

## REPORT.

As the Medical Council has been charged by the President of the General Board of Health with the duty of preparing a report on the late Epidemic Cholera, having special reference to scientific inquiries and discussions, it will not be necessary for me to do more, in the present report, than state as briefly as possible (chiefly from the reports of the Medical Inspectors) the extent of the epidemic; the localities principally affected; the more obvious localizing causes of the disease; the measures adopted under the Nuisances Removal and Diseases Prevention Act, and the regulations of the General Board of Health issued under that Act, for mitigating its ravages; with the defects in existing powers and authorities which have been rendered evident by the result of the experience obtained in putting the provisions of the Act in force.

### SECTION I.

*The Epidemic, the Localities chiefly affected, and the Steps taken by the General Board of Health.*

The epidemic of 1854 is the second outbreak of cholera which has occurred in the metropolis since the epidemic of 1849. In the autumn and winter of 1852, a number of suspicious cases occurred in various districts of the metropolis; and in consequence of this I was directed by the General Board of Health to make a special inspection of the epidemic localities on both sides of the river, and to report on their condition. These reports were printed and circulated for the information of the local authorities.

No deaths from cholera were registered during the month of January 1853. There were two deaths in February; two in March; six in April; one in May; three in June; and eighteen in July. During the subsequent four weeks of the month of August the mortality was 4, 10, 18, and 16. In the four weeks of September the deaths were 7, 16, 29, and 47. During October the epidemic progressed, the weekly mortality rising to 66, 45, 83, and 99. The outbreak reached its maximum on the first week of November, on which week the deaths from cholera were 102, and during the following weeks the mortality fell to 98, 72, 46. In December the deaths declined week by week to 28, 13, 11, and 10, on the week ending the 31st.

During the epidemic outbreak of 1853 the current weekly mortality from diarrhoea, a disease which prevails in the metropolis through

all seasons and temperatures, rose along with that from cholera. It declined with it also, and continued to occasion its usual mortality from the beginning of 1854, until the cholera appeared in an epidemic form in the month of July; the deaths throughout this period varying between 10, the lowest, and 38, the highest number of deaths per week.

During the earlier part of the year 1854, cholera had nearly disappeared, but there were occasional deaths registered. These amounted sometimes to one, sometimes to two a week, while none were registered for several consecutive weeks. The total deaths from cholera from the 1st of January till the 1st of July of the present year amounted only to 16. The cases appear, many of them, to have been aggravated forms of diarrhoea or English cholera, occasionally followed by consecutive fever, but generally continuing for a longer period before death than usually happens with Asiatic cholera.

Sometimes the cases were more rapid in their course. One of the earliest of these rapid cases occurred at Fulham, on the 20th May. In this instance death ensued in 15 hours after the time of attack. The usual interval between seizure and death was from 24 to 36 hours.

The following are the dates and residences of the 16 fatal cases which occurred during the first six months of the present year.

10th January	Periwinkle-street, Stepney	- Choleraic diarrhoea.
12th "	High-street, Notting-hill	- Cholera infantum.
18th "	Camden Town	- Cholera.
28th "	Ship Emma, off Wapping	- Cholera.
4th February	Charles Street, Hackney-road	Cholera.
3rd April	Prospect-place, Whitecross-street	- Choleraic diarrhoea.
4th "	Hardin's-lane, Woolwich	- Cholera.
13th "	Baynes'-row, Amwell	- Cholera Anglica.
" "	Workhouse, Islington	- Cholera, consecutive fever.
15th "	Dales'-place, Spitalfields	- English cholera.
19th "	Crow-lane, Fulham	- Spasmodic cholera.
26th "	Workhouse, Mile-end New Town	- Cholera.
27th "	Rich-street, Limehouse	- Spasmodic cholera.
8th June	Crown-street, St. Margaret's, Westminster	- Cholera.
16th "	Mill-lane, St. Paul's, Deptford	English cholera.
17th "	Cash's-ground, St. Saviour's	- Cholera.

These facts prove that the late epidemic, like that of 1849, was ushered in by a number of sporadic cases, scattered over the metropolis before the great outbreak took place.

During the whole of the first six months of the present year, there were a few deaths weekly from dysentery, the highest number being seven.

The mortality from typhus fever varied from 40 to 64 a week during the same period. The highest number of deaths from this disease occurred in the beginning of October, when 88 persons

died in one week. The whole class of zymotic diseases proved fatal to between 200 and 300 persons a week till cholera became epidemic, and the maximum mortality from the zymotic class took place on the week of the maximum mortality from cholera. During that week ending September 9th, no fewer than 2,558 inhabitants of the metropolis died of a class of diseases the ravages of which might be very greatly mitigated, if not prevented, by the adoption of measures for protecting the public health.

Cholera became epidemic in the metropolis early in July. No death from the disease had occurred from the 17th June. But on the 5th July, a female infant, six months old, died of "choleraic diarrhoea," in Belvoir-terrace, St. John's, Westminster, after an illness of 24 hours duration.

This case was followed by a number of fatal cases occurring in various districts of the metropolis.

On the 7th July a child died in South Chelsea. On the 8th there was a fatal case in Rotherhithe, and another in St. George's-in-the-East, in which death ensued in 12 hours. On the 9th a seaman died on board ship off Bermondsey, after 16 hours illness. A fatal case occurred in Marylebone on the 12th, another at Brixton on the 14th, and another in Shoreditch parish on the 15th.

During the ensuing week there was a rapid and progressive increase of the epidemic.

On the 16th July there were four fatal cases in Greenwich, St. George's Southwark, Poplar, and Spitalfields.

On the 17th a death took place in Chelsea, and another in Holborn Union.

There were three deaths on the 18th in St. Pancras, Bromley, and Bermondsey.

There were six deaths on the 19th, one in each of the following places,—Chelsea, Hackney, Hoxton, Limehouse, Battersea, Bermondsey.

On the 20th there were five deaths in Poplar, Lewisham, Lambeth, Whitechapel, and St. Olaves.

On the 21st a death took place in Holborn Union, two at Limehouse, and one at Bromley.

There were seven deaths on the 22d,—one in Limehouse, another in Chelsea, a third in the Savoy, and the remainder in St. George's-in-the-East, Camberwell, Rotherhithe, and one on board the Dreadnought hospital ship.

The epidemic by this time had shown its presence over the whole of the metropolis, and during the week ending the 29th July there were 133 fatal cases of cholera, and 84 fatal cases of diarrhoea. There was a rapid increase of the epidemic in the course of the month of August, and it reached its acmé in the second week of September, almost on the same day on which the epidemic of 1849 occasioned the highest mortality. There was indeed a remarkable similarity throughout in the progress and decline of both epidemics. On the week ending the 9th September there were 2,050 deaths from cholera, and 276 deaths from diarrhoea. The epidemic attained its

maximum in nine weeks, but it declined more slowly than it advanced, for the mortality did not fall to that of the first week of the epidemic until 13 weeks after the maximum period. During the advance of the cholera, there was a corresponding increase of the mortality from diarrhoea. Both forms of the epidemic attained their maximum mortality at the same time, and both declined together.

Table I. in the appendix gives the weekly statistics from the beginning of 1854 till the decline of cholera. Assuming the 1st of July as the commencement of the epidemic and the 16th December as its termination, the following table will represent the total mortality from cholera, diarrhoea, typhus, and other zymotic diseases, as contrasted with the mortality from all causes.\*

Deaths.				
Cholera.	Diarrhoea.	Typhus.	All Zymotic Diseases.	All Causes.
10,675	2,601	1,347	19,413	40,599

Although there were deaths from cholera over the whole of the metropolis, the mortality was very unequally distributed.

On the north side of the Thames among a population of 1,745,701 (at the last census) it was 4,948, or one death from cholera to 353 inhabitants, while on the south side of the river the deaths out of a population of 616,635 amounted to 5,729, or in the proportion of one death to every 108 inhabitants. The mortality on the south side was thus above threefold, in proportion to the population, what it was on the north side of the river.

The mortality in the districts north of the Thames was by no means equally distributed, but was generally speaking greatest on the lowest levels, with one marked exception, namely, the virulent outbreak of cholera in part of the parish of St. James, Westminster, which I shall make the subject of a separate report.

Table II. in the appendix gives the population and deaths from cholera during the epidemics of 1832, 1849, and 1854 for each parish and union of the metropolis. This table exhibits a considerable variation in the relative mortality of the two last epidemics in the same districts; and making every allowance for partial local improvements, it confirms the observation made during the epidemic of 1848-49, namely, that although localities presenting certain defective sanitary conditions are the special seats of cholera, such localities sometimes escape, or are not always attacked with equal severity.

The facts now stated will account for the greater attention which the General Board of Health directed to certain parts of the

\* Besides the deaths from cholera given in the table, there were 3 deaths registered on the week ending December 23d, and 2 deaths on the week ending the 30th. The total mortality from cholera during the year 1854 was therefore 10,696.

metropolis than to others, and in doing so the Board was guided by the experience of former epidemics, which in the main has been confirmed by the experience of the one which has passed away.

I next proceed to state the steps taken by the General Board of Health.

In consequence of the severe outbreak of epidemic cholera in Newcastle-on-Tyne in the month of September 1853, an Order in Council was issued on the 15th of that month, putting in force for six months the Diseases Prevention Act, and authorizing the General Board of Health to issue rules and regulations for the mitigation of the epidemic.

These regulations were issued on the 20th September and 12th October 1853, and sent with an instructional letter to all the parochial authorities in the kingdom. The order in Council was again renewed on the 18th March 1854, and the regulations were re-issued on the 24th of the same month.\*

By these regulations the local authorities were directed to carry out such sanitary measures of a temporary nature, as might remove the more obvious localizing causes of epidemic disease.

They were directed to prepare lists of epidemic localities in their parishes or unions; to cause these localities to be examined; to take steps for placing them in as healthy condition as possible by enforcing the removal of all accumulations injurious to health; to see to the cleansing of streets, courts, and alleys, the cleansing, lime washing or fumigating of filthy or infected houses; and they were also directed to provide places of refuge to which persons might be removed from infected houses or neighbourhoods.

The Guardians of the poor were further required to provide sufficient medical attendance for the sick, to open dispensaries for the gratuitous distribution of medicines, and to employ house-to-house visitors for the discovery and treatment of cases of cholera and diarrhoea, which might otherwise prove fatal through personal neglect.

At the end of last and the beginning of the present year Dr. Milroy was requested to re-inspect the worst portions of certain parishes in the metropolis, and to communicate personally with the local authorities as to the propriety of instituting precautionary measures.

The General Board of Health followed up these proceedings by drawing out and circulating among the local authorities a minute of instructions, (subsequently revised and confirmed by the Medical Council,) in which a most careful detail was given of every step required for protecting the public health and for saving life. The proceedings to be taken for improving the sanitary condition of epidemic localities were given step by step. The whole plan of organizing the medical relief of affected parishes was laid down with precision, and it was anticipated that very little interference on the

\* A new set of regulations, containing in the main the same provisions, though in a briefer form, were issued by the President of the present Board on the 8th and 14th Sept. following.

part of the Board with the proceedings of local authorities would be necessary in future.

Such was the position of matters when the constitution of the General Board of Health was changed by the Act of last session.

The President of the newly-constituted Board came into office on the 12th of August, and finding that the epidemic by that time was progressing rapidly, he on the same day issued a circular letter to all the Boards of Guardians of the metropolis offering the assistance and advice of the Board through its Medical Superintending Inspectors to any Boards of Guardians who might require it.

To this circular a number of replies were sent in. Several Boards accepted the offer of advice; a number of others gave unsatisfactory accounts of their proceedings; several declined assistance on the ground that they were doing all that was necessary, and from some Boards no answers were returned.

Of the few Boards who accepted assistance the majority were not those of parishes which suffered much from the epidemic, and in one or two instances of severely affected parishes, the advice asked for and given was not acted on.

The epidemic during this period continued to advance rapidly, and seeing that there was no appearance of any efficient measures for protecting the public health of the metropolis being in operation, the President determined to appoint a number of Medical Inspectors to visit all the parishes most severely affected, and to inquire what really was being done. This was on the 31st August, and on the 2d September the inquiry was commenced.

A circular was sent to the vestry clerks of the parishes requesting that meetings of Guardians might be held at a time specified to receive the Inspectors, the notice being as short as possible. Lithographed instructions were put into the hands of each Inspector, by which he was directed to make inquiry as to the extent and efficiency of the preventive measures in each parish as laid down in the Regulations and Instructional Minute of the General Board of Health. He was to visit the infected localities and inquire into the local causes which might appear to have determined the outbreak of the epidemic. He was to see whether the cleansing and removal of nuisances required by the regulations had been done; whether there was sufficient medical attendance for the sick; he was to urge in the strongest manner the necessity of medical house-to-house visitation being carried out, and a sufficient amount of dispensary relief being provided. He was also to see whether proper houses of refuge and hospital accommodation existed, and whether all of the measures of relief in the affected districts had been duly organized. The Inspector was also instructed to report any deficiencies in the existing arrangements, and such additions and improvements as might be requisite. One special head of the inquiry was to ascertain the state of the water supply in the southern districts of the metropolis, on account of serious complaints having been made against it. The work was done so quickly, that in four days the whole of most infected districts of the metropolis were placed under

the supervision of Medical Inspectors. Each Inspector was directed to report as soon as possible, and day by day.

The reports were sent in to the President generally every day, who immediately minuted his instructions on the back of each report, and directed the Inspector to return to his district and to state the wishes of the President to the local authorities, urging them at the same time to adopt the steps required for saving the lives of the people.

The object of the entire procedure was to aid the local authorities without interfering with their freedom of action, and to lead them to fulfil the obligations imposed on them by the Statute without resorting to any attempts at compulsion by means of provisions under which the President was advised that the directions could not be enforced.

These minute proceedings were continued from day to day as long as the severity of the epidemic appeared to render it necessary, and in cases where the authorities would not do their duty, the President directed the Inspector to call for inquests on the bodies of any persons who had died from neglect. In a number of instances this course had to be threatened to secure compliance, but in only one case was it taken. This happened in Clerkenwell, where several lives had been sacrificed in consequence of neglect of the Board's regulations.

The following were the arrangements of parishes under the different Inspectors:—

Dr. Hassall	-	-	Lambeth.
			Wandsworth Union.
Dr. Headlam Greenhow	-		St. Mary, Newington.
			St. George the Martyr.
			St. Saviour's, Southwark.
Mr. Walsh	-	-	Bermondsey.
			St. Olave's.
			St. John and St. Margaret
			Westminster.
Dr. Mortimer Glover	-		Rotherhithe.
			Greenwich Union.
Dr. Macloughlin	-		Stepney Union
			Poplar Union.
			St. Andrew, Holborn.
			St. Giles & St. George Bloomsbury.
Dr. Richard King			Shoreditch.
			Whitechapel.
			St. Luke's, Middlesex.
			Hackney.
Mr. George Glover			Bethnal Green.
			St. George-in-the-East.
			Islington.
			Clerkenwell.
Mr. Patterson	-	-	The Strand Union.
			St. James, Westminster.
			St. George, Hanover-square.
Dr. Fraser	-		Chelsea.
			Paddington.

Some slight alteration in these districts was made to suit circumstances. Part of Dr. Fraser's district was transferred to Dr. Greenhow, in consequence of Dr. Fraser having been directed by the President to undertake a special house-to-house inquiry into the circumstances connected with the violent outbreak of cholera in part of the parishes of St. James Westminster, and St. Ann Soho. Dr. Hassall also visited Fulham, and inspected the parish of St. Martin's-in-the-Fields. In addition to these arrangements for the inspection of the parishes, Dr. Gilbert King, Inspector of fleets and hospitals, was directed to inquire and report on the state of the river and shipping, with the view of organizing suitable measures for the treatment of the premonitory stages of cholera on board ship.

It was not considered necessary at that time to institute any inquiry by inspection within the City of London, or in the large parishes of St. Pancras or Marylebone, because the epidemic had visited them with comparative lightness, and moreover the President had reason to be satisfied with the activity of the local authorities and with the proceedings taken by the local sanitary committees.\*

At a later period Mr. Walsh was directed to visit these parishes, and reported favourably on their arrangements for meeting the epidemic in its then intensity. Reports of a similar nature were received respecting the parishes of Islington, Hackney, St. George Hanover Square, and Paddington; and hence the attention of the Inspectors was mainly directed to the parishes where the disease was most prevalent. I had myself previously met the Guardians of Kensington and Fulham, who agreed to carry out the necessary measures of precaution.

Besides the inquiries connected with the sanitary condition of affected districts, and the measures of protection in operation, the Inspectors were also directed to report any instances of improved sanitary arrangements they might meet with in their districts, and the effect of those improvements on the health of the inhabitants.

The Inspectors' reports on the whole epidemic in the metropolis being now before me, I shall next present as brief an abstract of them as possible, arranging the materials regarding all the parishes under a few heads.

## SECTION II.

### *Sanitary Condition of Localities affected by Cholera and Diarrhœa.*

All the inspectors agree in stating as the result of their experience that in those districts where cholera had become localized, they found it connected with obvious removable causes.

The chief place among these local causes is assigned to the state of the drainage, especially in the flat, low-lying districts south of the

\* The voluntary exertions of the Local Board of Health of Regent-square church district, St. Pancras, headed by the Incumbent, are worthy of the highest commendation, as affording an example of how much good may be accomplished, even in the present defective state of the law, by vigilance and well-directed effort.

Thames, and in part of Chelsea and Fulham. In all of these parts of the metropolis, there are large masses of population dependent for their drainage on open ditches, tidal ditches, old badly constructed sewers, and still worse house drains, the result of the whole being that the excreta of a large part of the metropolis are not conveyed away, but are left to putrify and rot in the open air, in cesspools under houses, or in large underground sewers, always generating foul gases, which are poured out into the streets, or into the houses, while in the more open districts, the exhalations from the ditches keep the atmosphere in a constantly malarious condition.

*Open Ditches.*—The reports of the Inspectors contain numerous illustrations of the effect of these causes in predisposing the people to attacks of cholera; and it is worthy of remark, that the exhalations from open ditches, so much complained of at the present time, occupied a prominent position among the causes to which in former days the sweating sickness was attributed.

In describing those which traverse the Borough and Newington, Dr. Greenhow says,—

“The tide flows for several miles up some of these ditches bearing with it the excreta of the inhabitants of the lower district, but carrying with it, in its recession, only a small proportion of the noxious substances it meets in its course, the greater part remaining in the form of black organic mud, which is exposed by the ebbing of the tide for many hours daily to the influence of the atmosphere.

“It is by no means surprising that such a district should be one of the unhealthiest in London, that fever should there find a permanent resting-place, and that pestilence should select the locality as one of its most favorite haunts.”

The following illustrations of their effects on the public health are given:—

Great Western-terrace, Kensall New Town, consists of ten or twelve cottages with gardens in front. There was no apparent cause of disease in this case, except that in front of the houses runs an open ditch passing into an open sewer. A good deal of diarrhœa, and several deaths from cholera, took place in these houses.

Dr. Fraser mentions an instance, in this same district, of five deaths having taken place in three houses. Behind one of those houses ran a foul ditch which receives the drainage of a number of privies. In a cottage nearest this ditch two persons died. The remaining three deaths were those of labourers living at a greater distance from the ditch, but who had worked in the field through which it passed. They had all complained greatly of the stench from it up to the time of their being taken ill.

Open ditches, used as sewers, are common in all the parishes that were under Dr. Greenhow's inspection.

He says, “wherever these ditches are used as sewers, more or less cholera appeared in any houses sufficiently near to be affected by the exhalations, and it was remarkable to observe the inhabitants of the neighbouring streets visited by the epidemic in nearly exact proportion to their proximity to the ditch.”

One of these open tidal ditches runs behind Bath-terrace, Newington. All along the course of the ditch cholera has been prevalent.

Running parallel with this ditch is Devonshire-place, containing 16 houses and 114 inhabitants. Of this number 12 persons had cholera, and six died, while 68 of the remaining inhabitants had diarrhoea. All the cholera cases, and nearly all the diarrhoea, took place in the houses abutting on the ditch.

A similar stagnant ditch passes behind Clandon street. In five consecutive houses nearest the ditch, containing 30 persons, 10 had cholera and nine died.

These ditches are constant sources of typhus, in houses in their vicinity, and "a continual cause of parochial expenditure." Their injurious influence is stated to be "in direct proportion to their stagnancy, the smaller and more sluggish branches being infinitely more noxious than the larger."

The parish of Fulham suffered severely from its open ditches.

Dr. Fraser, who examined into the causes of the fatal outbreak of cholera in Camberwell Workhouse, in addition to causes connected with the building itself, lays particular stress on the sanitary condition of the locality in which the workhouse is situated, and the vitiation of the air in the district by emanations from open ditches, piggeries, and other nuisances. He says there are not only local causes "enough to account for the outbreak of cholera, but to create surprise that malignant epidemic disease should ever be absent from the district." These foul ditches "traverse the neighbourhood in all directions, receiving the contents of the open privies." A street, called Harris-street, skirts one of them. This ditch receives privy soil and other refuse matter, and also the blood, dung, washings, and no small portion of the offal of a large slaughter-house. The blood from the slaughter-house coloured the ditch to a considerable distance, and the smell from it was most offensive. The people in Harris-street are generally obliged to keep their doors and windows shut in consequence of the stench. In that street, which consists of 20 houses, there were a large number of cholera cases, and in several of the houses there were two, three, or four deaths from the epidemic.

In this and some neighbouring streets, about 50 houses are dependent on a solitary pump for their water supply. This pump is sometimes dry, and the people are "days without water."

*Structural Defects in Streets and Houses.*—Dr. Greenhow, in describing the general sanitary condition of the houses in the districts under his inspection, states, that a great evil in these districts is, a total absence of any comprehensive plan of laying out ground for building purposes, and the neglect consequently of all arrangements for ensuring a free circulation of air round dwelling houses, and the existence of numerous narrow overcrowded courts and alleys, many of them mere *cul de sacs*. In one such court 12 per cent. of the inhabitants died of cholera in a few days, and most of the survivors had to be removed.

Another great evil is the existence of so many houses built back to back, with doors and windows only in front; with a dead wall behind, and no means of thorough ventilation. These houses are a constant cause of disease.

Dr. Hassall has made a similar complaint as to these back to back houses.

In all the poorer class of dwellings the means of ventilation are described as defective in the highest degree, and much disease and poverty result from the defect. The improvements already completed in dwellings for the labouring classes, show that the ventilation may be made sufficient even in the worst class of cottage property.

Cellar dwellings are stated to be still in use in many parts of the metropolis, contrary to the provisions of the Metropolis Buildings Act, 1844, as appears from the Parliamentary Paper No. 10, dated 14th December 1854. They ought to be abolished forthwith.

The smaller and poorer streets and courts are generally kept in bad repair. The gutters are stated to be badly constructed, and to retain foul water before the doors of the houses. The pavement of courts and alleys is in general very defective.

Mr. George Glover directs special attention to the condition of the dwellings in cholera localities. He describes the accommodation as wretched and confined; the houses overcrowded, ill ventilated, and badly lighted; the privy accommodation deficient; and the houses themselves intermingled with private slaughter-houses, cow-houses, stables, pigsties, and public privies.

*Cleansing.*—The wide open thoroughfares in the cholera localities are generally, though not always, well swept. The narrow back streets are very imperfectly cleansed, and the courts and alleys "entirely neglected at ordinary times."

Dr. Greenhow states that, in his districts, there appears to be no organized system for removing house refuse, and it hence accumulates in the back yards of the poorer class of property, so as to be injurious to health. The poor complain bitterly of neglect in this particular.

Mr. George Glover says that "the general paving and cleansing of the parish of *Bethnal Green* are very bad." They are both entrusted to one Inspector, who has various other duties to perform, and both are "sadly neglected."

Dr. Hassall states that the cleansing in some parts of Lambeth parish is so ill attended to, that for a period of nearly two months there was no dust contractor, and that in many cases the dust, along with refuse organic matter of all kinds, was not removed for several weeks during the prevalence of the cholera.

He states, also, his opinion that the legal process for abating nuisances is too tedious during the prevalence of a severe epidemic, and that some more summary method is required.

He states, that it has frequently happened that nuisances which the Inspectors have taken in hand at the commencement of the out-

break of cholera have not been removed until after the epidemic has ceased in the neighbourhood.

*Sewerage.*—The Inspectors agree in stating that the sewerage of all the localities is in a most imperfect condition. Many streets are unsewered. In others the sewers are imperfectly constructed, and become choked up with deposit which evolves the most noxious exhalations. Dr. Greenhow gives the following illustration of this fact.

“Dr. Jones, a member of the St. Saviour’s Board of Guardians, informed me at one of the meetings that a bad smell from a sewer close to his surgery having caused much annoyance, he made application for its cleansing. That although the original capacity of the sewer had been considerable, a waterway of six inches only was open, and that 200 loads of soil and mud were removed from the sewer in the space of a very few yards.”

It is also stated by Dr. Greenhow that a new sewer had recently been constructed in Guildford-street, St. Saviour’s, but that the old one, which was nearly choked up, had been left pretty much in that condition. This old sewer runs under the foot-pavement on the north side of the street, and out of 22 deaths from cholera in that portion of the street, 14 took place in the houses on the north side, close to the old sewer.

Another great sanitary evil, incident to the districts south of the river, is stated to be the reflux of the tide through the sewers at high water.

In some parts the tide fills the sewer and rises in the gully grate up to the level of the street, having previously forced the sewer gases into the public streets, or through the drains into dwelling-houses.

Not unfrequently the basements of houses are flooded from the same cause.

The sewer water so pent up is forced through the sides or openings of the sewer into the sub-soil, and produces malaria over large districts, the effect of which, Dr. Greenhow says, is shown by the marks of miasmatic poisoning in the countenances of the inhabitants.

Dr. Greenhow adduces evidence of medical practitioners and members of Boards of Guardians, to show that house drains are often not trapped, and that disease is produced by sewer gas passing into the houses. Want of trapping is said to arise frequently from surreptitious connexions being made between the house drains and sewers by unskilful persons, and thus the advantages of drainage are converted into direct causes of disease.

The method of ventilating sewers by untrapped gulley grates and open grates in the middle of the street, is condemned as directly injurious to the public health, and many cases of cholera both during the late and previous epidemic are stated to have occurred near these apertures. So long as the present imperfect sewerage exists, some efficient system of ventilation is absolutely necessary.

Dr. Greenhow describes the present system of ventilation by street gratings as “most pernicious.”

Dr. Hassall states, that the drainage in the districts under his inspection is very defective, many streets and roads being without any sewers; that the sewers in most cases do not empty themselves properly of their contents, but allow of their deposition and accumulation. Until these evils can be remedied, he conceives that some means of removing the unwholesome gases continually generated from the sewers are indispensably necessary.

Mr. George Glover states that in all the parishes under his inspection the sewerage is bad, and in fact in the greater portion of some of them there are no main sewers at all. The general deficiency and defective nature of the sewerage and house drainage of the narrow streets are notorious.

*House Drainage.*—Dr. Greenhow appears to have taken considerable pains to estimate the effect of the present condition of the sewerage and drainage of the metropolis in predisposing to cholera. He states, that it is difficult, where so many causes of insalubrity exist, to decide which is the most powerful in localizing the disease; that he directed his most earnest attention to the subject, and that whilst admitting that bad water, improper food, want, fatigue, depressing passions, bad health, and especially the existence of other diseases, powerfully predisposed individuals to attacks of cholera, the effluvia arising from collections of night-soil were by far the most influential. In certain cases, the atmospheric contamination arising from noxious trades appeared to have proved injurious, but, in by far the larger number of cases, direct vitiation of the air by open privies or by drains was obvious. The occurrence of disease from these latter causes, he states to be exceedingly common in the cottages both on the south side of the river and at Chelsea.

“The privies are most commonly untrapped, and placed over cess-pools, or drains which seem to act as such.” The privies are “most frequently situated in an extremely small back yard, often built against the main wall of the house or wash-house, through the foundations of which, after a time, the night-soil percolates, until it penetrates into the sub-soil below the living apartment,” or the privy is within three or four feet of the back door. Sometimes untrapped privies are actually situated inside houses. Where a privy has been common to a number of houses, it has repeatedly happened, that the occupants of the house situated nearest to it have alone suffered from the pestilence.

The effect of exhalations from badly constructed sewers was also observed to be highly injurious. Houses, in all other respects clean and wholesome, have suffered from the entrance of the sewer gases through untrapped drains and sinks. “In a great many cases, open gully-holes in the streets have exercised a like baneful influence on the internal air of houses.”

“Sometimes ruinous drains pass close to the walls of houses, and the effluvia from them, penetrating through chinks into the basement, rise from thence by the interstices of the floor to the apartments above.”

*Mischievous Results of Drains passing under Houses.*—The passage of drains underneath houses is stated by Dr. Greenhow to be a not less fruitful source of mischief. “Even when well constructed, this is a great evil, as the slightest imperfection in the joining of the pipe may lead to the most disastrous consequences.” This is still worse when drains are roughly made of bricks, often only covered by flags or by the boarding of the floor. Houses drained in this defective manner entail “continual ill health among their inmates, with almost the certainty of the cholera should it arrive in the district.”

As an illustration of the effect of these causes of disease, Dr. Greenhow states the following facts:—

In Suffolk-street, in the Borough, there were deaths from cholera in 20 houses. In these houses, up to the 23d September, there had been 29 cases of cholera, and at least as many of diarrhoea requiring medical treatment, and 24 deaths. Not far from these houses, there are bone-boiling establishments, cat-gut manufactories, knackers' yards, the smells from which were much complained of, and besides the smells, no other cause of disease could be detected in three out of the 20 houses. In 11 houses there were untrapped sinks or privies, either within or in such close proximity to the houses as to pollute the air indoors. In one house there was a watercloset on the first floor communicating with a cesspool underneath the shop. In another, there was a cesspool for house-slops in the back area, covered with boards, and a contrivance to pump the liquid up into the yard, from whence it ran into the sewer. In another case, a brick drain ran beneath the house; the privy in the back yard was exceedingly offensive, and there were two untrapped sinks. In one house the privy was built against the kitchen wall, and the yard was undermined by rats so as to afford free egress to the effluvia from the drains. In another case, there was a most offensive untrapped gully immediately in front of the house. It is remarkable that the inhabitants themselves had, with few exceptions, overlooked these local causes of disease, and attributed the cholera solely to the unwholesome trades. Dr. Greenhow examined a number of houses in Suffolk-street, in which there had been no illness, and found their sanitary condition good.

The outbreak of cholera in Lant-street is referred by Dr. Greenhow to similar causes. There were deaths in 12 houses. In these houses there were about 100 inhabitants, of whom 19 had cholera, and above 20 others diarrhoea; 16 out of the 19 cholera cases proved fatal. In this instance, also, the drains passed beneath several of the houses. In one house, a foul and offensive privy was built against the kitchen. In another there is an untrapped sink close to the back door. In the other houses there were similar unhealthy conditions.

Another instance is given of four houses in Swan-street, in three of which the drains passed beneath the houses, occasioning nuisances and producing fevers among the inmates. These houses suffered from cholera and diarrhoea, but the fourth house, the drain from

which did not pass beneath the floor, escaped the epidemic altogether.

Both inhabitants and proprietors expressed a strong desire that this most injurious and dangerous manner of draining should be discontinued, and the sullage removed without passing under the houses.

These illustrations are taken, not from the worst streets or houses, but from the dwellings of respectable tradespeople in comfortable circumstances.

*Privies and Cesspools.*—Numerous examples of the dangerous results of effluvia from open privies in the small yards of cottages came under Dr. Greenhow's observation, from which the following instances are selected:—

In a house in Down's-buildings, Christ-church, two cases of cholera took place, one of which was fatal. There was an open privy, so situated that the effluvia permeated the house.

Two deaths occurred in a house in Queen Charlotte-court, St. Saviour's. This house had an open privy entering from the bed-room.

In a house in White Hind-alley, in the same neighbourhood, inhabited by three persons, the privy was situated under the same roof as the house. Two of the inmates suffered, one from diarrhoea and the other from cholera, which proved fatal.

Close to a house in Moss-alley, St. Saviour's, there is situated a foul and offensive privy, and a sewer passes close to the wall of the house. Three persons in this house died of cholera.

Great Bland-street, Newington, is a broad, airy, good-looking street, inhabited by respectable people. One of the houses is of a superior class, clean and unexceptionable, but it has an open privy over a cesspool, built against the kitchen wall. There is no drainage, and most of the cesspools in the neighbourhood were overflowing. The house in question was inhabited by five inmates, four of whom died of cholera.

A house in Lombard-street, St. George the Martyr, had its drains choked and offensive, with a foul privy opposite the back door. Two children, who occupied a room overlooking this privy, died of cholera.

There is a house in Swan Court, in St. Mary, Newington, against the gable wall of which there are several privies erected. Two persons in this house died of cholera, and two others had diarrhoea. In this instance, it is said that the soil from the privies had percolated through the wall, and infiltrated the earth below the flooring of the house.

A single death from cholera took place in White-street, in the Borough. This house had a watercloset within three feet of the back door, underneath which there is a large cesspool, receiving the drainage of several other houses, and the smell at times is overpowering.

In a small market garden, by the side of Kensall-road, Kensall-green, is a cottage, well isolated from every other dwelling. There is



no cause of disease near it, except an open privy, with a cesspool constantly full, immediately behind the house; and there is a rude brick drain passing underneath the cottage, and conveying the overflow from this cesspool to another in front, where it is collected for manure. Of four adults inhabiting this cottage, one had diarrhoea, and three were seized with cholera, of whom one died.

Manor-gardens, Chelsea, is a large open unpaved court, which has been lately drained. Some of the houses are provided with water-closets, and others have the privy connected with the drain.

There was a good deal of diarrhoea in the court, and also one case of cholera, and that not a fatal one. Every inmate of the house where this case occurred, seven in all, had diarrhoea, and this house is the only one in the court which has a cesspool.

The absence of house drainage, Dr. Hassall found to give rise to a very great evil in the houses of the poorer classes in the districts under his inspection, namely, the use of cesspools and open privies. Both of these are often overflowing, and the stench from them pervades the whole house, and indeed he says, "the air of whole streets and courts is often polluted by the emanations."

They are also a frequent cause of the contamination of shallow well water, especially in suburban and rural districts.

Among the prominent local causes of disease in Bermondsey, Mr. Walsh mentions the house drainage and sewerage as being very defective, owing mainly to the low level of the district and the necessity for damming up the sewers and ditches, except during a low state of the tide. While this defect exists, complete structural arrangements for sewerage or for general house drainage are impossible, and partial changes that have been adopted, such as filling up cesspools without sufficient water being laid on to cleanse the drains, have sometimes been complained of as of doubtful efficacy.

*Predisposing Effect of Sewer Gases.*—The effluvia from deposits in badly constructed sewers, escaping through openings into public streets and houses, are amongst the most obvious predisposing causes of cholera. A few examples of this will suffice.

Dr. Greenhow states that in Crump's-yard, Chelsea, containing several houses, there is one immediately opposite an open gully; three persons out of four residing in this house were seized with cholera, and two died.

In First-street, Chelsea, are two houses, at a distance from each other, opposite each of which there is an offensive gully grate. Diarrhoea was prevalent in the street, but there was no cholera, except in these houses. In one of them there were eight or nine cases of diarrhoea, four cases of cholera, and two deaths; and in the other, there were two deaths from cholera, and several cases of diarrhoea.

Dr. Fraser gives the following illustration of the injurious effects of emanations from a large offensive untrapped gully opposite New-terrace, Camberwell green. "In the house, No. 6, immediately facing this gully, two deaths from cholera have taken place. In the adjoining house two patients are now ill with this disease, and one has recently recovered from it in a house a few doors off."

Dr. Greenhow also mentions a case of a respectable woman being carried off by cholera, from accidentally inhaling the effluvia arising from a gully near St. George's Church, in the Borough.

A fatal case of cholera, and several cases of diarrhoea took place in a house in Garden-row, Southwark, opposite the door of which is an untrapped gully grate, to which the inmates directly traced the disease.

Five persons residing in East-place, also in the Borough, were all attacked with diarrhoea; and one of them died of cholera. The assignable cause in this case also was an offensive gully grate opposite the door.

Dr. Greenhow states that similar facts came continually under his notice in every portion of his district.

*Noxious Trades.*—The influence of noxious trades and nuisances in predisposing to attacks of cholera has been observed during the late epidemic.

Dr. Greenhow says, that complaints of these trades were very early made to him in the Borough, "and there can be no doubt," he says, "that the insalubrity of the district is much increased by their being conducted in the midst of a thick population." Dr. Greenhow met with several cases of fever in streets near the premises where unwholesome trades are carried on, and "typhus, or some other fever is rarely absent."

The following example is given by Dr. Greenhow, from the Borough. It is that of a dustman's yard, not far from Essex-street, St. Saviour's, in which there are always many hundred cartloads of dust, road-scrappings, and also night-soil. Close to this dépôt is Devonshire-square, containing 22 houses and about 130 inhabitants. The place is clean, and there are no local causes connected with the houses themselves sufficient to account for the attacks of cholera which took place.

The people complained greatly of the nuisance from the dust yard. A large proportion of the inhabitants had diarrhoea; there were about twelve cases of cholera, eight of which proved fatal. A family removed from the square and another family took the house. Three of the members of this new family immediately took cholera, and one died. A good many cases of cholera and several deaths took place in each of the other streets round the dust yard.

Another similar instance of the injurious effect of a contractor's yard in the Borough is also given.

The effluvia proceeding from filthy stables, cow yards, and pigsties are cited among the aggravating causes of the epidemic, and instances are given of whole families, exposed to their influence, having been attacked by cholera and diarrhoea, some cases terminating fatally.

Mr. George Glover says that in the parish of St. George-in-the-East there are "noxious trades in full operation, and much complained of by the inhabitants and medical men." There are 2 bone-boilers, 2 oil-boilers, 3 soap makers, 4 or 5 sugar refiners re-burning animal charcoal, 1 naphtha distillery, 4 water-proofing works, 1 candle maker, and 1 place where putrid fish are boiled. One of the worst of these

nuisances was abated by the simple expedient of passing the fumes through a furnace.

Dr. Hassall states that the chief noxious trades in Lambeth district are five bone boilers and crushers, a glue manufactory, and a dust contractor's yard on Belvidere wharf, where there is at all times an enormous collection of organic matter, including sometimes night soil, from which most offensive smells proceed.

There are other noxious trades carried on in Wandsworth, and Dr. Hassall expresses his conviction of the absolute necessity of putting a stop to these most prolific causes of disease.

The examples of specific localizing causes of cholera given in the preceding pages appear to be enough to illustrate the usual influence of these causes on the public health, and I shall therefore give a general outline from the Inspectors' reports of the localizing causes in other parts of the metropolis.

Dr. Macloughlin points out the chief sanitary defects in the Unions under his inspection as follows:—

“The great want of *Stepney Union* is proper sewerage and a proper supply of wholesome water.”

“Great complaints exist against the bad smells arising from noxious trades, such as chemical works, bone boilers, India rubber manufactories, and heaps of dung, dust, and putrid matter, animal and vegetable,” which cannot be completely abated in the present state of the law.

It is stated that one of the Union guardians himself occasions a serious nuisance by collecting dung and night-soil and keeping pigs. In this instance two orders for cleansing were made, one after the other. Both were obeyed, but in a few days the nuisance was as bad as before.

Dr. Macloughlin states that diarrhoea and cholera were most prevalent and fatal in crowded localities, where the defective sanitary conditions above named were most marked.

In *Poplar Union* great complaints were urged against noxious trades, defective sewerage, and unwholesome water. These, he says, “materially injure the health of the poorer inhabitants, and make them so liable to fevers at other times, and now to attacks of diarrhoea and cholera.”

He mentions several instances where, from these causes and from accumulations of filth, the population has been decimated by zymotic disease. The filth was removed with only temporary benefit, for the real cause of the mischief, the sewerage and water supply, being left untouched, things reverted to their old position in a few days.

In *Holborn Union* overcrowded courts and houses were the special seats of the pestilence, and in the localities chiefly affected the great evil was again the defective state of the sewerage and water supply.

Many nuisances existed in various parts of the union, which the guardians abated so far as their legal powers would admit, but as there is no law to prevent the repetition of a nuisance the evil re-appeared a few days after it had been abated.

The local authorities of *St. Giles and St. George, Bloomsbury*, were found to be doing all they could to ameliorate the sanitary condition of the people, but having no control over the sewerage and water supply, or over unwholesome trades, they could do little that was permanently effectual.

They nevertheless appear to have exercised the powers they had with vigour. The courts of suspected districts were kept constantly lime-washed; nuisances were removed; above 400 cesspools were filled up, and improvements conducive to health were effected in upwards of 1,000 tenements.\*

Dr. Mortimer Glover describes the localizing causes of the epidemic in the parishes under his inspection as follows:—

In *Rotherhithe* the worst seats of cholera were those districts of the parish traversed by open tidal sewers, up and down which a slight tide flows from the Thames. “Most of these emit a strong smell of sulphuretted hydrogen, and along the banks of one of the worst, which I shall call *Workhouse-ditch*, from its close proximity to the workhouse, the most numerous and fatal cases of cholera have occurred.”

“The existence of monstrous nuisances was admitted, and the connexion of these generally with cholera, but the power of remedying them was totally denied.” The local authorities assigning as a reason that nothing effectual could be done without drainage, which they could not carry out for themselves, although perfectly willing to do so, on account of their being within the jurisdiction of the Commissioners of Sewers, from whom they could get no relief.

There were two inspectors of nuisances, but very little real good was effected notwithstanding the inspection.

In *Deptford* matters are, if possible, still worse. The drainage is exceedingly defective, and was an evident localizing cause of cholera. Dr. Glover gives an illustration of two new streets, called *Commercial-road* and *Wellington-street*, “where cholera has been most fatal.” The houses are two stories high; the ground is open around them, they seem to be houses of a superior character and inhabited by people in comparatively comfortable circumstances. But they have no drainage, and the filth of the houses is left to percolate the subsoil.

“In almost all the places where the disease was prevalent most frightful nuisances existed, such as overflowing cesspools, slaughter-houses, piggeries, &c., along with total want of drainage.”

“It may be doubted whether there is a proper sewer in *Deptford*.” Dr. Glover states that the worst features of *Newcastle* fall short of those of *New-street*. “On the 2d and 3d September there were at least 40 registered deaths in this immediate neighbourhood and many died who were not registered.”

“All attempts,” he says, “to remove permanently such a state of things as there exists must prove abortive in the present state of legislation on sanitary matters.”

\* Report of the Sanitary Committee of *St. Giles and St. George, Bloomsbury*.

At *Greenwich* many of the principal seats of cholera were places abounding in nuisances. In *York-street* Dr. Glover found above 200 people living in 20 wretched houses. In No. 5 in this street two deaths from cholera had occurred, and another was impending. Several deaths had also taken place in the immediate vicinity of this house. It was afterwards discovered that under the boarding of a room there was a depth of 10 inches of night-soil which had soaked from the adjoining privies. Dr. Glover says, "This is only one example of the many nuisances" he had observed.

*Woolwich* has a very active Local Board of Health elected under the Public Health Act, which was found doing its duty most energetically. The deaths from cholera chiefly occurred in Irish lodging-houses. In one of these houses in *Rope-yard-rails* there were 104 Irish. The house consisted of nineteen or twenty rooms, which had been tenanted by 120 persons previous to Dr. Glover's visit. In this house there were four cholera patients in one bed. Dr. Glover states that the smell in the house was "dreadful." "I was myself," he says, "instantly conscious as of having received a dose of poison, was ill all day, and at night had a violent attack of diarrhoea and vomiting."

Mr. Patterson, who inspected those parts of the parishes of *St. James, Westminster, and St. Anne, Soho*, which were so severely affected by the epidemic, describes the dwellings as overcrowded, unventilated, without any efficient house drainage; the cesspools and privies overflowing; the supply of water scanty; some of the houses so filthy and unhealthy as to be unfit for human habitation; some of the sewers of the district in a foul condition pouring sewer air through the gully grates into the streets and houses. He says there are in the district "almost every nuisance and abomination," slaughter-houses, cow-houses, boiling-houses, and other noxious and deleterious trades.

Mr. George Glover reports that the "potteries" in *Kensington* parish have suffered most severely from cholera. This place still retains its character for filth and disease. Pig feeding and the boiling of offal are still carried on as usual, the existing state of the law not being sufficient to enforce removal of the pigs and other nuisances. In the year 1849 the potteries contained 1,000 persons, fifty of whom died in the first ten months of the year, and of these twenty-one deaths were from cholera and diarrhoea. The population during the present year is about 1,270, and the deaths from cholera and diarrhoea have been thirty-three.

In a report on the condition of the epidemic localities in *Waterloo-road* district of *Lambeth* parish made to Dr. Fraser by Mr. Dodd, one of the union medical officers, he gives among the obvious causes of disease the sale of unwholesome food, private slaughter houses, defective sewerage, untrapped gully grates, overcrowding of houses, and overflowing cesspools.

In a district of the Parish of *St. Mary, Newington*, called *Lock's-fields*, a report on which was sent to the General Board of Health by Mr. Keever, one of the medical visitors, it is stated that "diarrhoea and cholera prevailed to an immense extent; and in nearly

"all cases the ravages have been greatest, if not altogether confined to those tenements, where the water was impure, the drainage bad, and the cesspools foul and offensive."

The drainage is described as being "everywhere most imperfect." Where the privies communicate with the drains there are no traps, and the smell is very bad at times. The street gratings, the writer says, have been in many instances complained of from want of trapping. It is also a frequent occurrence to see the water-butts placed over untrapped drains. The cesspools are often overflowing, and they were found, in some instances, saturating the ground beneath the floors of rooms.

"There seems to be no system of scavenging," and all sorts of filth and débris "seem to remain for an indefinite period in many of the bye-streets."

Dr. Gilbert King, who inspected the shipping on the *Thames*, points out in his report the foul and unwholesome state of the *Thames* water, from its intermixture with the *London* sewage. This water is used on board ship, and acts as a predisposing cause of cholera. The river banks, at low water, are in a filthy state from the same cause, and often expose the contents of privies or cesspools which have flowed from the houses. The exhalations from these pestilential banks of mud under a hot sun are most injurious to the purity of the air. Dr. King also ascribes much of the disease on board coal vessels to the dreadfully filthy condition of the sleeping quarters of the sailors, who are thus exposed to almost every cause likely to produce disease.

Mr. Glaisher has shown that *Thames* water contains an almost incredible amount of filth derived from the sewers, and that about four millions of gallons of water, loaded with putrescent matter, are every day evaporated from its surface within the metropolis, to be diffused through and to contaminate the atmosphere.\*

### SECTION III.

#### *The Water Supply of the Metropolis in relation to the Cholera.*

That a certain connexion exists between the use of impure water and the spread of pestilential disease is a circumstance that has been observed from the earliest times, and during the epidemic of 1848-49 it was found that the use of such water led in some instances to severe and fatal outbreaks of cholera.

In the report of the General Board of Health on that epidemic a number of carefully observed cases of this kind are given. One of these, the details of which I obtained myself, took place at *Salford*, in a street containing 90 houses. The inhabitants of 30 of these houses used water from a well, into which a sewer had leaked, and among them there were 19 cases of diarrhoea, 26 cases of cholera, and 25 deaths; while in the remaining 60 houses, which derived their water supply from purer sources, there were 11 cases of diarrhoea, but neither cholera cases nor deaths.

\* Report of the Registrar-General on the Cholera of 1849.

There is a difference of opinion concerning the part which impure water plays in the phenomena.

It is believed by some, that the water which induces cholera contains the specific poison of cholera in it, probably derived from the evacuations of cholera patients; while others believe there is no sufficient evidence of this being the case, and they consider that all the facts go to prove that water containing putrescent organic matter acts as a very powerful predisposing cause of the pestilence in a similar way as does putrescent organic matter introduced into the system by the atmosphere or by food, but not as a specific poison.

The matter in dispute is really of no great practical value, for if it be a fact that the use of impure water is dangerous to the public health, the manner of its action is of very secondary importance, at least for practical purposes.

The controversy however having given rise to distinct allegations, setting forth the destruction of human life occasioned by the quality of the water supplied by the companies, especially to the southern part of the metropolis, it became necessary to inquire, 1st, into the quality of the water, and 2d, into the relation, if any, between the use of the water and the mortality from cholera.

*Quality of the Water Supply.*—The facts about to be stated respecting the water supply of the metropolis, refer exclusively to its condition during the prevalence of the late epidemic at a period when (except in the case of the Lambeth Company) the provisions of "The Metropolis Water Act, 1852," had not come into operation. Under that Act, the sources from which the water is taken, the manner of conducting it to the metropolis, and the construction of the reservoirs will be improved, and a portion of the evils complained of will it is hoped be remedied.

Two distinct and separate inquiries have been carried on to determine the quality of the water; one microscopic and the other chemical. The microscopic inquiry was remitted to Dr. Hassall, who has had great experience in similar investigations, and the chemical inquiry was undertaken by Dr. R. D. Thomson, lecturer on chemistry to St. Thomas's Hospital, who has specially studied the influence of waters for domestic use on the public health.

Dr. Hassall was directed by the President to examine specimens of the water supplied by all the metropolitan companies, to be taken at the source of the supplies, from the tanks in which the water is stored, from the companies' mains, and from service pipes, cisterns, water-butts, tubs, &c., through which the supply is received for use in houses and neighbourhoods where cholera was prevalent.

The microscope is a most important means of conducting such inquiries, because it affords a kind of evidence as to the relative purity or otherwise of water which could not be so well estimated by chemical analysis alone. The result of the whole inquiry has been embodied in a series of extremely interesting reports and drawings, of which I proceed to give a brief abstract.

Dr. Hassall states, that the sources from which every metropolitan company, without exception at present, derives its supply are more or

less impure. All the waters taken at those sources exhibit, under the microscope, a greater or less amount of organized matter, living and dead. The presence of living organisms is a sure test of the presence of dead organic matter, and all the specimens examined contained living organisms, animal and vegetable. The purest water at its source is the Lambeth water, taken from the Thames at Thames Ditton. The most impure, on the south side of the river, is the Southwark and Vauxhall water, taken at Chelsea Reach. This last water contains the débris of food derived from the waterclosets and sewers of the metropolis. It also contains living organisms which naturally belong to brackish waters, and proves that a certain amount of tidal sea water is supplied to the inhabitants of the district.

The same living organisms and organic matters are found in the water from the tanks, mains, and service pipes of all the companies. In certain instances, the water is so loaded with organic matter that zoophytes and vegetable productions are developed rapidly, and to a great extent in the mains, and are discharged in masses into cisterns and butts along with the water, and in these receptacles the water is in its worst condition, often containing large worms, vibriones, fresh-water shrimps, fungi, and other cryptogamous plants, in addition to myriads of animalcules belonging to a number of different genera and species.

The real practical deduction from the whole of the microscopical analyses made is, that there is no water at present supplied to the metropolis that does not contain dead and living organic matter, animal and vegetable. But, as has been stated, the Thames Ditton water, supplied by the Lambeth Company, is by much the purest of the waters, while the Southwark and Vauxhall water is one of the worst, and the waters of the other companies might be arranged in a series between these two. The Southwark and Vauxhall water is so similar to the river water, that Dr. Hassall says, "between it and the water of the Thames, as taken from the river at the spot at which the Southwark and Vauxhall Company obtains its supplies, there is frequently only that amount of difference which would arise from mere subsidence."

The effect of storing water in butts and cisterns is to increase its impurity. These receptacles are described as sometimes situated so inconveniently as not to admit of being cleansed. Sometimes they are placed close to privies, so that the water imbibes the emanations proceeding from them. Often the water-butt has no lid, and the water is thus exposed to light and air, both of which promote the generation of organic life. Sometimes the lid is permanently fastened down, and the cistern cannot be cleansed. "Examples without end," he says, "of these conditions might be cited. In the houses and cottages of the middling and poorer classes the water is, for the most part, stored in butts, vats, and pans; these commonly have no lids, and they are unprovided with waste-pipes," and "the water is very apt to flow over at the top and saturate the soil around the house." "In many cases, the size of these butts is so

“small, that they do not afford anything like a proper supply of water, while, in a great many houses, the water is not laid on at all,” and “the daily supply is procured out of the house, and is kept in any jugs, dishes, or pans the people may happen to possess, which are usually placed in the single room which serves as kitchen, sitting-room, and bed-room.”

The use of cisterns and butts tends also to the accumulation of the various organic matters deposited from the water. “We have seen,” says Dr. Hassell, “dozens of cisterns half filled with green confervæ, and other vegetable and animal productions.” Such is the amount of noxious impurities sent into the mains, that a practice prevails in the districts supplied by the Southwark and Vauxhall Company of tying over the service-pipes and tops of the cisterns pieces of muslin, flannel, and very frequently old stockings, to act as filters, and “the quantity of dirt and organic matter obtained in this way in a short time is often perfectly surprising.”

The water itself, as delivered, is described as “nearly always more or less opalescent, containing in large proportions organic matter, living and dead, vegetable and animal.” “The complaints made of this water are almost universal.” “The Lambeth water,” Dr. Hassell says, “is comparatively a pure water, clear and bright, the amount of sediment furnished by it not being considerable. This water is filtered, but the Southwark and Vauxhall water is not filtered before delivery. At all events the amount of deposit was usually so great, and the nature of the organic impurities such, that it is scarcely credible that this water is subjected to any process of filtration previous to distribution.”

Dr. Hassell also examined a number of specimens of shallow well and pump waters, taken from neighbourhoods where cholera had been severe, and states, as a general conclusion, “that nearly all were of a very impure description.”

I have received from Dr. Thomson the following abstract of the results of the chemical analyses of the London waters, which corroborates those arrived at by the microscope:—

“The chemical investigation has extended to the examination of upwards of 70 samples of water supplied by the various metropolitan water companies, principally to houses in which deaths occurred from the epidemic. The result of these analyses has shown that the greatest amount of foreign matter existed in the water supplied by the Chelsea Company, its total amount of impurity being 60 degrees (reckoning each grain per gallon a degree), while its amount of organic impurity was 5.41 degrees. This result was obtained in September, during the prevalence of the cholera, but it was afterwards (in December) found to be characterized by 37 degrees of impurity. The actual amount of impurity may vary from day to day, according to the state of the tide when the companies’ engines are in action.

“Next to the Chelsea water the most impure water was found to be that of the Southwark and Vauxhall Company. Its impurity varied from 34 degrees to 72.66 degrees on one occasion, but the mean of

13 experiments gave 45 degrees as the mean impurity, that of the organic impurity being 4 degrees.

“The most striking evidence of the mixture of this water with decomposing animal matter was obtained by the extraction of a much larger quantity of ammonia from it than has been hitherto suspected. Indeed, the amount of this alkali is so considerable (as much as .773, or upwards of three quarters of a grain of carbonate of ammonia per gallon) that it can be distilled over, fixed by means of an acid, and crystallized with the greatest facility. But this strong test of animal impurity was found in all the waters, and in very appreciable amount in the Thames Ditton water ( $\frac{64}{1000}$  per gallon of carbonate of ammonia).

“This fact is an important but unfortunate one, since Thames Ditton has been chosen as the source of supply of all the Thames water companies.

“The following table gives the relative degrees of the total impurity of the metropolitan waters supplied to cholera houses, and taken as soon as possible after the occurrence of death.

Lambeth	-	-	-	13.36 degrees.
Grand Junction	-	-	-	14.46
West Middlesex	-	-	-	19
Southwark and Vauxhall	-	-	-	45
Chelsea	-	-	-	60.17
New River	-	-	-	17.18
Do. do. Soho District	-	-	-	25.64*
East London	-	-	-	18.30
Kent	-	-	-	17.76
Hampstead	-	-	-	24.22

“The water employed for domestic purposes has been likewise examined from a number of localities in which cholera was prevalent, such as Sandgate, Brasted, Newton Abbott, Nottingham, and numerous shallow wells in the metropolis, which last have been found much more saturated with noxious matter than could have been anticipated, the impurity rising from 100 degrees in the east to 180 degrees in the west of the metropolis.”

The Medical Inspectors, who were more specially occupied with the measures for mitigating the disease in their respective districts, have given the results of their observations as to the condition of the water supply, as they found it in affected houses and neighbourhoods.

Dr. Greenhow says, “the Lambeth water in the tanks was beautiful, the smallest object being clearly discerned at the bottom,” while the Southwark and Vauxhall water “was most turbid, full of animalcules, and of small substances of confervoid or other vegetable character, which, gradually coalescing, float near the surface, presenting whilst in the water much of the appearance of small sponges.”

Deptford, Greenwich, Woolwich, and the part of the parish of Rotherhithe east of the Surrey canal, are supplied from the Kent

\* During the severe outbreak of cholera in St. James Westminster, and St. Anne Soho.

Waterworks, the western district of Rotherhithe being supplied from the Southwark and Vauxhall Waterworks.

Dr. Glover describes the sources of both these waters as pretty much alike, one being taken from the Thames, the other from the Ravensbourne, both of which receive a large quantity of sewage. Both waters contain organic matter and infusoria, the only apparent difference between them being, that the Kent Waterworks Company filter their supply better before it is delivered. This process of filtration, nevertheless, leaves a considerable amount of organic matter in solution.

In Bermondsey, which is also supplied by the Southwark and Vauxhall Company, Mr. Walsh says, "The quality of the water supply continued to be much complained of." Many courts are supplied by one or more open pipes, which flow for a certain time every day (except Sunday), and the daily supply for each house must be caught during the flow, and stored for use. In unpaved or ill-paved courts, the effect of this mode of supply upon the soil is very bad.

"The clause of the Water Act, whereby tenants or landlords may be compelled to lay on water, has never been put in force. There would be obvious injustice, it is felt, in forcing upon them such bad water."

"The baths and wash-houses have been supplied with water of so bad a quality that they have become greatly disused."

In his report to Dr. Fraser on the Waterloo-road district of Lambeth, Mr. Dodd, Union medical officer, remarks, "This district is also partly supplied by the Vauxhall Water Company, and the water is of a poisonous character, very full of dirt and animal matter, and many of the water-butts are kept in such a bad state, and placed so near the privies, as to be unfit for drinking use."

Dr. Hassall says, in regard to the Southwark and Vauxhall water, that it is his deliberate opinion that the use of this water ought not to be permitted an hour longer than is absolutely indispensable.

He further states that in several localities in the parishes under his inspection, there is no water supply at all, the people either buying water from water carts, or taking it from the Thames, the Wandle, or even from ditches.

With reference to the defective and unwholesome system of distribution at present in use, he says, "I beg to express my conviction that the water supply of the metropolis will never be in a condition at all satisfactory, until the use of cisterns is abandoned and the constant method of supply adopted. This conviction has been forced upon me by an inspection of a great number of the cisterns, butts, pans, and tubs, now in use as receptacles for water."

Dr. Greenhow states that the intermittent nature of the water supply is a subject of universal complaint. It is sometimes on for no more than half an hour, unless there be a fire. The quantity is stated to be insufficient. The water butts in a very bad condition, and often extremely foul. There are frequently no butts at all, and he people have to watch for the water coming on, and in these

cases a sufficient supply is never obtained. In a small portion of St. Saviour's parish, there are 1,000 families without any means of storage. Sometimes water tanks are constructed in the ground, close to privies, cesspools and sewers, the contents of which permeate the walls of the tank and pollute the water. The water for Bolton's gardens, Chelsea, a place which suffered greatly from the epidemic, is stored in two hogsheads which supply twenty houses, and the hogsheads, being very leaky, were empty for the greater portion of the day. In Eatling's buildings there is a small tank to supply a number of families, but the stone slab covering it is cemented closely down and cannot be removed to cleanse the tank. In Chelsea there are still a great many places where the people are dependent for water on bad wells or on the river. The inhabitants of Sun-court have to beg water of their landlord, who is a publican. Another publican in the neighbourhood supplies the people with water for dietary purposes.

The parochial authorities have power to compel water supply, but it is inoperative in many cases, as the authorities themselves often own the property, and Dr. Greenhow says, that the law does not apply to a large class of houses which have been sub-divided to accommodate a number of families, on account of the aggregate weekly water rate for the house being necessarily above that specified in the Act.

The water rate is stated to be ill-defined, variable, and not levied in proportion to the rental.

Dr. George Glover calls attention to the defective nature of the water supply in his district. It is complained of as being deficient in quantity and bad in quality. It is received in tubs, pails, &c., which are generally placed close to the privies.

The grievous deficiency of water arising from the manner of distribution was experienced in many of the streets and houses most severely affected by cholera.

Mr. Walsh states that "the localities visited in Westminster, New-court, Ship-court, and others near the workhouse, were nearly all suffering from want of water. The supply is only for an hour or less daily; none on Sunday, and frequently from *open pipes only* running to waste until caught."

It has been stated to me, as a proof of the mischievous results of the present system of supplying the metropolis with water, that the two companies supplying—the one the best, the other the worst—water south of the Thames, often run their mains through the same streets, but by an arrangement between the companies, no one, however convinced he may be of the unwholesome character of the water supplied to him, can obtain the purer water.

*Effect of the Water Supply on the Health of the People.*—In the districts south of the Thames, where nearly every conceivable sanitary defect exists, there are great difficulties in estimating the precise statistical effect of the water used on the health of the population during the recent epidemic. So far as the inquiries instituted by the Registrar-

general go, they certainly exhibit some striking results, which are thus stated.

“ In 26,107 houses that derived the water from Ditton, 313 deaths from cholera occurred in 10 weeks. In the 40,046 houses that received the impure water from Battersea, 2,443 persons it was ascertained died from cholera in the same time. The deaths in the latter districts exceeded by nearly 2,000 the deaths that would have occurred if cholera had only been as fatal as it was in the houses that derived their water from Ditton. The Registrars were probably in some cases misinformed, but there is reason to believe that no undue proportion of deaths is referred to houses that the Southwark Company supplies.”

It would thus appear that the mortality in a given number of houses supplied by the Southwark and Vauxhall Company when compared with the mortality in the same number of houses supplied by the Lambeth Company would be about as 5 to 1.

When it is considered that the sanitary condition of the population does not materially differ, except in the quality of the water supplied by the two companies, it is difficult to resist this statistical evidence of the predisposing effect of the Battersea water, and of the loss of life which has arisen from its use.

In Dr. Thomson's report already quoted he says:—

“ If water be not an accessory in the production and propagation of cholera, it is a remarkable collateral fact that where cholera has been most fatal in the metropolis the water supply has been most impure. In the Soho district a very remarkable circumstance occurred in the houses supplied by the New River Company. In these it was found that the water, although taken on the same day, possessed a totally different composition from that contained in the reservoir at the New River Head; for while the impurity of the reservoir water was 17.18 degrees, that of the Soho district, obtained from the New River Company, as ascertained by the water receipts, but from what source is unknown, was 30 degrees; the organic impurity being 1.51 degrees in the first case and 2 degrees in the second instance.”

Dr. Greenhow states, that the districts which were under his inspection are supplied with water from five sources, namely, Lambeth, Chelsea, Southwark and Vauxhall Waterworks, the Thames, and springs. The Board of Guardians of St. Saviour's entertain the opinion, he says, that the nature of the water supply had a material influence on the development of the epidemic in their union.

The facts which apparently justify this inference are the following: In the year 1849, both the parishes of this union, St. Saviour's and Christchurch, derived their water supply from the same source, namely the Thames, through the Lambeth and Southwark and Vauxhall Companies.

In that year the mortality from cholera was 100 in 10,000 of the population of Christchurch, and 73 in 10,000 of the population of St. Saviour's.

After the epidemic of 1849, Christchurch parish was exclusively supplied with the new and comparatively pure water of the Lambeth company, while St. Saviour's continues to be mainly supplied with the impure water of the Southwark and Vauxhall Company. During the late epidemic the mortality in St. Saviour's had advanced from 73 to 97 in 10,000, while the mortality of Christchurch had fallen from 100 in 10,000 to 44 in 10,000 of the population. This great difference is sufficiently striking; but, while admitting the beneficial results of the purer water, Dr. Greenhow considers it not to be entirely due to the water alone, for Christchurch parish has been improved in other respects of late years, by the covering over of a pestiferous ditch which formerly occasioned a great deal of atmospheric impurity in the neighbourhood, and by other sanitary measures.

In proof that impure water, though a predisposing cause of cholera, does not act as a *specific poison* in producing cholera, Dr. Greenhow adduces several instances in which houses supplied by the Lambeth water suffered from cholera, while those supplied by the Southwark and Vauxhall water escaped. In these cases the greater predisposition to the disease is considered to have arisen from the foul and offensive state of the drainage in the houses supplied by the Lambeth water, and the diminished liability of the houses supplied by the Southwark and Vauxhall water is traced to the counteracting influence of the better condition of the drainage, and to the otherwise better sanitary condition of the houses. He states, nevertheless, as the result of his experience, that the use of the Southwark and Vauxhall water “ very greatly aggravated the pestilence.”

Several facts were stated to Dr. Mortimer Glover, in the districts under his inspection, to show the connexion between the use of the Southwark and Vauxhall water, and the prevalence of cholera.

Thus, in the part of the parish of Rotherhithe supplied from the Kent Waterworks, 15 cases of cholera had occurred up to a certain date, while 185 cases of cholera had occurred in other parts of the parish; and Dr. Glover says, that the medical men of Rotherhithe were of opinion, “ that the impurity of the water had been influential in augmenting the severity of the disease.” On the other hand, Dr. Glover states with justice, that the waters are very similar in character, and instances are adduced by him in which violent outbreaks of cholera took place in houses supplied from the Kent Waterworks; so that, from a comparison of the mortality of the districts supplied from the two sources, no satisfactory proof can be obtained, that one is more wholesome than the other. Dr. Glover, however, does not deny in the abstract that the condition of the water may be a predisposing cause of cholera, and cites one remarkable instance in favour of that view in his report.

Mr. Keever, one of the medical visitors in the parish of St. Mary, Newington, in his report on his district, already quoted, says in regard to the waters of the Southwark and Vauxhall and Lambeth Companies, that the complaints among the poor as to the water sup-

plied by the former of these companies were general, both as to its quality and quantity; and he adds, "I feel bound to state my belief that, *ceteris-paribus*, diarrhoea and cholera have not prevailed to the same extent where the water was supplied by the Lambeth Company." In regard to the deficient supply of water for cleansing purposes, Mr. Keever says, "a thunderstorm is a great boon to the district."

Where water for domestic use has become actually poisoned by sewage, the effect in predisposing to cholera is much more powerful. An instance of this kind, which occurred at Chelsea, is mentioned by Dr. Greenhow. A drain from Sun-court, crossing Lombard-street, passes through the cellar of the house No. 18, on the opposite side of the way, and so into the river. There is a valve placed at the mouth of the sewer, to prevent the tide from entering it, which valve is under the control of the occupier of the house. On one occasion, during the prevalence of the epidemic, he neglected to give egress to the confined sullage, by opening the valve at the recession of the tide, and the sewer water escaped into a well in the cellar of the next house. Several of the persons in the house used this vitiated water, all of them had diarrhoea, and two had cholera, both of whom died.

In summing up his inquiry as to the effect of impure water on cholera, Dr. Greenhow says, "although doubtless the unwholesome water has much aggravated the result, it is only one cause among several;" and he adds, "the amount of mortality has generally borne a direct ratio to the amount of atmospheric contamination."

On the whole, then, the evidence, from the experience of the epidemics of 1849 and 1854, as to the effect of impure water during an epidemic of cholera, may be summed up as follows:—

1st. That there is no sufficient proof that water in this condition acts specifically in generating cholera, or, in other words, that it is the specific cause of cholera.

2d. That the use of water containing organic matter in a state of decomposition is one predisposing cause of cholera.

3d. That the use of such water has aggravated the severity of the late epidemic, especially in the districts south of the Thames.

#### SECTION IV.

##### *Measures adopted by the Boards of Guardians.*

I next proceed to show from the Inspectors' reports what measures for protecting the public health they found in operation when they entered on their duties at the height of the epidemic, and to what extent the provisions of the Nuisances Removal and Diseases Prevention Act, and the Regulations and Instructional Minute of the General Board of Health, had been complied with.

*Sanitary Precautions.*—In Wandsworth and Clapham Union. Dr. Hassall states that there were six inspectors of nuisances appointed for this Union, but they were most inadequately paid. In

consequence of this, with the exception of Mr. Frost, they did but little, and often resigned their appointments when their services were most required. Very little chloride of lime was used for disinfecting purposes.

Dr. Hassall recommended additional scavenging and disinfecting; that a notice should be issued recommending the inhabitants to clean out all water butts and cisterns, and that the directors of the Southwark and Vauxhall Water Company should be recommended to clean their mains more frequently.

Although these precautionary measures were better carried out in this Union than in Lambeth, Dr. Hassall still considers that much more would have been done had the General Board of Health possessed powers for enforcing its recommendations. He says, "the Guardians, as a body, are not fully alive to the value of cleansing and disinfectant measures; they are not sufficiently impressed with the fact, that it is cheaper to prevent disease than to treat it; and they consider, that if some five or six cases of nuisances are brought before the Board each week, all that is requisite is done."

He points out, that the inspectors of nuisances, as at present appointed, are by no means sufficient for protecting a population from epidemic disease. They are appointed simply for an emergency, and dismissed when it is over; while the necessity of continued inspection and cleansing of epidemic localities is not at all recognized.

Dr. Hassall states that in *Lambeth*, at the beginning of his inspection, two inspectors of nuisances had been appointed, but the address of one of them given on the placards issued by the Board of Guardians, was at a loan office, with which he was connected, but where he did not reside. No one at the house knew his address. Inquiries were frequently being made for him, but, in almost all cases, applicants were obliged to go away without obtaining a hearing of their cases.

Dr. Hassall afterwards learned that the inspector resided out of his district altogether. On this being pointed out to the Board of Guardians, the inspector was required to reside in his district.

The other inspector resided in his district, but there was no name on the door to indicate his residence.

The inspectors were troubling themselves very little with precautionary measures, being satisfied with performing their average amount of work.

Dr. Hassall states, that in no instance, for a considerable period after the outbreak of the cholera, had the inspectors served any notices on landlords requiring lime-washing, neither had they themselves caused any lime-washing to be done in any part of the crowded and populous districts under their charge.

The inspectors had only one man each to assist them during the whole period of the epidemic, and these men were employed principally as scavengers. One of the inspectors had not used a particle of chloride of lime, and the other had used only 2lbs. for disinfecting purposes, for the greater period during which the cholera prevailed, and that among a population of about 140,000.



Dr. Hassall states that it was only after urgent remonstrances, and after threatening to place himself in communication with the coroner in any cases of death occurring in localities where the proper cleansing measures had not been carried out, that he succeeded in obtaining the adoption of these measures even to a limited extent, but before this was done the worst of the cholera was over, and even now not one tenth part of the cleansing required has been carried out.

In reference to the parishes of St. John and St. Margaret, *Westminster*, Mr. Walsh says, "The Nuisances Committee met once a fortnight. That the inspectors of nuisances made frequent visits I can myself affirm, and that lime-washing had frequently been applied under their directions, but many instances came under my notice of drains, cesspools, privies, unpaved courts, &c. being still in a most filthy and dangerous state."

Dr. Greenhow states, that in Chelsea "nothing really had been done by the authorities to prepare for the epidemic," and the condition of the inferior class of property, he says, has gradually been retrograding in a sanitary point of view. As an illustration of the neglect of the Chelsea Guardians, he mentions an instance in which several deaths from cholera occurred from want of the necessary cleansing measures on the part of the Board. In this instance the houses were at last lime-washed throughout, and the cesspools emptied. Twenty-one loads of night-soil were removed, and the whole cleansing expenses for twelve houses amounted to 16*l*.

The neglect in this case arose from the Board not having exercised the powers of the Act so as to have put the houses in good sanitary condition, instead of delaying till several lives had been sacrificed.

Dr. Greenhow states that, in neither Chelsea, St. Saviour's, Southwark, St. George's, Southwark, nor in Newington, were the recommendations of the General Board of Health adopted and carried out with sufficient zeal. "When I commenced duty on the 9th September," (after the epidemic had attained its maximum,) "I found no cleansing staff belonging to the Boards of Guardians in any of the unions or parishes under my inspection."

In St. George's parish, there was an active inspector of nuisances and several sub-committees of the Board of Guardians for inspecting courts and houses, but neither in St. Saviour's nor St. George's was any attention paid to the sanitary condition of the interior of the dwellings.

The inspector of nuisances of St. Mary, Newington, was inadequate to overlook so large a district.

In Chelsea, the relieving officers acted as inspectors of nuisances, but most inefficiently, on account of their time being almost wholly absorbed by their ordinary duties.

At *Rotherhithe*, Dr. Mortimer Glover found two inspectors of nuisances, and great efforts made to get rid of nuisances, but without success; the authorities alleging their want of jurisdiction over the sewerage as a reason, and the Guardians declined to proceed with the removal of nuisances, as entailing a useless expense.

There was no inspector of nuisances at *Deptford*, when cholera was at the worst.

In *Greenwich* there was at the same time no inspector of nuisances, and no attempts being made to abate nuisances.

Taking all the parishes together, in which the epidemic was most fatal, it appears that in not one of them was the preventive machinery, sanitary and medical, organized in accordance with the Minute of Instruction, although some parishes had done more than others.

*Houses of Refuge*.—The opening of places of refuge, in which to receive families from overcrowded and infected houses and neighbourhoods until their houses were cleansed and lime-washed, was attended by the most salutary results during the epidemic of 1849.

The General Board of Health at that time issued special orders to the parochial authorities for providing such houses, and the results of the experience obtained, were sufficiently remarkable to prove that the removal of the people from places where cholera has become localized, is one of the most effective means of preserving human life.

It has been shown, that when cholera attacks the inmates of any house or group of houses, between 30 and 40 per cent. of the attacks take place in houses where more than one person has already suffered, and that in some instances 87 per cent. of the cholera attacks, and 61 per cent. of the deaths have taken place in houses where other attacks had already occurred. On removing these same people to places of refuge out of the affected district, it is found that a large proportion of them are seized with diarrhoea, which is easily discovered and cured by the medical officer in charge of the refuge, and that very few of the cases go into developed cholera.

The experience of six houses of refuge during the cholera in 1849, given in the report of the General Board of Health, showed that out of 1,691 persons removed from infected houses and localities, there were only thirty-three cases of cholera and ten deaths, a mortality of less than 0.6 per cent. of the population, or less than one twentieth part of the mortality in many affected courts and alleys.

In their Regulations and Instructional Minute, issued before the appearance of the late epidemic, the General Board of Health called the attention of the Boards of Guardians specially to this means of saving life; but I do not know of a single instance of any metropolitan parish having had a place of refuge, except the workhouse, in readiness before the epidemic broke out. In only one or two instances was a place of refuge provided after the disease appeared, and in only one parish, so far as I have been able to ascertain, was the accommodation so provided made use of.

The general practice in regard to this important preventive measure is thus stated by Dr. Greenhow:—

Another duty entirely neglected by all the Boards, without exception, was the provision of suitable houses of refuge, to which the healthy might be removed from infected houses, and much loss of life was no doubt entailed by this neglect. In a few cases people were removed to workhouses, but the working classes very naturally

refused to avail themselves of such a provision for their safety. Dr. Greenhow says, "one woman told me that rather than become a pauper, she would drown both herself and her children."

Dr. Mortimer Glover says that he strongly recommended the opening of houses of refuge at Rotherhithe, Deptford, and Woolwich, but without effect. At Deptford, Captain Martin offered the use of a ship for a hospital, but the offer was either not accepted at all, or the acceptance was delayed till it was too late.

In the parishes of *St. John* and *St. Margaret, Westminster*, Mr. Walsh says, "the notoriously filthy and overcrowded state of many whole streets and courts, pointed out the providing houses of refuge as a measure of the most obvious and urgent necessity."

"The Improvement Commissioners had and still have several of their condemned houses unoccupied. An inquiry made by me at the office produced a most complete and unqualified offer to place any of these houses which might be deemed suitable at the disposal of the Board, but no use whatever was made of these unusual facilities."

The only instance which has come to my knowledge of the removal of people from infected houses and localities, took place at Fulham, where the Guardians erected a large tent outside the workhouse for receiving children. In this tent they lived and slept.

Dr. Hassall gives the following as the result of the proceeding.

"I find," he says, "that 76 children in all had been received into the tent; of these nine became subsequently attacked with diarrhoea, and two of these cases passed into cholera, but both ended in recovery. The first case of diarrhoea occurred three days subsequent to the removal from an infected house."

This experience confirms that of the epidemic of 1849, and along with it proves how large a sacrifice of life has been entailed on the community by neglect of this important precautionary measure.

*Medical Relief Measures.*—Before proceeding to describe the measures adopted for the medical relief of cholera, I shall abstract a brief description of the state of the health of the population from the Inspectors' reports, in order to show the nature and extent of the relief that was necessary to meet the emergency.

In describing the circumstances attending the appearance of the epidemic, and the universal prevalence of diarrhoea, Dr. Greenhow says that the choleraic aspect was generally well marked, and could be detected in persons residing in districts where cholera was prevalent, although perhaps these persons were free from disease, or were at most suffering from very slight diarrhoea; that cholera manifested the usual tendency to partial local outbreaks, attacking a single court or even a single house, cutting off several persons and then disappearing; that in all the districts there were nevertheless certain favourite localities from which it was hardly ever absent while the epidemic lasted. "Thus the first cases of cholera in Chelsea, in 1832, were in Augusta-court, Lawrence-street, wherein there have recently been several fatal cases." The earliest as well as the latest cases of the epidemic in Chelsea in 1848, were in White Hart-court, Lombard-street. The name of the court was changed in consequence,

but true to its laws, cholera appeared in the court early in the present epidemic, a death took place in the same house in which there was a fatal case in 1848. Other cases, and at least one other death occurred, and diarrhoea prevailed so extensively that one-half of the inhabitants were under treatment for it. Other similar instances are also mentioned.

It was observed in the parishes of *St. Giles and St. George, Bloomsbury*, that in nearly five cases out of six, the late epidemic occupied the same localities as its predecessor of 1849. Even particular houses showed a local affinity for the disease. Thus in eighteen such houses, there are recorded nearly one-third of the whole number of cases, and of these same eighteen houses every one was also visited by the cholera in 1849.\*

The tendency to partial outbreaks was observed with regard to diarrhoea as well as cholera, and although Dr. Greenhow was occasionally informed of cases in which the more malignant symptoms came on at once without the previous existence of diarrhoea, he himself met with no such case, but he "invariably found on careful inquiry, that diarrhoea of longer or shorter duration had preceded the more urgent symptoms." Most frequently diarrhoea had existed for several days or at least for a sufficient number of hours to have given ample warning. In a few instances, the interval betwixt the first appearance of the disease and its full development, did not exceed four or five hours.

The general curability of the diarrhoeal stage, even in localities where the epidemic was most severe and amongst classes of persons peculiarly predisposed to cholera, is evidenced by a fact stated by Dr. Greenhow, that "out of 330 cases of diarrhoea among the inmates of *St. Saviour's workhouse*, only one passed into cholera and that recovered." It would be easy, he says, "to multiply evidence on this head," and that although the severe and rapid cases of cholera "are probably death-stricken from the outset," such cases are exceptional, and by no means confute the ordinary opinion of medical men, that treatment in the earlier stage of the disease "is for the most part successful."

Diarrhoea is stated by Dr. Greenhow to have been "extremely common during the existence of cholera in all the localities." In most of the houses in which cholera occurred, diarrhoea was still more prevalent; in many no individual altogether escaped. In fact comparatively few persons in an epidemic district passed through the entire course of the visitation without some symptoms of indisposition. Referring to this general effect of the epidemic Dr. Greenhow says, "Between the cold pulseless moribund patient in the last stage of extreme collapse and the person whose indisposition was so slight as not to interfere with his ordinary pursuits there was, it is true, a vast gulf, but this was spanned by a series of cases differing from each other by imperceptible degrees of severity."

\* Report of the Sanitary Committee of *St. Giles and St. George, Bloomsbury*.

Dr. Milroy, who made a careful inspection of the *Parish of Camberwell*, reported to the President of the General Board of Health that diarrhœa prevailed extensively in all the districts; that in the great majority of the cholera cases there had been premonitory symptoms; that the cholera cases were generally seen for the first time in collapse or verging towards it; and he states that in one district of the parish out of fifty-nine cases of cholera ten were first seen in collapse and all died, while the remaining forty-nine cases were first seen at an earlier stage and all recovered except nine.

Dr. Macloughlin states that in *Stepney Union* diarrhœa prevailed to such an extent that it was found impracticable to record all the cases, but between 5th August and 14th October 1854 there had been dispensed gratuitously as much astringent medicine as would have served for at least 15,000 persons. The persons actually known to have received medical attention for diarrhœa between these two dates were 8,610.

The medical officers and visitors stated that all the cases of cholera they had seen were preceded by diarrhœa. If the proportion of cases to the mortality held good over the whole union, the total registered deaths from cholera would represent 45,000 epidemic diarrhœa cases.

In *Poplar Union* Dr. Macloughlin states that during the five weeks preceding his inspection diarrhœa had been increasing rapidly, so much so that the medical men and their assistants were unable to spare time to take down the names and addresses of applicants for relief.

He states that the medical officers in this union had not had a single case of cholera without previous diarrhœa for a longer or shorter time. A similar statement was made by all the house-to-house visitors. In this union 9,899 persons are known to have been treated for diarrhœa.

In *Holborn Union* the medical officers reported diarrhœa to be very prevalent, and both medical officers and house-to-house visitors stated that they had not had a single case of cholera which had not been preceded by premonitory diarrhœa. From the first week in August to the 14th October there were attended by the medical officers and visitors 2,600 cases of diarrhœa.

In *St. Giles's* diarrhœa and cholera were very prevalent in the usual epidemic localities.

Every case of cholera had been ushered in by diarrhœa of a longer or shorter duration.

The medical officers and visitors attended from the beginning of August to the 14th October 4,061 cases of diarrhœa, of whom 22 died, and 120 cases of cholera, of whom 73 died. From a very extensive experience, during the present and former epidemics, Dr. Macloughlin states it as his conviction that diarrhœa is invariably the first symptom of cholera.

Dr. Mortimer Glover states that in the parts of *Deptford* and *Greenwich* which suffered so severely diarrhœa "prevailed throughout."

Severe diarrhœa rapidly passing into cholera prevailed all over the affected parts of the parishes of *St. James Westminster*, and *St. Ann Soho*, which were under the inspection of Mr. Patterson. In short, wherever the cholera existed diarrhœa accompanied it; so far as is known, almost every cholera case had been preceded by diarrhœa, and there is reason to fear that many lives were lost through inefficient measures for checking the milder stage of the disease.

Mr. Walsh cites as a striking illustration of the severity of the epidemic in the parish of *Bermondsey*, where no fewer than 838 persons died of cholera, that "diarrhœa seemed both by the people and the medical officers to be taken but little account of, the former not applying for its relief, and the latter not always recording the relief given." This one fact shows the absolute necessity which existed for an extensive and thoroughly efficient system of house-to-house visitation, and it points very clearly to one source of the great fatality of the epidemic in that parish.

This fatal neglect of the premonitory diarrhœa Mr. Walsh ascribes partly to the medical relief of cholera having been made a parish matter, for, he says, the numerous respectable working population of *Bermondsey*, who were the chief sufferers, naturally held anything connected with the parish "in the greatest abhorrence."

*House-to-house Visitation.*—The medical relief of cholera, so far as such relief can be rendered available for diminishing the mortality from the disease, requires to be so organized and directed as to cope with and cure it in its earlier stages, instead of being mainly reserved for the fully developed form of the pestilence.

In the report and appendices of the General Board of Health, on the epidemic cholera of 1849, it was shown not to be enough for the accomplishment of these objects, to open dispensaries for the distribution of medicines to all applicants. It was proved also to be a necessity, founded on the nature of the disease, that medical relief should be sent into affected districts, instead of trusting to relief being applied for by the patients themselves. It was pointed out in the same report, that in all localities where cholera had broken out, or where an attack is imminent, diarrhœa is extensively prevalent. That the poor themselves overlook the dangerous significance of this symptom. That they are often apathetic, and unwilling to take any steps to arrest the diarrhœa. That medical aid is often not applied for till it is too late to be of use. That deaths from cholera sometimes take place without any medical attendance. That fatal cases of cholera are in reality those cases which are hardly ever seen by the medical attendant until the disease is fully developed, or until collapse has come on, and that when the epidemic is brought under treatment in its earlier stages, a very small proportion of the cases prove fatal.

These peculiarities of the epidemic had indeed been recognized as far back as the year 1832, and domiciliary visitation was tried in one or two instances.

In the first notification of the General Board of Health, issued at the very beginning of the epidemic of 1848, the local authorities were recommended to organize lay visiting committees, to ensure the

treatment of the premonitory diarrhoea. In my report to the Board on the epidemic of 1848 and 1849, I stated, that on the 7th December, 1848, during the severe epidemic cholera in Dumfries, when lay visitation was not applicable to the emergency, I recommended the Board, for the first time, to substitute medical house-to-house visitation for lay visitation, to arrest the disease in its earlier stage, by sending medical aid to the houses of the people, "by enjoining all "medical officers" (14 in number for a population of 10,500) "to visit not only cholera cases, but to make a house-to-house "visitation throughout their respective districts, to carry with them "medicines for immediate use, and to administer them on the spot "to all persons affected by diarrhoea. The visitation to be made "once a day at the least."

This recommendation was made matter of special order by the Board on the 9th December 1848, and was carried out with results so beneficial, that medical house-to-house visitation was adopted in other affected towns during the whole course of the epidemic.

House-to-house visitation was carried out to some extent in the metropolis, under the inspection of Mr. Grainger, during the epidemic of 1849, and that more good was not done by it at that time is to be attributed to the same causes which have led to its still more limited application during the late epidemic, namely, the remissness of the local authorities. Nevertheless, in 1849, there were discovered by the visitors, and brought under treatment in the metropolitan parishes, within a period of eight weeks, 43,737 cases of diarrhoea, and 978 cases approaching to cholera. Out of this whole number, of 44,715 epidemic cases, only 52 passed into developed cholera. During the same eight weeks, the visitors discovered 780 cases of developed cholera not under treatment.

All the facts stated above were perfectly well known. Moreover, during the severe outbreak of cholera in Newcastle, in 1853, organized house-to-house visitation was the means of saving many lives, and the General Board of Health, in anticipation of the epidemic attacking other districts, drew up and sent to all the parishes in the kingdom their printed Instructional Minute already mentioned, giving directions to the Boards of Guardians how to organize and carry out the measure. Every means of conveying practical information to these Boards had been adopted. But I am sorry to find from the reports of the Inspectors, that when they began their inspection they found that, with one or two exceptions of more healthy parishes, none of the metropolitan parishes had organized or prepared for putting in operation the provisions of the Instructional Minute. In a few of the parishes, after great exertions on the part of the Inspectors, and repeated recommendations on the part of the President of the General Board of Health, a few visitors were appointed, but, in most instances, nothing effectual had been done, and some of the parish authorities eventually did nothing.

In the appendix, Table III., are given the results of the medical relief measures, for a number of parishes, so far as these can be gathered from the parochial returns, and the following table gives the

total numbers of epidemic cases so treated between the middle of August and the end of October.

	Diarrhoea Cases.	Cholera Cases.
Dispensary cases -	14,453	45
Medical Officers -	47,524	3,531
Visitors -	7,606	481
Total - -	69,583	4,057

Dr. Hassall gives the following account of the medical relief measures in operation in *Lambeth* on the 4th September, when he first inspected the parish during the height of the epidemic.

There were no day or night dispensaries.

There were no houses of refuge.

There were no house-to-house visitors.

The accommodation for cholera cases consisted of two wards in the workhouse.

The medical relief for the whole parish, with its 140,000 inhabitants, consisted of nine medical officers and two assistants.

Dr. Hassall recommended that eight day and night dispensaries should be opened; and that nine house-to-house visitors, to act under the superintendence of the district surgeons, should be appointed.

These suggestions were approved and recommended for adoption by the President of the General Board of Health, but the Lambeth Guardians declined to accede to them.

The parish was therefore left without any adequate protection against the epidemic.

The course which the parish authorities actually took was to issue a circular, offering to the medical practitioners in the parish a small payment for every case that might apply to them. But out of 120 resident medical men, 32 only consented to act on the terms proposed.\*

\* The following are copies of the Circular sent to the medical men in the parish, and also of the form they were expected to sign and return to the Clerk.

Lambeth Workhouse,  
August 12, 1854.

SIR,

I AM directed by the Sanitary Committee of Guardians for the parish of Lambeth, to acquaint you that during the prevailing epidemic, they are prepared to enter into an engagement with yourself, and other resident medical practitioners, for the first attendance and treatment of all persons (not being private patients) attacked with diarrhoea, at 1s. 6d. per case, and with cholera 2s. 6d. per case; and that after such attendance and treatment they be referred by you to the medical officer of the district for his attention.

If you are willing to accede to this arrangement, I am to request that you will sign the accompanying form, and transmit the same to me forthwith, and upon receipt thereof, I will forward printed forms for reference to the district medical officer.

I am, &c.

W. T. LOGAN, Clerk.

TO THE BOARD OF GUARDIANS OF LAMBETH.

GENTLEMEN,

I HEREBY undertake the preliminary attendance and treatment of all cases (not being private patients) of diarrhoea and cholera which may be brought to my notice, for the sum of 1s. 6d. per case of diarrhoea, and 2s. 6d. per case of cholera.

August 1854.

I am, &c.

On the 7th September, Dr. Hassall found the medical relief in *Wandsworth and Clapham Union*, to be as follows.

There were seven district medical officers, and six assistants.

There were no day and night dispensaries, but one dispensary which was opened for a few hours daily.

There were three house-to-house visitors employed in Battersea district, the assistants of the medical officers doing duty in the other districts where necessary.

There was a resident medical officer at the workhouse, and four wards set apart for cholera cases, which were in admirable order.

There were no houses of refuge, the workhouse being used as such, when there was room. The Guardians had, moreover, formed themselves into district committees for inspecting nuisances, &c., so that upon the whole considerable provision had been made for meeting the epidemic in this union.

Considering the extent of the union, Dr. Hassall, with the sanction of the President, suggested the opening of six day and night dispensaries, in parts distant from the residences of the medical officers, and also the opening of a house of convalescence, should the epidemic continue to spread, as relapses from cholera were very common.

Several suggestions as to cleansing measures were also made.

The cleansing measures were adopted, but the other suggestions were not adopted.

Neither in *Wandsworth Union*, nor in the parish of *Lambeth*, were the medical relief measures organized on the plan of the Instructional Minute issued by the General Board of Health.

Dr. Hassall points out the entire want of uniformity in the relief measures adopted by the different Boards, and in the amount of medical relief given, and shows the necessity of the General Board of Health possessing sufficient compulsory power, for he says, "in the majority of cases the recommendations of the Board are not adopted at all, or else only partially so. If a fixed system of medical relief were organized alike in all cases, the Superintending Inspectors would undoubtedly be able to affect a much larger amount of good than they do now. At present their time and energies are partly spent in contests with the local authorities in order to get them to adopt even a portion of the recommendations of the General Board of Health."

Dr. Macloughlin reports as follows:—In *Stepney* he found that no house of refuge had been provided. That there was only one dispensary for the whole Union, and that although medicines had been placed at four police stations, there was no medical attendant to direct their distribution.

The Guardians had authorized the medical officers to appoint house-to-house visitors, but only one had been appointed.

On the recommendation of the President of the General Board of Health, additional house-to-house visitors were employed, and a medical officer appointed for each depôt of medicines.

In *Poplar Union* there were four medical officers for out-door service, and eight day and night dispensaries. The Guardians had

authorized the appointment of house-to-house visitors, but none had been appointed. The medical relief measures in this case were extended by the employment of six house-to-house visitors.

In *Holborn Union* there were three medical officers for out-door service, and ten assistants, who also performed the duties of house-to-house visitors.

The arrangements in *Holborn* were considered to be sufficient for the then intensity of the epidemic.

In *St. Giles' and St. George's, Bloomsbury*, there were one medical officer, three assistants, and two house-to-house visitors.

In this union two additional visitors were appointed.

Dr. Walsh says, that in the *Westminster parishes*, "the Instructional Minute of the General Board of Health had not even been seen by any one of the medical officers, nor had any organization been made according to its provisions."

In these parishes the returns required for ascertaining the progress of the epidemic were never made, and Mr. Walsh says, "house-to-house visitation had not so much as been attempted."

In *St. Olave's Union*, Mr. Walsh states that the arrangements for attending the parish paupers were most complete; but the very completeness of the parish arrangements rendered them inapplicable for protecting the public health in the union. "The mere fact," he says, "that all applications for medical relief had to be made at the workhouse, would necessarily limit their number to the very poorest class."

"No attempt was made at medical house-to-house visitation."

Mr. Walsh's inspection of *Bermondsey* began on the week during which the deaths from cholera attained the maximum, namely 126, and he found that the Board of Guardians had up to that time neglected to put the directions in the Instructional Minute into operation. They had neither house-to-house visitors, nor houses of refuge, and of course they had not adopted the organization in the Minute.

At a later date they got two medical men in practice, one from a distant part of London, to visit for a few hours daily.

No additional dispensaries were provided, nor were the three additional medical officers Mr. Walsh had recommended procured.

"The force of the epidemic," says Mr. Walsh, "therefore, may be said to have spent itself without any special organization whatever, calculated effectually to meet or control it, having been adopted." "It is admitted, he says, "that during the time of severest pressure on the medical officers, some few of the cases were not attended to, even of those applying for assistance, and it is impossible not to conclude that many passed the first and manageable stage, without seeking that aid which a systematic house-to-house visitation would have brought to their doors."

In *Clerkenwell*, Mr. George Glover states, that the Guardians "utterly disregarded" the recommendations of the President of the General Board of Health; that "from the first there was an openly expressed determination not in any way to be interfered with by the Board. The inspector was treated with discourtesy, and the

“ district medical officers and their recommendations were regarded  
“ with contempt.”

During the cholera of 1849 the parish of *Bethnal-green* lost 789 of its inhabitants, and when it was inspected by Mr. Glover in the middle of the late epidemic, it had no house-to-house visitors; no house of refuge for the working classes except the Union Workhouse; the only dispensary relief for a population of above 90,000 was afforded by an arrangement with one public dispensary. This was in reality all the preparation for the epidemic that had been considered necessary, and there was no organization for saving life in the event of the disease extending its ravages. “ The authorities,” says Mr. Glover, “ practically did nothing, although promising almost everything.”

As a contrast to the neglect of duty on the part of the authorities of *Bethnal-green*, Mr. Glover states, that the precautions adopted in the parish of *Islington* were highly satisfactory from the beginning, and that the necessary measures were taken by the parish of *St. George-in-the-East* with great readiness, although none had been adopted before the middle of the epidemic.

The parish of *Shoreditch*, which suffered so severely during the epidemic of 1849, escaped this year with less than one-third of the mortality. In 1849 the deaths amounted to 789, and the great bulk of the mortality took place within comparatively small limits. It seemed likely that the local authorities in this case would have profited by the calamity which formerly befel this parish, and that active measures would have been adopted.

Dr. Richard King inspected the parish when the epidemic had arrived at its maximum, and reports as follows:—

“ There is no house-to-house visitation; neither a day nor night dispensary, nor any depôt of medicines whatever; not a single notice has been printed to inform the poor of the addresses of the only four officers who are thus silently entrusted with the important charge of administering to the population labouring under diarrhoea, as well as isolated cases of cholera. Not one of the medical officers has even been asked to make a return.”

Dr. Glover states that on his first inspection the parochial authorities of *Rotherhithe* were found to have empowered the medical men to call in additional assistance, but they had not done so. There were no house-to-house visitors,—there were no dispensaries,—in fact, no provision had been made for the impending epidemic, and there was no accommodation for cholera cases. Various suggestions were made to the *Rotherhithe* authorities, backed by the special recommendation of the President of the General Board of Health, and Dr. Glover reports the result to have been that the *Guardians* positively refused to do anything.

At *Deptford* there was one dispensary, and three druggists had been appointed to supply medicines night and day. There was no inspector of nuisances, no house of refuge, no house-to-house visitors, and the medical attendance was deficient.

At *Greenwich* there was no house-to-house visitation, the *Guardians* alleging that the cholera was declining. There was no inspection of

nuisances, and there appeared to be no attempts made to abate them. There was no house of refuge, and the medical attendance was insufficient. There was no accommodation for cholera cases. Suggestions were made for remedying all of these defects; but, notwithstanding the urgency of the matter, Dr. Glover reports, that “ not one of the “ propositions was carried out at the time, although after some delay, “ at the expiration of weeks, they were partially or in whole carried “ out.”

Dr. Glover says that the mode in which necessary measures for the protection of the public health are evaded, “ is a striking example “ of the penny wise and pound foolish system. The orphan children of “ those dead of the cholera received into the union workhouse at “ Greenwich alone, I am informed, will cause the union an expenditure “ of £700 a year.”

At *Woolwich* the Local Board of Health appointed house-to-house visitors from the first.

Mr. Patterson states in regard to *St. James, Westminster*, that at his first meeting with the parochial authorities, in the very midst of the frightful outbreak of cholera in that parish, he “ was astonished to find that little or no preparation had been made.” They usually have one medical officer to attend their poor, and two others had been recently appointed, but there was no organization such as that laid down in the Instructional Minute. This parish, however, under the pressure of the epidemic, adopted the necessary measures, but too late.

Dr. Greenhow thus describes the preparations he found had been made when he began his inspection of his districts. “ There was,” he says, “ no systematic inspection of the houses occupied by the poorer “ classes in epidemic localities. No houses of refuge for the temporary “ accommodation of the healthy inhabitants of infected places. With “ the single exception of Newington, wherein house-to-house visitors “ and dispensaries had been agreed to and appointed the day before, “ but were not in full and active operation till the 12th September; “ no system of domiciliary visitation for the purpose of detecting and “ curing the disease in its earliest stage; and lastly, no efficient “ system of supervision by a medical superintendent or otherwise to “ direct and vary, as circumstances might render necessary, such “ imperfect and inefficient measures as were in force.”

Although the Boards of Guardians had not adopted the recommendations of the General Board of Health in their integrity, some little addition had been made to their usual medical relief. An additional medical officer was appointed at Newington in one of the worst localities, and a most efficient system of inspection of the inmates was put in operation in the workhouse, by which from 160 to 180 cases of diarrhoea were discovered and treated, the result being, that, notwithstanding the unhealthiness of the locality, and the extreme severity of the epidemic in the district, only two deaths from cholera took place in the workhouse, one being that of a bedridden person, and the other case had contrived to evade the regulations.

In *St. Saviour's Union* the medical officers were authorized to call in casual medical assistance, but did not avail themselves of it, although they had on some days upwards of 100 fresh cases of diarrhoea to attend, in addition to cases of cholera. *St. Saviour's Board*, however, appointed a medical sanitary inspector and an assistant, by whose exertions much good was effected.

Dr. Greenhow further states, that in *St. George's parish* no additional medical assistance had been directly provided, the same objectionable system having been pursued as in *St. Saviour's*, namely, that of authorizing the existing medical officers to provide assistance, the Board of Guardians thus throwing the responsibility off their own shoulders to those of the medical officers, and that without any arrangement as to the amount of remuneration for the extra anxiety and expense to be incurred.

In *Chelsea* he found that "two assistant medical officers had been appointed to relieve the regular medical officers, and to act as house-to-house visitors, a combination of incompatible duties which resulted in the almost entire neglect of the latter."

The imperfect and inefficient measures found in operation, and the delay in adopting more active proceedings, appear to have arisen from a mistaken sense of duty to the ratepayers, and from members of different Boards of Guardians being themselves occasionally large owners of cottage and other property.

"Such members often attend most diligently all meetings, and thus acquire an influence which overpowers that of the better disposed, who probably in all cases constitute the majority."

Dr. Greenhow states, that although the measures he found in operation were extremely defective, the recommendations of the President of the General Board of Health, made through his medium, were courteously received, and for the most part ultimately adopted, but that arrangements made during the height of the epidemic, were necessarily extremely defective. "I fear," he says, "many lives that might otherwise have been saved, have on this occasion been sacrificed by the absence of more systematic arrangements."

The number of house-to-house visitors was in every instance insufficient.

Dr. Greenhow says, that "there can be no doubt that in many cases, orphans and widows, unnecessarily rendered such by the dilatoriness of Boards of Guardians, will constitute a heavy burden upon the ratepayers for several years to come."

The result of the whole inquiry, as regards the administration of the sanitary and medical relief measures by the Boards of Guardians, is that, generally speaking, they were inefficient in character and extent, except in some of the larger and more healthy parishes, where they were least wanted. The experience in this respect is essentially the same as that obtained during the cholera of 1849, and it demonstrates that some more suitable local authorities, with adequate powers for carrying out permanent sanitary works and measures, and for providing the working classes with adequate medical relief

during seasons of pestilence are absolutely necessary for the metropolis.

#### SECTION V.

##### *Causes of the defective Administration of Sanitary and Medical Relief Measures.*

In considering this part of the subject, it is of importance to remark that the duties devolving on Boards of Guardians under the Nuisances Removal and Diseases Prevention Act, and the regulations of the General Board of Health, are not solely and specially the protection of the parish poor from cholera. These Boards appear to have been invested with the office of guardians of the public health mainly to avoid the necessity of erecting new local authorities, and because, to a certain extent, machinery which might be used for protecting the public health was already in their hands.

Let us next inquire on what classes of the community the force of the epidemic chiefly fell, in order that we may be able to form an estimate of the extent of protection against its ravages that was likely to be afforded by the administrative authority.

The statistics of the late epidemic are not so far complete as to afford accurate information on some points, but, from an examination I have made of the returns, I am of opinion that the weight of the epidemic of 1854, like that of the cholera of 1849, will be found to have fallen neither on the paupers nor on the richer classes of the community.

The deaths from cholera in the metropolis during the epidemic of 1849 were 14,590. Of these 329, or little more than 2·2 per cent. were gentry, 1,989 or 13·6 per cent. were tradesmen, and 10,332 or 60·8 per cent. of the total mortality fell to the lot of mechanics and their families; 1,940 or about 13·2 per cent. were undescribed.

It thus appears that, practically, the present state of the law vests the protection of the working classes and small tradesmen during periods of pestilence in the hands of the Poor law Guardians, while the chief localizing causes of pestilence have been already shown to be those requiring a totally different authority to deal with them.

Boards of Guardians, however willing, cannot sewer a street or drain a house. They cannot pave a court or control the water supply; all they really can do, is to enforce partial cleansings, and removal of nuisances, very useful no doubt if fully carried out, but requiring the Guardians to interfere with each other's interests or properties, or to place themselves in antagonism with other local authorities.

Again, when cholera is actually present, it comparatively spares their paupers, and carries off the working classes and small tradesmen, who detest parish assistance in all forms; and yet the only medical care exercised over these classes is that of the parish doctor. The dispensary is a parish dispensary. The house of refuge, one of the most important of all the preventive measures, is the parish workhouse, within which is also the parish hospital.

In *St. Giles* and *St. George, Bloomsbury*, the deaths from cholera in 1849 were 285, and the deaths from the epidemic of 1854 were 116, while the parish authorities state in their report that, "Amongst the known paupers no fatal case has occurred, either in the poor-house or on any of the parochial relief boards. In 1849 there were very few fatal cases amongst the poor receiving relief; in 1854 not one." I have reason to believe that the sanitary condition of the parish poor is considerably better than that of the working classes generally.

The incompetency of the existing local administration to deal with the epidemic immediately arrested the attention of the Inspectors who have had the worst districts of the metropolis.

Mr. Walsh points out as the result of his experience how unfit the guardians of the *poor* are to be the guardians of the *people* in a matter so important as the public health. "They are," he says, "the guardians of the *poor* against starvation and sickness, and the guardians of the *rates* against all except the poor. Their functions are instinctively *exclusive* not *inclusive*."

Dr. Mortimer Glover says, in reference to the prevention of cholera, "I think my report offers sufficient evidence of the incompetency of Boards of Guardians in general to work a measure of public health." In such a case as New-street, Deptford, where a very frightful outbreak of cholera occurred, he doubts whether any sanitary improvements short of the entire destruction of the property and the erection of model lodging-houses on its site, would remove the existing causes of epidemic disease. He says, "until the root of the matter is gone into, and until the powers of the General Board of Health are extended, or some similar central Board has the power to compel local authorities to adopt remedial measures, or until there be some Local Board acting under the supervision of a central authority, nothing effectual to remedy the existing evils will be done."

Dr. Greenhow, while remarking on the neglect of precautionary measures by the Boards of Guardians, points out that these bodies are elected for the express purpose of performing totally different duties from those devolving upon them under the Nuisances Removal and Diseases Prevention Act, that "parsimony is regarded as the one grand virtue; hence when they are elected they conceive themselves called upon to resist every unusual expenditure, and to cut down the ordinary outlay to the lowest possible amount."

That this dilatoriness and false economy are exercised at a period when promptness, method, and extra expense are especially called for, and that however convenient it may be to employ the Guardians as authorities elected by the ratepayers, the doing so is entirely at variance with the efficient administration of sanitary laws especially during a severe epidemic visitation.

Dr. Greenhow further points out that notwithstanding the great sanitary evils at present existing in the parishes under his inspection, there is in reality no authority competent to deal with them. The whole sanitary administration is in a state of chaos. There is a

multiplicity of authorities with ill-defined duties—water companies, paving boards, cleansing boards, commissioners of sewers, district surveyors, boards of guardians, &c.—and it is no unfrequent occurrence to find the administrative authority of some of these Boards in the hands of parties directly interested in the continuance of the present state of matters. The practical result is that the great majority of the population of these large districts of the metropolis are left without any adequate protection against the ravages of epidemic or other preventible diseases. The evil unquestionably exists, but the remedy has yet to be provided, for no systematic supervision over the sanitary state of the metropolis is in existence.

The mischief arising from the owners of a bad class of property getting elected on Boards of Guardians and using their influence at the Board to compound for the rates on their own property is also forcibly pointed out.

Dr. Greenhow also shows that in no part of the metropolis except the City of London, which like Liverpool and a few other towns has an officer of health, is there any officer conversant with the effect of local influences on the health of the population, and hence all the sanitary measures adopted are imperfect. Dr. Hassall also states his opinion that a well organized staff of officers of health is indispensable for the metropolis.

In these opinions, as to the necessity of officers of health, which are also shared by the other inspectors, I entirely agree. The diseases of towns depend, like those of the human body, on a variety of concurring causes, evidencing the extent and nature of their operation by distinct symptoms in the inhabitants, recognizable by those who are specially conversant with the subject. So-called sanitary improvements carried out in the absence of the necessary knowledge of the effects of those local conditions which they are intended to remedy, may be in any case, as they have been in many cases, mere empiricism and waste of money. And this can only be avoided by making use of the assistance of qualified officers of health.

#### SECTION VI.

##### *Effects of Sanitary Improvements in preventing Attacks of Cholera.*

Having in the preceding pages indicated the chief removable causes of the localization of epidemic cholera in the metropolis, and the defects in existing powers and authorities, I shall conclude this report by adducing some examples of the result of sanitary improvements already in operation, as they are given in the reports of the medical inspectors.

Referring to the Borough, Dr. Greenhow states that, although the cholera deaths have in general been fewer than in 1849, the greatest diminution has occurred in the parish of Christchurch, and in the London road district of *St. George's*, both of which have been considerably improved, as regards their sanitary condition, since 1849.

The water supply has been improved, and is now the purest in the metropolis. The back streets, courts, and alleys, although very far from being in a good condition, have been greatly amended. Pes-



tiferous ditches have been covered, and many cesspools have been closed over and filled up, the open privies having been converted into trapped waterclosets. All of these sanitary improvements have doubtless been attended by a diminution of the intensity of the epidemic.

In the other districts of St. George's parish, and also in some parts of St. Mary, Newington, local improvements have been carried out, and have been attended with a corresponding diminution of mortality.

So far as could be observed, the severity of the epidemic bore a tolerably correct ratio to the neglect of sanitary measures.

As an illustration of immunity from attacks of cholera following on improvements, Dr. Greenhow mentions a district in St. Saviour's which used to be traversed by an open ditch. The houses along this ditch suffered severely from cholera in 1832, and again in 1849. The ditch has been covered since that date, and the neighbourhood escaped entirely during the late epidemic.

A similar result was obtained by covering one of these ditches which ran behind Wagstaff-buildings, St. Saviour's.

Jackson-court, St. Mary, Newington, suffered from cholera in 1849, but was improved shortly before the late epidemic. The court, houses, and yards were well lime-washed, and the landlord sent some chloride of lime to each house, to be used as a disinfectant. The neighbourhood was severely visited with cholera, but these houses escaped.

Bull's-gardens, Chelsea, consists of a double row of cottages. Until recently an open ditch, receiving the sewage of the houses, ran through this place, and terminated in the Ranelagh sewer. In 1849, there were 70 cases of diarrhoea, 25 of cholera, and 12 deaths among the inhabitants. Since then, the ditch has been converted into a sewer, and the privies and sinks have been connected with it. Although there is still ample room for sanitary improvement, as is evidenced by the occurrence of diarrhoea in the houses, there has been no death from cholera.

Mr. Walsh states that Jacob's Island, Bermondsey, and its immediate neighbourhood, suffered much less during the late epidemic, notwithstanding its greater severity, than it did during either of the two former visitations, which, he says, is attributable without doubt to the filling up of the foul tidal ditch since the epidemic of 1849.

Dr. Greenhow gives the following examples of sanitary improvements:

Exeter-buildings, Chelsea was formerly notoriously unhealthy, and a focus for epidemic disease. The neighbourhood has been opened up, the privies trapped and flushed daily, the court-yards and interiors of the houses were all lime-washed by the landlord, in anticipation of the cholera. These houses escaped the disease.

St. Mark's College, Chelsea, which is thoroughly drained with pipe drains, and is otherwise in excellent sanitary condition, escaped the epidemic entirely. There was less diarrhoea among the 107 inmates than the usual autumnal average.

The Duke of York's school, Chelsea, is kept in excellent sanitary condition. It contains altogether about 470 inmates; about 30 of these had diarrhoea, but there was no case of cholera.

The Normal school of the British and Foreign School Society, Borough-road, in the midst of an epidemic district, has its sanitary arrangements well attended to, and enjoyed an entire immunity from cholera.

In St. George's, Southwark, are two sets of almshouses, close to Great Suffolk-street. The sanitary arrangements of these houses are far from being perfect, but they are much better than those of the neighbourhood. All the inmates escaped the disease except one, who had been sleeping in an infected part of Kennington, and took cholera immediately on her return.

In Norfolk-street, St. Saviour's, situated in a neighbourhood where there was a great deal of disease, some dwelling-houses were erected on an improved system so as to accommodate 15 families. The sanitary arrangements are tolerably good, and there was no cholera and very little diarrhoea among the inmates.

There is a similar set of improved dwellings in Union-place, Chelsea, occupied by 12 or 13 families. There was cholera directly opposite, but there was no disease except a few cases of diarrhoea in these houses. It is enough to account for the diarrhoea that the Ranelagh sewer passes at no great distance from the houses.

*Lambeth-square.*—After the decline of the cholera, the President of the General Board of Health directed Dr. Fraser to make an inspection and inquiry into the condition of Lambeth-square, to ascertain to what extent the epidemic had prevailed among the population. This inquiry was directed in consequence of certain improvements in drainage having been carried out, subsequent to the epidemic of 1849.

Lambeth-square is situated in the Lower Marsh, Lambeth, not far from Westminster Bridge-road. It contains 35 well-built eight-roomed houses, renting at about 26*l.* a year each, and inhabited by a better class of artizans. At the period of the cholera of 1849, four only of the houses had waterclosets, the remainder having privies, placed over open brick drains in small back yards close to the house doors. The filth from these receptacles was conveyed away by a drain, common to five houses, passing under the middle house to a sewer in front. The smells from those privies were described as being unbearable. In addition to these causes of pestilence in the houses, there were nuisances all round the square. Close to the back walls of the house yards, there were the cesspools of houses in adjoining streets, an abominable filthy cow-yard, dung-heaps, stale fish and vegetables accumulated by costermongers, &c.

It is not surprising, therefore, that notwithstanding the comfortable circumstances of the occupants of these houses, six of them should have died of cholera during the epidemic of 1849.

Both before and subsequently to that year, the inhabitants suffered from various zymotic diseases, and also from a high average mortality. This was especially the case in 1851-52. During twelve months in

these two years, there were 80 attacks of typhus fever, scarlet fever, small pox, &c., and 24 deaths among a population of 434, being in the proportion of two cases of sickness to less than every 11 inhabitants, and one death to every 18 living.

In the beginning of 1852, a memorial was presented to the General Board of Health by the proprietor of the square, stating that for three years past the inhabitants had suffered from typhus fever, and that although 400*l.* per annum was being spent on repairs, drainage, and cleansing, the disease had reappeared. In twenty years the expenses incident to this condition of matters had been 1,250*l.*

A survey was made of the houses, and a complete system of pipe drainage with waterclosets was laid down for every house, at a cost of less than 200*l.* The smells in the houses immediately disappeared, and with them a large amount of sickness and mortality. Unfortunately, however the causes of disease around the houses remain as they were. Dr. Fraser states in his report that the people complain of the smells proceeding from the nuisances already mentioned, and hence the result of the improved house drainage, as indicated by improved health, is not so great as it might have been. The drainage came into operation in July 1852, and Dr. Fraser has given the following as the mortality in the square since July 1850.

Years.	Total Mortality.	Deaths from Zymotic Disease.
July 1850 to July 1851	9	3
July 1851 to July 1852	27	17
July 1852 to July 1853	8	1
July 1853 to July 1854	11	2

There was not a single death from cholera in Lambeth-square, during the late epidemic.

The time which has elapsed since the improvements is too short to afford reliable data as to the results, but as far as they go, they show a reduction of mortality of not much less than one-half in the two years succeeding the improvements, as compared with the two years which preceded, while the deaths from zymotic disease have decreased to nearly a seventh part of what they were.

Dr. Fraser mentions that other parts of this district of Lambeth have been improved in health, by the filling up of ditches, and in some cases by the substituting of waterclosets for cesspools.

One of the streets specially mentioned is Francis-street, with a population of 598, in which there were fourteen deaths from cholera in 1849. An open ditch passed close to this street at that period. The ditch has since been converted into a sewer, and the privies have been drained into it, while some of the houses have had waterclosets provided. During the late epidemic only one death from cholera took place in this street, and the case was one imported from Deptford.

Adjoining Francis-street is Hooper-street, in which no improvements have taken place in the privies and cesspools. In this street

there had been eight deaths from cholera at the period of Dr. Fraser's inspection.

The discontinuing of interments in the churchyard of St. John's, Waterloo-road, is also stated to have been followed by a decrease of disease and mortality in its neighbourhood.

The following facts from the report of Dr. Fraser and Messrs. Hughes and Ludlow, on the outbreak of cholera in St. James, Westminster, and St. Ann, Soho, may be adduced as additional illustrations of the beneficial effects of improved drainage:—  
“Nos. 12, 14, 15, 16, 38, and 40, Marshall-street, and 25 and 28, Broad-street, which had been efficiently drained into the new sewer, had all escaped cholera, while, as our tables will show, the surrounding houses had been severely visited.”

The sanitary results of the regulation of common lodging-houses, under the Earl of Shaftesbury's Act, have been so remarkable that it appears necessary to make some allowance for imperfect information on the subject.

These houses used to be dens of filth, disease, and crime, until put under the inspection of the police. Since then over-crowding has been put a stop to, and cleanliness and ventilation are enforced as far as practicable.

Mr. Grainger has shown that in a large unregulated lodging-house in Tindall's-buildings, Gray's Inn-lane, there were, in 1849, fifteen or twenty cases of cholera, and that in thirty lodging-houses in St. Giles' there were twenty-eight deaths from cholera in the same year.

Under the Common Lodging-houses Act, the police have made returns of cases of epidemic disease occurring in houses under their inspection, from which it appears that between the 1st of January and the 1st of October 1854, there were reported twenty-six deaths from cholera, in the registered lodging-houses of the metropolis, the estimated population being 32,000, and in the lodging-houses not registered, but under inspection, there were thirty-five deaths from cholera reported among a population estimated at 50,000. If ample allowance be made for unreported deaths from cholera, there will still remain sufficient proof of the great sanitary improvement that has been effected by the Act.

The parochial authorities of *St. Giles and St. George, Bloomsbury*, state that in their parishes the Common Lodging-houses Act “has effected an amount of good which can scarcely be exaggerated,” but they are desirous that its powers should be extended.

Mr. Walsh states that, in the districts under his inspection, the beneficial effects of the Common Lodging-houses Act were marked, and that in the registered lodging-houses even in the worst districts the state of the privies was very much superior to what it was almost universally in the neighbourhood in a much better class of streets and houses. He says, “It is a fact that exceedingly few cases of cholera occurred in registered common lodging-houses.”

If we now turn to the improved dwellings and model lodging-houses of the metropolis, we shall obtain results equally striking and satisfactory.

In the newly constructed model dwellings and lodging-houses, all the evils and neglects existing in the same class of dwellings in other parts of the metropolis are as far as possible avoided.

There are neither cesspools, ashpits, nor nuisances; all the houses have waterclosets; and there is an abundant water supply, and suitable means of ventilation are provided.

The same improvements have been extended to the altered houses as far as it was practicable, and the results as regards the late epidemic cholera, for the seven establishments belonging to the Society for the Improvement of the Dwellings of the Labouring Classes, are thus stated in a communication received from the secretary.

1st. Model-houses for families, Streatham-street, Bloomsbury, 53 families, numbering 306 inmates, amongst whom six cases of diarrhoea have occurred, all of which speedily yielded to medical treatment.

2d. Thanksgiving model-buildings, Portpool-lane, Gray's Inn-lane, 26 families, and 66 females, or 166 inmates. Not a single case of sickness.

3d. Model-buildings, Bagnigge-wells, 23 families and 30 aged females, or 175 inmates. Not one case of sickness.

4th. Model lodging-house, George-street, St. Giles', 104 inmates, without a case of either disease.

5th. Model lodging-house, Charles-street, Drury-lane, 82 inmates, five cases of diarrhoea, very slight, and these were confined to men employed in the neighbourhood of the Tower and docks, and returned unwell. One case of cholera occurred, which can hardly be said to have been contracted in the house, as the individual had suffered from 19 days neglected diarrhoea, and was in a state of great destitution. He died at King's-college hospital.

6th. Model lodging-house, King-street, Drury-lane, 25 inmates, not a case of either disease.

7th. Hatton-garden chambers, Hatton-garden, 28 inmates, but having accommodation for 58. No sickness whatever.

The houses numbered 4, 5, 6, and 7 are for single men.

Mr. George Glover, who was requested by the President of the General Board of Health to inspect the model lodging-houses of the metropolis after the decline of the epidemic, has reported in regard to the buildings belonging to the Metropolitan Association, that in the Old Pancras-road buildings, containing a population of 693 persons, there was no cholera, but a few slight cases of diarrhoea, only four of which required medical treatment.

In the Soho chambers, with an average nightly population of 88, there was no cholera during the epidemic, and only seven cases of diarrhoea. This house is situated in the immediate vicinity of the houses so frightfully visited by cholera in the parish of St. James, Westminster.

In the premises in Pelham-street and Pleasant-row, with an average population of 120, there have been no deaths either from cholera or diarrhoea.

In the Albert-street chambers, Spitalfields, a lodging-house with

an average population of 200, there were three cases of diarrhoea and two cases of cholera. One of the cases, however, was taken ill in Smithfield market and was removed to the London hospital, where he recovered.

The other case, which proved fatal, took place in a man lodger who ate stale crab, offensive to the smell, for supper and breakfast, and fell a victim to an error of diet which no improved sanitary condition could neutralize.

In Albert-street dwellings for families, containing 354 inhabitants there were three slight cases of diarrhoea, but there were four deaths from cholera, all confined to one family, which shows that there must have been some peculiar cause at work in that one case.

This family consisted of a man, his wife, and eight children, who occupied a house of three small rooms, which allowed only 276½ cubic feet of sleeping space for each individual. Now experience has shown that during cholera epidemics, about 500 cubic feet are required for safety. Mr. Glover considers it probable that inefficient nourishment had also much to do with the attack.

Besides the model dwellings belonging to the two societies, there is a street of 80 tenements, in St. Georges in the East, built on the plan proposed by His Royal Highness Prince Albert, and shown in Hyde-park, at the Great Exhibition of 1851. They occupy the site of some property the inhabitants of which suffered most severely from cholera in 1849. These dwellings contain a population of about 450, and they all escaped the epidemic.

The experience so far as concerns the results of sanitary improvements is most satisfactory, although it also shows that other things require to be attended to in order to ensure security from epidemic disease.

## SECTION VII.

### *Conclusions.*

The facts in the preceding report appear to me to warrant the following conclusions:—

1. The chief causes which have localized epidemic cholera during the late and previous epidemics are known and removable.

2. However beneficial any temporary sanitary measures may be, such temporary measures are not enough to ward off attacks of pestilence, and that permanent sanitary works and arrangements are necessary.

3. That there is no local authority except in the city of London having the necessary powers for executing permanent works, and that new local authorities with adequate powers are requisite for the public safety.

4. That such new local authorities, besides carrying forwards the permanent sanitary improvement of the metropolis, should be intrusted with powers, under supervision of the General Board of Health, for providing houses of refuge, house to house visitation, and other similar measures required for the protection of the working-classes during extraordinary seasons of pestilence.

TABLE I.

Weekly Statistics of MORTALITY from CHOLERA, DIARRHŒA, and other Zymotic Diseases during the Epidemic of 1854.

Weeks ending	Cholera.	Diarrhœa.	Typhus.	Zymotics.	All Causes.
January 7	2	22	43	284	1,444
" 14	2	27	49	280	1,492
" 21	1	27	44	253	1,195
" 28	0	30	51	230	1,178
February 4	1	31	42	263	1,204
" 11	1	20	53	262	1,178
" 18	0	24	47	248	1,154
" 25	0	28	50	257	1,334
March 4	0	20	31	215	1,135
" 11	0	19	52	254	1,343
" 18	0	22	39	217	1,188
" 25	0	22	41	246	1,200
April 1	0	16	40	245	1,489
" 8	0	22	47	264	1,149
" 15	2	18	59	254	1,087
" 22	2	26	46	298	1,193
" 29	0	19	56	289	1,211
May 6	0	25	51	303	1,263
" 13	0	10	47	252	1,093
" 20	2	17	56	301	1,188
" 27	0	31	43	282	1,143
June 3	2	22	57	309	1,090
" 10	1	31	64	306	1,110
" 17	1	31	61	287	1,085
" 24	1	38	63	301	1,153
July 1	0	25	47	249	1,290
" 8	1	32	44	253	984
" 15	5	46	51	270	1,015
" 22	26	58	43	293	1,008
" 29	133	84	40	422	1,219
August 5	399	142	44	731	1,456
" 12	644	195	53	1,069	1,832
" 19	729	192	45	1,112	1,833
" 26	847	214	54	1,296	2,039
September 2	1,277	243	51	1,732	2,515
" 9	2,050	276	67	2,558	3,413
" 16	1,549	232	58	2,026	2,836
" 23	1,284	190	71	1,717	2,504
" 30	754	165	57	1,144	2,216
October 7	411	98	88	777	1,532
" 14	249	102	53	610	1,394
" 21	163	78	58	495	1,321
" 28	66	46	53	371	1,228
November 4	31	33	62	359	1,252
" 11	23	35	54	309	1,160
" 18	12	31	54	332	1,309
" 25	8	21	47	332	1,262
December 2	7	19	52	298	1,350
" 9	5	19	49	328	1,331
" 16	2	25	52	330	1,300

TABLE II.

Showing the comparative MORTALITY from CHOLERA during the Epidemics of 1832.\* 1849 and 1854, for each Parish and Union in the Metropolis.

Unions and Parishes.	Epidemics of Cholera.								
	1854.			1849.			1832-33.		
	Population 1851.	Dths.	Deaths per 1,000	Population 1849.	Deaths.	Deaths per 1,000	Population 1831.	Deaths.	Deaths per 1,000
Paddington - -	46,305	93	2.0	41,267	35	0.8	-	-	-
Kensington and Brompton - -	44,053	186	4.2	68,425	225	3.3	52,981	52	1.0
Hammersmith - -	17,760	117	6.0						
Fulham - -	11,886	93	7.7						
Chelsea - -	56,538	297	5.2	53,379	247	4.6	32,371	272	8.0
St. George, Hanover-sq. - -	73,430	294	4.0	71,672	131	1.8	58,209	74	1.0
St. John and St. Margaret, Westminster - -	65,609	420	6.4	64,109	437	6.8	-	-	5.0
Westminster - -	-	-	-	-	-	-	85,220	450	5.0
St. Martin-in-the-Fields - -	24,640	58	2.3	24,557	91	3.7	23,970	-	0.02
St. James', Westminster - -	36,406	484	13.0	36,426	57	1.6	-	-	-
Marylebone - -	157,896	344	2.1	153,960	261	1.7	122,206	355	3.0
Hampstead - -	11,986	14	1.1	11,572	9	0.8	8,588	-	-
St. Pancras - -	166,956	240	1.4	160,122	360	2.2	103,548	230	2.0
Islington - -	95,329	94	0.9	86,761	187	2.2	37,316	39	1.0
Hackney - -	58,419	71	1.2	55,152	139	2.5	34,527	8	0.2
St. Giles and St. George, Bloomsbury - -	54,214	116	2.1	54,062	285	5.3	52,907	280	5.0
Strand - -	44,460	109	2.4	44,254	156	3.5	42,015	26	0.06
Holborn - -	46,621	25	0.5	46,134	161	3.5	42,696	46	1.0
Clerkenwell - -	64,778	58	0.9	63,499	121	1.9	47,634	65	1.0
St. Luke - -	54,055	50	0.9	53,234	183	3.4	46,642	118	3.0
East London - -	44,406	85	1.8	43,495	182	4.5			
West London - -	23,790	125	4.3	28,829	429	9.6	123,608	605	5.0
City of London - -	55,932	71	1.2	55,816	207	3.8			
Shoreditch - -	129,257	238	1.8	104,122	789	7.6	68,564	57	1.0
Bethnal Green - -	90,293	190	2.1	87,263	789	9.0	62,018	345	5.0
Whitechapel - -	79,759	329	4.0	78,590	506	6.4	64,141	736	11.0
St. George's-in-the-East - -	48,376	154	3.0	47,334	199	4.2	38,505	123	3.0
Stepney - -	110,775	381	3.4	106,988	501	4.7	72,442	358	5.0
Poplar - -	47,182	208	4.0	44,103	313	7.1	25,066	101	4.0
St. Saviour's, Southwark - -	35,731	492	13.8	35,227	539	15.3			
St. Olave - -	19,375	313	15.6	19,278	349	18.1	91,501	1,128	12.0
St. George, Southwark - -	51,824	543	10.4	50,900	836	16.4			
Bermondsey - -	48,128	838	17.0	45,500	734	16.1	29,741	210	7.0
Newington - -	64,816	694	10.6	63,074	907	14.4	44,526	200	4.0
Lambeth - -	138,325	932	6.7	134,768	1,618	12.0	87,856	337	4.0
Wandsworth - -	50,764	421	8.0	48,446	484	10.0	33,090	46	1.0
Camberwell - -	54,667	553	10.0	51,704	504	9.7	28,231	107	3.0
Rotherhithe - -	17,807	284	15.7	17,208	352	20.5	12,875	19	1.0
Greenwich - -	99,365	567	5.6	95,954	718	7.5	63,564	149	2.0
Lewisham - -	35,835	75	2.0	32,299	96	3.0	18,426	-	-

\* I have copied the data for the epidemic of 1832-3, from Mr. Grainger's report on the cholera of 1849, with the same reserve he makes, namely, that it is only an approximation, on account of the imperfection of the records.

TABLE III.

Total number of CASES of DIARRHOEA and CHOLERA returned to the General Board of Health, as having been treated in the following Parishes and Unions during the Epidemic of 1854.

Union or Parish.	Diarrhoea.			Cholera.			
	Dispensar.	Medical Officers.	Visitors.	Dispensar.	Medical Officers.	Visitors.	
Lambeth - - -	-	3,364	-	-	427	-	
East London - - -	-	1,514	-	-	53	-	
St. Luke, Middlesex - - -	152	121	-	-	12	-	
West London - - -	-	951	-	-	13	-	
Shoreditch - - -	-	1,729	-	-	105	-	
Bethnal Green - - -	-	409	-	-	65	-	
Hackney - - -	-	716	-	-	16	-	
St. James, Westminster - - -	-	2,601	-	-	237	-	Including cases discovered by house-to-house Visitors.
Strand - - -	-	4,336	-	-	43	-	
Islington - - -	-	2,895	-	-	67	-	
Camberwell - - -	2,211	5,919	-	-	305	-	
St. Saviour's - - -	924	432	338	15	102	81	
Bermondsey - - -	256	117	30	-	39	-	
St. Luke, Chelsea - - -	-	2,564	1,323	-	146	15	
Whitechapel - - -	1,396	1,409	163	26	137	30	From 10th August to 23d October. First Visitor's Return on 15th Sept.
St. Mary, Newington - - -	394	3,569	949	4	341	77	August 8th to October 7th. First Visitor's Return on 16th Sept.
St. George the Martyr - - -	-	984	410	-	70	12	August 5th to October 1st. First Visitor's Return on 11th Sept.
Fulham - - -	-	1,670	487	-	449	70	
Stepney Union - - -	4,463	1,563	2,584	-	311	140	Including cases discovered by house-to-house Visitors.
Poplar Union - - -	4,577	4,000	1,322	-	435	56	
St. Giles and St. George, Bloomsbury - - -	-	4,061	-	-	120	-	
Holborn - - -	-	2,600	-	-	38	-	

## APPENDICES.

INSTRUCTIONS to LOCAL AUTHORITIES on PREVENTIVE MEASURES in relation to EPIDEMIC CHOLERA, under the NUISANCES REMOVAL ACTS.

THE main object of the Board in framing the accompanying Instructions has been to embody, in a form adapted to practical use, the results of experience as to the best means of meeting an outbreak of epidemic cholera.

One of the preventive measures recommended by the Board—that denominated "House-to-house Visitation," is based on the belief entertained by the medical profession, that by treating every case of diarrhoea which may be discovered among the population of a town or district visited by cholera, the ravages of this fatal disease may be to a large extent mitigated. It is well known that where cholera is epidemic, diarrhoea, usually painless, almost always prevails very extensively; and it is also known that diarrhoea of the same character usually precedes—sometimes for a few hours, sometimes for several days—the alarming symptoms which constitute developed cholera. Now the prevalent diarrhoea, in a vast majority of cases, yields to remedial measures promptly applied; and it is believed that if they had been neglected, many cases of diarrhoea thus arrested would have passed into developed cholera. As long, therefore, as cholera shows itself so difficult of cure, every plan which proposes to deal with an outbreak of this fearful disease *must provide for the immediate treatment of all cases of diarrhoea.*

It may, perhaps, at first sight appear that in order to effect the proposed object it would be sufficient to impress the foregoing plain and obvious facts upon the public, by means of placards and notices; to provide dispensaries where the poor might be supplied gratuitously with the requisite medicines, and to leave the rest to the common sense of the people. But it must be remembered that diarrhoea is a very common disease; and when painless attracts little notice, or is regarded as of no consequence. It must further be borne in mind that the principal sufferers from epidemic cholera belong to a class whose habits of life are peculiarly calculated to render them unwilling to anticipate misfortune. They may, perhaps, be taught that the filth, intemperance, and wretchedness in the midst of which they so generally live, render them peculiarly susceptible