

On defences against epidemic visitations.

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*of the Royal College
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ON
DEFENCES AGAINST EPIDEMIC
c VISITATIONS.

Last week, Mr. Edwin Chadwick paid a visit to the neighbourhood of Salisbury, and, by invitation, examined the new drainage works in that city. On Wednesday, there was a city meeting, to hear an address from him on those works, and on the means of meeting epidemic visitations. The Mayor was in the chair, and the meeting was attended by the members for the city, the clergy, and local medical authorities, together with the chief inhabitants of the city.

Mr. CHADWICK said:—

Being on a visit to my honourable friend, Mr. Marsh, your member, I respond to an invitation given to me to express an opinion as to the sanitary position of your ancient city to meet any extraordinary or ordinary epidemic visitations, and as to how it may be served therein by your new and completed works of home and main drainage and of water supply, and as to what additional defences may be needed for the best protection of its population against such scourges. In respect to the impending visitation of an extraordinary epidemic which has been believed to threaten Europe, whilst it is well to abate the tendency to panic, it is right, nevertheless, to consider seriously of preparations to meet it, for all preparations that might be made for it will serve, and are needed, for the prevention of the pestilential diseases we have always with us. The extraordinary epidemic which is spreading in Russia is described as the plague, and the plague is now generally admitted to be an intense typhus. Medical officers who have served during plague visitations in the Levant have described to me typhus cases with buboes (which occasionally occur in this country during severe epidemic visita-

tions of typhus) as identical with those they have dealt with at Malta and in the East as "the plague." In respect to the new works which the city has provided for itself, and set an example to all other cities of what they may do for themselves, having examined them, I can now state that, by the new system of what I call self-cleansing tubular drains and sewers, human *faecal* matter is no longer retained in cesspools, or in brick house drains, or in larger sewers of deposit, to stagnate and ferment, and give off foul emanations from beneath and amidst habitations, but is in a constant state of removal, and is removed before it can enter into advanced and noxious stages of decomposition. The excreta of the morning is received into the water with which every house is now provided. It is immediately removed in water. Before noon it is distributed in water. In its unfermented, and, as manure, in its unwasted condition, it is for the most part—for this portion of the work is not quite so complete as it might be—exercising its fertilising power over the water meadows below the town. The sewerage discharged from the old sewerage works of London and other cities into the sewers is putrid sewerage generally a year old, flushed out in annual cleanings or by occasional storms. The fresh sewerage constantly discharged from your new works may—sometimes within little more than a week—be converted into sweet-smelling grass, may be fed upon, and returned to the town as enriched milk. The putrid sewerage discharged from old large man-sized sewers of deposit killed fishes. The fresh sewerage which is yet improperly permitted to escape from direct application to the land, feeds them and improves their quality. I am told that the largest trout—thirteen pounds weight—have been caught at the mouth of your new out-fall sewer. By your new mechanical arrangements of universal water-closet apparatus and self-cleaning house drains, and sewers in substitution of the ancient cesspools, you have set a mechanical example to the British metropolis, with its thousand miles of man-sized sewers of deposit, which are only extended cesspools, costing twenty thousand pounds per annum for intermittent cleansing; you set an example to the French metropolis, which stinks, and in summer time is rendered uninhabitable to those who can get away from the emanations from the accumulations retained within its

fosses or cesspits; to Manchester, the city of mid-densteads; to Liverpool, with its sixty thousand cesspools, the most unhealthy in England; your mechanical example has gone far to show to such cities that at less than the annual cost of cleansing those foul accumulations, the disgusting labour of the nightman and the *vidangeur* may be dispensed with. But with the engineering example, you present to them the vastly higher example of the sanitary results obtainable by the new mechanical power of household and civic cleansing. Your ancient city was, in the former entire ignorance of sanitary science, scourged with such plagues as that which now scourges the filth-encumbered city of St. Petersburg, and the ordinary death-rate in the old and small-roomed houses was, so far as may be made out, about forty-four in a thousand—a rate such as yet prevails in the lower districts of New York, as well as in some of our older cities. By larger and somewhat better houses, the death-rate was reduced. On examining the statistics of the nine years before the completion of the new works, it appears that there was a fluctuation of the death-rate from twenty-two up to thirty-five in a thousand, or an average of about twenty-seven in a thousand exclusive of the cholera year. But, inclusive of the cholera year, which, I think, may be properly included, as the new works would undoubtedly serve to mitigate such visitations, the average death-rate was twenty-nine in a thousand, or about the same as that of Paris and some other old and ill-conditioned cities. The fluctuation during the nine years since the completion of the new drainage works has been from twenty-five to fourteen in a thousand, or an annual average of twenty in a thousand; and to every case of death reduced, there will, as a general rule, be twenty cases of sickness reduced. In round numbers the average death-rate may be said to be reduced one-third, that is to say, it is now as if every third year were a jubilee year in which there were no sickness and no deaths. The death-rate in a well-to-do district called the Close of Salisbury had been for many years twenty in a thousand. For the nine years since drainage, it has been reduced to fourteen in the thousand or below the most healthy districts in the country, which are about seventeen in the thousand. The reduction has been great in the deaths from foul-air diseases as might be expected,

but most marked in those which are intimately connected with moisture as well as foul air—of which the deaths from phthisis have since drainage been reduced to an average of one-half that which prevailed before drainage. The results in your city are corroborated by the like results obtained by the like means in other urban districts, some of which, however, having begun from a lower starting-point, have attained a lower fluctuation, as from seventeen to fourteen per thousand. But great as these gains are, practical sanitary art enables and requires further advances. An examination of the causes of death display, even in the reduced death-rates, large proportions of deaths which we know ought not to be—deaths from foul-air diseases, which are almost entirely banished where more complete internal as well as external sanitary conditions are made regularly prevalent. Your existing death-rate, I should say, shows that by your present sanitary works you have reduced the exposure of the population to extraordinary epidemics by about one-third. My more immediate object is to point out the simple available means by which that exposure, both to extraordinary and ordinary epidemics, may be still further diminished. With an irregular sort of periodicity, there occur extraordinary epidemics of varied types of disease, but all of sorts that are never absent from certain local conditions of the population. The types vary at different times, but all occur nearly in the same places, and amongst the same conditions of people. Thus, if I were to go to an experienced relieving-officer or medical officer in a crowded, ill-conditioned town district, and were to say to him, "I wish to see some fever cases, I prefer to see typhus cases," he would know where to seek them. If he were blindfolded, his nose would guide him in his search for cases. On the occurrence of particular states of weather, heavy, moist, stagnant, warm, and favourable to the decomposition of animal matter, an experienced medical officer will confidently anticipate an increase of his labours from the development of disease in particular districts. It may be dysenteric diseases, or it may be diseases of the eruptive classes, measles, small-pox, or scarlatina; but some one form or other he may be sure of. Epidemic conditions are usually preceded or accompanied by atmospheric disturbances. Last year there was less than the average movement of the air—less of clouds and less of sun-light, and more of

conditions favourable to the decomposition of animal and vegetable matter, and of aerial impurities. Extraordinary epidemic conditions appear to travel as clouds do, and are as little interrupted by quarantines as clouds or rain. They are denoted by aerial disturbances which chemistry has not yet explained. Sometimes the visitation affects the animal life first and almost exclusively. Mr. Bates in his travels in the Brazils gives an account of a choleric visitation amongst the animals of the forests there, which is so instructive that I give it in his own words:—"The first symptoms of the epidemic appeared among the crocodiles, whose hideous carcasses might then be seen floating down the stream in such prodigious numbers that both the waters and air of that fine region were tainted with their effluvium. It was observed that they were first seized with a violent fit of coughing, followed by a black vomit, which compelled them to quit their watery home, and finally find a grave amongst the thickets on the river banks. The disease next attacked the fish and other inhabitants of the water, with equal violence, until it was feared the streams would be depopulated. The fearful mortality among them can be better estimated from the fact that, for more than a month, the rippling waves of that noble river, the Apure, were constantly washing down masses of putrefaction, its placid surface being by them actually hidden from view for several weeks. The next victims were the pachydermata of the swamps, and it was a pitiable sight to see the sluggish *chiguires* (capyvaras) and the grizzly wild-boars dragging their paralysed hind-quarters after them; hence the name of *derrengadera*, applied to this disease. Not even monkeys in their aerial retreats escaped the contagion, and their melancholy cries resounded day and night through the woods like wailings of the eternally lost." The most destructive of a fish of prey called the Caribo, suffers from a special and constantly recurring visitation, these fish being subject to a yearly mortality during the heats of summer, when the water is deprived of a portion of the air it holds in solution. "Their carcasses," says Don Ramon, "may then be seen floating on the water by thousands, while the beach is strewn with their bones, especially their bristling jaws, which render walking barefoot on the borders of lagoons extremely dangerous." The observation of the effects of im-

pure water in epidemic periods, is the foundation of a popular belief at those times, that wells have been poisoned, which is true, but it is by the atmosphere, by decomposition of the animal and vegetable matter contained in the water. The fearful popular mistake has been in such periods that the water has been poisoned by doctors or some one else. Whatsoever may be the causes of extraordinary epidemics, the greatest intensity of the attack upon human beings is almost always found in certain localising conditions. We found that the first renewed visitations of cholera in different towns often appeared in the same streets, on the same sides, in the same houses, and sometimes in the same rooms, though the inhabitants had changed. In the course of my inquiries I met with one instance in the city of York, of a small court which, by tradition, was the spot where the great sweating sickness of 1485 appeared, then the great plague of 1664, then others, and the first visitation of cholera; the place was popularly called the "hagworm's nest." The hagworm is a species of snake which haunts dung-heaps. We looked with interest to see whether the place was true to its traditions in the second visitation of cholera, and we found it was so. We know the chief localising materials for epidemic explosions. There is, as it were, the charcoal, the nitre, and the sulphur which exist in ordinary times inertly, till there comes some atmospheric conditions, the light which creates the explosion and makes the materials destructive. Some forms of extraordinary epidemics we can create. In two prisons there were extraordinary epidemics of a dysenteric form; in both, after a time, it was found that old sewers had burst and leaked into the wells from which the prisoners were supplied with water. In one prison there was an extraordinary epidemic of typhus. It was found that the antecedent was the clearance of an adjacent ancient moat, the wind having been slowly and steadily in the direction of that part of the prison where the epidemic first appeared. A dreadful epidemic puerperal fever broke out in a large lying-in ward; the antecedents were found to have been the clearance of some stagnant ditches, and the spreading of the contents over the land contiguous to the ward. It was once mysteriously pointed out that the King of France always brought fever with him into Versailles. It came when he

came; it went when he went. The explanation was that the barracks were over-crowded by the band and other soldiers, the attendants of his state, who came when he came, and lodged in ill-ventilated rooms, and went when he went, and thus relieved the over-crowding. But this epidemic was afterwards prevented by an improved ventilation. In like manner, it was and is yet extensively a prevalent belief, that pestilence is brought into towns by tramps. The first outbreaks of fever were in common lodging-houses. But where the provisions of the Lodging House Regulations Act have been duly enforced, where over-crowding has been prevented, where some means of ventilation for the sleeping rooms has been enforced, water introduced into them, cesspools abolished, and means of cleanliness provided, the inmates are far more free from fever than are the great bulk of the artisan class, the occupiers of weekly tenements, to whom no such protection will be conceded—by the landlord legislators of the House of Commons. Whatsoever epidemics come, the occupants of the common lodging-houses will be their superiors in immunity. But we have had of late times, in some of our public institutions, examples of good sanitary arrangements resisting epidemics, which it is extremely important to study. As regards children, there are the schools for the pauper children of unions; and for adults well-constructed and well-managed prisons. These institutions are now almost fortresses against epidemics of any sort, and against diseases of fermentation or of the zymotic class. The late season has been extremely unhealthy. Scarletina and measles have been extremely severe on children throughout the country; but whatever the common atmospheric condition to induce these epidemics those institutions have been entirely free from them. Children are sent into the district schools, some only to die, or in advanced stages of all sorts of disease. Some of these who may be sickening with a disease, may inadvertently be put amongst healthy children in the school, and the disease certainly does spread, although in a comparatively mild form. But I am informed by the medical officers in charge of these institutions that of diseases of spontaneous origin they have scarcely any of those supposed to be inevitable to children; and that epidemics which ravage the populations in

the immediate neighbourhoods pass them untouched. In some of the institutions they have never seen a case of typhus, whilst it is constant in its *habitat* outside them. With all the imported cases of disease, the death-rate of children in these district institutions is scarcely above a third of that prevalent amongst the children of the same ages in the neighbourhood, and except ophthalmia, not yet banished, they are quite free from epidemics. The same results are obtained in the prisons—diseases of spontaneous origin they have scarcely a trace of. I remember once meeting a physician who had charge of a model prison who appeared to be in trouble. I asked him what had occurred to disturb him? "Why," he said, "I have actually got a case of small-pox which appears to have arisen in my prison." Small-pox was then raging in the ill-conditioned houses in the district where the prison was situated, and poor people were dying of it in great numbers, but that prevalence did not reconcile him to the single case occurring in his prison; it had no business there, and, no doubt, was an extraordinary event. As a further illustration of the results of the application of sanitary science, I may cite what we find in military prisons. The prisoners are commonly of the worst of the class from whence they are taken and whose death-rates we know. In the ranks, the death-rate of all classes of soldiers of the line was about seventeen in a thousand. The as yet partial applications of sanitary science, under the direction of special sanitary officers, be it observed, has reduced that death-rate to about nine in a thousand, and under some good special sanitary administration, to between four and five in a thousand. But in the military prisons, according to the reports of Sir Joshua Jebb, the death-rate has been reduced for years to two-and-a-half in a thousand, with prisoners with and without hard labour; and that, too, with dietaries exclusively vegetable, with the exception of some milk, and costing not one-half those they have in the ranks. If the sanitary measures, which have been accomplished in this city—a constant water supply, the abolition of the poison-pit, the cesspool, or the middenstead, and complete house drainage works, and tubular sewers were accomplished in London, and all other cities, towns, and villages, the saving of life in England and Wales alone would be upwards of one hundred thousand per annum.

But if the sanitary condition of the wage classes, or of the general population, were by the like attentions brought up to that of the populations of the institutions to which I have referred, the saving of life in England and Wales would be doubled, or would amount to nearly a quarter of a million annually. To meet extraordinary as well as ordinary epidemics, the tried measures of public application beyond those already in operation in this city, are complete removal of all fermentable matter before it can enter into advanced stages of decomposition; to order the daily removal of all dung from stables and cowhouses, of garbage from slaughter-houses; to direct the regular cleansing of all piggeries, and where that cannot be done to have them removed; to see to the cleansing of all unpaved or badly paved surfaces, and where they cannot be immediately amended, they ought to be covered over with a layer of fresh soil, as also all accumulations of putrescent matter. This was done, upon our order, on the last visitation of the cholera, and the people in the towns where it was done felt as if they were living in another atmosphere, whilst the soil for removal was vastly improved in productive power by what it absorbed. An independent medical officer of health should on all such visitations be put in charge, and be made responsible for seeing to the complete defences, as a military officer in command for the defences against a threatened siege. On the occurrence of each and every death from known foul air disease, from diseases of the zymotic class, he should at all times be empowered and required to examine, as to the localising causes whether in the house, the place of work, or the school, and take order for their removal. This should be done on all occasions; and all repetitions of deaths of the same sort in the same places should be made the subject of inquiry before coroners, with a view to punishment, and before civil courts for compensation. The "leprous houses" ought to be cleansed, the absorbent walls lime-washed. Those who have visited the lower class of houses in which the dead bodies have been long retained before interment will often have perceived the dead man's smell inhering the walls. On the occurrence of a severe epidemic in some houses the occupants were ordered to be turned out, and the walls to be lime-washed. In some instances the owners locked the doors and

refused to obey the cleansing order; the houses were re-occupied, and the disease re-appeared; but in the uncleansed houses only, and with new occupants. Medical men know perfectly well that the wage classes in hiring some houses are hiring fever. During the last visitation of cholera our sanitary inspectors reported to us that the conditions of the houses of some town districts were utterly irretrievable, and the positions—as the military phrase is—entirely untenable against the invasion. I had no hesitation with my colleagues in ordering immediate removal of all the people, as men, women, and children might be ordered to a more safe position against bombardment by shot and shell. We borrowed tents for them from the Ordnance stores. The event justified the precaution in every instance, for there was not a new attack in the new positions. I remember on the occasion of ordering the population of the fishing town of Megavissy, in Cornwall, to be tented out, that some of the people, becoming tired of the new mode of life, went back to the town and immediately were attacked with premonitory symptoms; they then returned to the tents and got clear of the symptoms; went back again to the town and were again attacked, returned to the tents and were put in a course of cure. The litmus test could not be more decisive of the localising influences of the disease. I may mention as an illustrative fact, that if one of our sanitary officers had overcrowded or put more than five persons in one of these bell-tents we should not have deemed him competent for our service. But in the Crimea sixteen men were commonly put under each of these same tents—quite enough in that epidemic period to occasion or largely aggravate the destruction of life which afterwards occurred. What people have to be made to understand is that the effect of these epidemic clouds or visitations is to reduce the strength of the human economy, to make as it were all people suddenly old, and to make all irregularities in living which, in ordinary times, may be indulged in with comparative impunity, then dangerous. This applies particularly to irregularities in diet. During seasons of epidemics bed curtains should be removed and the free circulation of air in the sleeping-rooms should be promoted. Where the over-crowding of the sleeping rooms cannot be reduced, the inmates should be taught to add to their bed-clothes and sleep with the window open

which is the practice of the best sanitary physician at all times. After all, the best indication of what should be done, which has been given to us for our protection, is the sense of smell. All offensive smells, all sickening smells, mean disease—active disease if they are intense; if they are faint, the seeds of disease. Put your nose into a sleeping-room after the occupants have been some time in bed, whether it be the sleeping-room of a family or of a ward, and the sense of smell will tell you of its condition and of the need of fresh air to ward off impending dangers from foul air. We have various leagues—temperance leagues and others, to promote social reforms, but in my view the most important league we could have would be a national league for the enforcement of personal cleanliness, teetotalism, and regular personal ablutions, as means of protection from epidemics, as well as for promotion of general health. It is only physicians who are aware of the personal filth of the great mass of the population. The medical officers who have to perform the duty of vaccination will tell you how horribly dirty they commonly find the persons of children. The surgeons who examine recruits for the army, though they examine them singly, and frequently in open rooms, before the day is over are overpowered by the effluvia. I am told of a militia colonel who a short time ago put his men into square to address them, was overcome by the surrounding stench, and vomited. Personal cleanliness, more than hands and face washing, amongst the populace is the exception. The person who succeeded best in preserving children from epidemics, and from the supposed inevitable children's diseases, and maintaining their highest degree of health, was the late Mr. Aubin, the manager of the Central District School of London, and his distinction in practice was to maintain the highest degree of personal cleanliness by the daily complete ablution of the children with tepid water. Being remonstrated with for the luxury of cleanliness of the clothes of the children of that class in giving them clean pinafores every day, his answer was that three hundred soiled pinafores made an appreciable difference in the air they breathed, and in proportion would three hundred soiled or dirty skins. The death-rate in some children's establishments has been reduced by about one-third by the ventilation of the dormitories, and the drainage of the premises, and by another

third on the introduction of complete regular head-to-foot daily ablution. A schoolmaster of a ragged school resorted to the practice of the daily ablution of the scholars at the school defensively against the horrible stench of the assemblage of them. At first the practice was introduced with difficulty when cold water was used; and he observed to me that it was apt to be overlooked that children of that class are generally of a low circulation, and that cold water is really painful to them, but we passed some steam through the water and made it tepid, when the difficulty was removed, the ablution was made agreeable, and the practice was introduced, and with the removal of the filth and the foul smell there was the removal of much disease, and the reduction of epidemic attacks. The difference in appearance of school children who are washed and of those who are unwashed is very striking. Into the district schools children are brought who are horribly squalid, whose aspect is gradually changed; the skin is altered and cleared, the hue of health is imparted, exercise is added; for these are half-time industrial schools, and shortly the child is another creature, it may be added, morally as well as physically, and so it might be with the entire population. With the health and strength of cleanliness they have, when properly set up, an immunity from epidemics. In the case of adults, you see squalid artisans brought in a state of high fever from filthy homes to the hospitals. They are put into a warm bath, are well washed, and then put into a clean bed in a well-ventilated ward, and from those measures alone they are often in rapid progress of recovery before the physician can come to see them. The most experienced nurses are the most careful for their own protection to have frequent personal ablutions. In our Indian cities Mussulmans, who are distinguished for their attention to ablutions, though exposed to the same bad atmospheres as other people, are distinguished also by far less suffering from epidemics. The immunity from attacks of epidemics, as well as the high state of health in our prisons, I can express a confident opinion, is to a large extent due to the complete personal cleanliness enforced there. In the ranks soldiers have commonly only hands and face washing; in prisons they have forced regular head-to-foot ablutions. The practice of complete daily ablution is attended with an overlooked economy,

which commends it for constant use to the very poor, and for use in periods of famine as well as of pestilence, which are often coincident. A general in command of a brigade during the war in Spain was besieged, and his men were put upon short rations. To occupy and amuse them, the weather being fine, he allowed them to bathe daily in a river near which they were stationed. He soon observed that his men on short rations were in as good health and strength as the general unwashed army on full rations. This fact explained to me one which I was at first at a loss to understand—the very remarkable strength and health maintained in well-managed prisons, even amongst prisoners put to hard labour, on dietaries so much below those to which they are accustomed out of prison. Illustrative evidence of the effect of constant cleansing of the skin in the more perfect assimilation of food is derived from the lower animals. It is found that pigs, regularly washed, gain full one-fifth more flesh from the same quantity of food than pigs that are unwashed; and although they are fed on the same food, the pork of the washed pigs is better. It is not too much to say that a family of five children, daily washed completely, will thrive as well on the food that sustains only four that are unwashed. It is a subject of national attention, as well as of domestic economy, that a fifth more of population may be maintained on the same quantity of food, as it is undoubtedly a subject of national importance as one great protective against all sorts of pestilence, especially for children. One method of inducing the practice of personal cleanliness would be to support the school teacher in insisting that all the children who came to school should be thoroughly washed daily. The school-mistress should take suspected female children aside, or behind a screen, and satisfy herself that the duty has been properly performed, and send the child away if it has not. In cities and towns where, from the low state of local administration, public representation, and legislature, the civic duty and public service has not been performed, as it has been in this city, of providing each house with a proper supply of wholesome water, provision for proper ablution should be attached to the schools, as it is in the examples of ragged and other schools in low neighbourhoods to which I have referred. I dwell on the defensive points of the school, because in ordinary times it is in itself a great source of the

visitation and diffusion of epidemics. I have estimated that in England and Wales the slaughter of fifty thousand children in the school age, is due to the ignorance of sanitary science and neglect of its application for the good ventilation of the school-rooms, and the proper treatment of the pupils. But however good the ventilation of the school—and ventilation will do much—yet evil arises if the children are kept too long together, especially in epidemic periods. If they were massed together in the open air they would keep their own atmosphere about them, as moving columns of troops do. It has been found during epidemic periods in India. There is a great difference in the epidemic when the soldiers are marched in open instead of in close order. There is, of course, an immense perceptible difference in the effect on the atmosphere of an unwashed and a washed school or crowd; but a close assemblage of any sort of children, or of adults, is productive of a deteriorated atmosphere, especially where the air is stagnant, and in times of epidemic it is attended with mischief. For ordinary as well as for extraordinary occasions, the principle of the half-time school comes in for application as a decided and most important means of relief and correction of all bad school conditions of unwashed children and bad ventilation, whether the principle be applied on alternate days of schooling, or half-time each day, which is proved to be educationally the best. The application of the half-time or short-time school principle to old schools has been followed by what the teachers deemed an extraordinary reduction of the previous average amount of non-attendances on account of sickness. On an impending epidemic or on its occurrence, the reduction of the hours of school attendance should be ordered by the public health authorities as a sanitary measure, and at times the pupils dispersed. Yet so numerous are the "habitations of cruelty" as the Psalmist designates them, so miserably bad are the conditions of some habitations, that even an inferior school has an advantage over them, and, practically, we cannot carry out such a rule without limitations and modifications, according to local conditions, of which the local health officer would be the judge. In respect to adults, one convenient and beneficial means of complete ablution, requiring comparatively little water, is the use of two towels, one wet for the application of the water by

friction to different parts of the body, the other a dry towel, to rub with and complete the purification in detail. It were well that the duty should be performed in leaving work, so that repose may be had in a clean skin. Some collieries, and in some other large works, provision is made for complete ablution with tepid water before leaving the works. Complete personal cleanliness is one of the duties to one's neighbour, and it is a violation of that duty for any one, by deteriorating the atmosphere, to inflict evil consequences on those with whom he works and acts. A trade's rule, if workpeople could be brought to understand or to make it, that no one should be allowed to leave his work unwashed, or to join in work unwashed, would be of far higher economical importance to the class—would tend more to their social respectability and elevation, than all the trades' unionist regulations put together. There is—I state it with submission to my lord bishop—not only a moral but even a Christian duty in personal cleanliness—outward and visible purity. To say of a man, as is said in some countries abroad, that he smells like a monk, or that he stinks like a saint, is to say that he is a terrible pervert, and it would be more truly said that he smells like a pagan or a heathen; for assuredly he is a walking violation of the precept of Him who enforced the practice, and who reproved Simon for a breach of the duties of hospitality for not having provided water for the cleanliness of his guest, and ointment for the prevention of any offensiveness, for the dirty sinner is in contravention of the express spiritual precept exemplified in the case of Namaan, "Wash and be clean." These, then, are the chief means of warding off epidemics, to be laboured for everywhere:—clean air in the streets; air clean from foul emanations beneath the surface, and from cesspools (which last you have by your drainage works attained); air clean from foul emanations from uncleaned streets, and yards, and stables; air clean from overcrowding in living and sleeping rooms, in schools and workshops; clean skins, clean body linen, pure water distributed into every house, and proper channels for the constant removal of all foul and waste water from within the house. With these are of course to be combined a sufficiency of nutritious food, and proper clothing. But with the skin kept clean the people may go forth regenerated, and armed as against an

extraordinary pestilence, as well as against that which we have always with us. Each step in advance, however, will be surely attended by a further reduction of the sickness and death-rates until the general population attained the immunity from pestilence and excessive mortality possessed by the inferior populations in the institutions to which I have referred. Simple as these objects may appear to be in statement, I am aware, from practical experience, that some of them are extremely difficult in attainment, even to the best local zeal and effort, in the absence of a competent and responsible central administrative authority for their instruction and support, such as that by which the works in question were promoted, but which, in despite of success, and I must say by the influence of sinister interests against the public, was not renewed. That is a topic into which, in your case, I need not enter, even if there were time for it. You have made the first important step. You have got the right works, essential as a means of further efficient voluntary efforts; and in the interests of sanitary science, I may thank the local authorities and your citizens, and amongst them Mr. Middleton, Mr. Lambert, and other gentlemen, by whose persevering labours a great and beneficent example has been achieved for the general public. As adding to the effect and influence of that example for the class of house-owners who are the chief opponents of sanitary measures in the notion of their expense and in ignorance of their true economy, it is due to state that whilst life has been improved by them, private property has been improved also. The losses of rents by reason of inability to pay on account of disabilities from excessive sickness and mortality have been diminished. Under the inquiry instituted by myself with my colleagues for the application of the Public Health Act, the evidence of a house-agent was adduced to show that house property had fallen, and was falling considerably, in demand and value. I am assured that since the new works have been brought into operation, it is here, as it has been elsewhere, the demand for houses has been restored, their value increased, and houses are now difficult to be got. Sanitary science skilfully applied by works, whilst it saves the waste of strength and life, improves property.

An enthusiastic vote of thanks was passed to Mr. Chadwick for his address, after several laudatory speeches.