

CHAPTER II

INDUSTRIAL ACCIDENTS, ILLNESS, AND PREMATURE DEATH: PREVENTION

ANY analysis of the causes of human misery must give an important place to the evils to be discussed in this chapter, — industrial accidents, illness, and premature death. Together they go far to account for the persistence of poverty and dependency in a country so fortunately situated as the United States. If they could be eliminated, or their harsh consequences softened, rapid progress might be made in that reduction of poverty which we all have at heart. Here I shall discuss the extent of these evils in the United States, and the measures that may be taken to prevent their occurrence. In the next chapter I shall consider methods of safeguarding wage earners against the losses which they entail.

Fourth of July orators are fond of calling attention to the different fields in which these United States beat the world. There is one field, however, which in our expansive and self-congratulatory

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moods it is better for us to forget. The United States shows every year a larger proportion of industrial accidents on its railroads and in its mines and factories than any other civilized land.

According to a recent comparison, we kill nearly three times and injure more than five times as many railroad employees, in every thousand employed, as Great Britain; we kill two and one half times and injure five times as many as Germany, and we kill more than three and injure nearly nine times as many as Austria-Hungary.¹ The showing made by our mining industries is almost as bad. To refer only to coal mines, in the five years, 1902-1906, three and one third employees in every thousand were killed on the average each year in the United States, as compared with two in Prussia (1900-1904), one and one quarter in Great Britain, and one in Belgium.² That the showing made by our mills and factories is equally unfavorable, no well-informed person will deny. The very reason which makes it impossible to prove this in figures — that is, the absence of trustworthy accident statistics for

¹ The New Encyclopedia of Social Reform, p. 7.

² Coal-Mine Accidents: Their Causes and Prevention. U. S. Geological Survey. 1907.

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the United States — is indirect evidence of our backwardness in the field of accident prevention. Basing a judgment on such comparative data as are available, I feel safe in asserting that, as regards occupations generally, accidents are nearly twice as common in the United States in proportion to the number employed as they are in the United Kingdom and Germany, and that, as regards the railroads, they are nearly three times as common.

Just what this means in loss of life and limb, in suffering, poverty, and dependency, it is impossible to state with any degree of accuracy. According to the mortality statistics for 1908, there were in that year 44,089 deaths from accident in the registration area of the United States, of which 19,287 befell gainfully employed men and boys, and 683, gainfully employed women and girls. All of the accidental deaths, even of the gainfully employed, were of course not due to *industrial* accidents, but it does not seem unreasonable to assume that three fourths of them were. Remembering that the registration area in 1908 embraced only one half of the population of the country, we may thus conclude that the fatalities from industrial accidents in that year aggregated about 30,000.

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That this total is not excessive is indicated by the fact that the annual death toll which our railroads and coal mines alone levy upon those they employ exceeds 5000,¹ although the employees in these industries constitute less than one tenth of the gainfully employed men and boys of the country.

Any estimate of the number of non-fatal accidents in the United States must be accepted as a pure guess. In 1906, according to figures furnished by the United States Geological Survey, our coal mines injured two and one half times as many men as they killed. There are other occupations, as that of linemen repairing wires carrying high-tension currents, in which men are seldom injured by accidents; they are almost always killed. On the other hand, on the railroads last year more than twenty times as many men were injured as were killed. Other industries, like textile mills,

¹ During the ten years ending June 30, 1909, the average annual number of fatal accidents to railroad employees was 3307; during the three years, 1904 to 1906, the average number of coal miners killed was 2052. The number of coal miners killed in 1908 was probably a good deal larger than this average, since 1250 were killed in Pennsylvania alone, in that year. With the terrible Cherry Hill disaster to its credit, there can be little doubt that 1909 established a new high record, though the exact figures are not yet available.

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would show many injured, but few if any killed, over a long period of years. Between these limits the fancy of the imaginative statistician may play at will. Mr. F. L. Hoffman, an acknowledged authority in this field, estimated the number of non-fatal accidents in the United States in 1908 at 2,000,000.¹ Professor R. P. Falkner, equally qualified to speak authoritatively on a statistical question, considers an estimate of even 500,000 "overdrawn."² What neither he, nor Mr. Hoffman, nor any other student of the subject, will deny is that the number of non-fatal as of fatal accidents in the United States is inexcusably, criminally large, and that fully half the accidents that now occur could be avoided.

As there is no difference of opinion in regard to the possibility of reducing the number of industrial accidents in the United States, so there is little as to the methods which should be adopted to this end. The principal changes in our present policy which should be made are three: First, the law should require that industrial accidents

¹ Bulletin of the U. S. Bureau of Labor, No. 78, September, 1908.

² Proceedings of the Ninth Annual Meeting of the National Civic Federation, December 14 and 15, 1908. p. 156.

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in all occupations be regularly reported to some public authority which shall make it its business to study the causes of accidents, and to devise means of preventing them. Second, safety and sanitary regulations, recommended by this public authority, should be drawn up and rigidly enforced by means of regular inspections. Third, some plan of accident indemnity should be devised which shall make it overwhelmingly to the financial advantage of employers to reduce to the narrowest limits the number of accidents that befall their employees.

Reference has already been made to the inadequacy of our information in regard to accidents. Even in New York, which is now fairly successful in securing reports in regard to factory accidents, no accident reports whatever are required in connection with building operations. To get information in regard to accidents in the building trades, the investigator must have recourse to the records of the private accident insurance companies. Thus, the first step toward wise regulation — information in regard to accidents, their causes, etc. — has yet to be taken in the leading state in the Union, in this notoriously dangerous industry! And New York is not behind the rest of the country

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in this field. On the whole, she is well in the van of progress, — but a progress which has only just begun.

As regards safety and sanitary regulations and inspection, the United States is equally backward. That the number of accidents can be greatly reduced by regulation and inspection has been proved over and over again. Thus, as regards the railroads, significant results have followed the requirement by federal law that automatic couplers be used. In 1893, when few automatic couplers were in use, the number of persons killed while coupling and uncoupling cars was 2.9, and the number injured was 76.9 for every 1000 employed in this operation. In 1908, when the law was generally observed, the number killed was only 1, and the number injured only 16.1 for every thousand. In other words, the number of fatalities in this department of railroad service was reduced to one third, and the number of accidents to one fifth what it had previously been, by this one simple remedy. How far accident prevention may be carried by intelligent attention to the problem is proved further by the fact that in 1908 there was not a single passenger killed on the railroads of Great Britain, and that one well-known railroad

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system in this country is said to have been equally free from accidents to passengers for ten successive years.

Accident prevention is equally possible in other occupations. A report recently published by the United States Geological Survey¹ shows how European countries have reduced the number of accidents in their coal mines by imposing and enforcing regulations in regard to the size of the charge that may be fired in a mine, the time when charges may be set off, the kind of safety lamps that must be used, etc. Engineers agree that coal mining is naturally safer in the United States than in Europe, where mines are deeper and veins are narrower. It is no exaggeration to say that we could reduce the number of fatal and non-fatal accidents that occur in coal mining to one third, or even one fourth, the present figures, if we would give the attention to the problem that it receives, for example, in Belgium. And we must do this. The present wanton sacrifice of lives and limbs is a national disgrace!

The final method of checking accidents is to make them costly to employers. In saying this,

¹ Coal-Mine Accidents: Their Causes and Prevention. By Clarence Hall and Walter O. Snelling. 1907.

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I do not wish to put the blame for the present situation upon employers. We must all share it. It is a result of our American haste and our tendency not to count the cost so long as the end aimed at is attained. But there are different ways of attaining ends. We have too long been satisfied with a system of accident indemnity that encouraged employers not to count the cost of human limbs and human lives. A different system, one which will put a price on every arm and leg and life that may be sacrificed on the altar of industry, as urged in the next chapter, must be adopted.

Along these lines — fuller information in regard to accidents, wise safety and sanitary regulations strictly enforced through frequent inspections, and a system of workmen's compensation that will make the employer the eager co-worker with the inspector in the effort to prevent — great progress may be made in reducing the number and seriousness of industrial accidents. Can an equally favorable claim be made in regard to the prevention of illness?

We have no exact statistics as to the amount of illness in the United States. Special inquiries, however, such as that of Dr. Jacobs, into the amount of illness calling for hospital treatment in

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New York City, appear to indicate that the situation here is not very different from the situation in the United Kingdom. On the basis of English statistics, Dr. Farr concluded, some twenty-five years ago, that in Great Britain and Ireland for every death in the community there are a little more than two years of illness. This amounts to saying that two persons are continually ill for every one person who dies in a given period. Needless to say, the persons ill vary constantly. The figures indicate merely that, for every death, two years of illness fall to the lot of some persons somewhere.

According to the most recent mortality statistics, the number of deaths in the United States in 1908 was about 1,500,000.¹ This would indicate, if we apply Farr's formula, that as many as 3,000,000 persons were continuously ill during that year. Of these, according to a careful estimate, as many as 500,000 were afflicted with tuberculosis, half of them being completely incapacitated by the disease, and the other half partly incapacitated.

¹ The actual number of deaths reported in the registration area was 691,574. As this area included only one half of the population of the country, and some deaths were undoubtedly not reported, the figure for the whole country is put at 1,500,000.

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On the average, the figures indicate a loss of 13 days a year by each man, woman, and child in the country, as a result of illness.¹

This loss is so appalling that it is difficult to appreciate at once its full significance. If we assume that the proportions in the different age classes of ill persons correspond to the mortality figures, more than one fourth of this illness affected children under five years of age; more than two fifths, persons from twenty to sixty-five years of age; and one fourth, persons over sixty-five years of age.² It would thus appear that more than 1,200,000 persons from twenty to sixty-five years of age, or in the period of active manhood and womanhood, were continuously ill. When we compare these 1,000,000 odd mature men and women who are ill every day with the number of victims of industrial accidents, the greater seriousness of the problem which illness presents is apparent.

¹These estimates agree with those of Professor Irving Fisher, from whose valuable *Report on National Vitality* (Washington, 1909) many of the following facts in regard to illness and its prevention are taken.

²This undoubtedly involves an understatement of the amount of illness that affects the higher age classes, as it is well known that morbidity increases with age.

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The best way to determine what proportion of this illness is preventable is to start again with the facts revealed by the mortality statistics. Much illness is, of course, due to minor ailments rarely if ever causing death. A large part, however, is the consequence of the diseases which contribute each year to the death rate. By considering these diseases from the view-point of preventability, we may get some idea of the extent to which illness is preventable.

The first fact which must impress the student of death rates is the extent to which these rates vary among different countries and among different sections of the same country. Recent statistics indicate that the number of persons who die in a year, in proportion to 1000 of the population, ranges from only 13.5 in Denmark (1906) and 14.4 in Sweden (1906) to 42.3 (males) in India (1901). In the registration area of the United States the death rate in 1908 was 15.3.¹ When we go behind this average figure, we discover that variations within the United States are very striking.

¹ This is undoubtedly lower than is warranted by the actual facts, because of incomplete returns from some parts of the registration area. In 1900 Professor Wilcox put the corrected death rate at about 18.

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As regards the different states, the rates for 1908 vary from 10.1 and 11.6, in South Dakota and Wisconsin respectively, to 17 and 18.4 in Colorado and California respectively. Cities show even wider variations. Thus, St. Paul and Minneapolis report rates of 10.1 and 10.3, which rival the low rate for South Dakota; while, at the other extreme, Fall River, New Orleans, and San Francisco show rates in excess of 22. New York City shows a rate midway between these extremes, of 16.8.

The reasons for these wide variations become apparent as soon as we study the mortality from different diseases in different localities, and among different classes of the population. A few illustrations will make this clear and will explain why physicians generally take such optimistic views of the possibilities of disease prevention.

Some diseases, like cholera and smallpox, which used to decimate periodically the populations of whole countries, are now almost forgotten in the Western World, although they are still serious scourges in the East. It is the persistence of these diseases and the ravages of famine which make the death rate of India nearly three times as high as the death rate of the United States.

More recent has been the successful campaign

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that has been waged against yellow fever in sections where it used to be one of the chief causes of a high death rate. To cite only the experience of Havana, Cuba, before the American occupation, the death rate from this disease rose as high in some years as 640 per 100,000. Even in 1900, the year during which American sanitary engineers were making a clean-up of the city, the rate was 124. In 1901 the rate fell to 7, and during the next three years — 1902, 1903, and 1904 — not a single death from yellow fever was reported.

Less sensational, but still impressive, is the progress made in coping with malaria since the connection of this disease with the vagrant mosquito was discovered. During the last eight years the deaths ascribed to malarial fever in the United States, per 100,000 of the population, have decreased by gradual steps from 5.4 to 2.5. This disease, which used to be a serious scourge in many sections of the country, is thus gradually losing its importance.

More impressive still are the results that have followed improvements in the public water supplies of cities in the United States which have shown a high death rate from typhoid fever. Thus, in Lawrence, Massachusetts, the death-rate from this

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disease was reduced from 105 to 22 per 100,000 as a consequence of improving the city's water supply. In 1907 Pittsburg had the unenviable distinction of showing the highest death rate from typhoid fever, 130.8, of any city in the civilized world. Allegheny was a close second, with a death rate of 96.9. During the next year, in consequence of the operation of a new filtration plant, the death rate for Pittsburg and Allegheny together — the Greater Pittsburg — was brought down to 46.6, or about to the point at which the death rate from this disease, for the whole United States, stood in 1890. That this is only a beginning in the direction of the improvement that must follow the introduction of pure water, pure milk, and pure air into regions previously polluted, is shown by the fact that, in the same period, Cincinnati reduced its death rate from typhoid from 46.4 (1907) to 18.6 (1908), and that, in the United States as a whole, the death rate from this cause was brought down from 46.3, in 1890, to 25.3 in 1908. That this progress may continue, until typhoid follows malarial fever into the position of an unimportant disease, is suggested by the fact that Worcester, Jersey City, Paterson, and Richmond Borough of New York already show death rates from typhoid

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of 10 or less, and that even this rate is high in comparison with the rates for the cities of western Europe. Thus, the rate for London in 1907 was only 5; that for Edinburgh, 2; that for Paris, 8; for the Hague, 1; for Berlin, Hamburg, and Vienna, 4; and for Munich, 3. There is no reason why similarly low rates should not be ultimately attained by the whole United States.

Official figures do not yet indicate in an equally striking way that progress is being made in lessening deaths from tuberculosis, but they do show a steady, if gradual, improvement. Thus, the number of deaths from tuberculosis of all forms in the United States, per 100,000 of the population, decreased in the five years from 1904 to 1908 from 201.6 to 173.9. The decline in deaths from tuberculosis of the lungs was even more marked, the rate falling from 177.3, in 1904, to 149.6, in 1908. In view of the short time during which the campaign against the white plague has been carried on, on a scale at all commensurate with the evil, this reduction in the death rate from tuberculosis of nearly 15 per cent in five years is highly encouraging. Professor Irving Fisher estimates on the basis of the opinions of specialists whom he consulted that the mortality from consumption may

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be reduced 75 per cent. Others go so far as to predict that tuberculosis will one day follow cholera, smallpox, and yellow fever in becoming one of the rare causes of death in civilized countries. That the death rate from this cause may and will be greatly reduced in the future, no well-informed person questions.

In addition to reducing the frequency with which specific diseases cause illness and death, sanitation and attention to the laws of health may increase greatly the resisting power of the human organism to diseases in general. There can be no question that economic conditions have an important influence on health and vitality. Thus, Newsholme found that in Glasgow the death rate for families living in one- and two-room houses was 27.7; for families living in three- and four-room houses, 19.5; and for families living in five rooms and over, 11.2.¹ Similarly, Rowntree discovered that the death rates in York, in three sections which he distinguishes as "poorest," "middle," and "highest," were 27.8, 20.7, and 13.5.² Levasseur made a similar comparison of different quarters of Paris which showed even more striking differences. The

¹ Vital Statistics, 1899, p. 163.

² Poverty: A Study of Town Life, 1902, p. 205.

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death rates he found were: poorest, 31.3; middle, 16.2; highest, 13.4.¹ Such calculations confirm the conclusion which, in any event, would commend itself to common understanding, that every advance in the campaign against poverty is also an advance against disease and death, which are themselves frequent causes of poverty.

It is impossible, with our present knowledge, to estimate the extent to which illness and death are preventable. Nevertheless, it is suggestive to bring together the views of physicians and others on this subject, and to hazard a guess as to what may be done. A notable effort of this sort was made by Professor Irving Fisher, in the *Report on National Vitality: Its Wastes and Conservation*, which he prepared last year for the National Conservation Commission.

Professor Fisher's method was to establish by consultation with physicians, sanitarians, and others a percentage of preventability for each of the ninety most important diseases distinguished in our mortality statistics, and then to determine the effect which the prevention of all preventable diseases would have upon the death rates for different age classes.

As we should expect, he found that the greatest

¹ *La Population Française*, 1889-1902, Vol. II, p. 403.

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field for advance is presented by the diseases to which infants and young children succumb. His calculation leads him to believe that pure air, pure milk, pure water, proper sanitation, and attention to the known laws of health, *if provided for all children*, would reduce the mortality of infants 47 per cent and that of young children (median age two to eight) 67 per cent. If correct, these estimates mean, as is pointed out in the Census Bulletin on Mortality Statistics for 1908, "applied to the 200,000 deaths of infants and children in the registration area, or the possible 400,000 deaths of these classes in the United States, a saving of at least 100,000 or 200,000 lives each year." And the hard-headed compiler of the Census figures adds, "This does not seem unreasonable, when we consider the fact that there is apparently no reason why infants, *if properly born* (and this means simply the prevention of ante-natal disease, and the improvement of the health and conditions of living of their parents), should die at all in early infancy or childhood, except from the comparatively small proportion of accidents that are strictly unavoidable."

Applying the same method to the diseases which carry off each year older children and

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adults, Professor Fisher estimates that 49 per cent of the deaths due to the diseases of youth and middle age (median age 23 to 49) are preventable, and 28 per cent of those due to the diseases of advanced age (median age 52 to 83). Combining these figures, he concludes that 42.3 per cent of the deaths which now occur might be prevented, or, more properly, postponed.

To make it clear what such a change would mean to the people of the United States, he translates this 42.3 per cent into its equivalent in the average addition to the length of life that would result from it. The average duration of life in the United States at present he estimates, on the basis of the available evidence, to be forty-five years. This average he finds would be increased by over fourteen years, or nearly one third, if deaths were prevented or postponed, as he is convinced they might be. Of this increase, "4.4 years would be caused by reducing infant deaths under or near one year; 1.5, by reducing mortality from children's diseases; 6.8, from reducing the diseases of middle life, especially tuberculosis and typhoid; and only 1.3 by reducing the mortality of diseases the deaths from which usually come after 50 years of age."

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Another aspect of illnesses that may be prevented and deaths that may be postponed is their cost. Professor Fisher concludes his report with some calculations under this head which I cannot refrain from quoting. Estimating that the number of persons who are sick all the time in the United States is about 3,000,000, and that very close to one third of these — or 1,000,000 — are in the working period of life, he figures out \$500,000,000 as the minimum loss in earnings. To this he would add \$1,500,000,000 as the cost of medical attendance and other extraordinary expenditures necessitated by illness. This figure, he admits, may be too large. For it he suggests that we substitute the average expenditure connected with illness found to be incurred by the wage earners' families investigated by the United States Bureau of Labor in its study of wage-earners' budgets, \$27, multiplied by the 17,000,000 odd families living in the United States. The resulting total, \$459,000,000, may safely be said to be much less than the actual cost of this item. The actual cost of illness in the United States, including the cost of medical attendance and the loss in earnings, is certainly, therefore, not less than \$1,000,000,000 a year, and may be as much

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as \$2,000,000,000. That this estimate is conservative is shown by comparing it with estimates that have been made by physicians from time to time. Thus, Dr. George M. Kober has calculated that typhoid fever alone costs the country not less than \$350,000,000 per year. Dr. George M. Gould has estimated that sickness and death in the United States cost \$3,000,000,000 annually, and that at least a third of this is preventable. Professor Fisher himself is confident that fully one half of the loss due to illness, or at a minimum, \$500,000,000, may be saved by fuller attention to preventive measures.

To the loss due to preventable illness must be added, of course, the loss due to deaths that might have been prevented or postponed. Estimating the annual number of deaths in the United States at 1,500,000, and assuming that 630,000 of these deaths are preventable or postponable, he concludes that the saving to the community that would result from the prolongation of life which he deems possible would amount to \$1,000,000,000. Thus, the total saving that may be expected to result from due attention to the conservation of national vitality is not less than \$1,500,000,000 a year, and may be much more.

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A discussion of all the measures that may be taken to prevent illness and postpone death would carry us into the technical field of preventive medicine. It is a remarkable fact, however, that the physicians who are most optimistic in regard to the problem of increasing national vitality and prolonging human life pin their faith, not so much to novel methods of combating disease, as to the wider extension of simple preventive and protective measures that have long been familiar.

Thus, Professor Fisher shows that of the ninety diseases that appear as the most important causes of death in the United States, seven account for more than half of the shortening of life which he considers preventable. These are diarrhea and enteritis, broncho-pneumonia, meningitis, typhoid fever, tuberculosis of the lungs, violence, and pneumonia. Together, these seven causes shorten the average duration of life in the United States needlessly by more than eight years. The means for combating these causes of death on which physicians place the greatest reliance are pure milk, pure water, pure air, and protection from accidents. If by a wise combination of community action and private philanthropy impure milk, impure water, impure air, and unnecessary exposure

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to accidents could be eliminated from American life, its average duration might be extended at least eight years, and probably a good deal more, since these are contributing factors in perpetuating other diseases also.

The means to be taken to insure pure milk, pure water, pure air, and protection against needless accidents to an ever larger proportion of our people are various but simple. All that is really necessary is that public opinion be educated up to the point of demanding these indispensable conditions to health, and municipalities will devise measures to insure them. Municipalities, as a rule, already assume responsibility for furnishing pure water to their inhabitants. Their standards of purity are often much too low, but there is little difference of opinion as to the means to make them higher.

Pure milk and pure air are not so easily secured, but that they can be secured is proved conclusively by the experience of those municipalities at home and abroad which are fully alive to their importance. No academic objections to municipal socialism should deter us from insisting that it is just as much the duty of the municipality to see to it that pure milk and pure air are within the reach of every citizen as that pure water is available.

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Provision of pure milk may be brought about by a proper combination of state and municipal regulation and inspection, or may be achieved only through municipal pure-milk depots. This is a technical problem that may call for different answers in different sections, but whatever the answer, nothing should deter us from pursuing the goal until it is attained.

Pure air for city dwellers may be secured by tenement house and factory and workshop regulations and inspection, or it may be attainable only through the systematic reconstruction of our cities, and the redistribution of congested populations over wider areas and in more healthful sections. Here, again, the goal is the thing to be held in view and to be worked toward, irrespective of the means that may prove to be necessary for its attainment.

In addition to the provision of pure water, milk, and air, for which we must depend upon municipal and state action, there are more complex means of combating disease and strengthening vitality, for guidance in the application of which we may well look to the national government. It is an amazing fact that, up to the present time, our federal government has devoted much more time

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and money to the protection of the lives of cattle, sheep, and hogs than it has to that of human beings. The Agricultural Department has long been effectively organized to study the conditions favorable to the health and development of plants and animals. We are still without any department to consider the conditions favorable to the health and development of men and women. Millions of dollars are expended every year—and wisely expended—on the agricultural experiment stations, and our knowledge in regard to methods of combating the diseases to which plants and animals are subject has been greatly extended. No similar provision is made for the study of human diseases, and though valuable work has been done in this field by army surgeons and other federal officials, they have worked without adequate financial assistance and without the persistent coöperation that is only possible in a permanent governmental department or bureau.

It is these considerations that caused President Taft, in a recent message to Congress, to follow President Roosevelt in advocating the creation of a Federal Bureau of Health, which should undertake to do for men and women what the Agricultural Department is doing so well for plants and

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domestic animals. It is earnestly to be hoped that this recommendation may lead to legislation, and that in a short time the federal government may be doing its share in the work of combating disease, to which so many agencies are now contributing. That these agencies together will steadily increase our knowledge of the causes and prevention of diseases that now baffle medical science must be the conviction of every one who considers what has already been accomplished. The same concentrated attention that mastered yellow fever must triumph over the hook-worm disease, if the proper treatment of that malady is not already understood. The same patient investigation that has yielded our present knowledge of tuberculosis must in time clear up the mystery which surrounds cancer. So, one by one, the dread diseases that have pursued humanity with illness and premature death in the past must be shorn of their terrors by the progress of medical knowledge. The prospect of such progress was never brighter than at present. Professor Fisher's estimate that the length of life may be prolonged by one third may now seem extreme, but changes may be imminent which will make it appear unduly cautious. Physicians are not lacking who

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insist that a time will come when all diseases will be understood, and all who care to obey the known laws of health may look forward confidently to a green old age. But this prediction refers to a future still remote, and even the most sanguine prophets of the new day, like Pasteur and Metchnikof, would hardly urge that present policies be determined by it.

I have devoted this chapter to the prevention of industrial accidents, illness, and premature death, not because I had any specially novel or significant methods of prevention to present, but because I wished it clearly to appear that the measures I shall advocate for indemnifying those who suffer because of these evils are not substitutes for preventive methods, but merely supplements to them. In any program of social reform prevention of these evils must always be given the first place. If we could entirely prevent them, then preventive measures alone would suffice. Unfortunately, we cannot entirely prevent them. The number of fatal accidents that occur in the United States may be cut in two. Non-fatal accidents may be reduced in equal proportion. Two fifths of the illness that now burdens our people may be checked, and the average duration of life

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may be extended by one third. These improvements may be attained, and we must all work for them in season and out of season. But even after they are attained, and much more during the many years while we are striving for their attainment, industrial accidents, illness, and premature death will impose a heavy burden on those who suffer in consequence of them. In the next chapter I shall consider what may be done to lighten this burden and check the stream of poverty and pauperism that is now directly traceable to these sources.