Public health and municipal government / by John S. Billings.

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AND

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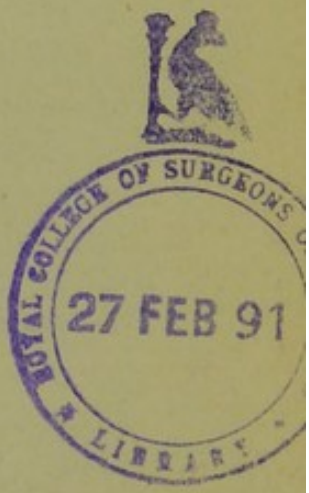

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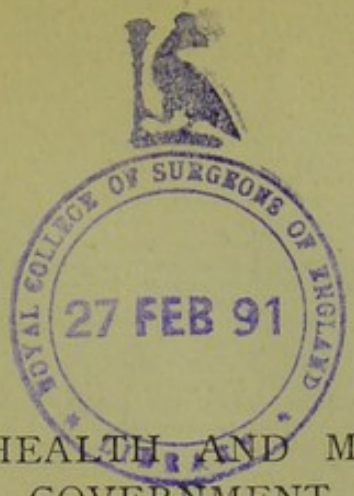

PUBLIC HEALTH AND MUNICIPAL GOVERNMENT.

I PROPOSE, this evening, to call your attention to certain matters affecting health and comfort which are, to a great extent, peculiar to cities, which are more or less the subject of municipal regulations, and which are becoming of increasing importance from the sociological and political point of view.

For the last forty years the cities of the United States have been progressively increasing in population faster than the rural districts. During the ten years from 1880 to 1890, the total population of the United States increased 24.57 per cent., while the number of persons living in cities of 10,000 inhabitants and upward increased over 48 per cent. The proportion of the total population living in such cities in 1880 was 23.26 per cent.; in 1890 it was 27.89 per cent. The proportion of persons residing in such cities is greater in the North Atlantic States, where it is now 48.83 per cent., or nearly one-half of the whole population. In Massachusetts over 70 per cent. of the people live in such cities; in New York, 58 per cent; in Rhode Island, 57 per cent.; in New Jersey, 50 per cent.; in Pennsylvania, nearly 39 per cent. The smallest proportions of urban population are found in the Southern States; thus, in Mississippi it is less than 2 per cent.; in Arkansas, 3 per cent.; in North Carolina, 3.3 per cent.; in Alabama, 5 per cent.; in South Carolina 6 per cent.; in Georgia, 9 per cent., but in all these States it has also increased.

This rapid increase in cities is due mainly to immigrants

from foreign countries, and to migration from the rural districts to the cities, and not to excess of births over deaths; for death-rates are much higher in the cities than they are in the country and in small villages, and this is one reason why the rate of increase of the total population of the United States has been less for the past ten years than it was for previous decades.

The effects of city life upon the health and vitality of those subjected to it form an increasingly important subject for investigation and study, not only by the physician, sanitarian, and philanthropist, but by business men, politicians, and sociologists.

The aggregation of large bodies of men in limited localities has many advantages; it concentrates force, stimulates and makes possible the doing of many things conducive to human happiness and progress which would not be done in a scattered community, and is a necessity for the progress of civilization.

When the dangers to health in such aggregations were far greater than they are to-day; when the average duration of life of the city dwellers was fifty per cent. shorter than, and their death-rate double, that of our most unhealthy towns, there were great cities to which, as now, the young, the ambitious, the energetic, the best of the race, flocked to seek the pleasures, prizes, and rewards which they knew might be found there, and there only, although they also knew that they risked their lives in doing so. And the reason for this is, that men feel that health is not an end, but a means. Its value is great to the individual, because it enables him to obtain and enjoy, but it is of small value if the person possessing it is isolated from his kind. When the human machine has given way at some point, when the stomach, or kidney, or heart, or brain, no longer performs its proper work without producing pain or consciousness on the part of its owner, the point of view changes somewhat, but it requires very considerable and continued suffering to induce most men engaged in active

business to give this up and devote their attention to avoiding pain instead of seeking pleasure. Every physician in active practice is familiar with the astonished, incredulous, and slightly-offended aspect of the man who comes to him for a prescription for a little dyspepsia, or hoarseness, or dizziness, or numbness, and is told that this is the beginning of the end, and that henceforth he cannot follow his favorite habits and pursuits if he wishes to preserve his life. And this is true to a certain extent of communities as well as individuals. It is hard to persuade a city that it is ill, or in danger of being ill, so long as the trade-pulse beats strongly and clearly, and still harder to induce it to submit to any treatment which may slacken this pulse even temporarily.

There is almost always room for doubt as to whether the case has been diagnosed correctly; whether the doctor is not an alarmist who would like to obtain, and retain, a paying patient; whether the suggested change cannot be deferred for a month or two, or a year or two, without much additional risk.

Occasionally the first symptom is a paralysis or an epidemic which cuts short the business activity of the merchant or of the city, and leaves no room for doubt as to the seriousness of the case—but such beginnings are the exception and not the rule—and when temporary recovery occurs are soon forgotten.

Upon the whole, it is well that this should be so; there is such a thing as being too cautious, and as worrying over troubles that never come.

It should be remembered, also, that health implies the power of adjusting the organism to changes in the environment. As Paget says, "He should not be deemed thoroughly healthy who is made better or worse, more or less unfit for work, by every change of weather or food, nor he who in order that he may do his work is bound by exact rules of living." In a large city, where a great variety of work must be done, under widely different cir-

cumstances, men become adapted to specially dangerous or disagreeable forms of occupation by habit and by natural selection; but the community as a whole must be fitted to meet hot waves and snowstorms, long dry spells, and drenching rains, without serious injury to its well-being, or it is not in good sanitary condition.

In matters of health, as of law and business enterprises, we have to deal with probabilities, and not with astronomical formulæ. The health of a community, like that of a man, is a "function of many variables." Like causes under like circumstances will produce like effects in the microcosm as well and as certainly as they will in the test-tube, but one may have like effects from different combinations of causes. Let us consider a little some of these variables which affect the healthfulness of different parts of a city.

The death-rate of a particular ward or block varies with the poverty of its inhabitants; the average shortening of life connected with great poverty being from ten to fifteen years. In all large cities there exist a number of people who are very poor, who as a rule do not get enough to eat and are insufficiently clothed, and among these there is a distinct class of people who are structurally and almost necessarily idle, ignorant, intemperate, and more or less vicious, who are failures, or the descendants of failures, and who for the most part belong to certain races.

These people congregate in certain quarters and in certain houses which are adapted to their means, tastes, and habits —they huddle together in foul rooms; they include the loafers, the street arabs, the tramps, and casuals; their poverty is the result of intemperance and indolence dependent on physical structure, and if the evil results were confined to themselves there would be little use, from the commercial point of view, in attempting to improve their condition. If we consider them alone, we are tempted to say with Carlyle: "Let wastefulness, idleness, and improvidence take the fate which God has appointed them, that

their opposites may have a chance for *their* fate. He that will not work according to his faculty, let him perish according to his necessity."

But we must look after these people, and help them, for the sake of others, if not on their own account. When diphtheria prevails in a tenement-house many school children are in danger, and the most perfect plumbing in a house affords little protection against the entrance of this disease if it is prevailing in the vicinity. Typhus and smallpox do not confine their ravages to the vicious and foul after they have acquired malignancy amongst them.

Mingled with those who might not be worth saving on their own account, is a much larger number of honest, industrious, and fairly intelligent and energetic poor people, who live by day's wages, and are struggling against their surroundings to improve their condition, and especially to give their children a fairer chance in the race for life than they themselves have had. These last are the people whom it is worth while to help for their own sake, while attempts to improve the condition of the others are, as a rule, chiefly beneficial to those who make such attempts. You will observe that I am considering this matter entirely from the money point of view, without reference to religion, or morals, or altruism. The questions: "Am I my brother's keeper?" "Are fools made for the purpose of giving occupation to wiser and stronger men?" "Is not most of the pleasure in a man's life connected with work done for others benefit?" are far more important, I admit; but to-night I confine myself to a lower plane—to the bread and butter aspects of municipal life. Great numbers of the incompetent, vicious, idle, deformed, or starved brain class have been poured into this country by immigration during the last fifty years, and have filled our slums and tenement-houses, our hospitals, asylums, almshouses, and jails to overflowing. They cannot escape the results of their physical organization, which, in its turn, is an inherited result

of ancestral degeneration. For them we may "hope the best, but hold the present fatal daughter of the past."

Their death-rates are from two to three times as great as those of the better class of population—one-fourth of their sickness is treated by charities, and one-third of those who die among them are buried at public expense. The districts in which they live require a larger proportion of the work of city officials, inspections, removal of nuisances, police, the courts, etc.; and, on the other hand, they contribute but little to municipal or other taxation. All this is well known, but we have not yet arrived at the stage of applying efficient and systematic prevention, which is perfectly possible, and are still pottering with the so-called remedies which are of little use.

In these districts the deaths usually outnumber the births, so that if it were not for a continued stream of new recruits, this population would diminish. How can accession be prevented? One way is to get rid of and prevent additions to the kind of dwellings which these people seek. Do you say that they must live somewhere, and that there must be such places for such people? I do not think so; it is not necessary that any city should allow the existence of such houses within its limits, and if their destruction forces some persons into almshouses and drives others away, it will be cheapest and best in the end.

Philadelphia has been peculiarly fortunate in the fact that the great majority of the families of her working classes have each a separate habitation, the average number of persons to a dwelling having been, in the tenth census, only 5.79, while in Baltimore it was 6.54, in Boston 8.26, in Cincinnati 9.11, and in New York 16.37.

This good fortune does not consist merely in the fact that these small separate houses are healthier and more conducive to morality than tenement-houses, but also in that they show that there is a more intelligent and industrious class of people here than elsewhere—since the demand creates the supply.

No doubt among these small cheap houses there is a vast amount of so-called "Jerry building," but the tendency is steadily toward improvement, and each family, as it increases and prospers, is better housed at each remove.

Now in comparing death and sick-rates of different parts of a city for the purpose of discovering where the loss of the productive forces of the community is greatest, it is specially important to obtain separate data for the slums and tenement-houses, just as it is for the prisons and hospitals, for this variable must be computed, or, at least, approximately estimated, in order to arrive at any useful practical result.

We must have the data for the so-called unavoidable, as well as for the avoidable, or preventable causes of disease, partly because with the rapid advances in knowledge, what seems unavoidable to-day may be quite within our power to prevent to-morrow, and partly because we have to estimate the one before we can come to any accurate conclusions with regard to the importance and influence of the other. Take, for instance, the influence of temperature, moisture, and pressure and movement of the air which make up the complex which we call "the weather." The weather exercises a powerful influence on health, especially in infancy and old age, and this influence is, to a great extent, especially for the poor, an unavoidable one.

The death-rate of Philadelphia varies with the number, suddenness, and extent of the heat-waves which pass over us in June, July, and August, and which greatly increase the infantile mortality, and also with the degree and duration of the winter's cold, which makes the burden of life for the old and feeble too grievous to be borne, and increases huddling and overcrowding, with the diseases favored by these conditions. If now we wish to know whether Philadelphia is more or less healthy than it was ten years ago, and seek to determine this by comparing death-rates, we must eliminate the influence of the differences produced by the different weather during the two

years which we are comparing. In pointing out that the higher mortality in cities is, in certain parts at least, inevitable, I am speaking only with reference to what the municipality can effect.

In every great city, and at all times, it is possible to find special instances of overcrowding, of squalor, of suffering, and of vice, such as are depicted in the "bitter cry of outcast London," and the question asked by the poet is still applicable, though much less so than it was fifty years ago:

"Is it well that while we range with science, glorying in the time,
City children soak and blacken soul and sense in city slime?
There the master scrimps his haggard seamstress of her daily bread.
There a single, sordid attic holds the living and the dead.
There the smouldering fire of fever creeps along the rotten floor,
And the crowded couch of incest in the warrens of the poor."

No form of municipal government is likely to do away absolutely and permanently with such conditions, or with the duty of, and necessity for, help on the part of individuals, for the poor we shall have always with us, and "the destruction of the poor is their poverty."

To illustrate these points let us take the death-rate of the first twenty-four wards of Philadelphia during the five years ending May 31, 1889, which is shown approximately in the table on the opposite page.

From this it appears that the death-rates in wards 4, 5, 11, 16, and 17 were considerably above the average. Was this due to the nature of the population of these wards, or to their sanitary condition independent of the nature of the population, or to both causes combined?

Wards.	Death-rate per 1000 of population.	Death-rate per 10,000 of Population.					
		Scarlet fever.	Typhoid fever.	Diphtheria and croup.	Diarrhœal diseases.	Consumption.	Cancers and tumors.
1st ward	23.07	4.21	6.42	10.72	14.77	26.98	4.42
2d "	25.68	4.27	5.98	10.57	17.93	32.38	4.73
3d "	25.71	4.34	4.14	11.69	18.52	33.21	5.17
4th "	34.44	3.83	5.44	15.83	25.11	47.49	5.95
5th "	31.03	3.10	4.29	10.14	18.49	50.93	6.32
6th "	25.72	3.50	6.34	12.69	15.97	40.68	6.34
7th "	27.19	3.08	6.23	7.61	18.56	41.46	7.74
8th "	26.59	2.47	5.38	6.73	12.56	33.65	6.95
9th "	25.18	2.25	4.50	6.19	15.38	33.96	8.26
10th "	20.28	1.99	4.24	7.59	12.55	28.74	5.87
11th "	31.10	2.16	8.34	14.06	22.56	32.91	7.42
12th "	23.32	1.95	6.13	10.87	16.03	32.06	6.27
13th "	22.11	2.20	5.06	8.03	13.32	27.73	6.82
14th "	22.31	3.01	7.04	7.14	14.75	31.75	6.48
15th "	20.46	1.37	5.10	7.81	11.89	27.97	6.16
16th "	29.32	2.42	16.15	11.77	30.11	31.15	7.50
17th "	31.10	2.82	12.39	13.90	23.87	36.96	6.65
18th "	26.18	2.32	8.21	11.49	18.47	31.75	4.93
19th "	25.54	2.85	11.30	13.80	18.61	31.56	4.81
20th "	21.85	3.18	8.99	9.63	13.40	31.11	6.49
21st "	20.56	3.56	5.14	16.67	17.49	24.38	5.14
22d "	18.61	1.75	6.94	7.74	12.29	24.63	6.29
23d "	18.76	2.44	8.69	11.25	15.25	21.32	3.50
24th "	25.86	2.56	6.13	12.20	16.09	36.48	5.53

At present I have not the data required to answer this question, because I do not know the number of people in each ward who belong to certain races, such as negroes, Irish, Italian, Germans, Poles, etc. This is an important factor, as you will easily see from the diagrams before you, which indicate the different proportion of deaths among native-born and foreign-born from certain classes of disease. Thus the proportion of deaths from typhoid fever, cancer, and consumption is greater among the foreigners than among the native-born.

Now, we cannot judge properly as to the cause of the greater death-rate in certain wards, or as to whether the municipal authorities are to be blamed for the circumstances producing these greater death-rates, unless we know for each ward the number of infants, children, youths, adults, and old persons who are of American white, negro, Irish,

German, Italian, Polish, etc., parentage who are living, and who have died from certain causes within a certain time.

Hence the mere counting the number of people living, which some people suppose is all that is needed for a census, is totally insufficient for one of the most important purposes of municipal book-keeping.

Let us now briefly consider a few variables affecting the health and comfort of citizens over which the city corporation has chief or exclusive control, and for the existence and condition of which it should, therefore, be held to a corresponding amount of responsibility. These include such matters as water-supply, sewerage, and drainage, streets and pavements, including means of rapid transit, parks, and open spaces, lighting, provision for the dead and for those affected with contagious disease, the sale of improper food and drinks, etc.

"The needs of the inhabitants of a large city are varied and multifarious, many being almost unknown to the farmer or small villager. The place produces nothing; the food, fuel, water, etc., must be brought to it, and the refuse must be taken away.

"Some of these needs, such as those for food, fuel, and clothing, can be best met by ordinary business competition, and the only thing required from the State or municipality to aid in the matter, is that abundant means of communication with the rest of the world are provided, and that the rights of property are maintained.

"With regard to the supply of such articles as water, gas, or electricity, the case is different. These articles are to be brought to, and into, every house through special pipes or conductors in the streets, which must be disturbed for the purpose of laying or repairing them."

They are articles which are needed, not only by each individual for his own convenience, but by the community as a whole to preserve health and to insure security to life and property. To furnish them in sufficient quantity and of good quality requires a large and costly plant, usually

at first in excess of the actually existing requirements, in order to provide for the future growth of the city. If they are furnished by free competition, special nuisances and dangers in connection with the public streets are produced, and the cost of production is necessarily increased. For these and other reasons it is now generally admitted that the supply of water and gas should be monopolies—and that in the immense majority of cases these monopolies should be owned and managed by the city—and many persons, myself among the number, think that the same is true with regard to electric-light plants and street railways.

Many of the variables which I have indicated as being especially under municipal control, have a powerful influence on the health of the people, and a large part of the discussions as to the best way to arrange and manage these, or as to whether in any particular place at a particular time the municipality is doing its duty with regard to them, turn on sickness and death-rates.

It should be borne in mind, however, that no sharp dividing-line can be drawn between comfort and health; that there are many things, such as noise, dust, offensive odors, rough streets, etc., the influence of which upon sick- and death-rates it would be at present difficult or impossible to demonstrate, at least to the satisfaction of a court of law, and yet which do add materially to the burdens of life of those who are subjected to them, and may in some instances turn the scale between life and death. The human body in some diseases may be likened to a heavy railway train going up a very steep grade. If the fire under the boiler can be kept bright and clear, if the fuel and water hold out, and the engineer is skilled and careful to get the benefit of every pound of steam-power developed, then the train will just reach the top of the hill, *provided there are no little pebbles on the track.*

It is always difficult, and usually impossible, to obtain

evidence that is satisfactory from a legal point of view, to prove that the offensive odors from a bone-boiling establishment, or the emanations from a cesspool, or the water from a polluted well, have produced such a definitely injurious effect upon the health of those within the sphere of their influence as to justify municipal interference with vested rights in property, or the exaction of damages for sickness or death produced by them. This has heretofore been due largely to the want of definite and precise, or, in other words, of scientific knowledge of the causes of disease and death.

So long as our sanitarians could talk only vaguely about contagion and its mysterious connection with filth, so long it was possible to meet their denunciations of particular collections of filth with the reply that there was no evidence that many similar collections, and these collections in particular, had done so much harm as to justify much expense in removing them. Attempts to compute or estimate the cost in money to a given community of an excessive amount of sickness and death occurring in it usually have little result in convincing the public that there is any necessary connection between the two, unless, indeed, in the case of a great epidemic.

For example, the annual death-rate of Philadelphia ought not to be as great as that of London, which is about 20 per 1000—indeed, I think it is safe to say that with a constant pure water-supply, good sewerage, and clean and smooth streets, this rate should not exceed 18 per 1000. During the last five years its death-rate has been 22.5 per 1000, which means that there have been each year over 4000 deaths and 7000 constant cases of sickness which were unnecessary.

Allowing twenty-five dollars as the cost of each death for funeral expenses, etc., and two hundred dollars per year as the cost of medicines, medical attendance, food, and nursing for a sick person, we find that about one million five hundred thousand dollars were lost to the

citizens in this way each year without counting indirect damages due to loss of labor, etc. But the reply to this may be that the money did not come out of the municipal purse, but mainly from the pockets of individual citizens, being in the form of an indirect tax, the direct loss to the city being only one or two hundred thousand dollars. I will not stop to argue this question, or to show that the individual loss in this case is, to a great extent, a municipal loss, but will pass on to the question—If heavy death-rates indicate heavy sickness and heavy demands upon the public purse, and if pure water-supplies, good sewerage, clean and well-paved streets, etc., are known to be among the best means to diminish sickness and loss of life, and to make a city attractive as a place of residence and for the transaction of business, and the cost of these things can thus be shown to be a good investment for the city from a purely commercial point of view, why is it that it is so difficult to get this work done in many of our cities?

The answer to this question lies in the domain of political and social science, which is the special province of this Academy. Speaking broadly, it is because those who have the power to initiate and carry out the measures required to obtain the money and to execute these municipal engineering works, do not think that it would be to their personal and political advantage to do so. What they conceive to be their interests lie in quite different directions; their main business is to find employment and wages for some of their friends and to protect the interests of others, in order to control votes in the State and National elections, as well as in those for municipal offices. The majority of the voters whose good-will they especially wish to secure, are not owners of real estate, or, indeed, of much property of any kind, unless it be liquors; nor are they specially anxious to secure well-paved, sewered, and lighted streets, or properly-constructed houses for other people; in fact, many of them suppose that their

interests are rather opposed to these things than otherwise, although this is not really the case.

It should be remembered that the requirements of a city as regards public health and comfort must be considered in connection with its other needs. Its means are limited, and the business of the officials is to apportion these to the several requirements as wisely as possible.

The fact that it can be shown that certain changes would probably diminish the amount of sickness and the number of deaths in a part of or in the whole city, does not make it the absolute duty of the officials to make these changes, regardless of cost, or of their effect on other interests. But no one can doubt the folly of spending large sums in the adornment of public buildings, and, as a consequence, failing to maintain good sewers and clean streets. What is criminal extravagance at one time may be proper expenditure at another.

In the *Forum* for last December, Mr. Andrew D. White commences a paper on the government of American cities by saying that "Without the slightest exaggeration we may assert that, with few exceptions, the city governments in the United States are the worst in Christendom—the most expensive, the most inefficient, and the most corrupt." It is a strong statement, but it is true so far as municipal engineering work is concerned with regard to several of the largest cities in this country. I can certify of my own knowledge that it does not now apply to the city of Washington, where the engineering work upon the streets and sewers has been of late years good and economical. The citizens of Washington have no votes for any offices, National, State, or municipal; they are taxed without direct representation, and they are governed by three commissioners selected by the President. There is no city in the world which has a less costly system of municipal administration in proportion to the work done. The money collected from the taxpayers is expended for the improvement and benefit of the city

with the least possible deduction for the benefit of officials.

President White's view of the causes of the defects of which he complains is, that our cities are managed as if they were political bodies, whereas they should be considered as business corporations, and should have nothing to do with general political interests; that the questions of a city should not be political questions. This also appears to me to be true, and Washington is the only city in this country which is managed in this way, although it is the rule as regards foreign cities.

In the same number of the *Forum* in which President White's article appeared is a paper by Mr. W. M. Springer, entitled "City Growth and Party Politics," in which he comments on the increased political power which our cities will gain by reason of their more rapid increase of population, giving them greater representation in the State Legislatures, and thus greater influence in the United States Senate, and this is also true.

The business of dealing in votes, of procuring them as cheaply as may be, of keeping them aggregated for use in a good state of preservation without risk of fermentation or spontaneous combustion, and of using them or bartering them for profit, is becoming an important industry in this country, especially in the large cities, and our city officials are in the centre of this branch of trade. It is not usually a cash business, but more frequently a form of exchange—exchange for offices, for licenses, for protection for gambling-houses, saloons, houses of ill-fame, dwellings unfit for habitation, and for dangerous and offensive trades; or for contracts for public work, for advertising, for news, etc.

The commission dealers in these things are not all unscrupulous villains; many of them are honest and reliable in their dealings in all other matters, and are liberal citizens and good fathers and husbands, but in political matters they have a code of morals and of etiquette which

is somewhat peculiar, and which causes them to view many questions connected with municipal administration in a totally different light from that in which they would consider them if they related to their own private business only. They do not obtain their power to control votes for nothing; they have to work for it, to know their men, to be on the watch for opportunities to do them little kindnesses, and to prevent legislation which will interfere with their control of the votes which they regard as their own property fairly acquired. It is especially important to their business that personal rights and property rights shall be provided for by the same officials, elected by votes of the whole community, and that the National, State, and municipal elections shall be held at the same time. The fact that while personal rights are equal, property rights are very unequal, is one which it is not to their interests to recognize so far as the ballot is concerned.

The small dealers in votes—the local bosses—the men who manage the primaries, often make great mistakes in the way they dispose of their property, for they do not see that they could get much more for it than they do, and they do not understand that for all the free drinks or small offices that they get they must pay the full share of the cost. The burden of the waste of the funds of a city does not fall exclusively, nor even mainly, upon capitalists and property owners, but on the daily wage-earners, and this burden consists not only in higher prices for shelter and food, and in diminishing opportunities for work, but in sickness of themselves and of their families—in the loss of the health which is necessary to enable them to earn their subsistence. The man of means can give his children a chance to form sound bodies by giving them some months at least in the country every year; but the laborer's children must breathe the impure air of foul streets and alleys without ceasing. The healthfulness of a city is far more important to the poor than to the rich, but they never think of this in disposing of their votes.

The remedies for the defects in our systems of municipal organization—and for the comparative indifference of city aldermen and councilmen to many conditions which affect comfort, health, and life—are, for the most part, not within my province to discuss, but I will briefly refer to one or two points connected with this matter.

The first is, that laws and ordinances are merely formal expressions of opinion, unless they are sustained and carried to their legitimate conclusions by the executive officials and the courts, and that the action of these last is greatly controlled by public sentiment—which last depends on the amount of knowledge which the public possesses as to what is really going on.[1] This information is not always to be obtained from official sources, and hence the importance and utility of voluntary organizations of public-spirited citizens for the purpose of educating the people as to what is and what ought to be. Such citizens' associations exist in several of our large cities—Philadelphia included—they have done much good in the past, and have a wide field of usefulness in the future. One of their functions is that referred to in a recent number of the *Nation*, in which attention is called to the need of a Society for the Systematic and Continuous Prodding of Delinquent Officials, which is to do its work with the greatest and most persistent publicity possible. It is true that we have abundance of public criticism of our officials, but experience has taught us that so much of this is made without proper investigation, and from motives that have nothing to do with public interests, that it has comparatively little influence. The remarks of one of the characters[2] in a recent novel expresses the feeling of many on this point, viz.: "The social and municipal economy of New York consists in one-third of the population everlastingly protesting

[1] "Law is the formal expression of the habits, customs, and ideas of a people. Every person is presumed to know it."

[2] Dr. Claudius, by F. M. Crawford, New York, 1883, p. 175.

against the outrageous things done by the other two-thirds. One-third fights another third, and the neutral third takes the fees of both parties. All that remains is handed over to the deserving poor."

The second point to which I will allude, is the need for more definite and precise knowledge as to the causes of disease, and the relations which they have to circumstances which may and should be controlled by the community as a body, and not be left to individual action.

The more clearly and certainly we can show that a certain outbreak of disease, or the persistent unhealthiness of a certain locality is due to definite and remediable causes, the more certainly will municipal officials be induced to act. It is true that they forget with a velocity and completeness which increase as the square of the distance—for example, during and immediately after a smallpox epidemic the vaccination of children in the public schools will be carefully looked after, but when five or ten years have elapsed without an outbreak the officials grow lax. There is now no need of much interruption to commerce on account of cholera—because we know the cholera organism, can tell whether it is present, and know how to destroy it; while we have to be more careful with ships coming from yellow fever regions in warm weather, because we do not know the germ, and must suspect everything; and we have nothing to say as yet with regard to *la grippe*.

Clear and precise information as to the condition of the people and of their surroundings in different parts of a city is especially desirable. It is not an abstract but a concrete problem that is to be solved; *i. e.*, Is every part of the city in such condition and so occupied that its inhabitants are not in danger themselves and not likely to cause injury to the persons or property of others? This information should be comparatively continuous, and the results should be demonstrable not only to the professional expert, but to the average citizen. If there is

anything wrong, What is it? Where is it? What is the remedy? And what will the remedy cost?

The essential foundation of this knowledge is the registration of deaths and, as far as possible, of diseases, by comparatively small units of areas; by wards, by portions of wards, and in some cases by blocks, or even by single houses. Most of our cities now have a registration of deaths, and a few have a registration, though an imperfect one, of certain forms of contagious disease, such as smallpox, diphtheria, typhoid fever, etc.

It is not possible to have a general registration of sickness, but much might be done in this direction through agencies of which the municipality has the control. For example, all cases of disease treated by public charity, physicians of the poor, free dispensaries, etc., should be reported daily by street and number, and nature of the disease, to the Health Department. All cases of sickness among school children and teachers in the public schools should be similarly reported. The data thus collected should be the guide to continuous inspections and investigations by the health officials.

This means that a sufficient force of skilled men are to be employed. A sanitary inspector whose sole idea is that filth is dangerous, that filth is matter which looks and smells unpleasantly, and that, if he finds some such matter in the vicinity of a sickly neighborhood, his mission is accomplished, is not likely to be of much service.

Bearing in mind the character, ideas, and purposes of municipal officials, and of those who make them, how is it possible to obtain for, and retain in, the service of the city a sufficient number of skilled men for this work? This question is one of practical politics, and as such I commend it to the attention of the Academy.

But there is need not only of the fullest information which can be gained from statistics and inspections, but of information which can only be obtained by experimental investigation—by scientific study.

Our knowledge as to certain causes of disease has increased greatly within the last ten years, and, which is much more important, we begin to see how this knowledge may be increased. It is true that to do this requires much time and labor—labor which must be highly skilled, and must have for use elaborate and costly apparatus, and rooms specially fitted and adapted to the purpose; but now that the utility of these things has been demonstrated, they are sure to be forthcoming. There are now half a dozen laboratories in Europe specially built and fitted for these investigations, and soon there will be one here in Philadelphia, while others are sure to follow. These laboratories are not municipal institutions, nor is it desirable that they should be under municipal control; but their work bids fair to be of great practical importance to our cities, and they should be a matter of special interest to all public-spirited citizens. We must admit that the laboratories and apparatus are less important and easier to provide than the brains which are to use them to good purpose; but they tend to develop these brains, they are centres of attraction to the men who love this work, they are a powerful stimulus to, as well as an indispensable means for the patient, careful, long, and continued investigation which is so necessary to produce reliable results.

The value of an institution properly equipped for research and for the diffusion of knowledge cannot be estimated directly in money, because its possibilities depend on the men who use it. You may, however, form an idea as to these possibilities if you will reflect upon the probable money value to Germany, and to the city of Berlin, of the fact that Koch lives there and has done his work there.

It is true that all laboratories do not develop men like Koch—the sequence of events is usually rather in the opposite direction—but it is also true that without the German laboratories there would have been small chance for Koch's full development.

There is an old story of the capture of a fortified town held by a foreign garrison. The citizens were numerous, but they had no weapons. One day a large number of bundles of fagots were brought in through the gates and delivered to one of the popular leaders, with a scrap of paper on which was written "*Non eget arci.*" He did not understand the message, but he received the fagots, and when he was alone examined them. Every fagot contained half a dozen long iron-tipped arrows. Then he understood the message, "*Non eget arci*"—"The bows shall not be wanting." They came a few days later—smuggled in loads of hay—and the fitting together of the arrows and bows gave the citizens the means of obtaining liberty.

So, also, with the splendid gift recently made of a specially-constructed and well-fitted laboratory of hygiene—a gift not merely to the University of Pennsylvania, but to the city of Philadelphia and to the whole country.

I hope and believe that the power required to move this machinery in the right direction and with sufficient force will also come and grow—that the bows for these arrows will not be wanting, and that the result will be increase of knowledge, improvement of method, and the training of men specially fitted to deal with the complicated and difficult questions involved in the relations of public health to municipal government in our rapidly-growing cities.