

Special report by Mr. Orton, Medical Officer of Health, upon the cholera epidemic of 1866.

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BOARD OF WORKS

FOR THE

LIMEHOUSE DISTRICT.

*SPECIAL REPORT by Mr. ORTON, Medical Officer of
Health, upon the CHOLERA EPIDEMIC of 1866.*

April 2





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BOARD OF WORKS

CHAMBERLAIN DISTRICT

THE BOARD OF WORKS OF THE CHAMBERLAIN DISTRICT
HAS THE HONOR TO ANNOUNCE THAT THE

TO THE

LIMEHOUSE BOARD OF WORKS.

GENTLEMEN,

At the close of June and early part of July, from the unusual state of the weather, the excessive heat, in connexion with almost a stagnation of the atmosphere, little or no wind for days together, and the more than usual depression generally felt by a summer temperature, I was led to expect as the result, from experience of previous years, an epidemic of fever. But on the outbreak of Cholera in its stead, and finding it more especially selecting the fever haunts for its victims, I was strongly disposed to watch it, as of course in a limited sense, a substitutionary or vicarious disease, modified by circumstances which I was unable to apprehend. Then the Register General's views became known touching the epidemic, the suggestion of the foul water poison as the cause, conveyed through the mains of the East London Company at Old Ford. At the time this hypothesis was plausible, seemed almost conclusive, and I, among the rest, living in the very heart of the cholera field, was inclined to acquiesce. But facts daily become more prominent. I hesitated, paused again and again, until at length I was convinced that the water had little or nothing to do with the Cholera. Then a difficulty arose on a point of decorum, in withstanding the opinion of the Register General, whose courtesy to the medical profession has at all times been gratefully appreciated. There was yet another difficulty in the way—either to fall in with the general opinion, for terror had made all unanimous, or stifle the expression of my own convictions. The terms on which I hold my office under the Metropolis Local Management Act marked out the line of duty. The 123rd Section, defining the vocations of the medical officer, says he is “to take cognizance of the existence of contagious or epidemic diseases, and to point out the most efficient mode of checking and preventing such diseases.” In this spirit I have already communicated some information to the Registrar General, and availing myself of a further invitation, I will indirectly now point to some facts of a practical character.

It is impossible to overlook the classes more likely to be affected by the water hypothesis, equally as it is of the estimation in which it is commonly received. I have already said, and to this I adhere, that nineteen out of twenty of the adults who have perished were not water-drinkers even occasionally, except in the ordinary cooking of their food. Then again, those who have been water-drinkers, teetotallers especially, have been pre-eminently exempt. The City of London Temperance Society, at the head of which is the Chamberlain, Mr. Scott, informs me, through their Secretary, that out of several hundreds, a large body of whom live in the Tower Hamlets, only three, one man and two women, and those under exceptional circumstances, have died from the commencement of the epidemic. I am acquainted with numbers of families, some with filtration, others without, who have gone on drinking water all the season without almost a single case of diarrhoea. The Sons of Phoenix, a Total Abstinence Society, all living within the limits of the East London water, numbering 1,250 besides their families, have lost only two of the fraternity from the Cholera. The United Phoenix, another society of 1,400 members, have only lost three males and two females. At a brass-founder's in the Back-road, a number of men are employed, an occupation inducing great thirst, and I am credibly informed that each man during the summer was in the habit daily of drinking a gallon of water on the average, without a single case of diarrhoea occurring. At 14, Love Lane, Ratcliff, the mother, husband, and sister died, who were not drinkers of water, but practised moderation. The five children escaped altogether from an attack of diarrhoea, while, to use her own words, they were doing nothing else but "drinking water all the summer and all day long."* Let me add, pretty generally amongst all classes the theory of the water poison is repudiated, especially among the poor, who have chiefly felt the shock; and this opinion is very commonly shared by professional men.

I have already expressed an opinion that the great local nuisances have probably had their part quite as much as the water, and much more, in the production of Cholera. The Lea Cut and Regent's Canal were intolerable during the hot weather in June, when on one day the thermometer was 165 degrees in the sun. Then look at the Bow Creek, into which was pumping all this time the sewage of 70,000 inhabitants, including Stratford, West Ham, and all about Victoria Dock. And am I to be told that such abominations

* Many such cases are found.

have had nothing to do in bringing about an epidemic? Then add to the list the numerous factories on Bow-common, and more or less throughout the eastern district, the comparatively stagnant water in the docks, as well as that charged with organic matter in and about the poorer dwellings at a low elevation, in some cases only two feet above, and vast numbers many feet actually below, Trinity high-water mark, and there is to be found an aggregate of filth, I believe I am not wrong in saying, not to be equalled by all the rest of the metropolis. At this time the Thames at Greenwich was 68 degrees, so that from a large tidal stream to stagnant water like the canals, it was probably here at 80 degs. of heat. It is a fact that organic matter in water at 60 degs. undergoes a fermentation, poisonous gases are thrown off, and deadly vapours, so that it would require slight calculation to estimate the influence of the heat on these masses of liquid filth, continuing for days together, and then conveyed exactly in a line with the cholera field. The records of medical science afford plenty of cases in illustration. The outbreak of choleraic diarrhœa, attended with many deaths, at the Carlisle Lunatic Asylum, as related by Dr. Clouston, is a case in point. Here the sewage of this institution had been thrown over a heavy, clayey land in the neighbourhood, and a favouring wind did the mischief. It was found when the wind was away from the asylum the disease was at once relieved; and then again, when in an opposite direction, disease and death increased.

It is a fact, that within 200 yards of the Regent's Canal, in the Limehouse district *alone*, 200 deaths have taken place. A consequently low elevation may however, in part account for this.

I have been informed by many intelligent persons, since these views have been made known, that at this very time, and for some days in succession, they felt a burning choking sensation in the throat mouth and nostrils, never before experienced, provocative of cough, sneezing, and urgent desire to expectorate.

Now, if we look at the map and see the river in the south, the Bow Creek in the east, and Sir George Duckett's Canal in the north, there is to be seen the area of mischief. And it is very remarkable, allowing for the action of the excessive heat in the production of cholera miasm, acted upon by a primary atmospheric influence, that the east and north-east wind following, would exactly convey this poison where the epidemic was mostly felt,

and over the field of the East London water supply. Stratford, West Ham, and Victoria Docks are in the rear, where the mortality was great, but then they lie low, and the poisonous contamination would be otherwise rapidly experienced by the process of diffusion, so close upon their borders.

It may be asked, why did not this mischief go south—across the water? This was no doubt prevented by the influence of the tidal currents and the river breezes. The Thames in its sanitary agency is little appreciated. I regard it in relation to zymotic disease, apart from other considerations, as the grand conservancy of public health. It is rare to find a case of fever on its banks at any time, and scarcely ever a death. Not one death from cholera or diarrhoea occurred on the water's edge from the eastern verge of Limehouse to the extremity of Wapping, the distance of a mile and a-half, during the late epidemic.

Again, in restricting it to one part of London, it is only in common with the visitation of epidemics, particularly cholera. In India it will take one side of a bazaar, skipping the other for a time, one side of a river, and so on. In the cattle plague, the same wandering character was observed; one county, not the next, one parish, missing another. In the vegetable world the same strange things occur. Any one acquainted with agriculture will have noticed the potatoe disease cutting a field diagonally, one-half untouched; turnips and other crops in the same way,

Everything, both preceding and succeeding, the recent outbreak of Cholera at the East End, shows it to have been an importation, atmospheric principally, following in the track of its influence for some time felt on the Continent, and not unlikely to have been accelerated by the free communication of the shipping with the towns on the Coast and that of the Port of London. But the water theory, while inconsistent in itself, takes no account of the cases of Cholera occurring in London *before* the "explosion"—as it has been termed—actually occurred. A man and his wife died from this disease at 12, Priory Street, Bromley, in the centre of all this poisonous effluvium, on the 27th of June, just 14 days before the first in Limehouse. Then Hammersmith, several miles in the West, on the 29th of June loses a man from Cholera. Then in St. Luke's Workhouse, on the 9th of July, supplied by New River Water, a man dies brought from Hoxton New Town, having also the same water supply. On the 12th of July a woman died in

London Wall, and on the 13th a man at Camberwell. So that it appears tolerably certain the Cholera poison was in existence in London, in all quarters, several days before the alleged "explosion" from Old Ford.

There were certain predisposing causes, no doubt, operating largely on those who experienced the early onslaught. Amongst the well-to-do classes may be enumerated intemperance, excesses generally, long fasting, and depressing causes commonly of body and mind; while in addition, among the poorer portion of the community, may be reckoned scanty and improper food, filthiness, and frequently neglected ventilation and drainage. In the second week in July the sanitary condition of the Limehouse District was good, as it had for some months been from 15 to 20 per cent. below the average on the last 3 years. But at that same hour death was standing ready. The first three cases occurred at Nos. 72 and 73, North Street, on the 11th and 13th of July; and thereupon, whatever the sources of mischief may turn out to be, were rapidly brought into action, the pestilence came down like a hurricane, swept away these classes, taking a north-easterly direction.

The deaths from Cholera alone in this district have amounted to 515 to the 27th of October.

The origin of this epidemic is unknown; its travels are equally a mystery. The water poison theory will not explain it, and our sanitary experience is taxed in vain in an endeavour to trace out the positive causes of its special localisation.

It may be interesting to make a general comparison of the Eastern Districts using the condemned water, to see how far that will help us in our enquiry, for the 10 weeks ending the 1st of September, including their respective deaths from Cholera and Diarrhoea, in that period:—

Elevation above Trinity High Water Mark.	Feet.	Persons to an acre.	Average House Rental.	Poor Rate, parts in 1,000 on the Rental.	Deaths from Cholera and Diarrhoea.	Deaths in each 10,000 persons.
Bethnal Green	38	145	£9	·136	688	62
Mile End	21	118	£20	*·066	545	67
St. George's-in-East	21	196	£32	·080	459	96
Poplar and Bow ...	8	34	£44	·060	929	93
Limehouse District .	21	97	£20	·066	668	118

* I suspect there is an error in this quotation of the Registrar General's Report, in placing the Mile End and Limehouse District Rental on an equality.

Now Bethnal Green is notorious for poverty, overcrowding, and fever, and yet this badly-conditioned district comes out first amongst all in its escape from Cholera. Mile End is next in its immunity, a fact wholly to be explained in the estimation of some probably from two to three thousand good houses having sprung up there of late years. St. George's has a fearful mortality, but then its overcrowding is great, it exceeds even that of Bethnal Green. But Poplar and Bow District has the least overcrowding of all; where one person is found there, nearly 3 are found in Limehouse, $3\frac{1}{2}$ in Mile End, and more than 4 in Bethnal Green, and approaching 6 in St. George's-in-the-East. When Poplar, then, is seen with the fewest persons to an acre, the highest rental, and the lowest poor rate, having 93 deaths in each 10,000 persons, half as many more than Bethnal Green, it is too obvious to waste a moment about it, there must be other causes at work in this field of destruction besides sewage water, and the River Lea. St. George's has 96 deaths in 10,000 persons, but a trifle exceeding that of Poplar, and fully one-third more deaths than Bethnal Green. But the Limehouse District tops all; it has lost 118 persons from Cholera and Diarrhoea, according to the same estimate, since the outbreak in July; a district closely watched over, in which 2,000 houses have come under my personal inspection during the past year, up to July, resulting in many hundred different forms of sanitary reparation.

The action of a poison—a water poison or what not—is uniform over a community; it treats all alike under like conditions. But this Old Ford water acts capriciously; it skips about in finding victims; here its devastations are heavy, but there passes by multitudes untouched. Poisons, as a rule, lay low more readily the weak, the poor, the half-starved, and the destitute; but these classes in the Cholera epidemic have stood the shock well, they have come foremost out of the fray. It has crushed the scanty population, it has passed by the overcrowded, spared the poor, laid low the rich, terrible in the houses of a wealthier district, merciful in those of the impoverished, scarcely felt on a hill, while awfully destructive in a valley.

But the water hypothesis is still held to be correct, because the mortality is said to have been co-extensive with the water supply. Now how can this arise? According to the Lancet Commissioner's investigations for the fortnight ending the 13th of August, there were 3 deaths in St. Botolph's,

Whitechapel, in houses supplied by the East London Company, but 19 in houses supplied by the New River. In one of the Haggerstone sub-districts, belonging to Shoreditch, in the same time 12 deaths fell within the water supply of the New River, and only 2 in that of the East London. In the only 19 houses supplied by the New River in the western extremity of Wapping, the mortality was considerably larger than in any other part of the parish. In South Hackney, for six weeks ending 25th of August, the deaths in houses supplied by East London Water was 13 in 10,000 persons, but at that part of West Hackney supplied by the New River, $5\frac{1}{2}$ persons died in the same number. Haggerstone East lost $4\frac{1}{2}$ in 10,000 from the East London, while Haggerstone West has 7 deaths in the same estimate from the New River Company.*

It is too contradictory and inconsistent, with these facts before us, to talk about the mortality in the outset being co-extensive with the water supply from Old Ford.

But the whole hypothesis is beginning to present itself in so extraordinary a character that I am very much inclined to question even its practicability. And here I will venture to say that if a suit of law had been going on, depending upon some theory or unusual speculation, in which almost a national interest had been aroused, the knotty points would have all been settled long ago. The peculiarity of this case is that in a panic-stricken public it has almost shut out discussion.

The charge against the Company consists, in an emergency, of distributing foul water from two old uncovered reservoirs at Old Ford.

It is nothing to the point to say that gentlemen sitting on the bench of justice, of unspotted private life, with their officials, having protested that the water from the suspected reservoirs at Old Ford has not been used, and that the subordinate *employees* are all ready to a man to come forward, if required, on oath, to declare that the sluice has not been opened for such purpose for the last 2 years. I will regard all this as merely uttered in a commercial spirit, and the vows of the men as simply the obsequiousness of dependants due to authority.

But, supposing again the whole is a conspiracy to serve a commercial corporation, at the risk of the public health, that from the Chairman downwards the secret has been kept; that the fifty men, or whatever may be the

* For the 6 weeks ending October, 250 deaths from Cholera happened in the Eastern Districts of London, and 258 in the South.

number, are ready at bidding to commit perjury, that the leakage from the Lea Cut has taken place, that the foul water has been distributed, and that the poison has been sent forth to the public.

A difficulty at once arises touching the chemical character of the water. Dr. Frankland finds it to contain, on the 1st of July, 1.40 grain in reduced numbers, to make it square with the estimate of another analyst, or nearly one and a-half grain of organic matter in the imperial gallon. Dr. Letheby's investigation, on the contrary, '40 of a grain, or less than one-third of the result of Dr. Frankland. Here are the results of Dr. Letheby's experiments for 6 months—in April, 1866, '40, not half a grain; May, '40; June, '40; July, '40; August, '56; September, '39. So that it is worthy of remark that while the water, at the time of the Cholera "explosion" in July, was, in the opinion of one Professor, unusually bad—never worse—a point on which of course great stress has been laid; yet, according to the experiments of another equally distinguished Chemist, at the same time, it was never better. If the waters had been identical, the results would have corresponded. Dr. Letheby took his sample from the main that supplies the London Hospital and that part of Whitechapel. My enquiries have not elicited the precise locality of the other experiment, the Professor best knows where.

We are very properly informed, at the same time, that the water may be extremely poisonous, and yet not in any way to be detected by the most delicate Chemical Analysis. Farther, in order to put the public on their guard, they are informed, so deadly is the Choleraic poison in some cases in the water, that even boiling it will not destroy the germs of the organism productive of the disease.

But we pass on. Let us now watch it, teeming with all these perils, to its destination. It acts like no other poison: it appears influenced by a kind of barometrical pressure; it seeks a low level for victims; and at an altitude is all but powerless for destruction. There is graduated scale of death about it. From 2 to 10 feet elevation above Trinity High Water Mark it kills 103; at 10 to 20 feet, 106; from 20 to 40 feet, 67; from 40 to 60 feet, 17; at 76 feet, only 4 as at Stamford Hill; while at 2 feet, as in the district of St. John's, in St. George's-in-the-East, 200 it slays in each 10,000 persons.

It was sought to explain the Stamford Hill immunity by supposing that gravitation had to do with it, and that the particles of Choleraic matter be-

came deposited possibly—an objection which with some might have weight ; but this could hardly apply to the subtle poison which baffles the most delicate analysis, when propelled, moreover, by the “magnificent engine” spoken of on its ascent of 76 feet. It has, however, since been discovered that Stamford Hill is supplied by a reservoir actually 20 feet higher than the town itself, so that with the full charge of the poison equally as at St. John’s District, it is powerless here to kill more than 4 in 10,000 persons.

But I will not take extreme cases, but come down from the hill to the plain, and have it tested on a perfect equality. In Bower Street, Ratcliff, consisting of 30 houses, there have been 8 deaths ; in Havering Street, on the same level, the same number of houses, built in precisely the same style, and inhabited by the same class of persons, there has been no death. In William Street, about 30 houses near at hand, there have been 12 deaths ; in Bath Street, exactly the same in structure and the character of the people, only one child has died. And of many other like cases may it be affirmed in Ratcliff. In Limehouse the same anomalies are found. In Northey Street, and round about, many deaths took place. Within 100 yards is the establishment for pauper children of the district. Into this institution was brought one child, before the Hospital at Wapping was started, suffering from Choleraic Diarrhœa, and within 14 hours died. There was another long-ailing consumptive child, an inmate, suffered—a common thing in such cases—from Diarrhœa, who drank no water, only wine, and died. It was registered “Diarrhœa.” In other respects the health was never better. It is a fact beyond dispute that out of 400 children in the establishment who had free access, and were drinking water all day long, that there was not even one case of common Diarrhœa.

In corroboration of the water hypothesis, some stress has been laid on the good result of an interview for the 1st August between the Engineer and the Authorities at Somerset House, for that immediately afterwards the Cholera began to decline.

Of course. There was no mystery about this. It was all in the natural order of things. It wanted no desperate efforts of the hydraulic engineer to stop the Cholera ; this was already set in action by another Hand, on another and a very different scale—*by the operations of nature*. Now, I have had some years’ experience in sanitary matters, and watching the bear-

ing of zymotic disease; and I have always found, without any laboured attempt at research into the unknown for an explanation, whenever an epidemic has raged along with a continuous special state of the weather, it has at all times been relieved—occasionally become almost extinct, as with the force and certainty of a general law—on the occurrence of an *opposite atmospheric condition*. So now, what I had been looking for, hoping for, hourly and for days in succession, took place. For the week ending the 4th of August the pestilence was at its height; there were 1,040 deaths from Cholera and Diarrhoea for the seven days. But on that same day the wind shifts; a lighter atmosphere was noticed; people breathed more freely; *rain fell*. The type of the disease was instantly changed, and the deaths at once declined. At the end of the next week—the 11th—still a favourable wind S.W. and N.W., and more rain, the mortality still lessening. In this way the weather lasted week after week till the end of September, brisk winds, chiefly south-west, plenty of rain, resulting in a decline of deaths from a weekly roll of 1,041 in the commencement of August down to 73.

These were the arrangements set on foot to stay the plague, powers quite sufficient in themselves, so that any co-operation on the part of the officials was altogether superfluous, or any engineering dexterity from the works at Old Ford.

I openly announced this change as a certainty on the stated conditions, before the Sanitary Committee the last week of July.

Now, whatever dispute there may be about the origin of the Cholera, and its relation to the water supply, there can be none as to the localities where it has found victims. In the parish of Limehouse there are 9 streets with 100 deaths; in Ratcliff 7 with upwards of 60. One character runs through the whole of them, as a rule, like Eastfield Street, North Street, and Northey Street, Limehouse, and William Street, Ratcliff. They are either built over slush and filth, or the flooring and joists rest on the earth itself, or but a very few inches above it. These are the places *where always has come fever*, just as they have lately been *in turn* the fatal resorts of Cholera.

In Burdett Road, Limehouse, there is a group of well-built houses, about four hundred in number, which have suffered *very little* from the late epidemics. A short quarter of a mile off eastward is another group of about 120

small four-roomed houses, occupied by mechanics and the better class of labourers, in full work, suffering no privations, but where the Cholera was fearfully disproportionate on the population. Ask about the general health as I have done, and the houses, and hear the same story from the whole—“Never been well since coming in, and the children always ailing, and my husband says he feels more refreshed when he comes from his work than after he gets up in the morning. And then everything spoils; meat put into a cupboard is musty in a night, one can keep nothing. Clothing becomes damaged, the drugget rots in a month, boots and shoes, and even the beds we lie on, are mildewed in a week.”

These are all new houses, built with the usual twelve-inch foundation for the walls, but in all the insterspace the earth remains untouched, or next to it, on which the flooring rests, sometimes with a slight ventilation, more commonly none.

A half mile off, a few years ago, there were some acres of gravel pits. The gravel had gone to the parishes round about for road-making, the sand for building purposes, the mould for extemporising gardens. The large pit was then filled up on invitation of the owner, with the aid of the scavenger and others, with all the slush and filth of a large circle of contributors. When this fund of abominations became consolidated, it was built over in the usual style. They were soon occupied by tenants and lodgers. Now this site during the epidemic has been a great slaughter-field; the mortality was shocking.

These, and such as these, are the Cholera fields, and not dirt and filth so much as is commonly believed, within and round about the house, but *under it*. There are thousands of such houses built about London. Besides the Limehouse district there are West Ham, Stratford, Victoria Docks, Plaistow, Poplar, and the Isle of Dogs, where the Cholera was fearfully felt, full of them. There are hundreds of such houses now building, all within the circle of the pestilence and of death; and when I see, as I have often seen, the robust mechanic enter with his young family, to seek a home, I know well it is only to find, as it were, a sepulchre. The Building Act is at fault for all this: a house may be built anywhere, as it has been said, even on a dunghill; while observing the line of frontage, the party-walls, and a few other niceties of the law. A short while ago the demolition of a

gasometer took place in the East of London, when the black earth, saturated with all the poisonous abominations arising from the manufacturing processes, was carted away to fill up a vacuum, robbed of its gravel and sand in the usual way, over which has been built a large public school. It was by the merest accident, within the last twelvemonths, Mr. Ellis, the Vestry Clerk, informs me that it came to the knowledge of the Hackney Board of the plans laid out for a "genteel family residence," as it is termed, on the spot where were deposited the remains of two cows that had died from the Cattle Plague. But built over filth, or on the bare earth, it is much the same; it is equally over organic matter, only in another form, and under certain conditions, gives rise to deadly exhalations. Elevation has shown a difference, a marked difference, in the ravages of Cholera, but it refers principally to the badly-built, not to the well-built houses. In Bromley, at a low elevation, the mortality has been heavy—in Bromley Union,* little or none; in Poplar, a fearful slaughter—in Poplar Workhouse, no death; in Limehouse, very numerous deaths—in Limehouse Establishment of 400 children, as already stated, not one.

Every link in the water theory, as it is touched, thus drops to pieces. The suggestion of the atmosphere, in its travels easterly as the primary agent in connection with a special localisation, is supported throughout by a chain of consistent and co-operating facts. The poison or miasm hangs about the lowest levels, and then revels in death. The water *drinking* poison has been mistaken for the water *exhaling* poison. At Amiens, in France, where a large mortality from Cholera took place, the water was perfectly pure; and Dr. Druitt could trace nearly all of it from the foul exhalations of organic matter in various forms. The atmospheric theory explains everything. It tells how the parts north of Victoria Park, on which emphasis has been laid, escaped so well; how Mile End got well off; and how Bethnal Green above all should have the smallest amount of mortality—because the poisonous wave, as a glance at the map will show, from the congregated filth, aided by the north east wind, would wholly pass by the greater parts of these districts, except allowing for the spray arising from occasional variation of the wind, and from the ordinary diffusion. The atmospheric theory also, from the low, swampy, Cholera habits, tells why there has been a gradation of death, and at once affords an explanation of the comparative exemption of Bethnal

* There were 4 deaths from Cholera in Bromley Union, in bed-ridden women for years, whose average ages were 75 years. This arose from an inmate going to visit a Cholera patient at Shadwell.

Green, at a higher elevation, and all but complete omission of Stamford Hill. The whole of London is deeply indebted to the Registrar General for arousing public attention to the state of the water. It is impossible to read the Report of Mr. Knight, the surveyor of Mile End, on the pollution of the water we drink, without starting, and who has certainly exhibited a masterly hand in descriptive powers in his exploring voyage down the Lea. But all the rivers are more or less in the same state about London and throughout England ; and it is somewhat surprising the towns escape so well. By a happy provision of nature, however, water has a wonderful property of purification in itself, so that when charged with filth at no great distance, it is well to know how little organic matter can be detected, on a chemical analysis, by the time it reaches the source of supply. Then those bushels of bi-valves thrown up in cleansing the mains occasionally, or in the event of a fire, and the eels establishing a blockade to the tank and butt, are unmistakeable evidence of the necessity for a *thorough* filtration. The supply again should be constant ; its deficiency has long been a crying evil ; the complaint should not arise from the short time it is *let on*: it ought *never* to be turned *off*. By this mode of supply I believe there would be no waste, no more water consumed. The conclusion I arrived at from the whole report, is involved in the following propositions :—

1. That all rivers, docks, canals, and other deposits of water, should be kept as rigidly free as possible from pollution ; and all factories, yards, and works of every description engaged in operations on animal matter, or giving rise to offensive effluvia, should be at once abolished, as standing perils in certain atmospheric conditions, to the health of the localities.

2. That the Building Act calls for revision, under which there is a demand for a clause by which no new house should be held as habitable unless certified by a Sanitary Authority.

3. Wholly demolish certain streets, courts, and alleys as incapable of sanitary repair, and unfit for habitation.

4. In houses of another class, but with defective structure, already pointed out, make it imperative on the owner to place a layer of concrete under the floor (a perfectly practicable thing) or other impermeable composition, to secure the inmates from pestilential and other dangerous exhalations of the earth.

This concludes my Report on the Cholera. It may possibly create some surprise that I have not dwelt more on the specialities of the Limehouse District. It was scarcely necessary. The interest has greater proportions. It is in a large sweep of districts that the facts and the force of the enquiry can only be fairly presented. An objection may also be made to the character of the practical suggestions. I can only say they are not the recommendations of the hour, springing up with the pestilence, they have weighed with me for years, and become irrevocably confirmed by recent events.

I have the honour to be,

GENTLEMEN,

Your most obedient Servant,

THOMAS ORTON,

Medical Officer to the Limehouse Board of Works.

November, 1866.