of the progress of our city, and the only reason why it does not go on faster is, that in this busy age everybody cannot keep up with the rapid progress made in modern scientific knowledge, of which Sanitary science is but one phase. To further this end, so beneficent to humanity and so important to the prosperity of our city, it seems to me well to again call your attention to some of the elementary truths of Sanitary science, to give its position and status as compared with other sciences, to explain its methods, give the basis of its deductions, notice its possibilities, and then to make some simple application to our own case.

The immediate object of Physical Science is to discover the laws of Nature, and when these have been discussed and published, the knowledge becomes a part of the

common property of the world, available to all. All the Physical sciences are based entirely upon observation and experiment. We first observe a large number of facts, (a single fact is worth but little by itself), then we classify and compare them. Next, if the subject admits, we make experiments to get at new facts or to show the bearings of old ones. When we have learned how these facts are related to each other and have so studied them that we can surely foretell a certain class of events, we say that we have found a Law of Nature, and a knowledge of Nature's laws we call *Science*.

The proof of a science is that we can foretell natural events yet to come to pass, and the more accurately we can predict such coming of events the more advanced is the science, and where we have control of the conditions, we can also the more certainly control the results.

A few familiar examples will better illustrate my meaning.

In the science of Astronomy, from observations and measurements of the motions of the heavenly bodies, eclipses and other astronomical events can be foretold with wonderful accuracy. Once such events seemed very mysterious, but now that we know the laws by which they are governed, their coming may be predicted years, it may be centuries beforehand. In this science we can make no direct experiments, we can only view the heavenly bodies from a great distance, all the forces and conditions which move them are entirely and absolutely beyond our control, and we can therefore in no wise affect the results, we can only predict them. Yet this knowledge is of great importance to us,—the accurate keeping of time, the finding our way at sea, the safety of every vessel on the ocean is dependant on this knowledge.

So, too, there is a science of Meteorology, and by observation and calculation we have deduced certain laws relating to storms. Observers are stationed at various points over the land, and the coming of storms is foretold. Here the conditions are more complicated and

not so well understood as in Astronomy, so we cannot predict a storm long beforehand, nor with the certainty and accuracy of an eclipse, the prediction is given in the form of a "*probability*," which is however usually so safe a prediction that it is of vast importance to our commerce and our industries. Here, too, we have no control over the results, we can only predict them. We cannot stop the storm, but if we know beforehand that it is coming we can prepare for it.

The science of Chemistry lies at the other extreme as to methods and applications. This science is founded more largely upon experiment. We can handle the things operated upon, and in a great measure can control the conditions which govern the processes. As a consequence we can both predict the results and control them. This is why the science has such numberless applications in the arts and manufactures. In Astronomy and Meteorology, any advance in the science is in greater accuracy in foretelling events; in Chemistry it is in controlling results. And so of the other sciences, the status of each is measured in one or the other of these ways.

Each science derives aid from all the others, they have been spoken of as if distinct but in reality they are so intimately connected that no sharp dividing line can be drawn between them. In the Biological sciences, classification of forms is a larger element, but its discussion is of no use in the present connection.

Now, where does *Sanitary* science stand? What is the basis of its deductions, what does it observe, what experiments can be made here, what are its methods, with what has it to do, what laws has it discovered, what events can it foretell, and how far can it control results?

The basis of its deductions is the death-rate of a community; it has to observe the causes and conditions which modify this death-rate: it has to do with the health and the prolonging of life in a community. Its questions are, shall disease be avoided and human life be lengthened? Shall our children die in infancy or grow up to usefulness? Shall pestilence be allowed to devastate our cities

and bring poverty and misery in its train? *How far can we control such results?* In short, how much is human life in any community sacrificed to ignorance, carelessness and greed, and how far can such useless waste be stopped and the misery and poverty incident to sickness and early death be lessened?

The death-rate of any community is the most important factor in all practical work in this science. The causes and conditions of death are however so complicated, so many elements enter into the problem that no single fact has much value if taken alone. It is only by a comparison of a great number of deaths and the conditions under which they occur, that we can arrive at satisfactory conclusions. We cannot deliberately make experiments that endanger and sacrifice human life, as the chemist experiments in his laboratory, but men and communities often do make experiments on a grand scale, which are the consequence of ignorance, accident or greed, but which are as instructive, often more so, than if deliberately planned and cruelly executed. Every city can point to grand but sad experiments of this kind. In some directions, however, direct experiment can be made particularly in connection with contagious diseases, and in this way valuable conclusions have been reached. Moreover, other sciences are so related to this one as to greatly aid in its advancement and confirm its conclusions.

As a result of all this, the main principles of Sanitary science are as firmly established as the fundamental doctrines in any of the science; some of the events pertaining to it can be as surely predicted as an eclipse, and results as certainly controlled as in an ordinary chemical process. In some directions we can merely predict results without having any control over them; in others we cannot predict with certainty, we can only calculate on very strong "probabilities;" in some directions we have complete and practically absolute control over the results; in others only very imperfect control, while in still others we are entirely in the dark and are consequently powerless to either predict or control.

As to the causes of disease, in some cases we have a complete explanation backed by positive proof and perfect demonstration; of others we have a moral certainty rather than demonstrated proof; of others we have perhaps an inkling which is as yet merely a plausible theory, while of still others we are as much in the dark as ever.

The action of official bodies must be largely confined to those things where we have sure and established ground to work on, but fortunately this is no longer scanty. For instance, the measure of their work is shown in the death-rate, and that a general increase of filth in any densely populated portion of a city will be accompanied and followed by an increase in the death-rate when the proper time and season comes, can be predicted as positively as an eclipse, and that this may be again reduced by a general cleaning up and keeping cleaned up is a result as surely and certainly under our control as any chemical process.

It is true that some natural causes which affect the health and death-rate, particularly such as belong to climate, are beyond our control, but so large a number of the causes of death are controlable, that the death-rate of any city community is within wide limits, under the control of that community; if it be low, the community has made it so, it did not grow small of itself; if it is high the community is to blame for it.

The vital statistics of this city are kept with greater accuracy than of any other portion of this State. They are published in detail, and I have made a great many computations and compared the figures with the various conditions believed to affect them, and *the results all point one way*. It is morally impossible but that the general teachings of these figures is correct; such errors as exist are in the details and not in the principles involved.

The present number and boundaries of Wards have prevailed for four years of vital statistics, during which time 4,389 deaths have occurred. If we take these ward by ward, and year by year, and compare the mean death-rate of the first two years of the present arrangement

(1877 and 1878) with that of the last two years (1879 and 1880) we find that the mean rate is lower for the last two years than for the previous two years *in eleven out of the twelve wards.* The only case where the average has increased (and that but slightly) is in the 4th ward, where a rapidly increasing population is feeling year by year the need of better sewer accommodations, and where, I trust, that future appeals for sewers will be listened to.

The 6th, 7th, 9th and 10th wards, all of them populous, have shown a very marked decrease in their average death-rates for the last two years (since the Sanitary Inspectors began work) from the previous two years.

The Board of Health has now been organized eight years. While no one can claim that all sanitary improvement in the city during that time is due to its work and the consequent agitation of the subject, still it is fair to show what those eight years have accomplished. The death-rate of the city for the four years previous to the organization of the Board (1869 to 1872 inclusive), was respectively 23.4, 25, 19.7 and 22.3 per thousand of population. The average of these is 22.6, and the total number of deaths recorded during those four years was 4,676. The death-rate for the last four years (1877 to 1880 inclusive) is respectively 19.7, 18, 16.7 and 17.8, the average of the four is 18.1, and during the four years there was a total of 4,389 deaths. The population of the city from 1870 to 1880, increased twelve thousand, but the deaths for the four years were 287 less than in the former four years.

With a death-rate equal to the average (22.6) for the four years before the organization of the Board, a population of 60,000 would call for 1,356 deaths yearly; the actual average for the last four years has been 1,097 deaths yearly. Here, then, is already *a saving of about two hundred and sixty lives per year*, asthe actual result of better sanitation.

If we take special diseases, we find the facts just as instructive. For example, enteric (Typhoid) fever was formerly a very common disease here. During the six

years, 1868 to 1873 inclusive, there were 315 deaths recorded from this cause, an average of over 53 per year. The victims were largely people in the prime of life, carried off by unsanitary conditions. Now, with a population 12,000 greater, the average deaths by this disease for the last four years are less than 15 per year, a reputed number believed by most medical men to be higher than the actual facts justify. An eminent medical man has has stated within a month "that true enteric (Typhoid) fever, formerly so common in this city, has become so rare as to become a curiosity in ordinary medical practice," and the statement was acquiesced in by a company of a score of practitioners. I trust that this residium of fifteen will be done away with and we have only imported cases.

Just so soon as the public will become alive to the fact that diphtheria is as truly a preventable disease as the typhoid fever is, we will then take effective means to reduce its ravages, and such reduction will as surely follow.

Another very instructive class of facts relate to infant mortality. Not having the figures at hand I have not carried the calculations farther back than the eight years for which the tables of our Board furnish the data. If we divide this eight years into two periods of four years each, we find that during the first period, 1873 to 1876 inclusive, there were 1,284 deaths of infants of less than one year, and 279 deaths was the *smallest* number for any one year (in 1874.) For the last four years, 1877 to 1880 inclusive, the total deaths of infants amounted to 959, the *largest* number in any one year being 268 (in 1877.) That is, with a much larger population, the number of infant deaths in the worst year of the four years was actually less than during the best year of the previous four years in a smaller population.

If we compare the deaths of all the children under five years of age, during the same period, the facts are seen in even a stronger light. During the first four years, an aggregate of 2,031 died; during the next four years, but 1,653 died, or 378 less in a population some thousands greater.

A variety of other calculations show the same fact, that some hundreds of human lives can be saved or lost at will in our city every year. It is surely possible to save them—if they are lost there is positive blame for it somewhere. If it was the matter of saving the same number of lives from preventable accidental death where the facts and causes were equally plain, *the saving would be accomplished at any cost*, and why should we be less vigilant in regard to death from preventable disease?

The natural features of our city are well understood and are favorable to an excellent sanitary condition. As to what is possible and practicable, it is only necessary to compare the actual death-rate in our best wards with that in the worst ones, not a comparison of an exceptional record in an exceptional year in a single ward with a small population, but using large numbers and several years for the deductions. The mean of the death-rates of the 1st, 5th and 8th wards for the whole of the last four years, 1877 to 1880 inclusive, is 13.1 per thousand inhabitants. The aggregate population of these wards is between 13,000 and 14,000. For the 7th, 9th and 12th wards, having an aggregate population about 2,000 greater, the average death-rate has been 20.4.

The total number of deaths in the whole city during these four years is 4,389, an average of 1,097 per year. Had the death-rate been as high in the whole city as the average was in these last-named wards, a population of 63,000 would call for 1,284 deaths per year; with a death-rate of 13.1 (which is the average actually attained for the whole four years for three populous wards) the deaths would be but 826 per year, or 458 deaths per year less than the former number.

If it be asked, can this lower rate be reached practically, I can only reply, *What is to hinder?*

If it be asked how, our Sanitary Inspectors answer the question in part—Sanitary science answers the rest. That diseases flourish in the exhalations of decaying filth is as certain as that plants grow in the sunshine. That water contaminated by sewage is an abundant cause of disease and death is as clearly proved as it is that the earth

revolves around the sun. That soil may become so saturated with filth that the water beneath will be contaminated and the air above reek with foul odors, is certain. Builders tell me that in making excavations in this city for cellars, they find that old privy vaults and cesspools remain foul for many years after their use has ceased. They say that when old privy vaults that were abandoned and then covered up with soil are again opened, they are still very foul after twenty, thirty, or even more years. It is certain that their exhalations continue to pass into the surrounding soil until the material is finally oxydized, and how long this takes no one knows. But this much we do know, that they are provocative of disease and death. These adjuncts of a former civilization have been accumulating for two hundred and forty years, until their numbers are simply enormous, so that the present generation has not only to fight against its own filth, but also against this legacy left us by our predecessors.

How to take care of that which is incidental to our daily life and habits, is the most difficult problem presented to modern cities. Our Sanitary Inspectors tell us that they have visited in our city about a thousand stables, over two thousand hencoops and two hundred and fifty-six pigstyes. They have enumerated over three thousand cesspools and upwards of six thousand privy vaults (more than two thousand of which were "in bad condition") to say nothing of the thousands of the unused ones covered up and out of sight and so not found by them, but which have not lost their power for evil. In our porous soil and scattered about among and between these nine thousand (9,267) known, and all the thousands of unknown cesspools and privy vaults, they tell us that there are nearly two thousand wells in use. There are reported upwards of two thousand six hundred houses on sewered streets which are not yet connected with the sewers; there is "garbage thrown on the surface" of the yards, "sinks untrapped"—and so on through the long list of unsanitary conditions.

This can and ultimately will be remedied. I am as sure of it as I am that the world moves, and blessed be the citizen who helps on the good work. The time has already come when men no longer openly oppose the grand movement. We see opposition enough, we feel it more than enough, but we see few who have the courage to state their position and openly espouse the cause of filth. The good work is actually going on and to attempt to delay it is the most foolish of follies—it is worse than folly.

In this improvement, cleaning up and keeping cleaned up is the first and most important of the practical work that belongs to the municipal authorities. Nature demands that we have no charity for uncleanness, and eternal vigilance is the price of health as well as of liberty.

Our natural conditions are favorable for a low death-rate. We have a dry, sandy soil, a genial climate, and an intelligent population. I have an abiding faith that public opinion is so working in the right direction that a death-rate of 13 per thousand or even less, may be reached for the whole city; that public intelligence will soon see its possibility and public opinion will then demand it.

Nature is a kind mother to her obedient children, but a severe mistress to the disobedient. There is no evading the penalties of disobedience. She knows no extenuating circumstances when her laws are violated; she listens to no plea of ignorance, but inflicts the penalties with merciless severity and pitiless certainty. Rich and poor, learned and unlearned, are judged alike and punished alike. Health and disease, long life and early death are in accordance with Nature's Laws, which, as a whole, are as beneficent and kind as they are inexorable and strict. It is the part of wisdom to accept these facts and work accordingly.

The duty of the city through its officers is plain, and I recommend the whole matter to your most thoughtful consideration.

Your obedient servant,

WM. H. BREWER, *President.*