REPORT

OF THE

GENERAL BOARD OF HEALTH

ON THE

EPIDEMIC CHOLERA

OF

1848 & 1849.

Presented to both Houses of Parliament by Command of Her Majesty.

LONDON:
PRINTED BY W. CLOWES & SONS, STAMFORD STREET,
FOR HER MAJESTY'S STATIONERY OFFICE.
1850.

Acc No. 5125.

REPORT

OF THE

GENERAL BOARD OF HEALTH

ON THE

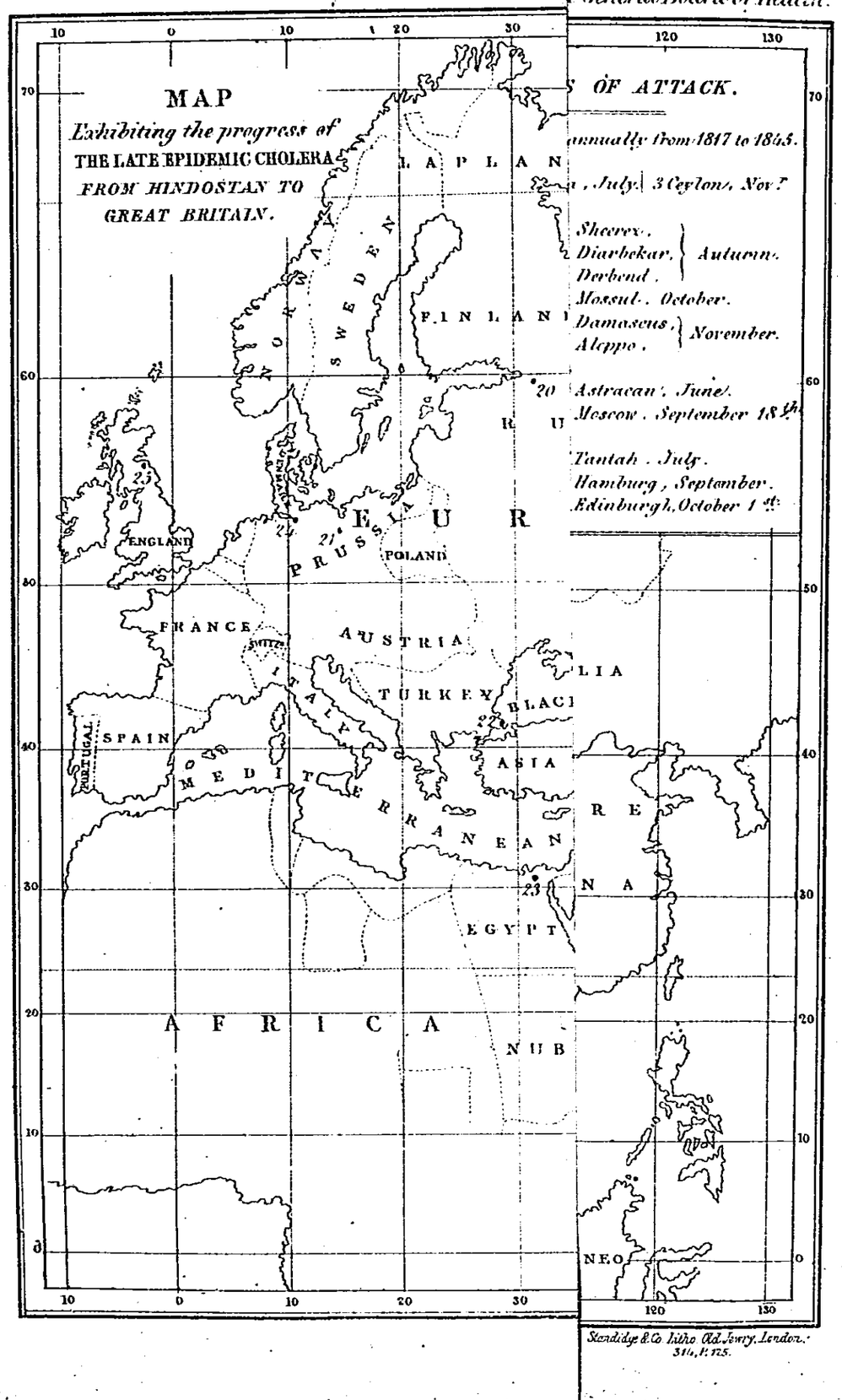
EPIDEMIC CHOLERA

OF

1848 & 1849.

Presented to both Houses of Parliament by Command of Her Majesty.

LONDON:
PRINTED BY W. CLOWES & SONS, STAMFORD STREET,
FOR HER MAJESTY'S STATIONERY OFFICE.
1850.



MAP

Exhibiting the progress of
THE LATE EPIDEMIC CHOLERA
FROM HINDOSTAN TO GREAT BRITAIN.

PLACES AND DATES OF ATTACK.

Hindostan in various districts annually from 1817 to 1845.

1845.

1 Cabool, Hot season. | 2 Umballa, July. | 3 Ceylon, Nov.r

1846.

4 Bombay, Spring.
5 Kurrachee, June.
6 Teheran, July.
7 Tabreez, Autumn.
8 Ispahan, } Sept.r
9 Bagdad, }
10 Sheeres, }
11 Diarbekar, } Autumn.
12 Derbend, }
13 Mossul, October.
14 Damascus, } November.
15 Aleppo, }

1847.

16 Mecca, January.
17 Trebizonde, Spring.
18 Astracan, June.
19 Moscow, September 18th
20 St.r Petersburg, }
21 Berlin, } June.
22 Constantinople, }
23 Tantah, July.
24 Hamburg, September.
25 Edinburgh, October 1st

LAPLAND
SWEDEN
NORWAY
FINLAND
RUSSIA
WESTERN SIBERIA
EUROPE
ENGLAND
FRANCE
PRUSSIA
POLAND
AUSTRIA
SWITZ.
ITALY
TURKEY
BLACK SEA
SPAIN
PORTUGAL
MEDITERRANEAN
ASIA MINOR
INDEPENDENT TARTARY
MONGOLIA
CHINESE EMPIRE
PERSIA
AFGHANISTAN
PANJAB
CHINA
BELOOCHISTAN
SINDE
HINDOOSTAN
BIRMAH
EGYPT
ARABIA
AFRICA
NUBIA
COCHIN CHINA
SIAM
SUMATRA
BORNEO

Standidge & Co. lithr. to the Admty. London.

LIST OF MAPS, DIAGRAMS, AND TABLES.

CONTENTS.

APPENDIX A.

APPENDIX B.

REPORT.

MAY IT PLEASE YOUR MAJESTY,

WHEN in the month of July, 1849, we presented a Report, giving an account of our first proceedings in the execution of the Public Health Act, and the Diseases Prevention Act, which we were appointed to administer, Asiatic Cholera was prevailing extensively in numerous parts of the country, and the epidemic had not yet reached its height. Though fully aware of the imperfection which must unavoidably attach to an account of the pestilence written while it was still extending its destructive course; yet it seemed desirable to promulgate without delay the practical results, as far as they were then obtained, of the measures of prevention and relief which we had deemed it our duty to recommend and enforce. On the first return of cholera, our knowledge of the disease was comparatively limited. Several essential facts had then been scarcely noticed, or were fully appreciated only by a few careful observers, who had taken no means to make them generally known, and other most important points which have since been rendered certain, were at that period wholly unknown: but we could only take for our guidance in the measures of prevention which we were immediately called upon to devise the broadest basis of experience which was at that time available.

The epidemic having now, for the present at least, finished its course, and a large body of evidence having been accumulated respecting it, derived from the whole experience of this country, and in part also from that of other nations, we propose to present a summary of the

results of that experience, with a view particularly to show how far the intentions of the Legislature have been carried into effect, and with what amount of success; and what further legislative provisions are required for the prevention in future of this pestilence, the scourge of modern times, as well as of other epidemic diseases.

We beg to call attention to the full and elaborate Reports of our medical inspectors, Dr. Sutherland and Mr. Grainger, which are given at length in the Appendix. During the whole course of the epidemic they, more than any private practitioners, and more probably than any other public servants, were engaged in a personal and laborious examination of the conditions connected with the propagation of the disease, and in superintending in different towns in various parts of the kingdom, the application of the measures which, on the best consideration, were judged necessary to meet the most formidable attacks of the disease. These Reports, though written independently, and each having a strict and exclusive relation to its respective field of service, will be found to present a remarkable coincidence in regard to the main subjects which are brought under consideration.

Before proceeding to state the results of the late experience of this epidemic, an experience which is more extended and complete than any with which we are acquainted in relation to any other pestilence, it may be useful briefly to describe the course which it took on this occasion, in its progress from India to this country. From Despatches received from time to time by Your Majesty's Government from foreign ministers and consuls, we are enabled to present a tolerably distinct view of its course, from the place of its outbreak to its arrival in Great Britain.

From the time that cholera first appeared in its epidemic form, in 1817, in Hindostan, down to the period of its last great irruption into Western Asia and Europe, the disease had never been absent from some part or other of the Indian peninsula. In the period included in the Parliamentary Returns, from 1825 to 1844, it caused annually nearly one-eighth of the whole mortality of the European soldiers, and nearly one-fifth of all the deaths among native soldiers.

At the beginning of the hot season of 1845 it broke out with great violence in Caboul; it devastated whole districts in Affghanistan and the Punjaub, and committed frightful ravages at Ferozepore and Loodianah, in Northern India. It attacked Umballa in July, 1845, where nearly all the first cases proved fatal, and in the course of the autumn it appeared at Kurnaul, Cawnpore, and other towns.

Some time in the month of November, 1845, small-pox having been extremely prevalent and mortal in the autumn of that year, both in the western and southern parts of the Island of Ceylon, this destructive disease was succeeded by an outbreak of cholera at Taffrea, where it raged with such violence, that out of 4,111 persons who were its first victims, 3,655 perished. This outbreak was there attributed not to any imported infection, but to some endemic influence supposed to have been called forth by the irregular recurrence of the rains in the late season, which, instead of appearing at the accustomed time and continuing for the ordinary period, were much later than usual, and interrupted and partial in their duration. No expectation was entertained of any material mitigation of the disease until the recurrence of the next monsoon, which usually commences to blow from the south-west about the middle of May; accordingly it continued to ravage various parts of the island, especially the districts which had recently been the special seats of small-pox.*

In the early part of 1846 it prevailed extensively and severely in various towns and villages in the southern parts of the Madras Presidency, particularly at Madura and Bellary.

Then advancing in a north-west direction in its progress to Bombay, "an awful visitation," is stated to have taken place at Sholapoor and its vicinity, the disease

* In many of the towns and villages attacked by cholera, in its progress through the Madras Presidency, it was preceded and accompanied by small-pox.

first appearing in the camp of the 33rd Regiment N. I., when on their march to Jaulnah. Spreading thence to the south Mahratta country it almost depopulated several villages in its course; and on no occasion, at least for many years past, had it proved so fatal to the native population.

It subsequently appeared at Poonah, Bombay, and Ahmedabad.

Still steadily maintaining a north-west course it arrived coastward at Scinde, where it first broke out at the sea-coast, and gradually it extended upwards to Hydrabad and Sehwan.

In the month of June an attack of extraordinary severity took place at Kurrachee, at the mouth of the Indus, where the disease is stated to have cut off a tenth part of the population, including 725 European and native soldiers in sixteen days. It is important to remark, that upwards of six months before this violent outbreak, namely, in the month of November, 1845, several sporadic cases of the disease, which proved fatal with great rapidity, occurred in the town.

While the pestilence was raging at Kurrachee, it broke out in Persia, and appeared as early as the month of May with great severity at Aden, at the mouth of the Red Sea, after a violent and unusual fall of rain.

Its progress through Persia was so rapid and fatal as to produce the utmost consternation among the inhabitants of the principal towns of that country. By the month of July it reached Teheran, where, out of a population of 60,000 it destroyed 12,000 persons, 300 deaths occurring daily, for several days in succession. In this town and neighbourhood it attacked with the utmost violence the rich as well as the poor, several members of the Royal Family having been among the first to perish by it.

From Teheran it proceeded by a north-west course to Tabreez, becoming more deadly as it advanced, for out of a population of 30,000, 6,677 persons perished, the greater part within the space of 20 days; from 450 to 500 deaths being reported daily while the pestilence continued at its height.

From Tabreez it turned off in a south-east direction towards Ispahan, which it reached in September, where it committed great havoc among the higher as well as the lower classes. Then, proceeding westward, it reached Baghdad at the latter end of the month, spreading such consternation among the inhabitants, that in a few days the town was deserted; the shops were closed; public offices were unattended, and all business was suspended. In this town and a narrow circle round it its victims are computed to have exceeded 30,000 souls.

From Baghdad, instead of pursuing its westward course, it again turned directly back in a south-east direction, taking the road through Cashan to Sheerez. From this retrograde course a hope was at first entertained that it would not extend its ravages to Europe, since instead of proceeding, as in 1831, in a direct line from India to Europe, through Russia and Turkey, it appeared to be retracing its steps towards the region in which it took its origin.

In a short time, however, all ground for this expectation vanished; for in October it entered Asiatic Turkey, breaking out at Mossul, and reaching as far northward as Diarbekar. At the same time penetrating into Syria, it spread to Damascus, in a few days reached Aleppo, and in the following month (December) it extended its ravages over the whole of the upper Tigris and the lower Euphrates; thence, advancing into Arabia, it reached Mecca early in January, 1847, where it proved so destructive to the Moslem pilgrims, that from two to three thousand of them are reported to have perished by it "in the one night," of their pilgrimage from Mecca to Mount Arafat.

While the pestilence was thus ravaging Arabia and the south-eastern portions of the Turkish empire, it was making steady progress through the southern portion of Georgia, having during the autumn extended its course as far as the province of Derbend, on the Caspian Sea, and to the Russian frontier.

The further progress of the scourge appears to have been stopped by the approach of winter; but early in the following spring it broke out with fresh virulence, pro-

ceeding now in two opposite directions; first retracing its steps through Trebizonde, Erzeroum, and Baghdad, to Persia, over almost the whole of which country, as well as the greater part of Asia Minor, it again exerted a most deadly influence, and at the same time advancing north-eastward, it ravaged the Russian provinces bordering on the Caspian Sea; spread throughout the eastern Caucasus, and in the month of June reached, in succession, Tiflis, Keylear, and Astrachan. Thence crossing the Don, it broke out, about the 18th of August, in the port of Taganrog among the shipping, though it had not yet reached Mariapol; nor did it appear to be advancing along the shores of the Azoph, but rather by the tributaries of the Don, far into the interior of the country, it being reported to have already invaded Lugan and other places of the government of Ekaterinoslav. In the mean time such a panic spread through the country that the current business of the season was suspended; the crops in many districts, though long ripe for the sickle, were left standing for want of reapers; and the carriers engaged in bringing goods from Nijni-novogorod abandoned their charge on the way, refusing to proceed southward of the Government of Harkoff.

After entering European Russia it advanced rapidly on Moscow, where it appeared on the 18th of September, 1847, being exactly the same date as that on which it struck the city in 1831.

The disease, on its first appearance at Moscow, did not present a very formidable aspect, nor extend widely over the city; it confined its attacks chiefly to one particular district near the river. Here, however, it assumed a severe character, for nearly one half of the cases that first occurred terminated fatally.

Its progress north and west was not rapid; it did not for many weeks extend much beyond the province of Moscow, and at the approach of winter the number of cases in that metropolis became so small, that hopes were entertained that it was altogether subsiding. A very significant fact, however, is stated by Dr. Adair Crawford, namely, that occasional cases continued to occur throughout the winter, affording too much ground for

the apprehension that the malady was only suspended by the cold and dry state of the winter atmosphere, and that it would again break out in spring.

The disease accordingly assumed increased activity about the month of May, extending itself over the whole city, and attacking all classes. The progress of the malady throughout the country became also much more rapid than during the previous year, for it spread almost simultaneously over all the provinces in the empire, north, east, and west, and reached St. Petersburgh in the begining of June, 1848.

While the pestilence was thus extending throughout the Russian empire, it broke out, at the end of June, in Constantinople, committing great ravages in that city, and in several other towns along the Bosphorus, and attacking the upper as well as the lower classes. Appearing at the same time at Odessa, and extending westward along the Danube, none of the persons first attacked in these districts recovered. The outbreak of the disease was here attended by intense heats and enormous numbers of caterpillars and locusts, which destroyed all before them.

About the middle of July, it broke out in Egypt, spreading rapidly over the greater part of the country, 300 attacks occurring daily at Cairo, and from 250 to 300 deaths at Alexandria. At Tantah, a village in the Delta where the pilgrims were assembled, 195,000 in number, 3,000 perished. The ravages of the disease in this country in all the towns and villages it attacked were frightful.

From June to July the pestilence extended its destructive course over nearly the whole of the Russian empire, and at St. Petersburgh the people ascribed the appalling number of deaths that occurred in every part of the city to a poisoning of the water, and several riots took place. In Moldavia and Wallachia its prevalence and mortality were so great that it was found necessary to close the courts of law. At Bucharest, business was universally suspended; a general panic struck the inhabitants; and all who could leave the city fled to the mountains.

It has been seen that the disease was nine months in

travelling from Moscow to St. Petersburgh; yet having reached the latter city, as has been stated, in the beginning of June, it extended in the following month to Finland and Sweden in its northern, and Riga in its western course. In the same month it penetrated into Prussia and reached its capital; but it does not appear to have manifested itself in Poland until August. In September it spread to Hamburgh and Holland. At the same time several mild cases had also occurred at Paris.

In the beginning of October, it crossed the German Ocean, and broke out in Edinburgh, spreading in the course of a few days to the neighbouring towns of Newhaven, Portobello, Loanhead, and numerous other localities. In the beginning of November it attacked Glasgow, and subsequently a large number of manufacturing towns and villages in Lanarkshire, Ayrshire, Dumfrieshire, and other counties in the south and west of Scotland. From this period the disease may be considered as having established itself in Great Britain, isolated cases, indeed, as will be seen immediately, having occurred at a still earlier period in London and its vicinity.

It thus appears that the first great epidemic outbreak proceeding from Caboul and the North Western provinces of Hindostan, as from a centre, swept over Affghanistan, Persia, and the South Eastern portion of Asiatic Turkey, until it was arrested by the winter of 1846, in its progress towards Europe. It had, up to this date become localised in the North Eastern parts of Asia Minor, from whence, in the Spring of 1847, it again commenced its career spreading in all directions; striking on the one hand the cities of Asia Minor, Persia, Arabia, and Egypt; and on the other Georgia, Circassia, and the Southern provinces of the Russian Empire. The Northern branch of this great outbreak continued its progress until nearly the whole of the Governments of European Russia were affected; after which one portion of it advanced into Finland and Sweden, where it apparently terminated its destructive course; while another branch, after sweeping round the North Eastern

shores of the Black Sea, and nearly decimating the cities and towns of the lower Danube, advanced through Austria into Germany and Hanover, and at the same time attacked the capital of the Turkish Empire. Some idea of the geographical extent of the pestilence, may be formed by the circumstance that it ravaged Constantinople, Berlin, St. Petersburg and Cairo in the same month. Hamburg was attacked on the 7th September; and within three weeks afterwards the epidemic reached the shores of Britain, where, as has been stated, it first appeared at Edinburgh in the beginning of October 1848.

In every European city in which the pestilence prevailed, it gave distinct warning of its approach and intimated by signs not to be mistaken, the severity of the impending attack. An extraordinary prevalence and mortality of the classes of disease which have been observed usually to precede it, foretold its approach and intensity. At Moscow, at St. Petersburg, and in other Russian towns its outbreak was preceded by a general prevalence of influenza and of intermittent fever, the latter disease in many continental cities taking the place of typhus in this country. Diarrhœa also, in the European cities first attacked was generally prevalent before the actual outburst of the disease. At Berlin, intermittent fever, diarrhœa, dysentery, but especially diarrhœa were epidemic. The same diseases, but particularly intermittent fever, scarlet fever, and influenza were prevalent at Hamburgh. In London there had been during the preceding five years a progressive increase in the whole class of zymotic diseases, amounting to an excess above the average of 31 per cent.; while the mortality from typhus, which in 1846 considerably preponderated over that of 1845, was still higher in 1847, and exceeded in 1848 by several hundred deaths, the mortality of any preceding year. The deaths from scarlet fever were also greatly above the average, and such was the mortality from influenza, that in 1847 and 1848, almost as many at the earlier periods of life perished by this disease as by the more terrible epidemic that followed it; but the malady which all along continued its course with the most steady

progress, was that which was the most nearly allied in nature to the approaching epidemic, namely, diarrhœa; the deaths from this disease in the five years ending with 1848, amounting to 7,580; whereas in the preceding five years they were only 2,828; while taking separate years in this series, the deaths were in 1848, more than seven times greater than in 1839, and nearly five times greater than in 1841. All these circumstances indicated an epidemic force extending over the metropolis and steadily increasing, which justified the prediction of the Metropolitan Sanitary Commissioners founded on their observation of the increased crowding of the population, its state of filth, its low sanitary condition, and the actual prevalence among the people of the diseases that precede and give warning of the approach of the pestilence, that the impending epidemic would be more severe than that of 1832; and the event has mournfully realized the prophecy.

There were in 1832 no means of obtaining an accurate return of the number of attacks and deaths; nor has there been any return that can be relied on, of the number of attacks in the late epidemic. We adopted all available means to obtain such a return, but we know that the disease was prevalent in several places from which no returns at all have been made, and that in others, the attacks and deaths have been much under stated. This was especially the case with watering places along the sea coast, and with places in general whose prosperity depended on the resort of visitors. As an example of this neglect, and the causes which have led to it, Mr. Lee, one of our Superintending Inspectors, states, in his Report on Great Yarmouth, that, in 1832, a great number of persons died of cholera; and during the last year the official returns of the cases and deaths could have no other effect but that of misleading the General Board of Health and the country as to the sanitary condition of the borough.

"There were, I believe, (says the Clerk to the Board of Guardians,) "a great many more cases here than were known. I returned all cases that were sent to me to the Board of Health, *but I believe not one in ten was returned;* the feeling of most parties being, that if they were published just at the season for watering-places, the town would suffer, as visitors would be afraid to come to Yarmouth."

For England and Wales we have the returns of the deaths from the Registrar-General, and these alone are to be relied on.

With reference to the epidemic of 1832-3, however, we must take the statement as we find it made to the Privy Council, from which it appears that in London, the attacks were 14,144, and the deaths 6,729; the population of London then being 1,681,641. From data given in the Appendix, it is estimated that, in 1848-9, the attacks were about 30,000, and the deaths 14,601; the population at that time being 2,206,076, so that in the last, as compared with the former epidemic, the deaths were more numerous than the attacks, while the attacks were more than double; or to state the result more precisely, in the epidemic of 1832-33, one person died in every 250 of the inhabitants, or ·4 per cent.; whereas in 1848-49 one person died in every 151 of the inhabitants, or ·66 per cent.; the mortality therefore in 1832-33, was about 2-5ths less than in 1849; which is the same as to say, that in proportion to the population, about 5,800 more persons perished of this epidemic in London, in 1849, than in 1832.

In England and Wales in 1832-33 the attacks are stated to have been 71,606 and the deaths 16,437.

From the Registrar-General's Return it appears that the total number of deaths in England and Wales in the year 1849 was, from—

Cholera . . .	53,293
Diarrhœa . . .	18,887
Total . .	72,180

From the total absence of any registration whatever in Scotland, it is of course impossible to obtain similarly accurate data for estimating the extent of the epidemic seizure in that part of Great Britain. Wherever we felt it important to obtain approximate estimates of the amount of mortality, we were obliged to direct Dr. Su-

therland to make a personal examination of the rude entries in the burial registers of the various places of interment likely to have received the dead of those affected districts whose condition we were desirous of ascertaining. The result of this kind of inquiry as to Glasgow was, that about 3,800 persons had died of cholera, and from a consideration of the returns obtained, it appears probable that between 7,000 and 8,000 persons were cut off in Scotland during the course of the epidemic. It may not be far short of the truth to estimate the mortality from cholera, exclusive of that from diarrhœa, in the whole of Great Britain at upwards of 60,000.

The former epidemic commenced in London on February 16, 1832, and ended on September 7, 1833, including a period of about 17 calendar months. But it is stated that during this period there was a total cessation of deaths for eight months, so that if this be true, there were in fact two epidemics, the first commencing on February 16, and lasting to November 30, 1832, and the second commencing on August 1 and lasting till September 7, 1833. The disease in 1832 came to its height in the week ending July 27, when the deaths were 445, which was the greatest weekly mortality recorded during the whole of that epidemic.

In the late epidemic, the first attack is generally considered to have been on the 22nd September, 1848, and the last death recorded in the return of the Registrar-General, is December 22, 1849; so that, according to this account the whole progress of the epidemic occupied a period of 15 calendar months. During the first six months, namely from the end of September, 1848 to the end of March, 1849, the disease advanced progressively but irregularly, numbering in the whole of this period, 988 deaths. During the following months of April and May, there was a lull in the disease; the deaths sinking to one in some weeks, and never in any week exceeding five; but there was never, as is stated to have been the case in 1832, a complete cessation of the disease, for there was never a single week without at least one death; a most significant fact, which as has been shown

had been previously observed during the suspension of the disease in Moscow. In the month of May, the total number of deaths did not exceed 13; but in the first week of June they suddenly rose to 9, increasing in the last week of the month to 124. From that period the epidemic went on rapidly and uninterruptedly increasing till it came to its height in the week ending September 8, 1849; when the deaths, including cholera and diarrhœa, amounted to 2,298. From this time the disease declined and ultimately ceased, as has been stated, December 22, 1849. There was thus one epidemic with two well marked periods; the first extending from September to March, and the second from June to December.

In the first of these periods the highest weekly mortality was 94; namely in the week ending January, 13, 1849; affording during that period a hope of a comparatively slight visitation; but in the second period, this hope was grievously disappointed, for the weekly mortality then rose, as has been just stated, as high as 2,298, independently of 17 deaths from dysentery, namely, in the week ending Sept. 8.

It is proved by the late experience that whenever an epidemic is impending over a country or district, individual cases of the disease generally occur a considerable time before the actual presence of the pestilence is acknowledged. There is a universal unwillingness to believe that the threatened calamity has really taken place; and all classes shut their eyes against the fact as long as possible. The first cases are either concealed, or are recorded under a false name, on the ground that, though they may be suspicious they are of a doubtful nature, and that at all events it is unwise to excite alarm. Thus, though the first recognized case of cholera in London is stated to have taken place as late as September 1848, yet there is undoubted evidence that isolated cases of the true disease occurred at a much earlier period; as far back indeed, as July, when four cases of it are recorded in one single district: these were followed by four more cases in August, in the same district; and these again by two in the beginning of September.

There may have been others in other parts of the

metropolis; but all these unquestionably occurred in Bethnal Green at the dates assigned: while three similar cases also occurred in Southwark prior to the 16th of September; so that the first of these cases occurred upwards of two months, and the last of them nearly a fortnight before the date commonly assigned as the commencement of the epidemic.

The slow and gradual approach of the disease on the metropolis afforded an opportunity of minutely observing its progress, and its mode of invasion.

We have elsewhere stated that, aware of the just importance which is attached to an accurate observation of the first cases that occur on the appearance of an epidemic, with a view to judge of its mode of propagation, we made arrangements for instituting a special inquiry on the spot into every case of cholera that might occur in the metropolis, immediately on receiving the report of it; and that we intrusted this investigation principally to Dr. Parkes, who had had considerable experience of cholera in India. The cases of cholera that occurred in London, it should be observed, were the first, as far as is known, that appeared in Great Britain, being from two to three months earlier than the first case reported in the port of Hull on board a vessel which had come direct from Hamburg.

It appears to us that the history of the progress of the disease in London thus carefully observed is highly important, as illustrating the mode in which it usually attacks and spreads; particularly as the main facts are confirmed by the manner of its invasion of the principal cities of Great Britain.

In order to complete the view of its progress, we repeat what we have stated at greater length in our First Report, that reckoning its commencement at the period commonly assigned to it, the first case occurred at Horsleydown, September 22: eight days afterwards, September 30, two more cases occurred simultaneously, the one at Lambeth, and the other at Chelsea. On the following day, October 1, another case occurred in the City, in Harp-court, Fleet-street; the next day, October 2, a case occurred in a convict ship, the Justitia Hulk, at

Woolwich; and three days afterwards, October 5, the disease broke out simultaneously in the seamen's hospital ship, the Dreadnought, off Greenwich, and in Spitalfields. From this period the disease steadily extending, by the end of the month there were registered 116 deaths from developed cholera, and 145 from diarrhœa.

The like careful observation has been made of the early cases in several other cities, and its approach and progress were found to be similar.

In Edinburgh, in the beginning of October 1848, two cases occurred simultaneously; one in the underground flat of a house at the top of Leith-walk, and another in Leith in a lodging-house behind King-street. Then two other cases occurred in the same room in the house in Leith-walk in which the first took place. In a day or two it struck two other points in Edinburgh; and at the same time appeared in the fishing village of Newhaven, about two miles distant. Subsequently it attacked by isolated cases, a number of new and distant localities, and advanced very slowly before it became epidemic.

In Glasgow, on or about the 5th of November, 1848, an imported case occurred in a house in Garngad-road, to the north of the city. This case proved fatal; but none of the attendants, and no persons in the neighbourhood suffered, nor was there any connection between it and the subsequent seizures.

Six days afterwards, that is, late at night on the 11th of November, two individuals residing on the ground flat of a damp cottage, nearly two miles to the west of this locality, were suddenly seized with severe diarrhœa, which they both allowed to go on unchecked until the 13th, when one of them was found in a state of profound collapse, and both died; one in the course of the following day. These cases occurred in the city parish, one of the two districts into which Glasgow North of the Clyde, is divided; another case took place simultaneously within the other division of the city, namely, the barony district, which proved fatal on the 13th. On the 14th, 15th, and 16th, three other cases took place in the barony parish. On the 17th a third case occurred in the city parish, at a considerable distance from the first two cases. During

the remainder of the month the disease was chiefly confined to this locality (Springbank) about 40 cases in all taking place in this neighbourhood before the disease began to show itself in the more densely peopled parts of Glasgow.

"From Springbank and its vicinity," (says Dr. Sutherland,) "the epidemic appears to have spread, as from a centre, towards the east, west, north, and south. On the 5th of December a case occurred south of the Clyde, and on the 9th a case was reported in the west end of Glasgow; and within a few days after this period, the epidemic attacked the whole city, falling upon it like a thunder shower, producing results that baffled all calculation, and setting all existing arrangements at defiance."

The manner in which the disease invaded Plymouth, Stonehouse, and Devonport, was similar—

"By referring to the Registrar's book," (says Dr. Milroy,) "I ascertained that, so far back as the 16th of March, a fatal case occurred in Rowe's-court, Stonehouse, one of the most disgustingly filthy places I ever visited, and that a month later two deaths occurred from cholera in the same house in Water-lane, immediately adjoining to the former locality. No other case seems to have taken place in Stonehouse, until the 1st of July, nor did the disease become general there for three or four weeks subsequently. In the mean time, however, dropping cases had occurred in Plymouth; and a severe outbreak had taken place at Noss, a small fishing village, eight or ten miles distant, in the beginning of June. The first fatal case in Plymouth was observed on the 9th of June, in the person of a man who had arrived, it was said, in a steamer from Ireland, and had taken up his quarters in a low inn situated in Stonehouse-lane, a place notorious for its filth, and for being a constant *habitat* of fever. The next case occurred on the 16th of the month, in the wife of a respectable tradesman living in a distant part of the town. About the same time, one or two mild cases occurred in other districts. Then, but not for three weeks later, came that terrible outbreak of the pestilence in Stonehouse-lane and the adjacent courts, which caused so much terror and dismay among all classes. So virulent was the poison that between 20 and 30 deaths occurred within three or four days in one court, which consisted of only six small three-roomed houses. Yet it was generally said, especially by the authorities of the town, that the attack had been quite *sudden* and *unexpected;* nor had any precautionary measures been taken, although strong representations on the subject had been made by the leading medical men of the place many months before. It may be worthy of notice, that none of the early cases of the disease in Plymouth were traceable to any of the passengers who had been landed from the 'American Eagle' in the beginning of June.

"In Devonport the disease made its appearance in the beginning of July at first in solitary cases in an insalubrious locality, and it did not become generally prevalent for three or four weeks afterwards. No one for a moment suspected that the early cases in this town had any mediate connection with those which existed at the same time in Plymouth or Stonehouse."

In Manchester the first death occurred in the second week of June; during the following week there was no fresh case: by the end of the month there had been registered, in all, five deaths. In the week ending 1st July two deaths took place, then there was an interval of a fortnight in which only one death occurred; in the following week, July 28th, eight deaths were registered; but it was not till the latter end of August, that is, upwards of two months from the date of the first case that the disease became decidedly epidemic.

In Dundee, Bristol, Liverpool, Hull, and every town in Great Britain in which the first cases were accurately observed its invasion was similar; so that this approach by isolated attacks, at considerable distances as to place, and intervals as to time, may be regarded as one of the laws of the epidemic. The popular notion that cholera is sudden in its invasion of a place or district, is as unfounded as the former prevalent opinion that it is sudden in its attack of the individual person. Experience has refuted both these opinions, and established the very opposite fact, namely, that, at least in this country, it is gradual and even slow in its approach. And the recognition of this law is of the highest importance in a practical point of view. These isolated cases occurring in any locality during the prevalence of a general epidemic constitution, are unequivocal and certain signs that an outbreak is impending over that place. They are warnings not to be mistaken, demanding the immediate and energetic adoption of preventive measures. Facts about to be stated, the melancholy results of the

late experience, show the dreadful suffering and loss of life which have followed from obstinately refusing to understand the signification of these warnings and to profit by them.

As was anticipated and predicted, cholera during its recent visitation returned to the same countries, and the same cities and towns, and even the same streets, houses, and rooms which it ravaged in 1832. It is true that many places have been attacked in the recent which escaped in the former epidemic, but very few indeed that suffered then have escaped now, except in some few instances in which sanitary measures had in the meantime been effected. In some instances it has reappeared on the very spot in which it first broke out 16 years ago. The first case that occurred in the town of Leith, in 1848, took place in the same house, and within a few feet of the very spot from whence the epidemic of 1832 commenced its course. On its reappearance in the town of Pollokshaws, it snatched its first victim from the same room and the very bed in which it broke out in 1832. Its first appearance in Bermondsey was close to the same ditch in which the earliest fatal cases occurred in 1832. At Oxford, in 1839 as in 1832, the first case occurred in the county jail. This return to its former haunts has been observed in several other places, and the experience abroad has been similar. At Gröningen, in Holland, the disease, in 1832, attacked, in the better part of the city, only two houses, and the epidemic broke out in these two identical houses in the visitation of 1848.

In numerous instances medical officers, who have attended to the conditions which influence its localization, have pointed out, before its return, the particular courts and houses which it would attack. "Before "cholera appeared in the district," says the medical officer of the Whitechapel Union, speaking of a small court in the hamlet, "I predicted that this would be one "of its strongholds." 18 cases occurred in it. Before cholera appeared in the district, the medical officer of Uxbridge, stated that, if it should visit that town it would be certain to break out in a particular house, to

the dangerous condition of which, he called the attention of the local authorities. The first cases that occurred, broke out in that identical house. In a place called Swain's-lane, in the healthy village of Highgate, near London, there is a spot where the medical officer felt so confident that the disease would make its appearance, that he repeatedly represented to the authorities the danger of allowing the place to remain in its existing condition, but in vain. In two houses on this spot, six attacks and four deaths took place; yet there was no other appearance of the disease during the whole epidemic in any other part of the village, containing 3,000 inhabitants.

Before the appearance of the disease in this country we warned the local authorities that the seats of the approaching pestilence in their respective districts, would be the usual haunts of other epidemics. Our conviction was founded on evidence to which the recent experience has added a degree of force that may be judged of by the following examples.

In the year 1838, a report was presented to the Poor Law Commissioners, describing certain localities in Bethnal Green, in which typhus was then or recently had been so prevalent, that it had attacked in some streets, every house, and in some houses every room. From that time to the present, these localities have been the special seats of fever and of every other epidemic that has chanced to be prevalent. From Dr. Gavin's careful and painfully descriptive Report on the recent progress of cholera in this district, it appears that in one of these places (Old Nichol-street), in 23 houses, 50 persons were attacked with cholera, of whom 33 died, three deaths having taken place in one house and four in another; the visitors finding, besides, nine cases approaching to cholera and 197 cases of diarrhœa. In New Nichol-street, closely adjoining, 21 persons perished of cholera; 30 more were attacked with the same disease who recovered, and there were besides, 2 cases approaching to cholera and 135 cases of diarrhœa. In a neighbouring street, Collingwood-street, six deaths took place in one house. Taking together 99 houses in this immediate

locality, the deaths from cholera amounted to the enormous number of 147; being in the ratio of 1½ deaths to each house. In Beckford-row, in the same district, consisting of 16 houses, there occurred in the year preceding the outbreak of cholera, 23 cases of fever and one of erysipelas; and on the outbreak of cholera, eight persons perished of this disease and two others of diarrhœa.

In one court in Rosemary-lane, Whitechapel, notorious for the number of fever cases constantly prevalent there, out of 60 inhabitants there occurred 13 cases of cholera; that is 21 per cent. of the whole of the population.

In a place called the Potteries at Kensington, where the causes of disease are so concentrated and intense, that during the three years ending December 31, 1848, there occurred 78 deaths out of a population of 1,000, the average age of all who died being under 12 years, and where, in the last year the medical officer attended 32 cases of fever, 21 persons perished of cholera. These deaths took place in the same streets, houses, and rooms which had been again and again visited by fever; and the medical officer pointed out rooms where some of these poor people had recovered from fever in the spring to fall victims to cholera in the summer.

Dr. Milroy says—

"From an instructive report published two years ago by Dr. Cookworthy, the senior physician of the public dispensary at Plymouth, presenting a topographical account of upwards of 2000 cases of fever which had occurred in that town, I find that the two localities that stood highest on the list were Lower-street — where, in 1832, the cholera raged with the greatest violence—and Stonehouse-lane, which was so severely visited last summer."

Mr. Noble, of Manchester, says—

"The great bulk of cholera cases that have arisen in my district have been in localities distinguished as the *habitat* of fever."

Much evidence to the same effect has been recorded by our Superintending Inspectors in their preliminary inquiries into the condition of towns petitioning for the application of the Public Health Act. Thus, Mr. Ranger, in giving an account of Barnard Castle, among other instances, states the following:—

"There is one particular house in Galgate notorious for its unhealthiness; whenever typhus is in the town it always prevails in this house; in three years there have been nine deaths in four rooms. There is always an accumulation of filth in the cellar, which the occupiers are in the habit of removing, from time to time, in pails. In this house there occurred three cases of cholera, all of which proved fatal within 24 hours.

"In Swinburne's, alias Peart's-yard, containing 11 houses, occupied by 35 inhabitants, there being to the houses no outlets at the back, and but one privy for the use of all the occupiers, 15 persons died of cholera.

"Mr. W. C. Russell, medical officer of the Doncaster Union, states that cholera, typhus, scarlet fever, measles, hooping-cough, erysipelas, and remittent fever, all prevail in the same localities.

"In Whippingham the cases of cholera and diarrhœa which occurred were all in the fever localities.

In Mr. Rawlinson's report on Wolverhampton it is stated that there are places in the town where fever is unknown and others from which it is rarely absent, and that cholera prevailed in all those places where fever was common. In his report on Alnwick and Canongate, he says,—

"Cholera prevails where fever is common."

Mr. Lee, in his report on Gainsborough, after enumerating between 60 and 70 localities, in which epidemic diseases prevail, observes—

"An awful sacrifice of human life has been long going on at Gainsborough. and the localities are the same whatever may be the epidemic with which the town happens for the time to be scourged."

Of Burslem he quotes the evidence of Mr. Lowndes, Superintendent Registrar, who says—

"The late epidemic, like the visitations which preceded it, has been most virulent and fatal in the dirtiest and most crowded parts of the town; and, as was the case with the 'Irish Immigrant Fever, which raged here two years ago, has thrown heavy burdens upon the ratepayers, and left many widows, fatherless children, and orphans, chargeable to the parish."

Of Nantwich he reports, that in one street, Second Wood-street, in which the general condition of the neighbourhood, the drainage, the construction of the houses, and the state of the privies, are all as bad as possible, cholera had prevailed in most of the houses,

and that in these same houses there was two years since much typhus, there having been in one house nine cases. In another street, Queen-street, where there had been much typhus for several years, cholera prevailed in nearly every house.

Mr. Babbage, in his report on Clitheroe, says—

"From the return of epidemic, endemic, and contagious diseases which is given in the Appendix, it will be seen that these diseases in one form or another are never absent from Clitheroe. The particular form of the disease changes; at one time measles, at another time scarlatina, or at a third time typhus fevers prevail, or these in their turn all disappear, leaving diarrhœa and cholera to supply their place, but one or other of them is always present, and they are generally to be found in the same localities."

Mr. Clark, in his report on Penzance, in describing an unhealthy district of the town, says—

"It is impossible for words to convey an adequate idea of the filth of this quarter, in which the cholera prevailed formerly, and from which epidemics or diseases of the bowels are rarely absent, and yet the whole stands upon a cliff 20 or 30 feet above high-water mark."

In Mr. Clark's report on the parishes of Sawtry All Saints and Sawtry St. Andrew, in the county of Huntingdon, Mr. Nicholson, surgeon to the Union, says—

"Medical science has clearly proved that the causes of typhus and other malignant epidemics, are to be found in the putrid gases and effluvia arising from animal and vegetable matter in a state of decomposition: of this truth the Sawtrys furnish a striking example."

Similar statements abound in all the Superintending Inspectors' Reports.

During the recent epidemic the disease often attacked definite spots in the districts which it invaded, confining its ravages to particular streets, the adjoining streets escaping; and even to one side of a street, scarcely a single case occurring on the opposite side. Thus at Rotherhithe, in a street where numerous deaths occurred, the attacks were almost entirely confined to one side of the street, occupied by respectable private families, the disease appearing in only one house on the other side. "The disease," says the medical officer of this parish, "passed right through and across several of the streets

"like a cannon ball." At Bedford, two streets are named as having each suffered on one side severely, the other nearly escaping. At Bristol, and in several other towns, the same fact was observed, and it has been noticed in foreign cities, particularly at St. Petersburg. In this respect also cholera bears a marked resemblance to typhus, yellow fever, and plague.

While the pestilence thus passed over adjoining spots, it sometimes attacked places in groups; that is, it seized on a certain number of courts, alleys, or streets, decimated their inhabitants, then ceased, and broke out in a similar manner, often at the opposite extremity of the district, occasionally returning again, after an interval, to the first locality. In this manner the occurrence of six, eight, or even more deaths was not uncommon in a particular house; but such a house did not form a centre from which the disease spread to neighbouring houses, and thence over the district. On the contrary, simultaneously with the attack in this particular house, or as soon as the work of death had been accomplished in it, the disease broke out afresh at a considerable distance, the intervening houses escaping. The preceding history of its progress from Asia to Europe, and through the several countries of Europe, shows that it advanced not by a strictly contiguous progressive and uninterrupted course, but that at one time it sprung at a single bound over a vast tract of country, while at another time its course was retrograde. Its progress through a city was similar, there being in general no regular continuity in its course, but its progress consisting in a succession of local outbreaks. Hence, in the course of the house-to-house visitation, the disease having disappeared from one district, the medical staff were obliged to follow it to another, and thence to a third, and so on from district to district till the whole epidemic-seizure was at an end.

With reference to the principal seats of the pestilence in the metropolis and their comparative mortality, it appears that in both epidemics the disease was localized in precisely the same districts, but that several of these have changed places in regard to the relative degree in which they have suffered.

Thus estimating the intensity of the epidemic force by the amount of mortality from cholera and diarrhœa, proportionably to every 1,000 living, it appears that Rotherhithe, which was the first in the order of mortality in the late, was only the ninth in the former epidemic; Bermondsey, the second in the late, was the fourth in the former; Southwark, the third in the late, was the first in the former; and Newington, the fourth in the late, was the sixth in the former epidemic, and so on.

The greater severity of the late as compared with the former epidemic is exhibited in a striking manner in the tables contained in Mr. Grainger's Report, pp. 30 and 31, (Appendix B.,) from which it appears, that taking six districts in the order in which the mortality was the highest in both epidemics, the proportionate mortality in the former as compared with that of the late epidemic was relatively in the first district as 12 to 29; in the second as 11 to 22; in the third as 8 to 18; in the fourth as 7 to 16; in the fifth as 5 to 13; and in the sixth as 4 to 11.

The tinted cholera map of London in Mr. Grainger's Report, intended by the depth of the tinting to represent to the eye the places on which the violence of the disease principally fell, taken in connection with the various tables appended, may suffice to show the progress and the relative intensity of the epidemic as far as locality is concerned.

"Of the parishes of Bethnal-green and Shoreditch," (says Mr. Grainger,) "more exact maps have been prepared, under the direction of Dr. Gavin, resting on his own investigations, by which every death from cholera has been traced not only to the particular street in which it occurred, but even to the individual house. Two striking facts present themselves in reviewing these tables; first, that the localities south of the Thames have been the main seat of the epidemic; second, that the districts bordering both sides of the river have collectively suffered much more than those removed from the stream. Thus, out of the 10 parishes and unions in which the per centage of deaths is highest, eight are placed on the south of the river; whilst in all the southern districts, with a population of 585,067, or 26·5 per cent. of the whole population of the metropolis, no less than 8,200 deaths, or 48·8 per cent. of the whole mortality, occurred; as regards the districts skirting the two sides of the river, their population amounts to 947,936, or

42·9 per cent. of the whole, the deaths being here 9,966, or 59·3 per cent. of the total mortality.

"The tables of Mr. Edwards show, in detail, the influence of locality on persons of various ages, and in the three principal ranks of life; and the following extract from the remarks of that gentleman will suffice to illustrate the subject:—

"'These tables (see Appendix, Nos. 2 and 3) are important as indicating, that where there are defective sanitary arrangements there will be found an excessive mortality. It shows that in wealthy districts, where attention is paid to proper sewerage, and where cleanliness is observed, there, comparatively speaking, cholera has been harmless; and that where there is an almost total want of the appliances to health the epidemic has been most destructive.

"'If merely two districts of the metropolis are compared, viz., the north and south, the difference is most striking. The population at each age has been taken as given in the census of 1841, for both districts, and the relative proportion of mortality to the living at each quinquennial period shown, and, in every instance, a fearful difference is indicated on the side of filth, overcrowding, and defective drainage. In the north district the mortality at all ages was only ·26 per cent. to the living, whilst in the south it was 1·47 per cent., or nearly six times greater; but if the mortality at each age is taken together with the population, the difference is still more apparent. Thus, in the following table, it is made clear that at every period of age there is a considerable excess, which is more marked as the ages progress: thus, from 60 years of age and upwards in the north district, only 1 per cent. of the population died, whilst in the south 3·9 per cent. perished, showing a difference against the south district of 2·9 per cent., or 29 in 1000 living; thus demonstrating that the south district contains in itself an immense amount of exciting causes of disease.

"'It should also be borne in mind that the south district embraces many localities which are proverbially healthy, such as Dulwich, Norwood, Brixton; and the great excess therefore arises in those districts where there is defective sewerage, overcrowding, &c.; such as parts of the parish of Lambeth, the parishes of Bermondsey, Rotherhithe; St. Olave, St. Saviour, St. George, Southwark; and Newington.

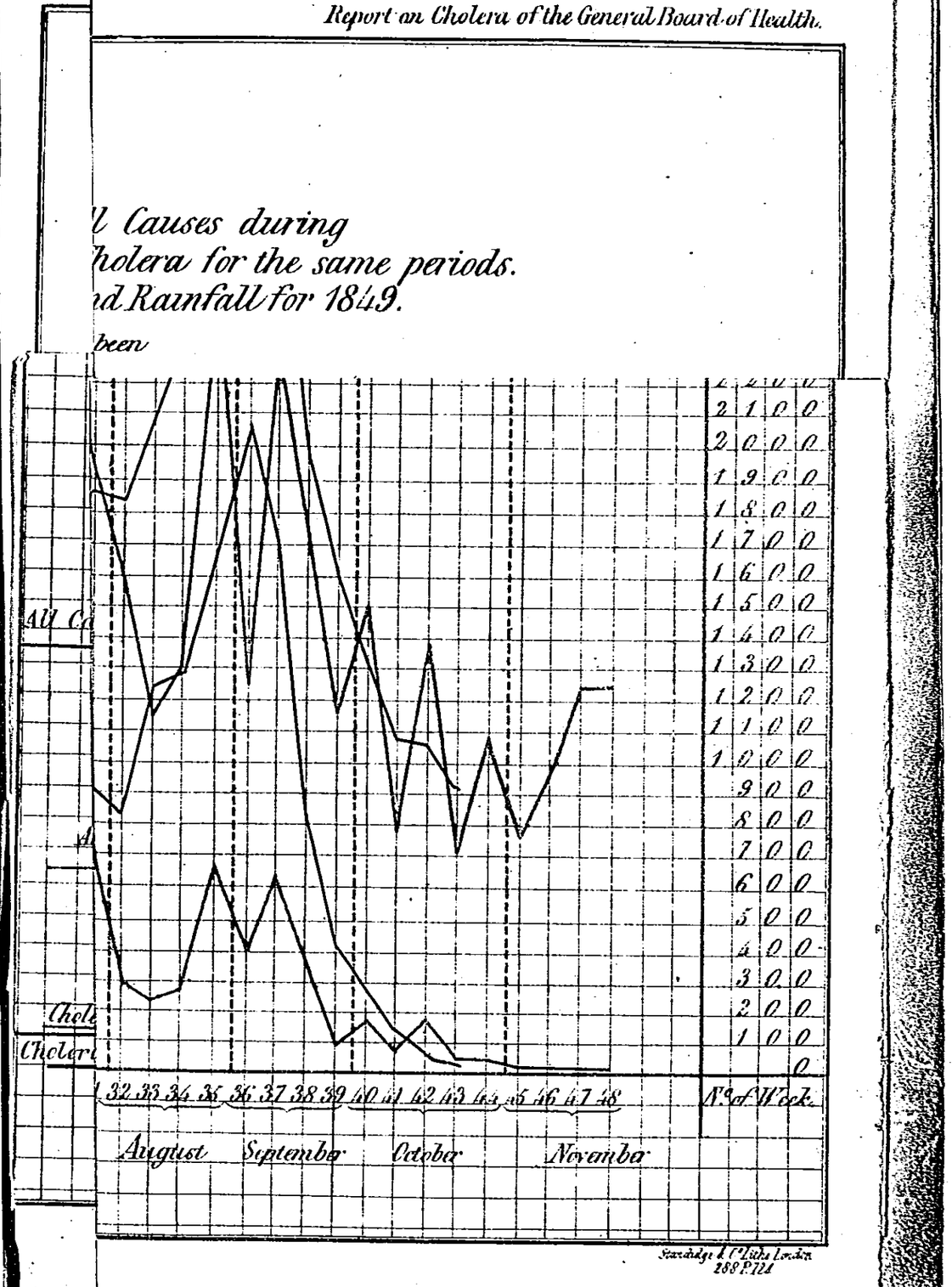
"'The excess of deaths, therefore, in these particular parishes, must be considerably greater than has been stated above.'"

"By referring to the tinted map of London, which shows the more precise seat of the mortality in each district, the intimate relation existing between the activity of the disease and proximity of the river will become still more apparent; the dark colour, which indicates the relative mortality, showing, even at

a distance, the general course of the Thames. A similar effect was produced by the river Lea, as it runs through Hackney Union: thus, in a cluster of cottages at High-hill Ferry, where, however, other causes of insalubrity also operate, Dr. Gavin states six deaths took place, besides which 84 cases of choleraic diarrhœa were discovered during the house-to-house visitation."

We have elsewhere called attention to the atmospheric changes which usually precede and accompany the outbreak of great epidemics. These changes, though observed from ancient times, have not yet been connected by any precise relation with the origin and progress of pestilence. Recent experience has added but little to our knowledge of this subject. At St. Petersburg, the electricity of the atmosphere appears to have been disturbed in a remarkable degree during the whole course of the epidemic, being so much diminished that machines could not be charged. The magnetic force was also diminished; but these phenomena were not general. At Berlin and Hamburg express observations were made, which showed that the magnet had lost none of its power. In London, during what may be regarded as the cholera quarter, thunderstorms were frequent, and the air was unusually dry; but the magnets were seldom disturbed, and the amount of electricity, though less than usual, seems to have diminished only in proportion to the less amount of humidity of the air.

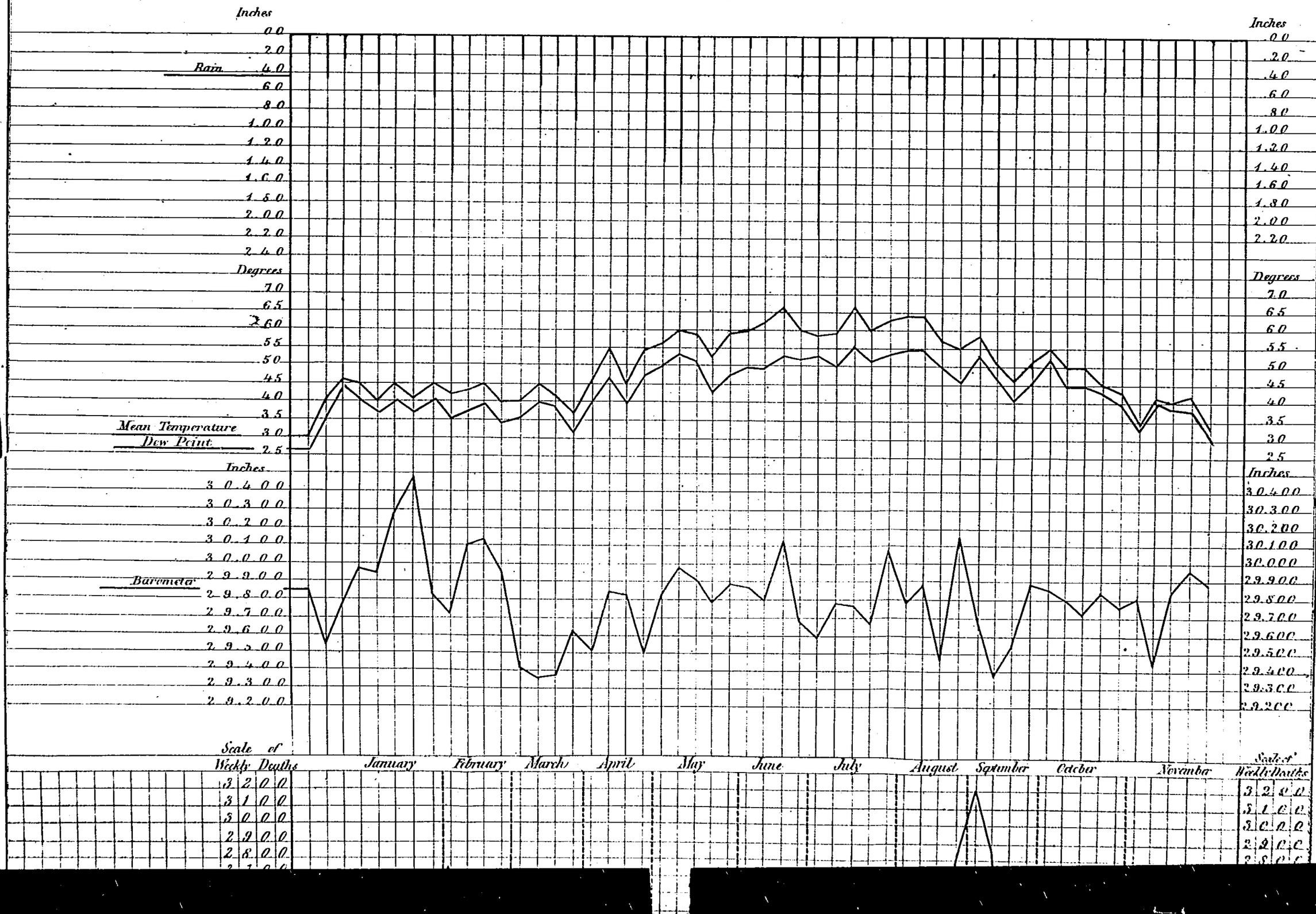
Along the Danube, and in all the eastern countries devastated by the pestilence, the disease was in general at its height when the heat was most intense, the temperature being everywhere unusually high. In London, also, at the period when the pestilence was most prevalent and mortal, that is, from the middle of August to the middle of September, the temperature was, without exception, high. The air was also unusually stagnant. It is stated by Mr. Glaisher of the Royal Observatory, Greenwich, that the horizontal movement of the air during the whole of this period was only one-half of the usual amount; that the period was distinguished by a thick stagnant atmosphere; that the air was, for the most part, very close and oppressive, and that, on some days, when there was a strong breeze blowing at the top of the Observatory at Greenwich, and over Black-



DIACRAM

Shewing a Comparison between the Mortality in the Metropolis from all Causes during the Years 1832_33 & 1848_9 and the progress and amount of Mortality from Cholera for the same periods. together with the weekly mean of the Barometer, Thermometer, Dew point and Rainfall for 1849.

Note. In order to render the comparison complete the Deaths in 1832 have been Calculated on the same ratio of Population as in 1848_9.



Mean Temperature
Dew Point

Barometer

All Causes 1848-9

All Causes 1832 Corrected

Cholera 1832 Corrected

Cholera 1848-9

Scale of Weekly Deaths

N.o of Weeks

January February March April May June July August September October November

Scale of Weekly Deaths

heath, there was not the slightest motion in the air on the banks of the Thames.

With due allowance for difference of climate, apparently consisting chiefly in difference of temperature, and of the hygrometrical state of the air, there is a remarkable coincidence between this description of the atmosphere of London and that given by Mr. Thom of the atmosphere at Kurrachee, some time before the dreadful outburst of cholera in that town:—

> The climate of Kurrachee during the weeks preceding the appearance of cholera among the troops was characterized by several peculiarities different from those which generally belong to all hot countries and seasons, perhaps merely so by their presence being in an excessive degree. First, the temperature was unusually high, being 90° to 92° in the day-time, and 86° at night in good houses, and in the tents of our soldiers it rose to 96°, 98°, and 104°, as indicated by a thermometer suspended on a central pole 5 feet from the ground, and in a thorough draught between the doors. Secondly, the quantity of moisture in the atmosphere was greater than I ever saw it before in any part of the world, or at any season, the dew point being at 83°, and the thermometer in the shade at 90°, the lowest range; even this gives 12·19 grains of vapour in each cubic foot of air. The mean heat in the 24 hours was such as to suspend an unusually large proportion of vapour in the air, always near, but rarely or ever reaching the point of deposition. Even at the Equator, with the sun overhead, I never saw the point of deposition above 78°. The third, and perhaps most important circumstance worthy of notice in connexion with the other two, was the light, weak, and unsteady winds or calms which prevailed in the early part of June. Now this is exactly the reverse of what ordinarily happens. In the last two years the months of June and July were remarkable for the strong, steady winds and overcast sky, which has given so favourable a character to the climate of Kurrachee during the hot months. It also appears that the quantity of rain which fell during the prevalence of cholera was much beyond anything that had occurred for a long time before, at least it surprised the European officers who had been there for three or four years. The effect of all this on the bodily feelings of every one, even the older residents in India, may more easily be conceived than described. There was a sense of languor and oppression, a stifling feeling about the respiration, and inability to undergo the slightest fatigue without extreme exhaustion. It was impossible to sleep at night, yet during the day the tendency to be overcome by a torpid sort of sleep

was universally complained of; the body was bathed in perspiration, and the skin was corrugated and thickened, as if it had been immersed for a long time in water The lightest clothing could hardly be borne, or anything that arrested the free communication between the skin and the air. Hence every one was forced to seek the open air out of doors, or some place where the weak breezes were turned into a sharp draught; and it was a luxury of no common kind to have a punkah. In fact for 10 days before the predictions were unhappily fulfilled, it was a common remark among "old hands" that it was regular "cholera weather."

Upon the whole the general result of observation and experience is, that the natural physical condition of the air which is the most conducive to the production and propagation of cholera is a hot, moist, and stagnant atmosphere, especially when immediately preceded by the prevalence of cold and dry winds. Hence the central part of India is stated to be the most subject to cholera, probably on account of its higher temperature; and the earlier and more constant occurrence of the causes that give rise to the south-west monsoon, or sea-breeze of the hot months, that is, a hot wind saturated with moisture. Mr. Thom endeavours to trace a condition essentially similar in the climate of all the tracts of inhabited land over which cholera has travelled.

"For," (he says), "Affghanistan, Persia, Turkey, Southern Russia, and Central Europe, form a chain of countries which are exposed to alternations from cold and dry to hot and moist currents of wind, resembling those of the Indian Peninsula, but in a modified degree, except in extraordinary hot years, when the similarity will be perfect; and it is by this route that cholera has usually found its way from the north-west of India to Europe. As to its contagious nature, I believe that has been long ago satisfactorily denied by almost all medical men; and this opinion will be shown to have been corroborated in a remarkable manner during its late outburst at Kurrachee. I cannot now quote authorities, but I think it will be an easy task to show that many of the great recorded plagues, especially those called the "black death" and "sweating sickness," "mort du chien," were true cholera, or modifications of it: that these so-called plagues have chiefly visited the kingdoms of Persia, Asia Minor, and Europe, or those regions most likely to be influenced by the atmospheric phenomena to which I have devoted so much attention."

The extreme oppression caused by an elevated temperature with an atmosphere charged to saturation with moisture has been just described. In such a condition of the atmosphere some of the main excretory functions of the body, particularly the exhalations from the skin and lungs, must be to a great degree suppressed, and a proportionate poisoning of the blood by the retention in the system of matters which ought to be eliminated from it, is inevitable. How much this state of things is aggravated by the absence of wind, and a consequent stagnant condition of the atmosphere, is illustrated by Indian experience, where, from experiment, it appears that from a surface equal to a disc of six inches in diameter, with the dew-point at 83°, and a temperature at 90° in the shade, the evaporation per minute would be equal to half a grain in a calm, 1·40 in a moderate breeze, and 2·10 in a brisk wind, thus making the quantity of fluid removed from the system to be nearly three times as much in a moderate breeze, and upwards of four times so in a fresh wind, as in a calm or stagnant state of the atmosphere.

It is important to bear in mind that these physical conditions of the atmosphere which thus oppress the vital powers are the very conditions under which noxious animal and vegetable refuse decompose with the greatest rapidity, and in which the products are carried in greatest quantity into the blood by the respiratory organs.

But these atmospheric conditions can be regarded only as powerful accessory causes, acquiring peculiar force in a climate in which they are so intense as in India; but by no means as the sole or essential causes, since the pestilence has prevailed extensively and severely in countries and seasons in which such atmospheric conditions do not exist, as in Scotland during the intense frost of January, and in the metropolis in the unusually dry state of the atmosphere described by Mr. Glaisher.

During the late epidemic when the pestilence actually broke out in any locality it spared neither sex nor age. In London the larger proportion of its victims appears to have been males. The return of the Registrar-General for England and Wales, in the year 1848, also shows a greater mortality from this disease among males than females, the deaths among males being 1057, and among

females 877. In some cities, however, as in Glasgow, from causes hereafter to be assigned, there is reason to believe that females were the greater sufferers.

A very large proportion of its victims were in the prime of life. Out of 2,322 attacks and 1,058 deaths occurring at Glasgow, in which the ages were carefully taken, the numbers attacked between 20 and 40 (1,148) were more than double those up to 20; between 20 and 50 the numbers more than doubled those who suffered in all the other periods of life put together. Taking the whole of Glasgow, the number of deaths between the ages of 20 and 40 were 50 per cent. of the entire mortality; but in London the proportion was only 33·6 per cent., the reason of this difference probably being, that at Glasgow great numbers of immigrants at these ages annually throng into it, whose premature deaths regularly swell, beyond the ordinary average, the proportion of those who there perish in the prime of life. At Berlin, also, it was observed that by far the greater number of the cholera victims were between the ages of 20 and 40. In this tendency to seize on persons of mature age cholera confirms the observation formerly promulgated in regard to typhus, that it seizes on persons in the most productive periods of life; both able and willing to work; the very strength of the country; many of them parents of young and increasing families, who are suddenly cut off by a great, and what all experience has proved to be, a preventible calamity; and this fact assigns the reason for the larger amount of widowhood and orphanage, and consequently of pauperism, produced by both diseases.

The recent experience has afforded fresh and conclusive evidence that the attacks of the disease are not confined to the weak and sickly, but that great numbers of its victims are among the healthy and vigorous. No robustness of constitution was found a security against the pestilence under exposure to powerful predisposing conditions; and, on the other hand, in the absence of such conditions, the feeble and sickly escaped as well as the strong.

Mr. Thom expressly states that it was the tallest and

strongest men that suffered most in the outbreak at Kurrachee.

> "It seems," (he says) "as if the disease had travelled along the front ranks of these. Indeed, throughout the regiment, it was the most powerful, muscular, and robust men that most speedily, and generally, fell victims to the malady. Any one who ever saw the splendid men in our flank companies, and will inspect (Table F) will quickly appreciate the truth of this. It was indeed a sight never to be forgotten, to behold the powerful frames of the finest men of a fine corps, who had that morning been in apparent good health, and most of them on the evening parade, as if at once stricken down, and striving with the last efforts of gigantic strength to resist a death-call that would not be refused."

Abundant evidence has refuted the common notion that cholera is particularly prevalent and fatal among the extremely poor. The chief sufferers in the recent epidemic were not paupers, but independent labourers, artizans, and the lower grade of shopkeepers; classes generally not destitute of food and clothing. In particular localities it was also fatal to the police and to soldiers. But some attacks occurred of extreme violence under circumstances in which want cannot be supposed to have formed a predisposing cause. In an establishment in the Hackney-road, for example, out of 96 inmates, young women in the prime of life, having abundance of excellent food, and in the possession of ordinary health, no fewer than 40 were seized with cholera, of whom 15 died, that is, 15 per cent of the whole number of the inmates of this asylum perished. These facts are in accordance with the observation that typhus is sometimes most rife in periods of the fullest employment.

It is remarkable that a large proportion of the attacks both in this country and abroad, took place at night. This was so much the case at Hamburg that, during the height of the epidemic, people were afraid to go to bed. The general impression of the medical officers in London is, that a large proportion of the seizures took place some hours after the patients had retired to rest, having eaten a hearty supper. From a table supplied by Dr. Alexander M. Adam, of Glasgow, it appears that out of a given number of cases recorded in that city

there occurred, between the hours of 8 P.M. and 8 A.M., 140 attacks and 65 deaths, as compared with 85 attacks and 53 deaths occurring within the corresponding 12 hours of the day.

It is also stated by Mr. Thom, that at Kurrachee many more men were attacked at night or in the early morning than during the day.

During the epidemic of 1831-2 it is stated that numerous instances occurred in which an infected individual came into a healthy locality, and that the disease soon afterwards attacked other persons in the house or immediate neighbourhood in which the infected individual resided, and spread from thence as from a centre.

No instance of this kind has been brought under our notice in the progress of the late epidemic. In all cases where the facts have been carefully observed on the first appearance of the disease in a new locality, which is the only period when the observation can be made, it has appeared to attack and spread epidemically, and not by the contact of the sick with the healthy.

When, for example, in the month of September, 1848, cholera broke out in the port of Hull, on board the "Pallas," the vessel was closely wedged in among others, and the seamen actually slept two nights in the town after the occurrence of the cases of cholera, and before the vessel was placed in quarantine, yet the disease did not spread to neighbouring vessels, nor extend into the town. Subsequently several other vessels arrived from Hamburg under similar circumstances, many fatal cases occurring on board, but in no instance was disease communicated to any other ship or to any individual. On the other hand, nearly a year afterwards, when there was no cholera in Hamburg, and no importation of the disease from any other place, cholera broke out violently, and spread extensively through the town. Dr. Sutherland, who, after a careful examination of the health of the town when the disease had been imported, arrived at the conclusion that there was no ground for the apprehension of an outbreak of cholera at that time, but who, on examining the health of the town ten months

afterwards, regarded it as in imminent danger, and warned the authorities of the impending outbreak, says,—

> "I look upon the evidence of the non-contagious nature of cholera, and of its dependence upon an epidemic constitution and suitable localizing circumstances in the population, as afforded by the whole history of the disease in Hull, to be perfectly conclusive."

In numerous instances individuals arrived in uninfected localities with the disease upon them, and died without communicating the infection to any one, and without the spread of the disease.

The first fatal case in Dundee, for example, was in a man who was brought ashore from a small vessel in the Tay, in which he had arrived from Alloa on the Forth. In neither town was there any cholera; the patient was seized on the passage, and died shortly after he was taken to the hospital, on the 12th September, 1848. Cholera did not become epidemic in Dundee till July in the following year.

The first fatal case of cholera took place in Hull on the 23rd August, 1848. Another fatal case occurred on the 9th September. One or two other cases followed at intervals, but the epidemic did not appear in force till nearly a whole year from the occurrence of the first fatal case, and it then committed the most dreadful ravages.

The first fatal cases of cholera in Liverpool were imported from Dumfries on the 10th December, 1848; they occurred in an Irish family, consisting of a man, his wife, and six children, three of whom died of the disease. The fourth case occurred in a woman who had been engaged in attending on the deceased: she was seized on the 14th, and died next morning. It has not been ascertained whether this woman had previously suffered from diarrhœa, but the case was by some considered as affording an illustration of the extension of the disease by contagion. It must be borne in mind, however, that the disease broke out at the same time in another Irish family, which had no communication with the family in question, three deaths occurring in the second family in rapid succession. After this period

isolated cases of the disease took place, occurring in different parts of the town, but it did not assume a decidedly epidemic form for several months afterwards.

On a careful and minute investigation of the first 28 cases that occurred in London, there was conclusive evidence that no communication whatever took place between the infected individuals. At Glasgow, the same observation was made. The parochial surgeon of the district in which cholera first broke out states, that no communication could be traced between the individuals first affected; and that 21 cases occurred under his own charge before he saw an example of two persons *consecutively* attacked in the same house or even in the same neighbourhood, that is, in the same street or lane. In 13 instances relatives lay in the same beds with the sick without being affected. In 9 cases children were suckled by women labouring under the disease, and yet not one of them was attacked.

In numerous instances a person in sound health and living habitually in a pure atmosphere, on going into an infected locality and remaining there a short time, but without seeing or holding any intercourse with an infected person, imbibed the poison, went back into the country, and there sickened of the disease and died. In no instance that has come under our notice did such an individual communicate the disease to his nurse or to any member of his family, and in no case was his return followed by the spread of the disease in the neighbourhood.

It is true that instances were reported of nurses in attendance on the sick catching the disease and dying; and several alleged facts were recorded in the Registrar-General's Returns, with reference to the metropolis, to the effect, that the death in question was that of a washerwoman who had washed the clothes of an infected person, and who immediately afterwards had sickened and died.

We made a careful examination into all the cases that were brought under our notice, in which nurses were reported to have caught the disease from a close attendance on an infected person. In every case thus investigated, we found either that the nurse had been previously suffering under premonitory diarrhœa, in some instances for several days together, which she had neglected; or that she had committed some act of intemperance, or was exhausted by over fatigue; predisposing causes to the powerful influence of which attention will be called immediately.

With reference to the cases of the washerwomen, we directed a special inquiry to be made into every instance of this kind reported in the Registrar-General's Returns. Dr. Waller Lewis ascertained the facts of the case in each instance by personal investigation on the spot. From Dr. Lewis's Report, it appears that some of the statements were wholly without foundation, the person in question never having washed any clothes at all; and that in other instances, though clothes had been washed, the individuals in question were previously labouring under premonitory diarrhœa, which they neglected, while they were, at the same time, living in infected localities, and some of them in houses and even in rooms where the disease had been or was then prevailing.

We submit that an attentive consideration of the course of the disease from nation to nation is not favourable to the view of its propagation by contact from person to person. But an inspection of the dates when the disease first made its appearance in the several towns and cities of this country is still more decisive against this opinion. For example, on its first outbreak in 1848 cases of it occurred, as reported to us, on the same day at Lasswade, near Edinburgh, Sunderland, and Hounslow; on another day at Falkirk, Tynemouth, and Chelmsford; on a third at Greenock, Preston Kirk, Monckland, Blantyre, Thornhill, and Cambridge, and the like instances might be multiplied to a great extent. (*See* Table B.)

We beg to call attention to one important practical conclusion to be derived from these and similar facts. It has been stated that the first case of this disease is generally considered to have occurred in London on the 22nd of September, 1848, but we have shown that undoubted cases of it existed in the metropolis at least two months previously to this period, and that isolated cases of it

continued to recur at different times in widely distant districts up to the 22nd of September. Had quarantine been practicable in this instance, and had it been put in force on the very day that the first commonly recognized case of the malady occurred, it can hardly be conceived that it could have answered any useful purpose, since the disease had been already undeniably in the metropolis, and incubating there, in several different localities, two months previously.

The occurrence of isolated cases many months before the general outbreak of the disease has been observed in other countries. Such cases occurred at Moscow and St. Petersburgh, and as has been stated, at Kurrachee, before the terrible outbreak in that town. Mr. Thom states that a single case of cholera, but a pure and genuine attack, proved fatal at Kurrachee eight months before the general outbreak. Two or three cases subsequently occurred after a lapse of about two months; this was followed by several others after another period of two months, and then "there was no further spread of the malady till the "awful visitation in June," some months subsequently.

We submit that the law of the disease, exemplified by these and other instances, that it spreads not by continuity of time or place, but that it occurs at irregular periods, and extends by a succession of local outbreaks, is a decisive proof that it is propagated not by the contact of one infected person with another, but by a general influence operating on particular localities and persons, according to certain localizing conditions and predisposing causes.

The experience of the recent epidemic has afforded, perhaps, the most definite and impressive evidence of the influence of these localizing conditions and predisposing causes that has been yet observed; and we cite the following examples of it, in the hope of directing attention to the vast mass of evidence to the same effect which is detailed at length in the reports given in the Appendix.

Overcrowding.—Without a certain quantity and quality of air life cannot be maintained. When a number of persons are crowded together in a small space, without the constant admission of fresh air, they are exposed to a double evil; they are deprived of the necessary quantity of air, and what air they do breathe becomes more and more vitiated at every respiration. It is found by experience that unless extraordinary means are taken for the constant renewal of the air by some special apparatus for ventilation, health and strength cannot be maintained in a breathing space of less than from 700 to 800 cubic feet, and that to live and sleep in a space of less than from 400 to 500 cubic feet for each individual, especially during the prevalence of an epidemic, is not compatible with safety to life. Some conception may be formed of the extent to which the atmosphere must necessarily become vitiated when a number of persons are confined together in a small space without the means of renewing the air, from the fact that the skin and lungs exhale at each moment a definite and measurable quantity of poisonous gas (carbonic acid gas) together with a certain amount of animal matter of a highly putrescent nature, the existence of which is demonstrated by condensing the vapour in which it is suspended as it passes from the lungs. It is found that this putrescent animal matter, if it is not allowed to escape, is deposited on the walls of living and sleeping-rooms, and clings to articles of clothing, bedding, and other furniture, and is the source of the nauseous smell perceived on entering dirty and crowded dormitories, living-rooms, school-rooms, and other places of public resort. Under confinement in such a place the most robust health gives way, and the extent to which the habitual respiration of its atmosphere destroys the resisting power of the constitution and predisposes to disease, becomes manifest in an appalling manner when such a place happens to be invaded by an epidemic influence. Of the many proofs of this afforded by late experience it may suffice to cite the following:—

"In the beginning of June, 1849, a sudden and violent outbreak of cholera occurred in the workhouse of the town of Taunton. No case of cholera had previously existed, nor did any subsequently take place, among the general inhabitants of the town, though diarrhœa was prevalent to a considerable extent. The workhouse is badly constructed, the ceilings of the rooms being in general not more than 8 feet 9 inches in height, and the ventilation extremely defective. Into the girls' school-

room, a slated shed, 50 feet long, 9 feet 10 inches broad, and 7 feet 9 inches in height to the top of the walls, the roof being sloping, there were huddled 67 children. Each child had, therefore, for respiration only about 68 cubic feet of air. The epidemic influence which was pervading the district struck this establishment. On November 3rd, one of the inmates was attacked with cholera; in ten minutes from the time of the seizure the sufferer passed into a state of hopeless collapse. Within the space of 48 hours from the first attack 42 cases and 19 deaths had taken place, and in the course of one week 60 of the inmates had been swept away. 'A curious circumstance,' (says Dr. Sutherland), 'occurred with respect to the boys' school. This apartment was rather worse than that of the girls; but the boys, who were good and obedient in other respects, could not be kept from breaking the windows. In the girls' school the windows were never broken; and the chaplain of the workhouse states his firm belief, that it was to the better ventilation, which the broken windows maintained in the boys' school, that the children in some measure owed their lives."

A similar outbreak occurred in the parish of East Farleigh, near Maidstone, among the hop-pickers engaged at a farm on which about 1,000 persons of all ages were employed. As an example of the manner in which these people were lodged, it is stated, that in a room containing 700 cubic feet 14 persons slept, so that each individual had for respiration about 50 cubic feet of air. Within four days after the first seizure of this population there had occurred upwards of 200 cases of diarrhœa, 97 of developed cholera, and 47 deaths.

Precisely similar was the outbreak among the pauper children at Tooting, where each boy had for respiration in the dormitory 150 cubic feet, and each girl 133 cubic feet; the windows of the girls' dormitories small and few, being closed during the night, the doors shut, and the chimney-places boarded up. Before cholera had decidedly manifested its presence in London, and while its existence was doubted, and even denied, out of about 1,000 inmates in this establishment, 300 were seized with cholera, and 180 died.

Mr. Grainger states, as the general result of his observation of the late epidemic in the metropolis, that the force of the disease was in the ratio of the overcrowding, all other circumstances being the same.

"Thus," (he says,) "among the workhouses of the metropolis, although the official returns relating to them have not yet been received, it may be stated that the attacks were the most numerous in those establishments in which the wards were the most crowded and defective in ventilation. As an example of this may be mentioned the workhouse of Shoreditch, which suffered most severely; so that among the inmates 109 cases of cholera, 61 terminating fatally, besides a large number of diarrhœal cases, occurred between December 1848, and September 1849. This house is in all the older parts most defective in construction; several of the dormitories and other rooms were found, when inspected by Dr. Arthur Farre and myself, in the beginning of 1849, to be low, dark, and ill-ventilated. In reference to the above attacks, the medical officer, Mr. Clark, says—

"'I am convinced that wherever large numbers of human beings are congregated together, and who eat, drink, and sleep in the same apartment, as is the case of the young and old in workhouses (among which classes diarrhœa has in our house been most prevalent), there the inmates are most liable to suffer.'"

"In a most fatal outbreak, occurring in a large establishment for pauper children, and to which the public attention was at the time painfully directed, it was observed that the girls suffered more than the boys; and yet the former, as is usually the case in such institutions, were in better condition than the latter. On investigation it was found that the girls' dormitories were more overcrowded, and much worse ventilated, than those of the boys; and this was the only difference I could discover to explain the greater number of attacks in their case.

"Several instances of a similar kind to the last occurred among the general population. This was the case, so far as could be learnt from a careful investigation, in the place called Jennings'-buildings, Kensington.

"The Committee of the Academy of Medicine of Paris, in their instructions to the people, place the avoidance of overcrowding at the head of their precautions:—

"'The first, and without doubt the most important care, is to maintain around each person a pure atmosphere, experience having shown that those who neglect this precaution in the time of the epidemic are the most exposed to be attacked by it; consequently persons should avoid as much as possible sleeping in too great numbers in the same room,'" &c.

But the most striking effects of overcrowding are seen in climates where the conditions of disease are the most intense, as in India. It is stated by Mr. Thom, that in the native town of Kurrachee, which consists of mud

houses, with mere crannies as windows, where the houses are built so closely together, and the streets, barely wide enough to allow a loaded camel to pass, are so very tortuous and inaccessible to currents of air, that all ventilation must be arrested unless during a perfect gale of wind, out of 15,000 inhabitants, 1,500, or 1 in 10, died of cholera; whereas in the bazaar, which is inhabited by the same description of persons, but which is laid out in large compounds, divided by wide streets, straight and at right angles to one another, the houses and stores being well-built, so that the general ventilation of the place is secured, the proportion of deaths was only 1 in 30. He also states:—

"That when cholera showed itself in Hydrabad, in 48 hours it carried off 96 out of about 400 prisoners who were confined in a very imperfectly-ventilated gaol, and that almost every ship carrying coolies from Calcutta to the West Indies was attacked with cholera in the first fortnight of the voyage: these poor creatures in all probability labouring under a choleraic diathesis on shore, by sleeping in the open air did not suffer; but no sooner were they cooped up on board a vessel, and hundreds of them shoved down into the ''tween decks,' at night at least, or in the day time also if the weather was bad, than they got cholera."

Filth.—When an atmosphere contaminated by the emanations that arise from filth accumulated in and about dwellings is respired, the noxious matters dissolved or suspended in the air are carried directly into the blood. The extent to which such matters may poison the blood may be understood when it is considered that in the space of every 24 hours an adult person breathes 36 hogsheads of air; that there pass at the same time through the lungs, to be brought into contact with this bulk of air 24 hogsheads of blood; and that the velocity of the circulation is so great that the whole mass of the blood is carried round the body in one minute.

Yet no just appreciation is generally entertained of the importance to health and life of the purity of the air that is habitually breathed. At the present day the power of effluvia from decaying animal matter to injure the health, is doubted and denied, even by some medical men; and a conception may be formed of the state of

knowledge on this subject among less educated persons from the following statement:—

"It may appear almost incredible," (says Mr. Grainger,) "that, by many persons even of the middle ranks of life, the foul exhalations of privies, stables, and cow-stalls, are deemed to be innocuous, or even beneficial; and yet it is certain that such opinions are by no means rare. I have heard in a London Board of Guardians the argument maintained, that the effluvia from a cesspool could not be noxious because the speaker, who was advanced in years, had lived close to one all his life. In one of the eastern counties it is deemed to be a beneficial thing for children labouring under hooping-cough to hold them over a privy 'early in the morning.' A more prevalent opinion is that the air of a cow-stall, no matter how many animals are crowded together, is particularly advantageous, especially in consumptive cases. Even by many of those who have paid some attention to the sanitary question, the grosser and more palpable contamination of the air of towns by smoke has attracted more general attention, and has given rise to more stringent legislation for its removal, than the infinitely graver evils arising from those subtle, invisible, but all-powerful effluvia, proceeding from decomposing organic matter, whether animal or vegetable, which, in a multitude of different, and, by the general public, little-suspected ways, lay the foundation for those diseases which so frequently debilitate or destroy numbers of the labouring classes."

It is therefore still not unnecessary to call attention to the evidence, which recent experience has afforded, with reference to this subject.

Immediately opposite Christchurch workhouse, Spitalfields, belonging to the Whitechapel Union, and only separated from it by a narrow lane, a few feet wide, there was, in 1848, a manufactory of artificial manure, in which bullocks' blood and night soil were desiccated by dry heat on a kiln, or sometimes by mere exposure of the compost to the action of the sun and air, causing a most powerful stench. The workhouse contained about 400 children, and a few adult paupers. Whenever the works were actively carried on, particularly when the wind blew in the direction of the house, there were produced numerous cases of fever, of an intractable and typhoid form; a typhoid tendency to measles, small-pox, and other infantile diseases, and for some time a most un-

manageable and fatal form of apthæ of the mouth, ending in gangrene. From this cause alone 12 deaths took place among the infants in one quarter. In the month of December, 1848, when cholera had already occurred in the Whitechapel Union, 60 of the children in the workhouse were suddenly seized with violent diarrhœa in the early morning. The proprietor was compelled to close his establishment, and the children returned to their ordinary health. Five months afterwards the works were recommenced; in a day or two subsequently, the wind blowing from the manufactory, a most powerful stench pervaded the workhouse. In the night following 45 of the boys, whose dormitories directly faced the manufactory, were again suddenly seized with severe diarrhœa; whilst the girls, whose dormitories were in a more distant part, and faced in another direction, escaped. The manufactory having been again suppressed, there has been no return of diarrhœa up to the present time.

In the summer of 1847, a similar manufactory was established in the parish of St. George, Southwark, in the midst of a dense population. It is stated that, on the very first occasion when the operations of this manufactory were commenced, a most powerful stench pervaded the neighbourhood, so as to attract general notice, and that soon afterwards a large number of persons living around were suddenly seized with diarrhœa. A medical man in extensive practice in the neighbourhood states that, he had immediately great numbers of applications for medicine to check diarrhœa. Being convinced that this local illness arose from the poisonous animal effluvia that proceeded from this manufactory, the necessary steps were taken by the local authorities; the nuisance was suppressed, and the diarrhœa directly subsided.

"In reference to these two cases," (says Mr. Grainger,) "it is not superfluous to remark, that, in both, the parties offending were foreigners; a class of persons, it appears from information I have received, who are somewhat extensively engaged in the manufacture in question, and who are attracted to London by the existence of facilities so properly denied them by the laws of their own country."

Dr. Baly, Physician of the Millbank Penitentiary, after careful investigation, is of opinion that the diarrhœa and dysentery to which that prison is so subject, are intimately connected with the noxious animal effluvia wafted across the Thames from the bone-boiling establishments in Lambeth.

One of the most severe outbreaks of cholera that occurred in the metropolis was at Albion-terrace, Wandsworth-road, a place consisting of 17 houses, having the appearance of commodious, comfortable dwellings. About 200 yards in the rear of the terrace, is an open black ditch, which receives the drainage from Clapham, Streatham, and Brixton-hill. The inhabitants of the houses complained of offensive effluvium in their gardens behind, whenever the wind blew in a particular direction; the servants complained of a stench in different parts of the kitchen-floor, more especially over the sink in the back-kitchen. In the house in which the first case of cholera occurred, there was an enormous accumulation of most offensive rubbish, amounting to seven or eight cartloads, consisting of a disgusting compound, swarming with maggots, and exhaling a putrid effluvium. There is also reason to believe that the water supplied to some of the houses, accidentally became contaminated with the contents of a sewer and cesspool. Within the space of a fortnight, out of an estimated population of 120 persons residing in this terrace, 42 persons were seized with cholera, of whom 30 died, or 71 per cent. of the whole number attacked.

In the "Potteries," at Kensington, a place already noticed, there were kept 3000 pigs; the process of fat-boiling was carried on so extensively as to taint the atmosphere for half-a-mile round; the dwellings, or rather hovels, in which the inhabitants lived, are stated to be unsurpassed as to filth and misery, by anything, known in Ireland; the streets, courts, alleys, and yards are without a drop of clear water, all being charged with organic matter, and on the margin of a large stagnant piece of water, called the "Ocean," which is covered with a filthy slime, and bubbling with a poisonous gas, caused by the drainage of pig-sties and privies that flow

into it, is placed St. James's National School, with about 130 children. It has been already stated that, in this place, out of a population of 1000 persons, there occurred within the first 10 months of 1849, fifty deaths; that is, at the rate of 6 per cent. per annum; and that of these, 29 were from fever and other causes, and 21 from cholera and diarrhœa.

The condition of this place is not only the cause of excessive mortality to its own inhabitants, but is the source of disease and death to those in its immediate neighbourhood. Some 1200 or 1300 feet off, reports Dr. Lewis—

"Is situated a row of clean, respectable houses, called Crafter-terrace, Latimer-road; the situation, though rather low, is clear and airy. On Saturday and Sunday, the 8th and 9th of September 1849, the inhabitants complained of an intolerable stench, the N.E. wind blowing directly upon the terrace from the Potteries. Till this time there had been no case of cholera among the inhabitants. The next day the disease broke out violently, and on the following day, the 11th, a child died at No, 1; on the 12th, a person died at No. 2; on the 13th, one died at No. 5, and another at No. 7; on the 14th, another child at No. 1; on the 15th, a second child at No. 5; and on the 22nd, an adult at No. 9."

Mr. Ranger gives, as an example of the state of filth in which the poor are often doomed to live, the following result of an examination, made by himself, of some houses in the town of Cowes.

In the Marsh, he says,

"Houses are standing literally over cesspools. In one instance, that of a block of four houses, finding the inmates bearing a most unhealthy aspect, I was induced to examine the seat of the houses by having a hole made through the boarded floor; immediately under and up to within a few inches of the under side of the floor, the sub-stratum to a depth of more than 3 feet was that of a slime emitting a stench like that of a foul cesspool; this was the seat of cholera, and forms but one of the many cases where parties are residing in the vicinage of excrementitious and noxious effluvium."

Four out of eight deaths from cholera that occurred in Hampstead, took place in one family living in rooms over a stable, there being at the door a dung-pit, and in the interior, in addition to the ordinary sources of impurity, two or three pits made to collect the urine of the animals; in a yard at the rear, into which one or two windows looked, there was a privy that stunk abominably, and within two or three yards of it a pigstye, scarcely less offensive.

The medical officers of Marylebone state, that persons suffered intensely who lived over stables and cowhouses, of which there are so many in the mews of that parish, and a similar result was observed in all the affected districts of the metropolis.

There is a spot in the town of Hull which affords a remarkable example of the influence of town refuse in lowering the standard of the public health, and predisposing to epidemic disease:—

"On the east side of the town of Hull," (says Dr. Sutherland,) "there lies a suburb called Witham, in which there is a triangular space of ground bounded by the streets called Witham, Great Union-street, and Church-street. This triangle is surrounded by houses, so as to leave an open space in the centre of nearly three acres in extent, about two acres of which is used as a place of deposit for part of the night-soil of the town and other manure, which is interspersed in heaps among the houses, and close to the doors of dwellings. These noxious matters are collected by a number of persons who make a trade of accumulating and selling them for agricultural purposes, and they have become so accustomed to live amongst this horrible garbage, that they not only heap it up against the walls and immediately under the windows of their houses, but it is stated that they have come to consider the atmosphere of the locality 'rather wholesome and agreeable than otherwise.' One indication of the extreme unhealthiness of this district is afforded by the fact, that although the average age of all persons who die in other parishes in the town of Hull is 23 years, the average age of all persons dying at Witham is only 18 years."

A warning was given of the approach of cholera on the town ten months before its arrival. Earnest representations were made to the local authorities as to the extreme danger of this particular spot, but these representations were made in vain; nothing was done to cleanse it. Cholera at length struck the town, and broke out in this spot with a violence scarcely paralleled in any other place in this country. On the outskirts of a triangular space, measuring little more than 200 yards,

there occurred 91 deaths from cholera. "I have never "known," says Dr. Sutherland, "an open neighbour-"hood of this size yield so large a number of deaths."

A plan of this locality is given in plate 1, taken from Dr. Sutherland's Report, Appendix A., in which the sites of the deaths from cholera, in relation to the filth which caused them, are very clearly shown.

Among the places most severely visited by cholera during the late epidemic, and in which the disease held on its destructive course for the longest period, were Merthyr Tidfil, Dowlais, and Pen-y-darran, all in the same neighbourhood. Long antecedent neglect had accumulated perhaps in the most intense form anywhere witnessed in this country all the conditions necessary to localize the disease. Mr. Bowie, who was at Merthyr during a considerable portion of the epidemic, gives the following account of the condition of the affected districts.

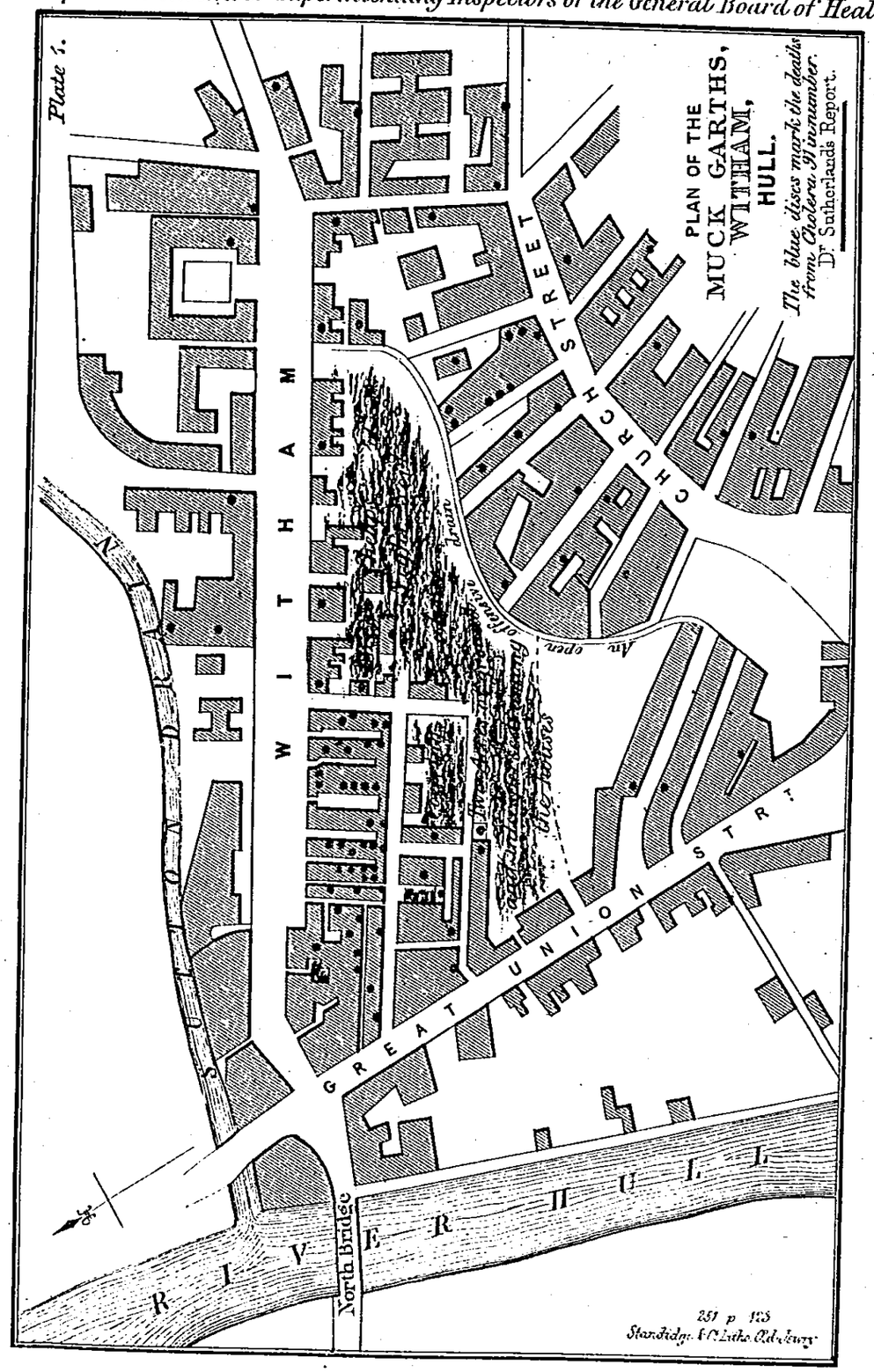
"The vast masses of refuse; the enormous collections of everything vile; the crowded state of the houses, many of them dilapidated and ruinous, and some standing on a disused burial-ground, with portions of the tombstones before their doors; the want of ventilation; the scarcity of water, for a scanty supply of which many of the people have to go more than a mile, and to wait perhaps a whole night:—more miserable and deplorable places particularly than Pen-y-darran cannot exist, nor any better calculated to manufacture fever and pestilence on a large scale."

This description proves that there are causes of disease in operation in such localities against which no merely temporary measures of relief could be of much avail, and the melancholy consequences in the examples mentioned must be within the memory of all.

The reports of the inspectors and medical officers abound with representations of the extraordinary prevalence of cholera among the inhabitants of houses having foul and overflowing privies, and the following statement, derived from foreign experience, affords a striking illustration of the fatal effects produced by exposure to these emanations:—

"At a late meeting of the Institute was read a highly interesting memoir on the epidemic attack of cholera in the prison

Plate 1.



at Brest, occupied by the galley slaves. Some facts, which seem clearly to connect the development of the disease with malarious causes, may be worthy of record. The prison contained 2,662 inmates, distributed in four wards and in an infirmary. The four wards are furnished each with 27 water-closets, in order that the prisoners of each row may be enabled to reach the closet without being unchained, for these unhappy culprits never quit their heavy chains for an instant. The water-closets communicate with a drain which opens into the harbour of Brest, and at low water the south-west winds, blowing up the unguarded drain, force back the mephitic vapours into the very wards. The infirmary and the condemned cell are free from this inconvenience. 189 cases of cholera occurred in the prison, and of these no less than 113 proved fatal. Now, of 2,445 prisoners in the wards just alluded to, 165 were attacked by cholera; while of 217 individuals in the infirmary and condemned cell, only three persons were attacked. The very same result had occurred in 1832. At that period 53 prisoners were cut off by cholera in the wards furnished with water-closets connected with the open drains, while in the infirmary, which is free from this source of disease, only a single death took place.

We believe that the experience has been everywhere very similar in England, and we have met with no instance of any series of cases of cholera in prisons in England where there was not some such cause present to account for the attack as that displayed in the above instance.

Malaria from Putrescent Mud.—While epidemic cholera was prevailing in the town of Cardiff, in the month of June, 1849, a sudden attack of the disease took place in a cluster of houses about a mile and a-half distant from the town, situated near a canal, from which the water had been drawn off, leaving a large surface of black putrescent mud to the direct action of a hot sun, and the result was that very offensive effluvia were immediately perceptible. The smell was complained of by the inhabitants of all the adjoining houses, and produced a variety of symptoms, varying in intensity in different individuals. There were on this spot 22 houses, three of which were vacant, and the total population was 117 souls. Out of the 19 inhabited houses 15 were affected, so that only four escaped. There were in all 43 cases of diarrhœa, 33 of developed

cholera, and 13 deaths; so that nearly one-third of the inhabitants were attacked with cholera, and one-ninth of the whole perished. The works of the canal were finished as expeditiously as possible and the water admitted. Persons on the spot stated that the air felt purer immediately, and the disease was arrested.

Dr. Milroy has called attention to the effect of foul canals and ditches in the neighbourhood of London in predisposing to severe attacks of cholera.

"I have reason to believe," (he says,) "that the severity of the disease in some localities in the metropolis was attributable to their proximity to canals and basins in which the water was nearly stagnant, except when it was stirred by the passing of barges. One of the most striking instances of this source of insalubrity which has come under my notice was what occurred in the neighbourhood of the Cumberland Basin of the Regent's Canal, situated about midway between the Hampstead-road and the Regent's-park. During the prevalence of the epidemic there was a great amount of cholera in all the adjoining streets, a much greater than might have been expected, when we consider that the locality is generally regarded as salubrious, being open, rather elevated, and by no means densely peopled. The street which suffered most severely is Edward-street, on the west side of the basin. Only one side of the street is entirely occupied with houses, the other being but partially so. In some of these houses as many as four, and even six fatal cases occurred, besides a very general prevalence of diarrhœa among the residents. Mr. Johnson, the parochial surgeon of this district of St. Pancras, informed me that within a space of 200 feet in length 20 fatal cases of cholera occurred. Augustus-street, on the other or east side of the basin, also suffered, although much less severely; and two, if not more fatal cases occurred on the north side of Cumberland Market, the rears of the houses there being open to the canal. I find, also, that there was a great deal of choleraic disease among the men who were employed in the barges, and that most of the families living in the houses on the wharves were more or less affected, in some cases with great severity, and in one instance fatally. One woman informed me that she and her family were ailing chiefly from bowel complaints during nearly the whole season. Her house is clean and well drained, and the only reason she could imagine for the constantly-recurring illness of herself and children was the unpleasant smell from the canal. From all accounts it appears that the water was in a most offensive state, and, indeed, no better than that of a stagnant putrid ditch. Its surface was entirely covered with duck-weed, so that it

looked more like a meadow than the basin of a canal, and when anything was thrown into it streams of fœtid gas came bubbling up. Mr. Johnson assured me that he has known the men obliged to leave their barges in consequence of the foul smell when the water was disturbed. So putrid had it become that not a fish was to be seen in the basin, although it formerly teemed with them. When drawn, it was observed to contain myriads of insects and animalculæ, and the men were unwilling to use it even for boiling potatoes, especially as it was dark coloured and also offensive in smell at the same time. I have conversed with several medical gentlemen in the neighbourhood and find that they had long regarded the state of the canal as injurious to the health of the residents near it; moreover, they all agreed in believing that the effluvia from it tended very much to increase and aggravate the epidemic of last season. So strongly convinced was Mr. Johnson of this that he made a forcible representation to the parochial authorities of St. Pancras on the subject, and with the good effect of having the Directors of the Canal Company summoned before a magistrate, for the purpose of compelling them to have the basin cleaned out. This was agreed to be done; but it was judiciously postponed until the epidemic had ceased and the weather had become cool. The quantity of mud removed was enormous, amounting to between two and three thousand tons, and, there is reason to believe, that nearly as much was left behind, in consequence of the inefficient manner in which the process was conducted. It was black and fœtid, like that from an obstructed sewer. No one will wonder at this when he learns that the basin had not been cleaned out for 25 or 30 years, and that the water had never been renewed during the whole of that period, while every year it was becoming more and more offensive, from the pollutions that were thrown into it. All the people engaged on the basin admit that a great improvement has been effected by what has been done; they are now no longer annoyed with any disgusting smell from it, although the re-appearance of duckweed on its surface pretty clearly shows how stagnant the water must be. Swarms of small fish have returned to it.

"I find that complaints have been made of the exhalations from the canal at a considerable distance, from the basin near Cumberland market; but without detailing any particulars at present, I shall merely mention that a good many severe cases of cholera occurred last year in James-street and Grove-street, Camden Town; and that, in Mr. Johnson's opinion, the effluvia from two or three small docks, where the water of the canal is usually stagnant and more or less offensive, and which are in the immediate vicinity of the streets in question, were

not without a most pernicious effect upon the health of the residents.

"The exhalations from the muddy banks or bottoms of ditches and canals were observed, in many parts of the country, to promote the development of cholera. I saw a striking instance of this at Oxford. In a house recently built, clean, and standing by itself, six persons were attacked, and four died of the disease. There did not appear to be any cause of insalubrity within the house; but it stood upon the very edge of a lengthened ditch or canal, which communicated with the river, but was generally left nearly dry during the summer months, and then exhaled an unpleasant smell. It is quite a spot where we should expect to meet with agueish disease.

DAMPNESS.—The late epidemic has afforded large additional evidence in proof of the statements already made as to the influence of dampness in causing the localization of the disease. It has been already stated that the districts bounding both sides of the Thames have suffered much more than those at a distance from the river; upwards of 64 per cent. of the total deaths of the metropolis having occurred in its neighbourhood. One main cause of the excessive mortality near the banks of the Thames appears to be the large evaporating surface of foul water which such sites present.

"At Hamburg," (says Mr. Grainger,) "in those streets which immediately face the spot where the numerous canals that have traversed the city and have become loaded with the excreta of 175,000 people, concentrate to pour their foul contents into the Elbe, the cholera raged so violently as to destroy 3·01 per cent of the inhabitants, while residents near the other and purer parts of the river suffered much less. The street in Berlin distinguished above all others for its excessive mortality occupies on the map of that city precisely the same spot as the above locality at Hamburgh, being. in fact, placed just where the numerous branches of the Spree, which go off from the river at its entrance into the city, again re-enter it, like a huge Fleet-ditch, after being loaded, as was pointed out to me, with all the filth from the drains and débris of the houses. In the small town of Chesham, where a severe outbreak of cholera took place in 1848, I found that the focus of the disease was a place called Water-side, situated below the town and close to the little river Chess. which, entering the place as a sparkling stream, becomes subsequently poisoned by the putrid matters from tanner' yards, slaughter-houses, and cesspools."

Dr. Sutherland points out the mischievous effects of a wet sub-soil, under circumstances which have not attracted that degree of attention which their importance deserves.

"At first sight," (he says,) "it might appear that houses built on hill-sides, at a considerable elevation above the neighbouring low ground, ought to be exempt from the attacks of epidemic disease. Their airy exposed situation, and great apparent facilities for drainage, might be supposed to render them specially conducive to health, but such is by no means a necessary consequence of the simple accident of elevated position. It has been considered a mark of the peculiar capricious and erratic nature of cholera, that it has sometimes attacked lofty situations, while it has left the neighbouring valleys untouched. During the late epidemic several examples occurred of extremely violent outbreaks in towns, and even in individual houses built on the sloping sides of hills. I might instance the cases of Hamilton in Lanarkshire, Maxwelltown in Dumfrieshire, and Dowlais in South Wales, with a number of other places similarly situated.

"The reason of this predisposition will be easily understood by an individual illustration. The one I shall select is that of the village of Spring Bank, which may be considered as the epidemic centre of Glasgow. This case is especially illustrative, because there is a head of water in the Forth and Clyde Canal, not many yards from, but considerably above the level of the foundations of the houses. The pressure of the water keeps the hill-side in a state of perpetual dampness, and the water collects in any hollows which may exist in the ground. The consequence is, that the atmosphere is moist both within and without the houses.

"In other instances a similar effect is produced by the lateral exudation of moisture from slopes of hills proceeding from the natural drainage, the usual rainfall in its passage from the surface of the hill to the low ground appearing at various points on the hill-side. It must be obvious that, if a street of houses be built across the natural course of the drainage, the foundations will obstruct the downward flow of the water, and accumulate it in the ground immediatety behind the houses. In one such instance a stream of water actually percolated the back wall of a cottage from the slope above, and escaped upon the public road after passing through the house. This dwelling was attacked with cholera.

"The evils described are greatly aggravated if pigsties, manure-heaps, or other nuisances, are placed higher than the houses, especially if the ground be at all of a porous nature. In

such cases the lateral drainage becomes polluted with organic matters.

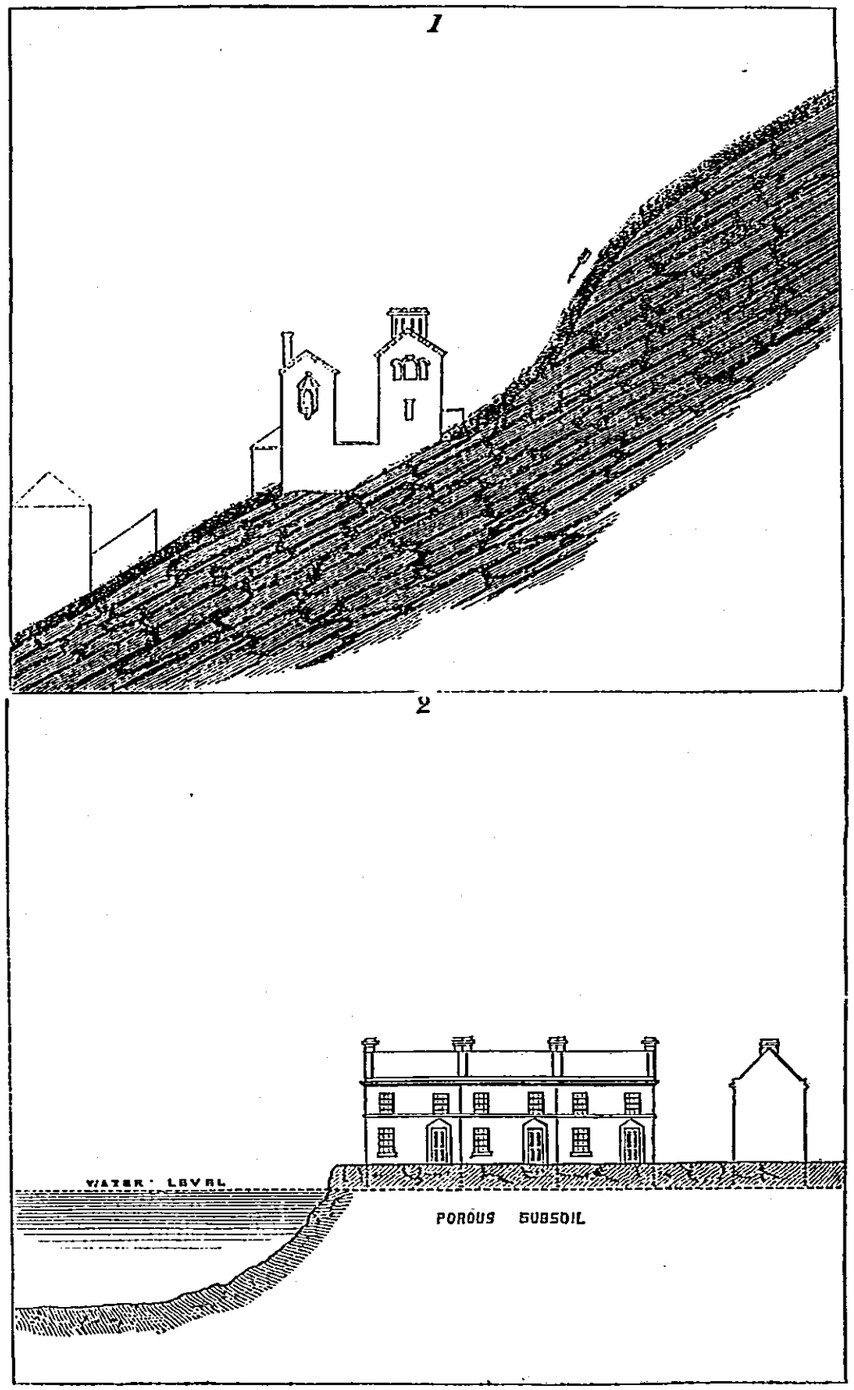
"Even surface-drainage, flowing from the higher to the lower parts of towns, at times produces much mischief. Such an instance occurred when cholera was prevalent in Edinburgh. The disease carried off four or five individuals in a single house, fronting the open country, at the foot of one of the closes in the Canongate. There was not a single case of cholera in the neighbourhood except these, and the house was perfectly clean, and the locality well ventilated. The catastrophe arose as follows:—The drainage of the High-street and Canongate takes place on the surface, and is continually impregnated with night-soil and other impurities. In passing the mouth of the close in question, from some defect in the gutter, part of the drainage was turned aside and ran down the close. There was no escape for it at the lower end, where it accumulated and became extremely offensive. Only two or three families were exposed to the effluvia, and one of them was almost entirely destroyed. The cause was then recognised and removed. I cite these facts as affording individual illustrations of a class of causes which operate in rendering localities unhealthy which otherwise should not be so. Houses and towns built on hill-slopes evidently require sanitary precautions of a particular kind, and proper means should be taken to cut off the natural drainage from the site chosen, and to divert it in such a way as to render it innocuous.

"Much of the evil resulting from the close proximity of rivers and canals arises from lateral infiltration of the subsoil, and not merely from the aqueous vapour which rises from the surface of the water itself. In the village of Spring Bank already referred to, many of the houses most severely attacked by cholera had their floors nearly on a level with the canal. A small cottage in which the first cases occurred is thus situated. It contained two inhabitants, both of whom died, and there was no other appreciable reason for the attack.

"The epidemic seizure of the lower part of Inverness in April, 1849, affords another similar illustration. The site occupied by the houses is a flat gravelly piece of ground on the banks of the river Ness, and the foundations are rather below high-water mark. The whole of this gravelly subsoil receives the brackish water of the river, which can be obtained by digging a few feet below the surface."

The accompanying sketches from Dr. Sutherland's report, illustrate the operation of these causes of dampness.

No. 1 shows a section of a row of houses built on a hill-slope, across the natural course of the drainage,



Origin of Damp Subsoil.

which is interrupted both by the cutting across of the strata, and by the obstruction which the houses offer to the surface-drainage.

No. 2 shows the lateral infiltration of water from rivers and canals under the foundations of houses built on their banks.

In further illustration of the localizing effect of dampness, Dr. Milroy states as follows:—

"Speedwell-street, in Oxford, was more severely visited with cholera than any other street in that city, and yet it is moderately wide, and the houses are newly built, of fair size, and well windowed, and the inhabitants are respectable and above the lower class. The cellars and basement stories, however, were very damp, and in wet weather the water often stood one or two feet in them for months at a time. When the water dried up, the inmates were annoyed with a most unpleasant smell in the lower part of their houses."

Dr. Sutherland calls attention to the fact that the higher flats of the houses in the larger towns of Scotland are the most unhealthy, and assigns the cause of it.

"It is commonly believed," (he says,) "that the chief causes of sickness are connected with the condition of the surface or subsoil of a town; but in the Scotch cities it is found that a great deal of epidemic disease occurs at the top of the loftiest tenements, where a comparatively pure atmosphere surrounds the dwellings. The perishable nature of the structures in many of the English towns renders a complete reconstruction possible within comparatively short intervals of time, and a progressive improvement and amelioration can thus be effected. Such, however, is not the case in Edinburgh and Glasgow, very many of the houses of which have been inhabited for centuries, and to all appearances will last for centuries to come. Ancient mediæval structures, after having served as mansions during feudal times, have been divided and subdivided to suit the necessities of a new class of occupants, with little regard to the best methods of effecting the change, and with an utter forgetfulness of the comfort, health, and convenience of the tenants. Houses with eight or ten successive nests of families, piled one above the other, are by no means uncommon. Such tenements are hardly suitable for the purposes of modern civilization, and they can only be occupied without absolute danger to the health and morals of the inmates by a strict application of those resources which science has brought to bear on the social welfare of the people. The 'lands,' as they are called, have generally one common stair to give access to their teeming

population, a circumstance which must always render a thorough cleanliness of these approaches next to impossible. Many of the stairs and the passages which branch off from them are dark and noisome; and from the absence of all domestic conveniences in the houses, they become depositories of filth of the most disgusting kind The atmosphere in them is most impure, and often extremely offensive: and as the houses must be supplied with air through these channels, we need not be surprised to find that the supply is at times almost intolerable. The same want of convenience leads to a most abominable state of the closes, which all police regulations have hitherto failed to improve materially, especially in Edinburgh, so that the ordinary channels through which the atmosphere reaches the inmates, even in the loftiest and apparently best ventilated parts of the old town of Edinburgh, are impregnated with impurities, dissolved and carried along by the air. There are no means provided by which the solid and fluid egesta of the households can be removed, except the laborious process of carrying down the whole weight which had previously been carried up. There are neither water-closets, sinks, nor dust-shoots, and the result of the want of these most needful conveniences is, that all the offensive refuse of the house must be retained within inhabited apartments, and in immediate proximity to the scanty water-supply. The atmosphere is rendered damp and foul by the exhalations, and the water unwholesome by absorbing them. It is true that the police send round carts for removing the refuse; but under the best possible arrangements of this kind, the house refuse must still be retained sufficiently long to be injurious, while the inmates not unfrequently find themselves inconvenienced by the operation of conveying it down from such an altitude at the precise moment fixed by the police for its removal. The practical result is, that it is often retained as long as possible, or thrown out of the windows into the closes below. It is even not a rare occurrence to find large accumulations of decomposing matter, which appear to have lain for years, in garrets and empty apartments of these lofty houses."

Want of Drains and Bad Drains.—The object of efficient drainage-work is two-fold; first, the removal of decomposing matter in suspension in water; and secondly, the removal of surplus moisture. But ample experience has proved that bad drainage, empirically conducted, in the hands of those who have given no special attention to the subject, increases the evil intended to be obviated, by extending the noxious evaporating surface, or by shifting the decomposing matter from one place to another. The

Superintending Inspectors in their reports on the various towns, they have examined, concur in stating that the force of fever and of cholera in general falls on those localities which are without drainage, or in which the drainage that has been attempted has been so unskilfully performed as to have increased the evil. Dr. Sutherland and Mr. Clark give a remarkable example of this in their Reports on Bristol. Dr. Sutherland in describing the condition of certain courts covering a piece of land 56 yards in length by 37 yards in breadth, and containing 66 dwellings, in which there occurred 44 deaths from cholera, says:—

"A more deplorable event perhaps never occurred than these tables describe. A very slight consideration of the whole circumstances is, in my opinion sufficient to prove that this great sacrifice of human life was occasioned by ignorance or negligence, as flagrant as any which from time to time gives rise to railway or other accidents. A glance at the plan will show that something like sanitary improvements had actually been contemplated; and no doubt it was believed that the object would be attained if only a sufficient number of drains and privies were constructed. Like every other step taken in a false direction, the so-called improvements increased the evil they were intended to mitigate, and, with the other circumstances above detailed, caused the untimely death of many innocent persons."

Mr. Clark, speaking of the same localities, says:—

"It would be incorrect to say that there were no drains (so called) in these courts, and it would be equally at variance with truth to say that they answered any purpose of drains in carrying off the refuse matter from the houses; at the inner and farther extremity of the courts they were closed, and the fall, instead of being towards the other extremity, opening into the main sewer in Redcross-street, was found, on the contrary, to favour the flow of sewage upon the courts. The effect of this faulty construction was necessarily to occasion a large accumulation of privy and house refuse, amounting to several loads; in fact, to create extended local cesspools of the worst and most obnoxious character.

"Under these circumstances, it cannot be matter of surprise that cholera raged in these courts with terrific virulence—that, within a few days, 44 persons fell victims—and that it was not till the most energetic measures were adopted, and a complete purification and white-liming effected, that its ravages

were stayed. Of these 44 deaths, 20 occurred in Gloucester-court, 14 in Wellington-buildings, and 10 in Wellington-court; and to this fatal catalogue must be added yet another death, that of the man, viz., employed in cleaning out the drains, who, it was stated, died from the effects of the noxious effluvia to which he was thus exposed.

"The sequel is scarcely less striking and instructive. While these sheets were passing through the press, this locality was visited by two gentlemen, members of the 'Health of Towns' Committee' of the Town Council (whose names have appeared more than once in this Report), who found, upon inquiry, that though the pavements, at the suggestion of Mr. Goldney, the medical officer, had been newly laid down, and fresh drains constructed, with a proper fall, some of the privies were again becoming choked, and all complained of as very offensive; that there was 'not a drop of water' upon the premises fit to drink; *that* supplied by the only pump being wholly unsuitable, from its tainted nature, for domestic purposes; and that scavenging, which should be performed once a week, was by no means regularly attended to. In fact, that these courts, notwithstanding the fearful warning so recently conveyed, were fast relapsing into the same neglected condition in which they were at the time of the cholera—striking evidence, this, of the indispensable necessity for *constant and efficient* sanitary supervision."

Dr. Milroy gives the following examples of the effect of the contents of foul sewers in predisposing to violent attacks of cholera:—

"It is a fact which appears to me to be particularly worthy of notice, that the only clean and open street in Plymouth in which any fatal case of cholera has occurred this season is Union-street. Three fatal cases have occurred in two adjoining houses on one side of this street, and they were among the earliest which took place in the town. The circumstances are curious. In consequence of the construction of some works connected with the railway terminus the drains of these two houses had become dammed across, and the result was that their lower premises were overflowed with sewage water. Although measures were immediately taken to remove the nuisance, three of the inmates were attacked with all the symptoms of the malignant disease, which, at the time, had manifested itself only in one or two of the filthiest parts of the town, and were rapidly carried off. Several of the other inmates were affected with diarrhœa. One of the fatal seizures occurred in a young man who went down into one of the houses to get a bottle full of the foul water which had inundated the basement story. Within an hour he was attacked and he died in the course of 13 hours from the commence-

ment of the symptoms. He said himself that he felt certain that the stirring up of that filthy stuff was the cause of his illness.

"No subsequent sickness occurred in either of the houses after the nuisance was thoroughly corrected, nor in the immediate neighbourhood, although the epidemic has become much more widely diffused over the town than it was when the above cases occurred. The disease as quickly subsided in the locality as it had suddenly appeared.

"The pernicious influence of sewage water in localising the disease was manifested about the same time at Devonport. The street there that was by far the most severely visited in the early period of the epidemic, is William-street, in Morice Town. Its situation is low, but it is wide, and the houses are tolerably open behind. They are chiefly occupied by workmen engaged in the government dock, and by other labourers. At a short distance from the lower end of the street is the outlet of the main sewer of the district, at about three or four hundred yards from the sea, into which the fœtid contents were conducted by a partially-covered trench. In the course of the summer this trench had become obstructed by the works of the new dock that is in process of building, and the sewage in consequence overflowed a large open space situated between its outlet and the sea, and converted it into a stinking quagmire, from which the most disgusting effluvia were continually given off. It is worthy of notice, that the first fatal case of cholera occurred in the corner house in William-street, which was nearest this disgusting nuisance. The general impression was that the pollution of the atmosphere from the nuisance now mentioned was one of the principal causes of the large amount of sickness in the neighbourhood."

Dr. Milroy further states, on the authority of Dr. Allen, the resident physician of Marylebone Infirmary, that close to a ward in that institution where cholera first appeared, while the rest of the house was exempt from the disease, there had been an open untrapped drain which emitted very offensive effluvia. The nurses remarked that the smell was always worst when the windows were first opened in the morning. The nuisance was immediately corrected, and thereupon the disease ceased to manifest itself in this particular part of the building.

Graveyards.—After the evidence which we have elsewhere adduced of the injurious effects of graveyards, on the crowded populations in their immediate neighbourhood, we shall only cite the two following occurrences, in further illustration of the fact derived from recent experience.

At Bristol, at a place called the Rackhay, there is a burial ground about 80 feet in length, and between 40 and 50 in breadth, the surface of the earth of which is four and a-half feet above the level of the pavement in the adjoining courts. It is completely surrounded by houses, 33 in number. Under the external walls of the burial ground there are drains with open gully grates, from which, at the time the medical inspector examined them, issued a most offensive odour, having the unmistakeable graveyard smell. Out of those 33 houses, one of them being empty, cholera broke out in 15, chiefly in those on the side next the burial ground. In one house there occurred no fewer than 11 cases, and in several from five to six, in all 47 cases and 33 deaths.

"There were no local sanitary defects," (says Dr. Sutherland,) "which tended to make this place more liable to an epidemic outbreak than other districts in the same neighbourhood, except the presence of the burial-ground, and the polluted state of the drainage, to which it appears to have materially contributed."

"It is known," (says Mr. Grainger,) "that a most distinguished surgeon, Mr. Key, whose valuable life fell a sacrifice to the late epidemic, resided in a house the back windows of which looked directly into a graveyard; that he was much in the habit of sitting at these windows when opened; that he had complained to his servant several times shortly before his attack of the offensive smell proceeding from the burial-ground, in which some cholera corpses had been interred; and that on the very day of the fatal seizure a grave had been dug which attracted his attention as having increased the noxious effluvia."

Unwholesome Water.—During the late epidemic much additional evidence has been elicited proving the influence of the use of impure water in predisposing to the disease. There has been scarcely a town in the kingdom in which cholera has been prevalent that has not afforded some instance of it; and when the water has been contaminated by the contents of sewers or privies, or by the drainage of graveyards, the seizures have been more sudden and violent, and the proportion of deaths to attacks greater even than from overcrowding.

The following out of great numbers may be cited as examples.

The privies of a number of houses in Silkmill-row, Hackney, were pulled down, and cesspools substituted. In Dr. Gavin's Report it is stated—

"The first cesspool was sunk in the middle of July within one yard of the only well which supplies with water 12 houses containing 85 inhabitants. Three other cesspools were made at the distances of 3, 5, and 12 yards from this well. About a fortnight or three weeks after the first cesspool had been made, the inhabitants observed the water become tainted and offensive; it gradually became worse until, when I saw it, that fresh drawn in the morning was as thick as thin soup, with feculent matter. The landlord's agent employed himself an hour every morning in pumping off the thickened water in order to fit it for consumption and use. After his morning's work he declared the water to be quite good enough for the inhabitants. Those who do not choose to drink and cook with this most foul water are compelled to catch the surface water which flows along the kennel from the road and neighbouring field. This water, which at other times would be considered foul, appears pure when compared with that used by the unfortunate inhabitants of this place."

Of these 85 inhabitants, 22 did not use the water of the well: these remained free from disease. Of the remaining 63, 46 were attacked with severe diarrhœa, one of them approaching cholera.

Five houses in Windmill-square, Shoreditch, occupied by 22 inhabitants, were supplied with water from a well into which surface refuse and the contents of cesspools percolated. Of the inhabitants of these houses 11, that is, one-half of the whole number, died of cholera within a few days.

The first outbreak of cholera in Rotherhithe occurred in 16 houses which were supplied with water from a well that was expressly ascertained to be contaminated by infiltration from a foul open ditch. In these 16 houses there were 20 cases of cholera; and several of the persons who died were decent mechanics, and not in destitute circumstances.

The water which supplied 25 houses in another street was taken out of a ditch that received the contents of privies. In these 25 houses there occurred 15 deaths

from cholera. The medical officer states his conviction that the use of this water acted powerfully as a predisposing cause, and tended to the spread of the disease. The rector, who was the chairman of the Board of Guardians, says:—

"He was constantly occupied in aiding with the guardians in the preventive measures during the height of the epidemic; observed in some cases where the disease had been very severe, and where the water was tainted, that, on supplying pure water and having a medical man in constant attendance, the cholera was controlled to a marvellous extent, few cases occuring subsequently. Is convinced from the facts that came to his knowledge that the bad quality of the water in certain localities acted most prejudicially as a predisposing cause, and led to the spread of the disease."

Thirteen small houses, forming a court called Surrey Buildings, in Horselydown, were supplied with water from a sunk tank, the edge of which was even with the pavement, so that it constantly received the washings of the court. Here 8 deaths from cholera occurred in one week, and another followed in the ensuing week.

In Waterloo-road, Lambeth, where the mortality from cholera was excessive, the water supplied by the Lambeth Water Works is stated to be "muddy, having a fœtid smell and replete with insects." In some of the courts 70 or 80 persons are dependent on one tap, and "a very active scramble occurs to secure the precious fluid." At a place called the Apollo, with 51 houses, the water flows only for about 30 minutes daily. Here 12 fatal cholera cases occurred. In the same locality, within a very limited space, exposed however to other localizing circumstances, besides the deficient and bad supply of water, it is stated that great numbers experienced very severe attacks of cholera; 42 died, and it is believed there was scarcely a house in which the inmates did not suffer from diarrhœa.

In one court in Lambeth, where most malignant scarlet fever, with sloughing of the integument, and very bad typhus fever had prevailed, two severe cases of cholera having occurred, the surgeon was induced to examine the water supplied by a pump, when he found it discoloured, and so foul that "it stank at a distance of

the contents of a cesspool;" the piston of the pump was removed, and no other case of cholera occurred in the court.

In Manchester a sudden and violent outbreak of cholera took place in Hope-street, Salford. The inhabitants used water from a particular pump-well. This well had been repaired, and a sewer which passes within nine inches of the edge of it became accidentally stopped up, and leaked into the well. The inhabitants of 30 houses used the water from this well: among them there occurred 19 cases of diarrhœa, 26 cases of cholera, and 25 deaths. The inhabitants of 60 houses in the same immediate neighbourhood used other water; among these there occurred 11 cases of diarrhœa, but not a single case of cholera, nor one death. It is remarkable that in this instance, out of the 26 persons attacked with cholera, the whole perished excepting one.

Observations of the analogous influence of polluted water in producing fever have been made in other countries. Dr. Boudin, a French writer on Medical Geography, relates a marked example of marsh-water exciting fever:—

"In July 1834, 800 soldiers, all in good health, embarked on the same day in three transports at Bona, and arrived together at Marseilles; they were exposed to the same atmospheric influences, and were, with one essential difference, supplied with the same food and subjected to the same discipline. On board one of the vessels were 120 soldiers; of these 13 died on the passage from a destructive fever, and 98 more were taken to the military hospital of the lazaretto at Marseilles, presenting all the pathological characters proper to marshy localities; so that 'by the side of a simple intermittent was seen a pernicious fever. Here was a type recalling the yellow fever of the Antilles, and there was the cholera of the Ganges, with its most terrible traits.' On an inquiry being instituted, it was ascertained that on board the affected ship the water supplied for the soldiers, owing to the haste of the embarkation, had been taken from a marshy place near Bona, whilst the crew, not one of whom was attacked, were provided with wholesome water. It further appeared that the nine soldiers who escaped had purchased water of the crew, and had consequently not drunk the marshy water. Not a single soldier or sailor of the other two transports, who were supplied with pure water, suffered."

Dr. Evans, of Bedford, relates an equally definite instance:—

"A few years ago he was staying at Versailles with his lady, when they both became affected with ague, and, on inquiry, the following facts were disclosed:—The town of Versailles is supplied with water for domestic purposes from the Seine at Marli. At the time in question a large tank, supplying one particular quarter, was damaged, and the mayor, without consulting the medical authorities, provided a supply of water consisting of the surface-drainage of the surrounding country, which is of a marshy character. The regular inhabitants would not use this polluted water; but Dr. and Mrs. Evans, who were at an hotel, drank of it unwittingly, and it was also used by a regiment of cavalry. The result was, that those who drank the water suffered from intermittent fever of so severe a type that seven or eight of the soldiers, fine young men, died on one day, September 1, 1845. On a careful investigation it was ascertained that those only of the troops who had drunk the marsh-water, were attacked, all the others, though breathing the same atmosphere, having escaped, as did also the townspeople."

Food.—We recommended in our first notification the observance, during the prevalence of the epidemic, of such a solid and dry diet as would naturally tend to maintain a moderately constipated state of the bowels; and with this view an abstinence, or at least a very limited indulgence, in vegetables and fruits. We also gave a caution against the use of salted or dried provisions, and the oily kinds of fish, as well as shellfish. We likewise enjoined moderation in the use even of the most wholesome and suitable food, and, as a rule, an abstinence from ardent spirits. The experience of the late epidemic has shown that these precautions were of more importance than could have been fully comprehended at the time. Such disastrous consequences had resulted in some foreign cities from the use of crude vegetables and acid fruits, that the authorities forbade the sale of them, and articles of food of this description have been found equally pernicious in our own country. Among the first cases of cholera that occurred in Great Britain were those of the Prussian sailors on board the barque "Pallas," who having been brought from a healthy town were exposed for a few hours to the epi-

demic influence at Hamburg, and who ate on their passage to Hull a quantity of plums, which the vessel was bringing to Hull for the market.

"The eating of a few plums," (observes Dr. Sutherland,) "would certainly, under ordinary circumstances, have produced no such fatal results; but during an epidemic constitution such indulgence is well known to be fraught with extreme danger. Possibly these men might have resisted their morbid state had it not been for the very serious error as to diet which they committed."

"Instances were very common," (says Mr. Grainger,) "where the seizure resulted merely from partaking of a hearty meal of substances liable at such a time to disturb the alimentary canal, such as veal, pork, eels, &c. It is particularly necessary to point out that during the epidemic influence even substances, which in ordinary times are harmless, may produce the most serious consequences. Thus, in one instance, the children of a physician, having been allowed to partake of cherries, were all seized with alarming diarrhœa."

On examining the returns of the medical visitors and inspectors, such statements as the following are very common:—

"Had been under treatment two or three days for simple diarrhœa, and was convalescent when she indulged in eating plum pudding for supper, and was seized in the night with rice-water purging and vomiting, and was soon in a state of collapse. Died in about 20 hours.

"Seized during the night, after eating a hearty supper of greens and pork.

"Was pretty well after a slight attack of diarrhœa; had been warned to continue careful as to diet; ate heartily of stewed eels; in a few hours diarrhœa returned, and passed rapidly into developed cholera."

Similar statements are made respecting other articles of diet against which caution has been given, and which, as has been proved by general experience, cannot be used without imminent peril during exposure to an epidemic influence, however grateful, innocent, and even nutritive, they may be to the same individual in the absence of an epidemic constitution.

There is also too much evidence to show that numerous attacks of cholera were indirectly induced among the poorer classes by the use of bad meat, tainted fish, and other improper articles of food exposed for sale.

"Urgent representations," (says Mr. Grainger,) "were made in different parts of the metropolis, both by the local authorities and medical officers, respecting the open sale of articles of food, especially fish, altogether unfit for human consumption; it was stated, further, that the existing state of the law did not secure the suppression of this practice, which, in poor neighbourhoods, was felt to be a great evil. Several marked examples were brought under my notice, where violent attacks of cholera were distinctly traceable to the use of putrid fish, bad pickled pork, decayed cheese, &c.

Not only were habitual drunkards the most easy and certain victims of cholera but even single acts of intemperance were followed by almost immediate diarrhœa. A vessel in the roadstead of Sunderland, early in October, 1848, having arrived from Hamburg, and having had one death on board shortly after leaving the port was put in quarantine.

"I went alongside of her," (says Dr. Sutherland,) "in a small steam-boat, for the purpose of making the needful inquiries. I saw all the crew, who appeared to be in perfect health, and one middle-aged man was especially communicative, and afforded a good deal of information in regard to the vessel. I gave the people instructions how to act in case the disease should again appear, and especially cautioned them to avoid intoxication, which I assured them would lead to certain death. This was about 7 o'clock P. M., and, immediately after I left, the man referred to went down to the forecastle, where he had secreted a bottle of brandy at Hamburg, and drank a large quantity. In an hour or two afterwards he was collapsed, and died the next morning at seven o'clock."

"Abundant evidence," (says Mr. Grainger,) "was afforded during the late epidemic that habitual drunkards were highly predisposed to cholera; and of them a large number perished. Occasional excesses also led to a vast number of attacks; thus, at Hamburgh, it was observed that there was among the numerous sailors in that great port a regular accession of cholera every Monday and Tuesday, owing to the men going ashore and getting drunk on the preceding Sunday. In London also, several medical men informed me they had noticed the same thing; excess either in drinking or eating, particularly if improper food was used, such as pork, cabbage, &c., being followed by attacks, which thus became more frequent on Sunday night and Monday.

In Edinburgh, in Glasgow, and in the neighbouring manufacturing towns in general, it was observed, that

periodic augmentations of the disease were coincident with the earlier days of the week, which could only be attributed to the intoxication which followed the weekly receipt of wages.

"I cannot but express regret," (says Dr. Sutherland,) "at the small amount of restraint which has hitherto been put on this abominable vice. The whole licensing system, and the way in which it is too frequently administered, are a public disgrace, and call urgently for reform. In every fresh outburst of cholera, persons of dissipated, intemperate habits have been the first to fall victims to the disease; and I feel assured that many lives were sacrificed which might have been saved, had the vice of drunkenness met with that discouragement on the part of authorities and the legislature which its detestable and brutalizing tendency, as well as its injurious effects on the public health, have so long demanded."

Many deaths occurred during the late epidemic, from disregarding the caution against fatigue. In numerous instances, nurses and medical men, and on some occasions, clergymen, zealously devoted to their arduous duties, lost their lives from continuing their labours too unremittingly.

"I have seen a great number of instances of this," (says Dr. Sutherland,) "amongst different classes of people. Persons engaged in iron-forges, and other equally laborious occupations, have suffered in large proportion. The length of time during which the exertion is continued appears to be a more important element than the actual present amount of work, and hence it has been thought necessary in a number of instances to place the men on what are called short shifts.

"From want of attention to this matter, casualties have occasionally taken place amongst nurses in hospitals; and this class of cases is sometimes ranked amongst the results of contagion by inexperienced observers. Medical men have also suffered from a similar cause. I am not aware that any individual died while acting under my own special instructions; and I attribute this favourable result to my having endeavoured to impress upon them the necessity of avoiding overexertion, and of making immediate application for additional medical aid as soon as they found it necessary. I am sorry to say that I have known instances where a different course was pursued from inadvertence. I met with one case in which the medical officer of a district gave each of his two assistants 24 hours' work and 24 hours' rest alternately. His object was a good one, but the result was fatal to the young men, and in little more than a week both were dead."

In the outbreak at Kurrachee, the regiments that had recently been fatigued by long and harassing marches, suffered in a double or treble proportion to those that were stationary. And this is the general experience of India.

Many lives were lost during the late epidemic, by the use of purgative medicines, even of the mildest kind and those to which individuals were accustomed.

"I have known a number of instances," (says Dr. Sutherland,) "in which individuals living in comparatively healthy situations have been suddenly destroyed by the use of purgative medicine, and that in very moderate quantity. Saline purgatives, which under ordinary circumstances may be used with advantage, are invested with poisonous properties in relation to the altered constitutional state produced by the epidemic influence. A similar fact has been observed in regard to almost every form of aperient. A case came under my own knowledge, in which an ordinary dose of rhubarb and magnesia with mint-water produced a rapid and fatal attack of cholera in a healthy young woman who had taken the medicine as an aperient."

"One very painful case of this kind," (says Mr. Grainger,) "was related to me: a lady gave to her four young children some aperient she was in the habit of administering; this was at night. Early the next morning the children were seized with violent purging and vomiting, and ultimately they all died."

"I have known the most alarming and even fatal results produced by the administration of the mildest purgatives; and it is certain much mischief was produced by the notion, so common among non-professional persons, that all cases of looseness of the bowels are caused by some noxious matter which demands expulsion. Mr. George T. Jones, who treated, as a medical visitor, 1,000 cases of diarrhœa, says,—'When a poor man is attacked with a flux of any kind, and especially diarrhœa, he invariably thinks that there is some peccant humour in his body which requires to be discharged, and forthwith sets about to expedite the removal of the offending matter. Hence a reason why during my visitorship I have met with so many cases of diarrhœa, aggravated by taking doses of Epsom salts, jalap, and other drugs.' This common and dangerous error was dispelled by the house-visitation, so that when this was established, but unfortunately only at the end of the epidemic the people were better informed on this point, and were not so eager to take purgatives."

We may add to the preceding statements, that a

medical association has recently been formed in the United States, consisting of representatives from nearly all parts of the Union, whose special object is the investigation of questions connected with the public health. In their first Report, published last year, they so entirely coincide with the views as to the general localizing causes of epidemic given in this Report, that they arrive at the following conclusions :—

"The great source of infection is putrefaction.
"So long as the cause exists so long will disease be generated.
"By preventing putrefaction we are enabled to arrest infection."

Having thus called attention to some of the principal conditions proved by the late experience to have favoured the outbreak of the disease in particular localities, and to have predisposed individuals to its attack, we now proceed to point out certain exemptions from its visitation, which appear to us to place the influence of those conditions in a still more definite and impressive point of view. The exemptions in question, relate to large groups of people who were living during the whole course of the epidemic in the localities in which the disease was raging, and who belong to the classes that were the chief sufferers. Among the most remarkable of these exemptions, were the various establishments provided in the metropolis for housing and lodging the poorer classes, founded for the express purpose of proving the influence of sanitary arrangement in preventing excessive sickness and improving the physical well-being of the inhabitants. The efficacy of such establishments for the accomplishment of this object, has been brought to a severe test by the late epidemic, and the following examples may suffice to show the manner in which they have come out of the trial.

In George-street, Bloomsbury, and Charles and King-streets, Drury-lane, there are establishments for lodging single men, in which though the sanitary arrangements are by no means perfect, yet the inmates are exempt to a considerable extent from the evils of bad drainage, accumulations of filth, overcrowding and personal uncleanliness.

These houses contain 210 inmates; among the whole of which, with one exception, there was no case of cholera; the exception being that of an old man, 70 years of age, of intemperate habits who rarely tasted animal food. All the other inmates escaped. It is remarkable, however, that in George-street there were ten and in Charles-street two cases of diarrhœa, thus demonstrating, that the epidemic influence was upon them; but that the improved sanitary conditions under which they were placed, enabled them to resist it. In the house in King-street there was no case either of cholera or diarrhœa.

In the Lower Pentonville-road, there is a group of buildings consisting of 24 houses, containing between 80 and 90 inhabitants. Here the sanitary conditions are upon the whole better than those of the establishments in Bloomsbury and Drury-lane; and the inmates of these houses enjoyed a complete immunity both from cholera and diarrhœa.

In the Old Pancras-road, is situated a large structure, called "Metropolitan Buildings," which is let out as separate tenements to families. It contains upwards of 500 inmates, of whom about 350 are children. This building is well drained, it is kept clean, an abundant and constant supply of water is afforded to each tenement; there is no privy or cesspool on the premises, but each tenement is provided with a water-closet and also with a dust-shaft for the immediate removal of refuse. Though the structural arrangements of this building admit of considerable improvements yet its sanitary condition is far superior to that commonly found in the dwellings of the poor. A corresponding improvement has taken place in the health of its inmates. Taking the full period of its occupancy, now upwards of 18 months, its total mortality as compared with the general mortality of the metropolis, has been diminished one-half; and as compared with the mortality of the worst parts of the metropolis, it has been diminished two-thirds; while its infant mortality, the most delicate test of the healthfulness of a place, has been at least five times less than that of some parts of the metropolis. From its remarkable

exemption from disease in general, and especially from the zymotic class of disease, notwithstanding that it contained so large a proportion of infants, a confident hope was entertained that it would escape any visitation from cholera; and that hope has been realized, for not a single case of cholera occurred among its inmates, and only seven cases of diarrhœa; although at a distance of not more than between 300 and 400 yards from the building, in a row of houses called Paradise-street, there were three deaths from cholera in one house; in an adjoining court the disease was very prevalent and mortal; the whole neighbourhood was afflicted severely with diarrhœa; and in this parish, though at some some distance from this particular spot, within a space of 200 feet in length 20 fatal cases of cholera occurred.

On board the American ship "Eagle" a sudden and violent outbreak of cholera took place precisely similar to an outbreak in a village or the localization of the disease in the district of a town. Here the sufferers were exclusively steerage passengers. They were overcrowded, and had no proper ventilation. There were in all 250 of these passengers, of whom a large proportion were attacked with diarrhœa; 21 with developed cholera, and 13 died. The cabin of this ship was large, commodious, clean, and well ventilated, and while the epidemic was raging in such close proximity to them, the passengers in this better conditioned part of the ship, enjoyed a complete exemption not only from cholera but even from diarrhœa.

Some of the metropolitan prisons were entirely exempt from attack, others suffered severely.

In the Model Prison, at Pentonville, in the structure and arrangement of which important sanitary improvements have been introduced, out of an average of 465 prisoners, there was no attack of cholera and very little diarrhœa.

Giltspur and Newgate prisons enjoyed the former a complete, and the latter all but a complete exemption from the disease, though situated in a district which suffered with extraordinary severity from the epidemic.

In the House of Correction, Cold Bath Fields, in the epidemic of 1832, when the number of prisoners was

1,148, there occurred 319 cases of premonitory diarrhœa, 207 of developed cholera, and 45 deaths. At that time the drainage of the prison was defective, the sewers, which were dry-built, without mortar, had in places fallen in, and were choked with soil; there were water-closets but the pans were made of iron instead of earthenware, and, owing to the defective structure of the drains, their contents were not carried off. Subsequently the whole sewerage of the prison was rebuilt, and, on a late examination of it, was found to be in good order. The ventilation has been improved, and a small open fire, placed in each of the day rooms, appears to have operated beneficially, by preventing cold and dampness. In the late epidemic, out of 1,100 prisoners there was not a single case of cholera, and only a few cases of diarrhœa, which, by prompt attention, were prevented from passing into the developed form of the disease.

Bridewell prison, in 1832, is described as having been in a most filthy state; the dirt on the walls being merely covered with lime wash, so that when a thorough purification took place the walls were found coated with filth to the depth of two inches: three prisoners were allowed to occupy a single cell: no attention was paid to personal cleanliness and there was a deficiency of medical superintendence. In the epidemic of that period 12 of the prisoners were attacked with cholera, and four died. Since that time the state of the prison has been changed; it is now kept clean; personal cleanliness also is enforced; only one inmate is allowed in a cell, and the prisoners are under strict medical superintendence. In the late epidemic, cholera raged on all sides of this prison, in houses closely contiguous, separated only by a narrow court; yet, out of 90 prisoners, no case of cholera occurred, and only one case of diarrhœa, though it is stated that fresh prisoners were daily brought in of the lowest class, and in the greatest state of filth.

Attention has already been directed to the violent outbreak of cholera in the workhouse of Taunton, in which only 68 cubic feet of space was allowed to each child. In the county gaol, situated in the same town, the space allowed to each prisoner ranges from 819 to

935 cubic feet; at the same time there passes through each cell a perfect system of ventilation, while a temperature is maintained that hardly varies three degrees in the 24 hours. Each prisoner has abundant means of personal cleanliness; he has a water-closet, wash-hand-basin, and unlimited water supply, and personal cleanliness is strictly enforced. The inmates of the gaol, though in confinement, being thus surrounded by the appliances of health, escaped without experiencing the slightest touch of the epidemic; while, of the 276 inmates of the workhouse no fewer thau 60, or nearly 22 per cent. of the whole number died of cholera within one week, and nearly all the survivors suffered to a greater or less extent from cholera or diarrhœa.

In the metropolitan district there are two public lunatic asylums, Bethlem and Hanwell; Bethlem contains, on an average, 400 inmates. During the late epidemic no case of cholera occurred in this establishment, which enjoyed a similar exemption in 1832. Yet cholera prevailed extensively and severely within a hundred yards of the building. In connexion with this establishment Mr. Grainger states,—

"Some years ago a particular gallery attracted the attention of the authorities, in consequence of the inmates suffering from fever and diarrhœa. This was the more unexpected, because the gallery was one of the most favourably situated in the whole establishment; it was lofty, very airy, and not at all crowded, and the patients were of the healthiest class. Upon examination it was ascertained, that owing to some defect in the water-closet, a leakage of the soil had taken place beneath the floor. This was corrected; the sickness ceased, and this gallery has ever since continued as healthy as any part of the Institution."

From the report of the resident medical officer of the asylum at Hanwell, it appears that no case of fever has occurred in that institution, containing 961 inmates, since his appointment, a period of four years, and that he has been unable to find any record of such an attack for a much longer time. There is unmistakeable evidence that during the late epidemic, this institution was not exempt from its influence, for 140 females were attacked with diarrhœa, 17 in one night, together with

one nurse, all in the same ward, the diarrhœa being attended by great exhaustion, but none of these cases passed into the developed form of the disease, and no case of cholera occurred.

Several facts are stated relative to the results of improved sanitary conditions in the great hospitals of the metropolis. In St. Bartholomew's Hospital, for example, 478 cases of cholera were admitted into some detached wards. The average number of ordinary patients is 500, and there are upwards of 100 female attendants: out of this large number of nurses not a single case of cholera occurred. It is stated that great attention is paid to the sanitary condition of the establishment, and that in the year preceding the late epidemic the sum of 2,000*l.* was expended in improving the drainage of the hospital, which is represented as being now in a very efficient state.

Similar exemptions are described as resulting from improvements recently introduced into St. Thomas's Hospital and Middlesex Hospital.

Dr. Sutherland, after giving an abstract of the localizing causes in the various cities and towns under his inspection, and pointing out the circumstances under which certain portions of them were exempted from cholera, sums up the result of his experience as follows:—

"In every district which it attacked, its ravages were most fatal where the sanitary conditions were the worst. It took a smaller number from amongst those who lived in healthier localities; and, as a general rule, it may be stated, that those parts of our cities and towns which careful observation would pronounce as likely to be the most healthy, escaped almost entirely. The epidemic was no respecter of classes, but was a great respecter of localities—rich and poor suffered alike or escaped alike, according as they lived in the observance or violation of the laws of their physical well-being."

Even when the exemption was not complete, as in the preceding examples, numerous instances occurred in which marked benefit was experienced from even minor improvements. In Liverpool it is stated that the total mortality from the epidemic cholera of 1849 was about equal with that from the epidemic fever of 1847; and Dr. Duncan gives the following instances, among

others, of decided benefit derived from recent improvements:—

In 1847, Lace-street, one of the most unhealthy streets in Liverpool, was undrained. In that year there occurred in the street 200 deaths from fever, and 250 more from other causes. In 1848 it was sewered. During the epidemic of the following year, (1849) the deaths from cholera were only 36.

In a certain number of registered lodging-houses, the history of which has been traced, there occurred annually, *before* registration, which involves supervision, prevention of overcrowding, and attention to cleanliness, 150 cases of fever. During the late epidemic there occurred in these houses only 98 cases of cholera; while the total cholera cases in the town were to the fever cases of the preceding years referred to as 2 to 1; so that cholera *after* registration was only in the proportion of one to three as compared with fever *before* registration.

In a certain district, at the period of the fever of 1847, the cellar population amounted to 12 per cent. of the entire population. At that time the fever carried off upwards of 500 of the inhabitants. During the late epidemic, the inhabitants of cellars in this district having been reduced to less than 2 per cent. of the population, the deaths from cholera were only 94, or, in the proportion, of less than 1 to 5 of the former mortality from fever.

Dr. J. M. Adams, of Glasgow, records a fact illustrative of the same result, though in a somewhat different way. From having observed that two large tenements in College-street were the constant nurseries of disease, particularly of typhus, he expected, on the breaking out of the epidemic, that they would suffer severely, and therefore kept a watch upon them, causing a house-to-house visitation to be made of the several flats once or twice daily. From first to last there occurred in one of these buildings two, but in the other 15 cases of choleraic disease, three of which, in the latter instance, proved fatal. Both buildings were inhabited by the same class of people; but the first tenement, a few months prior to the commencement of the epidemic, had passed into the hands of a factor, who had caused all its houses and lobbies to be whitewashed thoroughly several times, and by constant inspection enforced habits of cleanliness on the tenants. In the other tenement which suffered matters remained in their usual dirty condition.

Mr. Bowie, in his reports to us, gives among others the following instances of the rapid suppression of the pestilence from the adoption of sanitary measures.

"At Nordelph, Norfolk, after the adoption of efficient means of cleansing, cholera was immediately checked, and disappeared altogether in three days, not a single fresh case occurring after the sanitary measures described were carried into effect.

"At Noss, near Plymouth, and at Offchurch, Warwickshire, it was arrested with equal rapidity. At Offchurch, however, on a relaxation of the measures of cleansing it again recurred; but now, instead of 7 deaths out of 10 cases, there occurred only 2 out of 12. In three days after the resumption of these measures the disease entirely disappeared.

"The experience at East Rudham was the same.

"At Milcham, Norfolk, after the adoption of prompt sanitary measures, the disease was arrested in a few days, and never again broke out.

"In some of the towns and villages of South Wales, where the like measures were carried into effect, the disease was quickly checked, and might have been removed with little comparative loss of life had these measures been persevered in with proper spirit.

"In Scotland generally the same results were obtained, and in one village cholera disappeared from the day that thorough cleansing was effected, and never returned."

Mr. Grainger calls attention to an instance that occurred in the metropolis, showing the beneficial results that followed the removal of a special source of filth:—

"Camden-place," (he says,) "was occupied in 1848 by a number of pig-fatteners, 23 of whom were summoned before the magistrate at the Hammersmith police-court, who ordered the pigs to be removed, allowing two months for that purpose. The majority of the people complied, but some refused; one of these was fined 10*s.* a-day till the nuisance was removed, and, after a fine of 2*l.* had been incurred, the animals were taken away. This amelioration was effected before the cholera, which produced such dire results in the Potteries, had broken out in this part of the metropolis: the results, which were most striking, are thus stated by Dr. Lewis in his Report:—

"'During the first 10 months of that year (1848), with a population of 518, there were in Camden-place eight deaths, while, after the removal of the pigs, and the consequent cleansing of the street, with a population increased to 532, there was but one death in the corresponding 10 months of 1849,

although a most fatal epidemic has been superadded to other ordinary causes of mortality.'"

Mr. Grainger thus sums up the result of his own observations, with reference to the metropolis:—

"Having," (he says,) "carefully gone over the whole of the evidence collected by the medical inspectors; having well weighed a large number of facts communicated to me in a series of years by practitioners of all classes, residing both in town and country; and having also considered all the various circumstances that have fallen directly under my own observation, I feel myself justified in stating, that in no one instance has a well-matured plan of sanitary amelioration failed in the great object of all these proceedings—the diminution of sickness, suffering, and death, and the consequent promotion of human happiness. Whether the amelioration consisted in removing a damp and foul evaporating surface by flagging a court, or in promoting the free circulation of air by widening streets and exposing narrow alleys to the renovating influence of the direct rays of the sun, or in the substitution of water-closets for pestilential privies, or in the provision of a pure and ample water-supply, in each and every instance disease, and especially zymotic disease, has decreased, and life has been prolonged. To this statement I know not a single exception."

Dr. Sutherland states, in regard to the sanitary precautions directed by the regulations of the Board,—

"That the temporary measures for the removal of the localizing causes of cholera, ordered by the regulations of the General Board of Health, have, *cæteris paribus*, been successful, precisely in the ratio of the ability and perseverance with which they have been applied."

There is an opinion entertained by some persons, that epidemics and the mortality they produce, are necessary evils, and that they are attended at least with this good result, that they keep down the population, the excess of which would occasion worse evils than the natural remedy, severe and painful as that is. A careful examination of facts shows, however, that there is no real foundation for this inference; and tends, indeed, to the very opposite conclusion. It is proved by indubitable evidence, that an excessive mortality, instead of diminishing the population, eventually increases it; the excessive deaths in the worst conditioned districts, being invariably followed by a more than proportionate excess

in the number of births. Thus, in Manchester, while the births are 1 in 26 of the population in the unhealthy parts, they are only 1 in 33 in the more healthy districts; the proportion for the whole town of Manchester being 1 in 25; a proportion which shows the extraordinary fecundity of this manufacturing community: the proportion for the whole of England being no more than 1 in 31, for Devon and Hampshire 1 in 36, and for Salop only 1 in 37.

This subject has recently undergone a renewed and very careful investigation with reference to the city of Bristol, by Mr. Clark, one of our Superintendent-Inspectors, who arrives at the following general conclusions:—

"That in those districts in which the per centage of deaths is the highest, the ratio of the increase of population is likewise the highest; or, more simply, *where the many die, the many are born.* Thus, in St. Mary Redcliffe (Table III.), 25 in 1,000 of the population died; 36 in 1,000 were born; and the ratio of increase was 1·08, or 11 in 1,000; being at the rate of 160 per annum. Again, in St. Paul, 24 in 1,000 died; 34 in 1,000 were born; and the ratio of increase was 1·16, or 12 in 1,000; 173 per annum. So, in St. Augustine, the relative proportion is 22 to 31 in 1,000 or in the ratio of 9; 120 per annum. In Castle Precints (excluding St. Peter's Hospital), 21 and 24, the ratio of increase being only 3 in 1,000; 30 per annum. In St. James, 23 and 29, or 6 in 1,000. Now, had the births to the deaths, in the two latter districts, been in the same proportion as in St. Mary Redcliffe, instead of 24 and 29, they would have been 29 and 33 (25 : 36 :: 21 = 29, &c.), and the increase of the population in the seven years, instead of being only 212 and 405, would have been 820 and 807; and, consequently, the respective populations, in the year 1848, would have been 11,546 and 11,362; whereas, the table shows them to be only 10,938 and 10,960. A *great mortality*, therefore, so far from *decreasing*, tends directly, in a series of years, to *increase* the population. This is in accordance with what has been observed in the case of extensively fatal epidemics. Hence, the occurrence of fever or cholera, which prove fatal to so large a proportion of the labouring classes, entails a double expense upon the community at large. First, and directly, by the sickness and mortality, and widowhood and orphanage they occasion; and, secondly, and indirectly, though not less truly, by the additional numbers born, as the sequel, if not the result of such previous mortality. And hence, it likewise follows, as a necessary consequence, palpable to those who

have studied the subject, and gradually becoming more obvious to those who have not, *in the practical and irresistible form of increased poor-rates*, that the neglect of sanitary measures is the neglect of pecuniary economy; and their adoption not more the duty than the interest of a community."

Thus the result of the most recent inquiry has afforded powerful confirmation of the truth of the earlier conclusions as to the effect of epidemics at which Dr. Lyon Playfair had arrived, who says:—

"Careful investigation into facts has brought the indisputable conclusion, that disease and pestilence do not always check the increase of our species. Nay, singular and incredible as it may appear, these scourges are not merely powerless to restrain, but they actually give an impulse to population. The facts exhibited in the preceding sections will, I apprehend, convincingly show that a crowded and unhealthy district, with all its immutable accompaniments of low morals and low intelligence, where the condition of human beings is scarcely above that of animals, where appetite and instinct occupy the place of higher feelings, where the barest means of support encourage the most improvident and early marriages, is not the place where we shall find a diminishing or even a stationary population; for the early unions are followed by early offspring, and although more than half that offspring may be swept away by disease during infancy, yet nearly a third of it will grow up in spite of all the surrounding evils, to follow in the steps of their parents, and, in their turn, to continue a race ignorant, miserable, and immoral as themselves."

There has not yet been time for the development of the consequences of the late epidemic upon the condition of the population, but there is no ground for believing that the results will be dissimilar from those of other epidemics in the particular districts which they ravaged. In the metropolis alone there perished upwards of 6,000 males and females, between the ages of 20 and 60, belonging to the industrious classes. For those prematurely cut off younger persons will be substituted; there will be increased marriages and re-marriages, and an increased proportion of births: and the immediate void occasioned by such dreadful sufferings will be more than filled up by a population on the whole younger, and containing, with the widows and orphans of those who have been destroyed by cholera, a population,

having, on the whole, a larger proportion of dependent members.

We submit that the facts now adduced establish a positive and invariable relation between certain conditions at present existing in towns and cities and excessive sickness and premature mortality among large classes of the people; that these conditions do not inevitably arise out of the existence of town and city populations, but on the contrary that they admit of prevention; and that their prevention is the prevention of suffering, loss of life, physical and moral deterioration, pauperism and crime.

The Legislature having recognised the practicability of the removal and prevention of these conditions, and enacted positive provisions for the accomplishment of this object, we submit that the local authorities charged, with the administration of these provisions, are responsible for neglect of this most important duty.

The Commissioners for the Consolidation of the Criminal Law have adverted to this principle of reponsibility and the attachment of legal culpability for the omission of duty in the following terms:—

"1. The law takes no cognizance of homicide, unless death result from bodily injury, occasioned by some act, or *unlawful omission*, as contradistinguished from death occasioned by an influence upon the mind, or by any disease arising from such influence.

"2. The terms, '*unlawful omission*,' comprehend every case, where any one, being under legal obligation to apply food, clothing, or *other aid or support, or to do* any other act, or make any other provisions for the sustentation of life, or prevention of injury to life, is guilty of any breach of such duty.

"3. It is homicide, although the effect of the injury be merely to *accelerate* the death of one labouring under some previous injury or infirmity, or although if timely remedies or skilful treatment had been applied, death might have been prevented."

We apprehend that the experience of the late epidemic has afforded stronger evidence than before existed of the amount of evil involved in this description of *unlawful omission*; and has placed in a stronger point of view

the modifications required in the existing law for the accomplishment of the intentions of the Legislature.

In carrying into effect the Act, which, on the approach of cholera in 1848 we were appointed to administer, we framed our regulations with a view to prevent, as far as might be practicable, the outbreak of the disease or where that should be found impossible to check its progress, and to administer relief to the sufferers. Assuming that the measures available for the prevention of cholera were the same as experience had proved to be effectual for the prevention of other epidemics; that the places in which these measures would be first and specially required, and the classes of the population which would most urgently need whatever protection they might be capable of affording, were the places and classes the most subject to typhus and other zymotic diseases, and that it was desirable to bring these measures into operation as long as possible before the actual outbreak of the pestilence, we issued on the 3rd of November 1848, to the Boards of Guardians for England and Wales, and on the 19th of November 1848, to the Parochial Boards of Scotland, the General and Special Regulations, of which we have already given an account in our first Report.

We have subsequently received much evidence as to the practical efficiency of the preventive measures involved in these regulations, and of the spirit in which they were accepted and executed by the authorities appointed by the Legislature for carrying them into effect. The efficiency of all the other regulations depended on the fulfilment of the one which required the Guardians to make out a list of the epidemic localities in their respective districts, and to cause their medical officers to visit and report on the actual state of such localities, and to certify the special measures and precautions which each demanded. It was intended that this first step of preparation for meeting the impending pestilence should be taken simultaneously all over the country as soon as the Regulations were issued, and the common danger appeared to warrant the expectation that this reasonable course would have been pursued. We regret to have

received from our medical inspectors, as the result of their personal observation and enquiry, the following statemnts:—

With reference to the Metropolis Mr. Grainger reports:—

"It must be obvious to all unprejudiced persons, that if any combined and efficient efforts were to be made by the agency of sanitary amelioration, to guard the population of this vast metropolis from the ravages of the destructive pestilence with which it was at the period in question threatened, no initiatory measures could be better adapted to secure that all-important object than those set forth in the above regulations; and yet I am bound to state that, with some few exceptions, they were disregarded by the various boards of guardians in London and its neighbourhood for many months after the cholera had given unmistakeable evidence of its presence by severe though restricted outbreaks in divers metropolitan parishes. In spite of these regulations and significant warnings much precious time was thus irrevocably lost; no systematic sanitary precautions were adopted; and I consequently found on visiting various localities on the reappearance of the disease in June and July, as the medical visitors did subsequently in September, that foul and obstructed drains, filthy houses, and overflowing cesspools, were as rife as they were before Christmas, when the epidemic first broke out. This was even the case in the various spots where cholera had formerly prevailed, and where the whole class of epidemic diseases had again and again recurred.

"On seeking to learn the reason why the preventive sanitary measures prescribed by the General Board had in so many instances been neglected, one of the most fundamental omissions connected with the local management of the late epidemic, and to which, according to my judgment, by far the larger portion of the evils that followed ought to be attributed, came to light. *The parochial medical officers, with some few exceptions, had neither been consulted by the guardians on the measures required at such a crisis, nor authorized to examine into the causes affecting the public health*, and this notwithstanding the express requirement contained in the official regulations, that the guardians should 'cause the medical officers employed by them, or specially appointed for the purpose,' to visit all places where epidemic, endemic, and contagious diseases had of late prevailed, and report on the sanitary precautions required.

"So early as the beginning of November, 1848, the General Board of Health gave ample and distinct information upon this all-important point; it published a large body of medical

evidence, derived from the most competent observers, to show that, as the neglected and filthy parts of a town,—the parts unvisited by the scavenger, the parts unsewered and undrained, the parts having no proper supply of water for washing away their filth or for domestic use,—were the chosen spots where typhus prevails, and decimates the population, so were they the special seats of cholera; it pointed out that this had been universally proved in respect of the epidemic of 1832; and in order to ascertain if, as could scarcely be doubted, the same law would be observed again in 1848, the General Board instituted extensive inquiries, and all of which distinctly demonstrated that the march and progress of cholera, so far as it had then extended, was, as in the former attack, in the midst of the fever districts.

"Now these districts were as familiar to the medical officers of the metropolis as if they had been marked out on a map; each and all of these gentlemen, had they been required, or even, I may but in too many instances say, had they even been permitted, to lay before the guardians the information they possessed, could, before a single case of cholera had occurred in their districts, have placed their finger upon the very spots and houses which, supposing no ameliorations to be effected, would furnish the victims of the coming disease.

"But, unhappily, after all the information that had been collected and published, after the repeated efforts made by the General Board to ensure to the public the benefit and protection of well-considered and efficient sanitary precautions, the lessons of experience were but too generally neglected by the authorities more especially bound to adopt them; and the population of London, and specially the poorer classes of it, found themselves, when cholera began to rage among them, as unprepared to meet it as in 1832, if they were not, owing to increased numbers, even in a worse position."

With reference to the observance in provincial towns of the regulation requiring the special examination of epidemic localities, Dr. Sutherland reports:—

"I am warranted by experience in stating that had this process been rigorously carried out the severity of the epidemic attack would have been materially lessened, and a vast number of lives saved; but I am sorry to say that in the majority of instances no efficient steps of the kind were taken, and in many the regulation was totally neglected. It is fortunate that town councils, and other local boards, having cleansing powers, frequently took an independent course, and no doubt much good was done in this way; but in most of such instances the active cleansing operations were not commenced

till the epidemic appeared, and in a few they had to be carried out while the disease was ravaging the towns; while in almost all, that concentration of effort on the epidemic localities, and that continued watchfulness over them which could only have been exercised by a rigid adherence to the letter of the regulations, appeared neither to have been understood nor put in force. I am truly glad to have been able to adduce examples of a very different kind, but the undeniable saving of life which resulted only makes the great losses which have arisen from local neglect elsewhere appear the more lamentable.

"The provisions of the Contagious Diseases Prevention Act, for removing nuisances, were very generally put in force with greater or less effect; but as *continued cleansing and inspection of fever districts* was the preventive measure really required, the simple abatement of a few nuisances, though praiseworthy in itself, and useful so far as it is went, was by no means sufficient to protect the public health.

"A true and intelligent sense of the awful calamity impending over the country, and of the unremitting energy which would be required to prepare the population, as far as practicable, to resist it, would have led to the immediate exercise of all the powers granted as soon as they became known, and to their continued exercise until the last footsteps of the epidemic had disappeared from the country. *The preparatory measures*, generally speaking, were thus only partially and, as a necessary consequence, inefficiently applied. In order to make temporary sanitary ameliorations effective to the preservation of human life, they ought to be in operation for some time before the epidemic prevails in the district. In the great majority of cases, however, the most extraordinary apathy existed in regard to this matter; and it was generally thought to be sufficient to begin the cleansing of bad districts of towns when the disease was in the immediate neighbourhood. I have no doubt that beneficial results arose even from these very imperfect measures; but that they were by no means what might have been attained, is sufficiently proved by the experience of towns where a more enlightened and intelligent management was pursued. Whole months of *preparation* would have been required to fulfil the intentions of the regulations.

"In some cases I am sorry to say I have found nothing done even while the epidemic was ravaging the towns. All the old localizing causes were left untouched. To all intents and purposes no one fact of sanitary science might ever have been ascertained, so far as the local authorities were concerned; and, as might have been expected, the most disastrous consequences have in these instances ensued."

From the defective manner in which the preparatory measures were executed, it became the more necessary to endeavour to carry into effect measures for checking the extension of the disease, and for affording prompt assistance to the sufferers. We relied chiefly for preventing the extension of the disease on measures for the external and internal cleansing of infected districts; and for the relief of actual sufferers, as well those labouring under the premonitory as the developed stage of the malady, on the organization of a system of house to house visitation; the provision of additional medical assistance; the opening of houses of refuge for the temporary reception of persons whose safety could be secured in no other manner; the establishment of dispensaries and, in a few instances, cholera hospitals, and facilitating the early interment of the dead. The practical results of these measures, when carried into effect energetically and as a combined system, were unexpected by those who witnessed them, and they appear to us to be highly important for future guidance and warning.

External and Internal Cleansing.—We stated in our Second Notification that where water is not laid on at high pressure, but can be otherwise obtained, the most efficient means of cleansing would be by the use of a small fire or garden engine; but that wherever water is laid on at high pressure, advantage should be taken of the hose and jet, which removes the dirt from the carriage-way much more effectually than the street-sweeping machine; gives to the pavement the appearance of having been as thoroughly cleansed as the stone steps in front of private houses; and when properly applied in close and dirty courts and alleys, rapidly carries off the filth, destroys offensive smells, and by suddenly changing the temperature and so causing a current of air, produces a sense of coolness and refreshment. We further showed that cesspools may be cleansed in one-third of the usual time, and at one-third of the usual cost, by means of a two-handled pump and hose, wherever there is a sewer within reach into which their contents may be discharged.

We may cite among many other instances of immediate benefit arising from this mode of cleansing, the case of Harebrain and Slater's-courts, and several other courts in Rosemary-lane, Whitechapel.

In December, 1848, cholera broke out severely in two of these courts, under circumstances which gave rise to an investigation by the coroner. Before the disease had yet become epidemic in the metropolis, eight cases of cholera occurred in one of these courts and four in another. The whole of the neighbourhood was found to be in a most disgusting state of filth from the accumulation of fish, soil, offal, refuse of various kinds, and the overflowing of cesspools into the yards, and, in some instances, even into the houses. Directions were given to make a thorough cleansing of these localities by the pump and hose. In the course of three days 70 cubic yards of soil were removed from 12 courts; seven courts were cleansed and the accumulations removed from them; and 12 yards and courts were thoroughly cleansed and lime-whited. The superintendent states, that the result of these labours was most satisfactory; that a change was effected from the disgusting condition with which the inhabitants had been for months annoyed, producing in himself and assistants severe headache and vomiting, to one comparatively salubrious, for which the poor people most strongly expressed their thanks; that the progress of cholera was immediately arrested, and that there was no return of the disease.

This thorough cleansing in like manner exterminated cholera in several other spots on which it suddenly broke out and from which it threatened to extend, as in George-yard, in the same parish, and in several other streets and courts in adjoining districts.

A similar result was effected under the direction of Dr. Sutherland, during a severe outbreak of cholera at Sunderland.

"The chief means of cleansing I advised," (he says,) "was washing the streets and lanes, and flushing the sewers with the fire-engine, the water for which was forced upwards from the river. The disease immediately subsided on the use of this measure, but increased in a few days, and again nearly

disappeared after a heavy rain-fall, which produced a thorough cleansing. The same occurrence took place a second time after rain, and cholera then disappeared entirely."

In our Second Notification we called attention to the great importance of lime-washing as a measure of cleansing the interior of houses, and recommended the local authorities to engage a sufficient number of persons accustomed to the work, for the express purpose of carrying this purifying process through all houses in the poorer districts which had heretofore been fever nests, and which would therefore probably become the seats of cholera. The experience of Edinburgh, had already shown that, by the aid of two men, with no other implements than a painter's white-washing brush and a pail, a second or third rate tenement containing two or three apartments, might be effectually lime-washed at an expense not exceeding from 9*d.* to 1*s.* per tenement.

"The solution of lime in water," (says Mr. Ramsay,) "is very quickly applied, and when the workmen become accustomed to it, which they soon do, they put the inmates to very little trouble, and do not occasion the usual splashing about of the material, the fear of which creates an aversion to the operation in the minds of indolent and infirm persons, not always to be overcome. When one or two houses have been cleansed and limewashed, many of the neighbours, gratified with the fresh smell of the lime, and its light and agreeable effect on the black and dirty walls, apply to have their houses also washed; and others, seeing with how little inconvenience to themselves it is accomplished, and its agreeable effects, on their permission being asked, very rarely refuse."

Recent experience has proved that this cleansing operation is more effectual in the suppression of disease in general, and cholera in particular, than had heretofore been understood.

"There could be no doubt whatever," (says Dr. Sutherland,) "that the disease was immediately checked in numerous instances by the use of this measure. Houses with filthy, damp, mouldy walls, are peculiarly liable to become the nurseries of fever and cholera; and during the prevalence of the former class of diseases the utility of quicklime-washing had been fully recognised. The General Board of Health, therefore, wisely ordered it to be employed as a measure of prevention against cholera, the favouring conditions of both types of disease having been found to be identical. Numerous cases occurred in which

considerable districts were subjected to the process, both within the houses and on the external walls, and I know of very few instances in which the disease appeared in houses which had been protected in this way."

This operation was again during the recent epidemic carried into effect to a great extent in the worst parishes of Edinburgh, particularly in the districts affected with cholera.

"This process," (says Dr. Sutherland,) "appears to have been mainly relied on as the most effective preventive measure, and I know no city or town where it was adopted to anything like the same extent. It was in Edinburgh that the practice was first successfully adopted to put an arrest on the progress of epidemic typhus, and there can be no doubt that it operated as beneficially in diminishing attacks of cholera in the fever localities. The Canongate parish had nearly every close in it lime-washed; and on making visits of inspection I often found the washers at their work. This poor parish escaped with comparatively little disease.

"In a communication received from Mr. Hay, inspector of the poor of the city parish, he states that in that parish 'the places cleansed by lime-washing and fumigation were 21 closes, 300 houses, 1,060 single rooms, 926 passages, and 1,130 flights of stairs. The cleansing was done by a staff of men, at the expense of the Board, recovered in a considerable number of cases from the proprietors.' The affected portion of the city parish contains about 20,000 inhabitants, and the amount of lime-washing must appear considerable to any one who knows the structure of the houses. It will be seen that the main preventive measures were directed to the diminishing of the absolute number of epidemic attacks, and this may account for the fact that the deaths reported during the late epidemic were only about one half of those reported during the epidemic of 1832, while in all those towns where equally effective sanitary measures were not adopted, the mortality was very much greater from the late than from the former epidemic."

The same results were obtained at Bristol, where there are notorious fever localities, which it is stated—

"Were at once dealt with in compliance with the advice of the General Board of Health. A whole street of fever-courts was thoroughly cleansed and lime-washed, so that on comparing its condition with what it formerly was, the locality could hardly be recognized. All streets requiring constant attention were reported regularly to the proper authorities, and were preserved in a good sanitary condition, so far as the re-

movable causes of disease were concerned. Mr. Goldney reports the results of these measures as follows:—

"'The lime-washing operations were continued throughout the whole time of the epidemic, and certainly obtained immunity from attacks of cholera, even in the most notoriously unhealthy districts. Nearly the whole of a large fever-district was washed prior to the appearance of the cholera, and escaped.'"

Dr. Sutherland expresses his full conviction that one reason why the deaths from cholera in Manchester were not more numerous, was the great extent to which lime-washing and house-cleansing were carried by the local authorities.

House-to-House Visitation.—We founded the recommendation of this important measure on facts which were early brought under our observation establishing the general existence of a premonitory stage in cholera, and proving that the progress of the disease may be almost universally arrested at this stage by appropriate treatment administered within the first few hours after the commencement of the attack. But the evidence on which these conclusions rested was not generally known, or had not been duly considered, at the time when we issued the regulation enjoining the adoption of this measure in the districts and localties in which cholera had broken out. Its efficacy was doubted by medical men; it was undertaken with reluctance by local authorities; it had been tried in no other country, and it was thought of in this by those who had paid most attention to the subject as a thing greatly to be desired indeed, but hardly to be realized. Notwithstanding the efforts that had been made to promulgate information which, if properly attended to, must have rendered the importance of this and similar measures obvious to every one,—

"There was not wanting," (says Mr. Grainger,) "a certain amount of scepticism amongst even the highest ranks of the medical profession. It was my lot frequently to listen to expressions of such incredulity, not unmingled with something of contempt, when the all-powerful influence of local causes in the propagation of fever, cholera, and other zymotic diseases, was asserted."

The state of mind which admitted of incredulity as to the influence of such causes in the propagation of diseases

of this class was of course incompatible with an appreciation of the true value of the preventive measures which were founded on a knowledge of that influence.

Whatever doubt may have been entertained during the epidemic seizure of 1832, as to the general and extraordinary prevalence of the premonitory symptom, namely, diarrhœa, on the general existence of which the visitation system is founded, the experience of the late epidemic has settled this question. Over the whole of Europe, and in every town and village of this country wherever cholera broke out, it was proceeded and accompanied by an enormous amount of diarrhœa. Long before cholera appeared in Great Britain, we were warned that in Russia, wherever the pestilence was prevalent, the inhabitants in general were seized with looseness of the bowels, and that this was the case amongst all classes of the people, and of all varieties of individual constitution. Of Berlin it was stated that almost every person in that city was affected in the same manner. In Hamburg vast numbers of persons laboured under the same affection. In this metropolis, in the districts in which the epidemic was severe, there was an enormous amount of bowel complaints, consisting essentially of diarrhœa, but accompanied also very frequently with vomiting.

"The surgeries of the medical officers," (says Mr. Grainger,) "in all such localities were besieged with applicants; the various dispensaries gave assistance to multitudes of patients; and a vast number applied, in all the poorer districts, to the druggists' shops; and, besides all these, many neglected to seek assistance, trusting either to various remedies of their own, or allowing the affection to take its course."

In the towns visited by Dr. Sutherland, Bristol, Hull, Manchester, Liverpool, the same general prevalence of diarrhœa was observed. In Dumfries, Dundee, and the affected parts of Edinburgh, it was the same. In Glasgow, during the height of the epidemic, nearly the whole population appear to have been thus affected; and this was still more remarkably the case in the more limited populations of the small manufacturing villages. At Coatbridge, consisting of a population of 4,000 souls, there were only about 600 persons exempt from the affection. At Carnbroe, a village near Coatbridge, con-

sisting of a population of 1,200 souls, the entire village suffered; with the exception of about 100 individuals.

This very general prevalence of the affection has afforded extensive and varied opportunities of investigating its true nature; and the medical men who have entered into this enquiry have come to the unanimous conclusion that, whenever diarrhœa prevails extensively in a country and district, where cholera is epidemic, that diarrhœa is premonitory of cholera; that it is not a mere coincident or concomitant; that it is not even merely a predisposing condition, like a multitude of other circumstances, but is part and parcel of the disease not to be distinguished from the actual commencement of the most severe form of the malady. Mr. Grainger states that the peculiarities of this affection were so uniform and striking as to leave no doubt on the mind of those who witnessed the attacks, that they were one and all dependent on the choleraic poison.

"Indeed," (he says,) "I can scarcely recal a single instance among the numerous medical officers whom I had occasion to consult on this point where a different opinion was expressed."

"So thoroughly," (says Dr. Sutherland,) "has the unity of cholera through all its stages been impressed on the minds of many eminent practitioners, that I have occasionally experienced considerable difficulty in obtaining statistical data, in consequence of its being found 'impossible to draw any line between the most severe cases of cholera and the ordinary diarrhœa prevailing, warranted by any pathological distinction.' This conclusion, which was stated by eminent members of the medical profession, rests on that kind of evidence which is derived from careful observation; but during the late epidemic I obtained striking statistical evidence of the same fact.

The following considerations, among others, appear to have led medical observers to this unanimity of opinion.*

* The following striking evidence of the unity of the disease in all its stages is afforded by the Indian experience. In describing the general effects of the atmosphere, which preceded the outbreak at Kurrachee, Mr. Thom says:—

"The morbid tendency in the system which preceded the pestilence, was equally remarkable among the officers and families as among the men. Every one more or less complained of loss of appetite, nausea, and tendency to diarrhœa. The gastric irritation was very troublesome, and created much thirst, at a moment when the stomach was unwilling to retain fluid. The Lichen tropicus (prickly heat) prevailed to an intolerable degree, and I doubt if a single individual escaped it, not excepting even the old acclimatized Indians, who considered themselves secure against it. Of the 410 cases of cholera which were brought under my observation, I do not recollect one in which the whole body was not covered with this cutaneous disease. A great proportion of the officers were ill with dyspepsia, diarrhœa, &c. It was even found that mild symptoms, closely allied to those of spasmodic cholera, existed among the classes who were not sufficiently ill to be put on the sick list, and constitute what I consider to be the choleraic diathesis, which precedes or ushers in an attack. With impaired appetite there was disinclination for animal food, a craving for drink, burning sensation at the pit of the stomach after eating, and the most trifling physical exertion was succeeded by unaccountable prostration of strength, restlessness, and anxiety. Persons who were delicate, or only returned under the head of 'Dyspepsia,' were often suddenly attacked with 'rice-water' dejections by stool, without any other sign of cholera; others had vomiting of the same without purging, but even two or three scanty motions of this kind left the person shrunk, pallid, and depressed in strength. Those who were walking about at duty complained of fulness, tension, and stiffness of the hands and feet, accompanied by an unpleasant tingling sensation in the palms of the hands and soles of the feet; often pervading the whole extremities, and producing twitching and spasmodic startings of the limbs when in bed. These last were very generally felt. At the same time the body was constantly bathed in perspiration, and the very atmosphere had a muggy close feeling, as if it was a vapour bath. During the prevalence of the disease I had no tendency to diarrhœa or dysentery, although I have formerly suffered from the latter in a severe degree; yet I felt a constant tendency to nausea, loathing of animal food, and seldom could eat anything but dry biscuit, toast, or sugar, although undergoing fatigue of no common kind, and at such a season. One night I was attacked with spasms of the calves of the legs, without any other symptoms of cholera except nausea. Two of my three assistants were taken ill in 24 hours after the disease broke out, with diarrhœa and prostration of strength; the other continued at work, but suffered from diarrhœa.

"I refer to this morbidly congestive condition of the system as existing among officers and their families, who are considered to have had a marked exemption from cholera, for it shows that they were equally subject to the atmospheric agencies as the men; and had they been exposed to the same collateral causes as the latter, they would, no doubt, have suffered in an equal ratio. It is this peculiar state of the system which induces me to infer that all were subject to a common uncontrollable cause, which was modified by circumstances under our influence: in one class running into a malignant form, in another so mild as scarcely to merit the term 'disease.'" He adds further, "the symptoms of the disease were the same as those commonly described, only differing in degree in every group, from the most malignant attack to the mildest case of diarrhœa."

1. Diarrhœa suddenly sweeps over the entire area of a city or a district. This happens, perhaps, in the depth of winter when diarrhœa is usually extremely rare: it is preceded and accompanied by violent and fatal outbursts of cholera; if it be not part of the epidemic, what is it? By what external sign or internal pathological character can it be distinguished?

2. The progressive change of the dejections which when carefully observed are found to be at first feculent, then to become gradually paler and more fluid, and, lastly, quite colourless, presenting the characteristic

rice-water appearance of undoubted cholera. In one instance no fewer than 500 cases of cholera were minutely investigated, and were almost without exception found to have been preceded by diarrhœa of this kind of from ten to twelve days duration; and in some cases even beyond this period.

Dr. Burrows, who had the charge of the cholera cases that were admitted into Bartholomew's Hospital, says:—

"From what I could learn from many patients whom I interrogated, and from what I saw in a few at the commencement, I believe there is a period, of uncertain duration, when the stools are feculent, before they assume their peculiar rice-water appearance."

Dr. Frederick Farre has given the particulars of several cases, in which dark feculent motions preceded the rice-water stools.

Mr. Wood, the apothecary of St. Bartholomew's Hospital, states:—

"I find it recorded in several instances that the evacuations contained feculent matter even after admission into our wards. In a very great number of other cases, where the evacuations were represented to have been dark and offensive, diarrhœa had existed for a period varying from two or three to ten days. Some of those cases which terminated fatally most rapidly commenced by a copious liquid and feculent evacuation."

Dr. Lewis, who carefully investigated this point, says:—

"A few hours diarrhœa of ordinary feculent character presented itself; this soon increased in frequency, the stools being still feculent but less so than at first. The peculiarity of the diarrhœa consisted in its utter painlessness and in the patient almost always imagining that the bowels would not be troubled any more for a long time. After these symptoms had continued a very variable length of time, from three or four hours to as many weeks, the character of the discharges entirely changed in their nature. This change usually took place gradually, but sometimes suddenly; from being of the ordinary appearance the ejecta became of a pale white, sometimes almost colourless, so well known by the simile of "rice-water.'"

A similar result was arrived at by Dr. Macloughlin, one of the Inspectors of the Metropolitan parishes, who sums up an extended inquiry in the following words:—

"I am justified in concluding, that I have not found in 3,902 cases of cholera, which occurred in the above nine Unions, one case of cholera without premonitory diarrhœa."

The experience of Berlin corresponds with these statements. Drs. Reinhart and Leubuscher give the following account of the evacuations:—

"The first stools, so far as we could observe them in the few cases which are available for such examination in an hospital, were in the beginning thin, liquid, and feculent, mixed with the remains of food, and coloured by decomposed brownish or yellowish bile, and generally with numerous mucous flocculi. In a few cases this condition of the stools continued during the whole of the cholera attack; but the most usual course was this, that the remains of the food disappeared; that the stools at length consisted only of a thin, watery fluid, with mucous flocculi suspended therein, sometimes still mixed with green bile, which in some cholera cases, remained during the whole attack. In the greatest number of cases, however, the stools were quite colourless, and without the least admixture of bile: these are the so-called rice-water stools.

"We regard the diarrhœa which arises under the influence of the general noxiousness (schädlichkeit) operating at the time of epidemic cholera as the one, and asphyxia as the other point of a progressive series of phenomena, with a number of intermediate stages."

The great accuracy with which the investigation was made by these authors, who had constant recourse to the microscope, gives to their conclusions great weight.

3. The transition of diarrhœa into consecutive fever, an event of frequent occurrence.

Dr. Sutherland states, that in the beginning of the autumn of 1848 one of the earliest manifestations of the presence of cholera on the east coast of Yorkshire, occurred in a village where typhus fever had been very prevalent, and that the fever cases assumed symptoms of a choleraic character, ending in collapse; that in a number of instances the approach of the epidemic was heralded by the appearance of fever, particularly at Glasgow, where typhus and small-pox were prevalent together; that during one outbreak at Bristol, the earlier cases were decidedly typhoid in their character, and that, as the epidemic advanced, the successive groups of cases became more closely allied to cholera, until the typhoid

substratum presented by the earlier cases disappeared. He also states, that in several instances, particularly in Manchester and Leeds, the decline of cholera was marked by the appearance of fever, of a somewhat peculiar type, which at Leeds resembled influenza in several points.

The same transition of choleraic disease into fever is observed in India. Gastric irritation, with diarrhœa, is there so nearly allied both to cholera and fever, that some medical men return the cases under one of these heads and others under the other; and Mr. Thom states, that in the pestilence at Kurrachee gradations were traceable from the most virulent cases to those of simple diarrhœa, and that although the more remarkable gradations may be arranged under certain groups, yet each was linked to the other by a series of cases scarcely admitting of an arbitrary line of demarcation.

"As cholera closed its career," he says, "it gradually changed its type to that of fever: a succession of cases might have been placed beside one another, in which a definite boundary could not have been drawn, scientifically, between the two diseases. The proportion that actually passed into fever, was about one in eight; but a large number of cases were returned as cholera, and presented the usual symptoms of this disease for the first six or eight hours. While one out of four or five of these cases ran into spasmodic cholera, the others would terminate in fever, and were registered as such, showing all the characters of low remittent. As these cases were, at the close of the cholera, I really believe that they were men with greater innate stamina, who had either resisted the disease longer, or thus got over it in a more favourable form, than those who had first been attacked."

4. The comparative mortality of different stages of diarrhœa. Dr. Sutherland states, that of 1113 cases of diarrrhœa observed by Drs. A. M. and T. M. Adams,

"The deaths were 6 or 0·588 per cent. In 49 cases of bilious purging without vomiting or cramps there was no death, the number being too small to give such a result. In bilious purging with vomiting and cramps, the cases were 43, and the deaths 3, or about 7 per cent.; of rice-water purging there were 280 cases, and 12 deaths, or about 4 per cent. The addition of other symptoms in this peculiar stage of the disease appears to be attended with a great increase of danger. Out of 108 cases, in which the serous character of the stools was accompanied by vomiting, there were no fewer than 42 deaths, or

nearly 39 per cent., and the addition of cramps to the other symptoms, which occurred in 281 cases, raised the mortality to 149, or 53 per cent. Perhaps no clearer proof could be given of the unity of the disease and its progressive danger. Even where the disease had gone on to cholera, or where the premonitory symptoms had become so violent as to excite alarm, and thus induce the patient or his friends to send for medical aid, a ratio was found to exist between the *earliness* of such application and the result of the treatment. Of those cholera cases which were brought under treatment within six hours of the time of attack, the per centage of deaths was only about 21. Between six and twelve hours, the per centage rose to above 33. Between twelve and twenty-four hours, 45 per cent. died; and when a delay of more than twenty-four hours took place before application was made for medical aid, the deaths rose to above 62 per cent.

Satisfied that this connexion between diarrhœa and cholera, though so certain, and of such vital practical importance, would not be understood by unprofessional persons, and especially by the poorer classes, we were apprehensive that a great loss of life would be the consequence of leaving the poor to themselves until they should of their own accord apply for relief. It appeared to us that it was not sufficient merely to appoint an additional staff of medical officers to be ready to give their assistance when summoned, but that it was necessary to send those officers, provided with the appropriate remedies, into the infected localities, and even to the very houses of the poor, to examine the inhabitants in their own homes, and while engaged in their ordinary occupations, and in this manner to commence the treatment of the disease wherever it should be found to exist, before the persons affected were themselves conscious that they were the subjects of it. This seemed to be the only effectual mode of dealing with a pestilence the peculiar character of which is, that it runs its mortal course in a few hours, and passes wholly beyond the control of human aid and skill, unless preventive measures are taken against it in its very earliest stage. The practical trial of the system of house-to-house visitation, brought out the evidence of the ignorance and neglect of their perilous condition on the part of all classes, but particularly of the poor, to a larger extent than could have been anticipated.

With reference to the metropolis, Mr. Grainger states that to those who are unacquainted with the actual facts of the case, the extent to which the poor, during the epidemic, neglected the premonitory diarrhœa, must appear almost incredible; that notwithstanding the measures adopted by the authorities to advertise them of the necessity of early application, they were generally, when first seen by the medical officers, already in collapse; and that their ignorance of the connexion between looseness of the bowels and cholera, the apparently slight nature of the attack, and especially *the absence of pain*, lulled thousands into a fatal apathy and security. The following are examples of the statements made by the medical visitors.

Mr. Liddle, Whitechapel Union :—

"It is a well-known fact that the poor would not of themselves make early application for medical advice during the premonitory stage of cholera. In some instances, so slightly did they consider the warning given them by the looseness of bowels, that this was denied when the visitors called; and only when collapse supervened did they acknowledge that diarrhœa had existed, saying 'they thought it was of no moment, as they did not feel ill.'"

Dr. Gavin, Hackney and Shoreditch :—

"Previous to the house-visitation, few poor persons were found who were aware that diarrhœa was a premonitory symptom of cholera; if asked if any person were ill, the almost invariable answer was, 'No, but my husband or child has got a very bad bowel complaint.' One reason for this apathy consists in the belief of the poor that everything of the kind 'will work itself off;' this belief probably arising from the frequency of diarrhœa among them."

Mr. Ferguson, Lambeth :—

"For a long time, especially till the house-visitation was fairly in work, it was astounding to find to what an extent the poor would allow diarrhœa to go on unchecked. I used to imagine there was a peculiar moral obliquity about persons so attacked, for it was with difficulty I could get information from the persons themselves as to their condition, and usually discovered it from another person in the house. It was no unusual thing to find a person having five or six stools in a forenoon, taking no notice of it, and not seeking for any relief."

Mr. Adley, Bethnal Green :—

"I have often met with cases where constant diarrhœa had been allowed to continue upwards of a month, without application for medical relief."

"On visiting one of the courts of Lambeth," (says Mr. Grainger,) "where the disease had fearfully raged, I was told by a poor woman that she had lost her grown-up daughter; and on my inquiring if she had suffered previously from looseness of the bowels, she said, 'Yes, for several days; and being further asked why they did not apply for medicine, the answer was, 'Oh, there was no pain, and we thought nothing of it.' Mr. Benington, one of the assistant medical officers of Lambeth, reported to Dr. Gavin that he lost 82 cases of cholera, in every one of which there had been previous neglected diarrhœa, of a duration sufficient to have afforded ample opportunity to secure the safety of the patient. One of the surgeons of a large parish informed me that he was called to a child labouring under a fatal attack of cholera; that in consequence he visited the house several times, and on each occasion inquired of all the inmates if any one was suffering from bowel complaint, and was answered in the negative. Soon after the father was seized, and became collapsed; and then it turned out that this person, who was present when the surgeon made his visits, had been suffering for some time with diarrhœa, which he had totally neglected. Very frequently, and especially among the poorest and most destitute classes, the only person who could give information was the patient himself, who, from the intense suffering and profound prostration, often of course was in a state in which no satisfactory replies could be obtained. Little reliance in such cases can be placed on the statement of friends, as the following case will show. In a country town near London, where the disease had been most severe, I visited a case of cholera, and on inquiry of the medical officer if there had been any premonitory diarrhœa, a decided negative was given. I then asked the daughter, a grown-up young woman, if her mother, who had become collapsed in the early morning, had had any looseness of the bowels on the preceding day, when a second negative was given. Not feeling satisfied, I questioned the patient herself, when she answered, 'Oh! yes, sir, I was purged all yesterday.' The fact is, that unless the medical attendant makes a more searching inquiry than it is usually possible for a parochial surgeon, overwhelmed as he is with incessant labour, to undertake, the exact preceding circumstances, especially if it be a question of only slight disturbance of the bowels, to which the poor pay no attention, and usually regard as a salutary operation, cannot be ascertained.

"The same kind of difficulty was observed in other countries

Thus, at Paris, M. Guérin says that one of his colleagues, who was too young to have seen the cholera of 1832, but who was a careful observer, affirmed that in several cases there had been no premonitory symptoms. Not crediting this, M. Guérin went to the people, and convinced his colleague that in these supposed sudden attacks cholerine had pre-existed during several days, and in one case for six weeks. The editor of the 'Gazette Médicale' also points out the difficulty of ascertaining the existence of the premonitory diarrhœa; and he adduces the case of a man, said to have had a 'foudroyant' attack, where there had been diarrhœa for two or three days."

Dr. Sutherland states that his experience of the provincial towns of England, Wales, and Scotland, is to the same effect, and attributes this extraordinary indifference, in part at least, to the physical and mental apathy produced by the operation of the poison of the disease on the system, and shows that infected individuals, belonging even to the educated and professional classes, are under the same fatal influence.

"A very ample experience," (he says) "has convinced me that those who are in most danger are least likely to apply, because there is a state of the nervous system connected with a severe epidemic seizure, the tendency of which is to make the sufferer apathetic. The sentient nerves are dulled, and important constitutional changes take place without pain. The discharges which are sapping the very powers of life are permitted to go on, not only without check, but with a certain consent to the feelings of relief which are experienced. No alarm is taken till it is too late, and in not a few instances the relatives have been first aroused to a sense of danger by the last death-struggle of the patient; it has likewise happened that the medical visitor, in going his rounds to seek out cases of diarrhœa, has found the dead bodies of those for whom no medical aid has been sought or procured. Fifty-one such examples occurred in one parish in Glasgow alone. I know an instance of this fatal neglect which happened in the person of an eminent physician, who was particularly successful in the cholera of 1831-32, because he directed his treatment against its early stages, and who, during the late epidemic, was fully alive to the absolute necessity of seeking out and treating the poor in their own houses; nevertheless, with his judgment perfectly convinced as to the danger of delay, and in spite of the urgent representations of professional friends, he permitted a slight attack of diarrhœa to progress unchecked, and did not think it even needful to go to bed, until sudden and fatal collapse put a period to his existence. A very striking case of

the same kind is mentioned by Dr. Malcolm in his Report on the Cholera in Dundee. A system of medical inspection had been introduced into the factories in that town at the instance of the General Board of Health, and it became part of the duty of the mill overseers to warn the operatives to apply for advice immediately on being taken ill. Dr. Malcolm says that one of these overseers 'suffered from diarrhœa for five or six days without asking any medical aid till it ended in cholera, though he was daily during the time he was ill with diarrhœa reporting to the medical attendant of the mill the cases of this disease that occurred among the mill-workers under his charge.' This case also proved fatal. I mention these illustrations, because they afford conclusive proof to my own mind of the danger and inutility of trusting to the feelings of a patient as indicating the necessity for medical relief; indeed, it has not unfrequently happened that, while the poor who were under medical visitation were escaping with diarrhœa, their richer neighbours, left to themselves, were suffering from cholera. Sad experience has proved that a time of pestilence is very generally a time of mental apathy; and even during the present epidemic people otherwise intelligent have been content to suffer because 'all were dying.' Under such circumstances the visitor, if he discharge his duty efficiently, becomes a messenger of mercy, to rouse the apathetic, to caution the vicious, to enlighten the ignorant, and to heal the sick. The *à priori* necessity for some more efficient method of staying the ravages of cholera than the opening of dispensaries, is thus founded on the very nature of the disease."

"In Liverpool, as in every town severely visited, the most extraordinary apathy was found to prevail among the poor in making application for medical relief, however freely it was offered to them. Dr. Duncan states, that 'bowel complaints, particularly when unattended with pain, were looked upon as trifling, and not requiring medical treatment. Many individuals were collapsed before they or their friends thought it necessary to apply for medical attendance.' It was in order to meet this fatal neglect, that the house-to-house visitation was instituted, but even in districts where it was in operation, many cases of diarrhœa were allowed to go on unheeded, 'chiefly from the obstinacy of the parties in refusing to believe that painless diarrhœa could be attended with danger, notwithstanding the plain and repeated warnings which were given.'

"It has been found by melancholy experience both in Dumfries and Glasgow, that neither rich nor poor will, of their own accord, apply for medical aid until the time for its effectual exercise is either past or the chances of recovery reduced to a very small proportion. The premonitory diarrhœa, in a large number of persons, is attended with sensations rather agree-

able than otherwise, the sufferer is lulled into a fatal security and no alarm is taken till it is too late."

That owing to the apathy of the people, produced, in part at least, by the poison of the epidemic, loss of life must necessarily result from the neglect of house-to-house visitation, is further shown by the experience of those who have had the most ample opportunities of witnessing the disease in India.

"That this measure [house-to-house visitation]," (says Dr. Dempster), "is absolutely necessary I feel perfectly convinced, from having had so frequently to lament the infatuated carelessness of soldiers, and the lower orders of civil life on several occasions, for days together neglecting the premonitory diarrhœa, and not applying for medical aid until the urgent symptoms of cholera had made their appearance, and then only at a period of the disease when treatment proved of little avail."

Describing the effect of the epidemic influence on the soldiers and others at Kurrachee, Mr. Thom says:—

"Not a few sunk without suffering or complaint, but lay down to die with an apathy scarcely credible."

In many instances alarm was not taken by the people when they were on the very verge of a violent seizure, and even when the imminence of the danger was unequivocally manifest to the eye of the observer. Some time before what was commonly regarded as the commencement of the attack a change was often discoverable in the colour of the complexion, and the expression of the features. This was certainly the consequence of the poison being already in the system, just as it has been proved by direct experiment that exposure to the epidemic atmosphere of yellow fever, changes visibly the colour of the blood in those who are about to become the victims of that disease; the natural transparent straw colour of the serum of the blood being changed to a deep orange colour. In like manner changes take place internally in cholera, which disorder the action of the vital organs, and communicate to this disease a physiognomy of its own. In an infected locality, says Dr. Sutherland:—

"We find certain appearances among the people, which, when once observed, can hardly be forgotten. The countenance has a peculiar aspect, half anxious, half apathetic. The eyes

are suffused, and often surrounded by a faint areola. The skin has a dusky reddish hue, as if from impeded circulation. I have found such persons averse to exertion, and indisposed to take any steps for their safety. They have usually denied being ill, and refused to leave the locality; and I have not unfrequently been able to predict the deaths of individuals from their positively objecting to being interfered with. Existing cases of fever, or other epidemics, change their aspect and fall rapidly into hopeless collapse."

"The peculiar appearance characteristic of cholera," says Mr. Thom, "was at Kurrachee, often detected in the ranks before the men had any other evident sign of the disease, and for weeks and months after its cessation; we could thereby at once point out those who had recovered. While this guides to an early detection of the malady, it also shows that a peculiar diathesis is in existence prior and often posterior to the climax constituting the danger. * * * I believe that very important changes are effected by the influence of atmospheric agency, before any suspicion is created of their existence. When men were falling by hundreds around us, there were few in health who did not mark their sensations, and all acknowledged that their feelings were strange and indicative of general derangement, while the uniformity of those sensations showed that mere fancy did not produce them."

On the actual trial of the system of house-to-house visitation, it proved to be far more easily carried into effect than was at first apprehended. The presumed difficulty of obtaining an adequate number of qualified persons to undertake a work apparently so extensive and dangerous, was never a practical one. Experience has shown that in the most violent and extensive outbreaks of the pestilence, its virulence is invariably confined to circumscribed localities. Even in the districts the most severely attacked the great bulk of the mortality always occurs within a very limited space, while the disease seldom lasts long at any one point, but attacking a number of points in succession. This is the law of the epidemic.

A large staff of visitors, therefore, is not required. A small number, properly organized and directed, are capable of commanding a very extensive district, and may hunt out the disease therein wherever it exists; but this service requires to be performed with all the precision of a military movement.

A full detail of the organization ordinarily required and found in practice efficient, is given by Dr. Sutherland in his Report, Appendix A, p. 51, *et seq.*; and by Mr. Grainger, with reference to the Metropolis, in the 9th section of his Report: Appendix B.

The general and uniform results of the adoption of this system were:—

1. The discovery of a number of dead bodies, the individuals having died of cholera without having received any medical assistance whatever.

2. The discovery of a number of cases of cholera in various stages of developement, proceeding with different degrees of rapidity to a fatal termination, not only without medical assistance, but without the slightest apprehension of any danger on the part either of the sufferers or their friends.

3. The discovery of a vast number of cases of diarrhœa, some of them bilious, some with rice-water purging, and others advanced to the stage characterised by serous discharges, without any medicine having been taken, without any alteration having been made in diet, without any thought of sickness, and much less any apprehension of the actual commencement of a mortal ailment.

4. The application of a great number of persons to the various dispensaries for the immediate and gratuitous supply of medicines, the opening of which in convenient situations formed an essential part of the visitation system. One special duty of the visitor being to direct all persons who might be taken ill after his visit to make instant application for aid to the nearest dispensary.

5. A gradual and progressive diminution of the developed, and an apparent increase of the premonitory cases, the diarrhœa taking the place of cholera.

6. A decided diminution in the number of attacks.

7. A decided diminution in the mortality.

8. Sometimes a rapid cessation of the disease, and invariably a decided and steady progress towards it.

The effect, however, was often less striking than might have been expected from the real efficiency of the measure, first because it was impossible to carry into effect a universal house-to-house visitation; the regulations of the General Board of Health being intended only for the necessitous: neither the richer portion of the community, nor even persons in the receipt of wages being chargeable on the parochial Boards; and several lamentable instances occurred in which the wealthier classes perished while the poor were saved. Secondly, because the attack of the epidemic was not always a single one. On the contrary, the pestilence commonly attacked large cities, as if they consisted of groups of villages; first appearing in one district or one portion of a district; decimating that; then disappearing there, and breaking out in some other locality. It is obvious, therefore, that even if the preventive measures had actually stopped all the cases in one locality, still the cases resulting from the fresh seizure of another locality would be recorded in the daily returns for the whole city, so that the apparent would be smaller than the real effect produced. It is only when the population is comparatively small, when an efficient preventive medical staff is placed over it, and when the epidemic seizure is a single one, that the effect of the system of house-to-house visitation with its open dispensaries and extensively distributed notices, is seen in its just light.

A selection of the results obtained in some of the towns in which this system was carried into effect with the greatest energy and completeness, may suffice to illustrate its working and the benefits which followed its adoption.

Dumfries was the first town in which the experiment was tried. The population, about 10,000, was not too large; the epidemic seizure was a single one, all the cases, almost without exception, were preceded by neglected diarrhœa. The circumstances were, therefore, favourable for testing the efficiency of the visitation system.

Before any arrangements were made for its adoption 147 of the townspeople had perished; before it could be put into full operation there had occurred 250 deaths. During the three first days in which it was only partially

in use, the fresh attacks daily were respectively 37, 38, 23; and the deaths 9, 6, 9; on the three succeeding days, when it was in full activity, the attacks diminished to 11, 14, 12, and the deaths to 7, 3, 6; and on the following three days the attacks sunk to 8, 4, 2, and the deaths to 6, 4, 5; in three days more the epidemic was at an end; a few isolated cases only occurring during the succeeding eight or ten days.

The diagram, plate 8, taken from Dr. Sutherland's Report, exhibiting in contrast the progress of cholera and diarrhœa, during the prevalence of the pestilence in this town, shows how suddenly and completely cholera was struck down from the day that the full staff of visitors, 14 in number, were in operation. The black line shows the large number of premonitory cases treated by the visitors, and the red line the arrest of cholera, caused by the prevention of its development.

The result was similar at Paisley. The suburb of this town, Charleston, was placed under active visitation at a period when the new attacks of cholera amounted to 23 daily. On the fourth day after the system was in complete operation the attacks fell from 23 to 3 daily, and in a few days more the pestilence had ceased. In the other districts in Paisley which were not under visitation the disease went on after the last case had occurred in Charleston. See Plate 6, Appendix A.

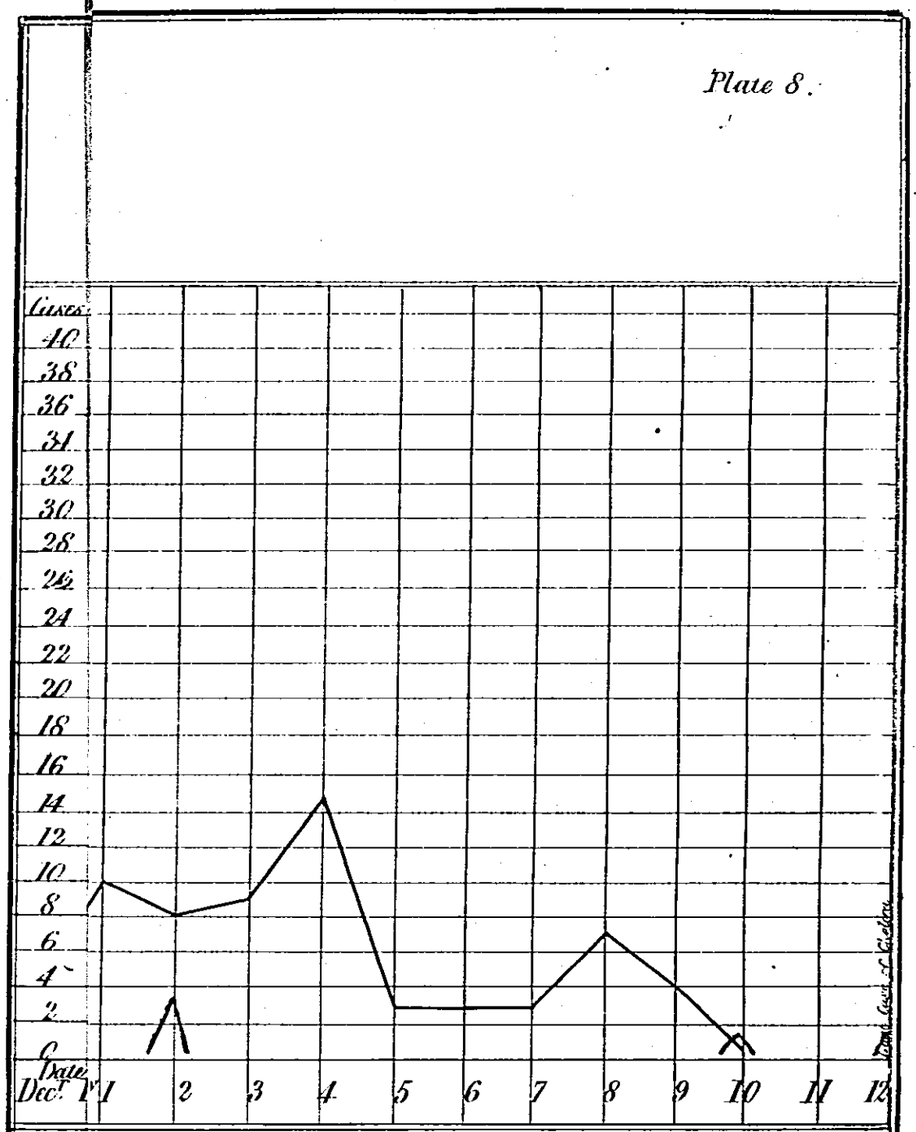
The first epidemic seizure in Inverness was limited to 20 cases of choleraic diarrhœa; of these the first 10, being neglected, all proved fatal; the last 10, being brought under visitation, and thereby under immediate treatment, all recovered.

In Glasgow there were brought under visitation 13,039 cases of premonitory diarrhœa; of which nearly 1,000 had advanced to the stage of rice-water purging; yet, out of this total number only 27 passed into cholera. Taking into account the number of unrecorded cases, it is probable that the real number thus brought under early treatment was not less than 15,000.

The Parkhead district of the Barony Parish, Glasgow, is a circumscribed one, so that the population could be placed under comparatively strict inspection. So

Cholera of Superintending Inspectors of the General Board of Health.

Plate 8.



n 1848_1849. (Cholera, Red. Premonitory, Black).

Dr. Sutherland's Report.

Plate 8.

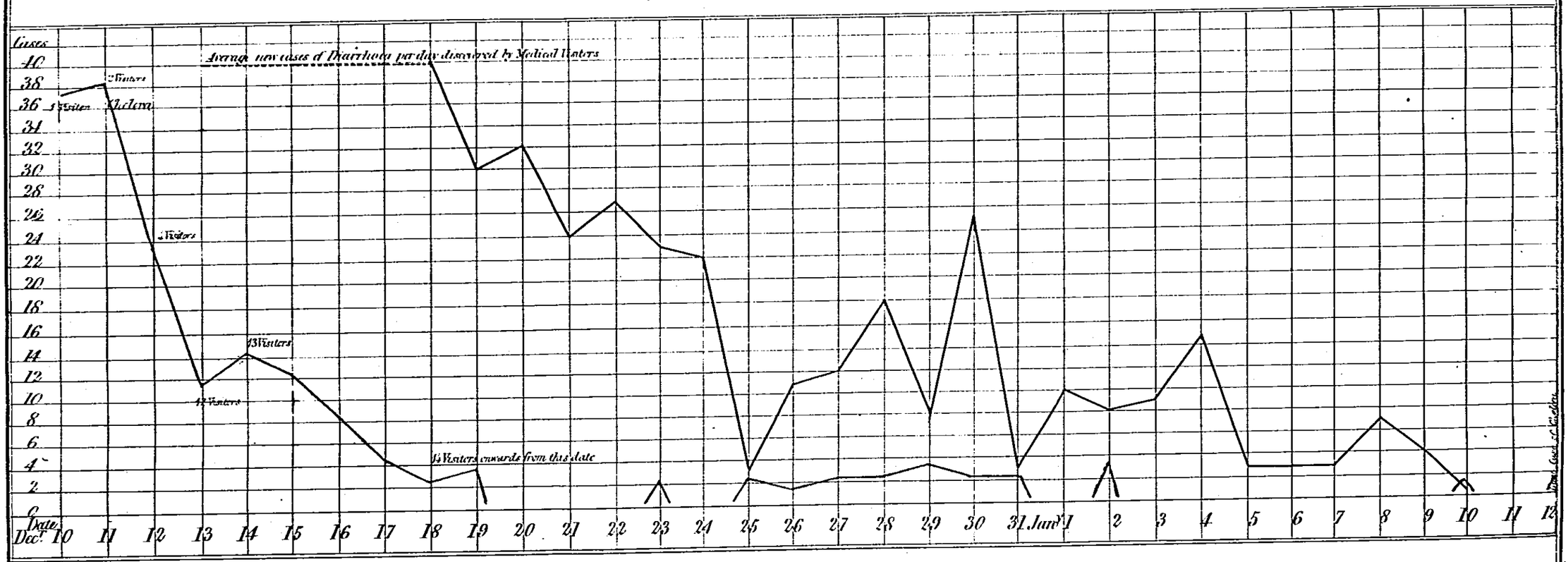
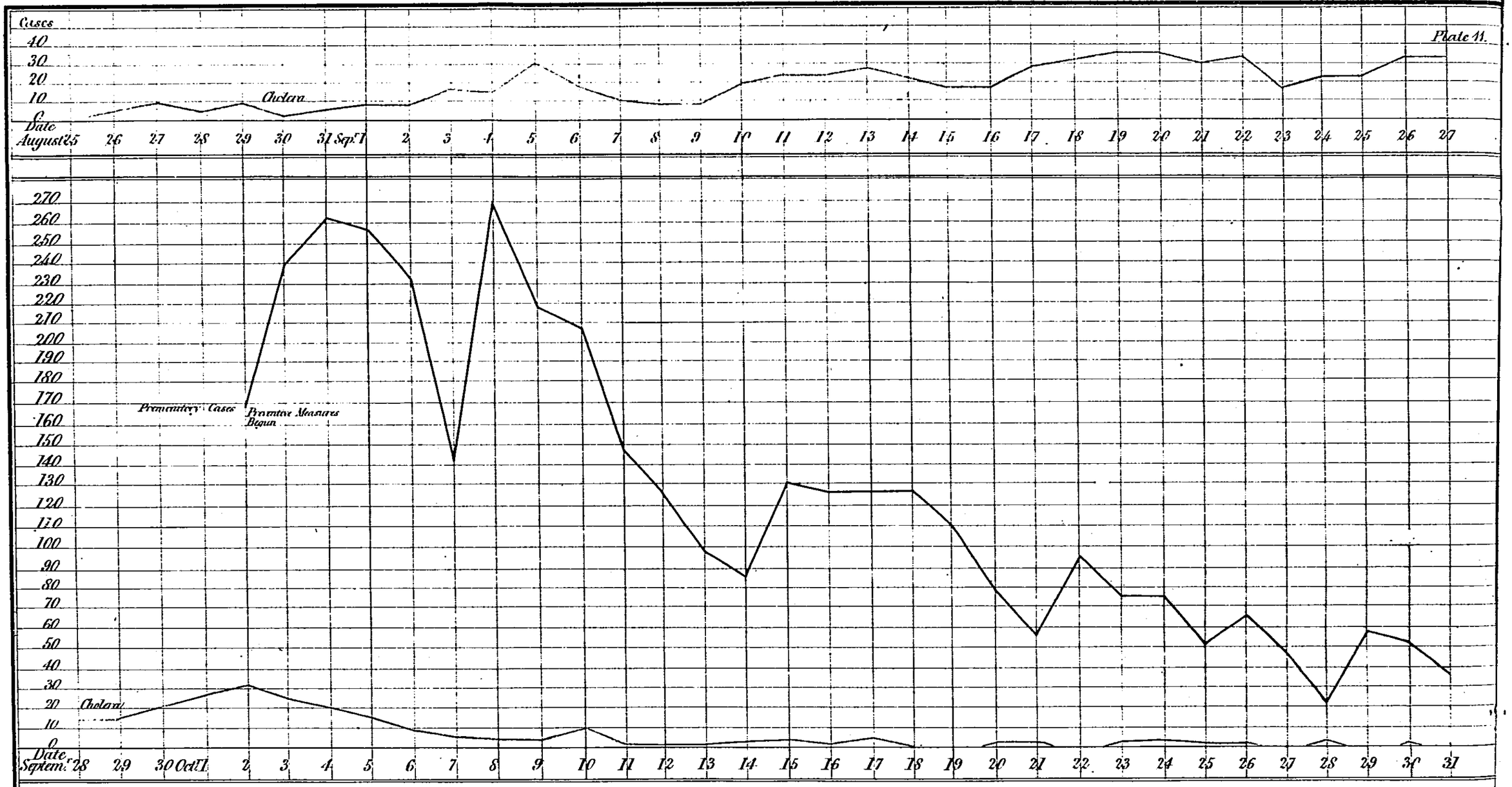


Diagram of Cholera in Dumfries: shewing the results of house to house visitation in 1848_1849. (Cholera, Red. Premonitory, Black).

Dr Sutherland's Report.

Plate 11.

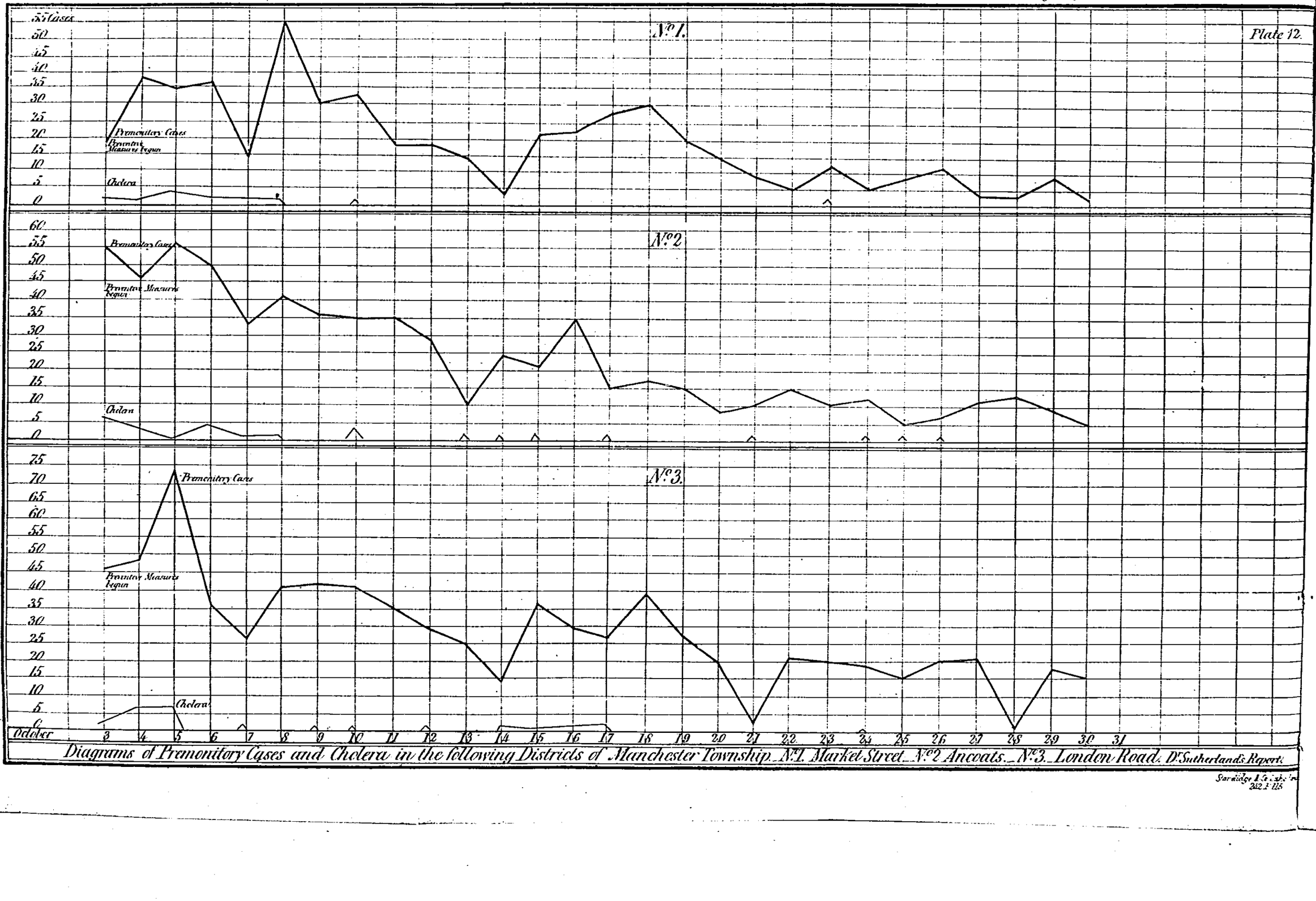


Diagrams of Premonitory Cases and Cholera in Manchester Township from August 25.th to October 31.st 1849.

D.r Sutherland's Report.

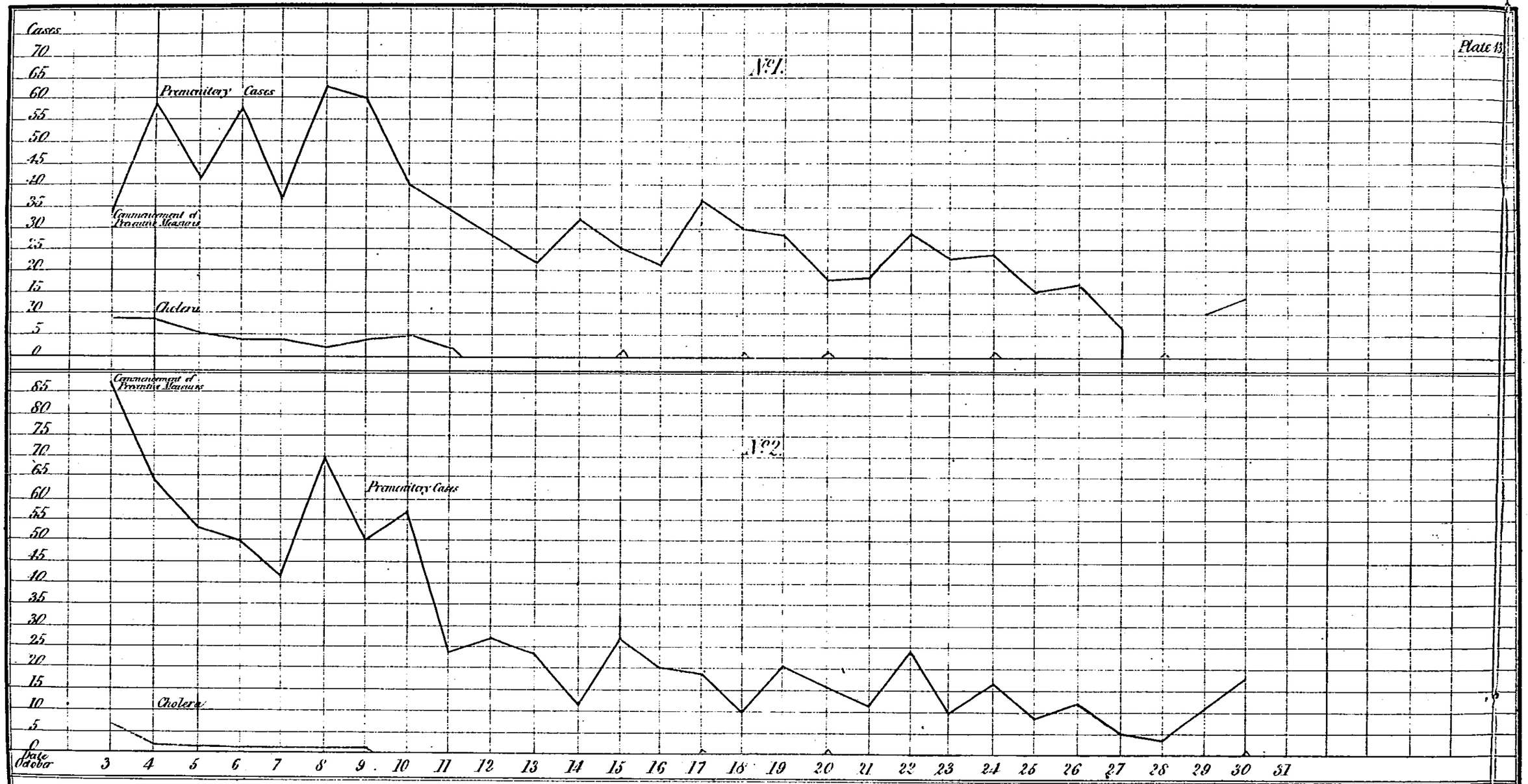
Standidge & Co. 12th. London
244 F.115

Plate 12.



Diagrams of Premonitory Cases and Cholera in the following Districts of Manchester Township. No 1. Market Street. No 2 Ancoats. No 3. London Road. Dr Sutherland's Reports.

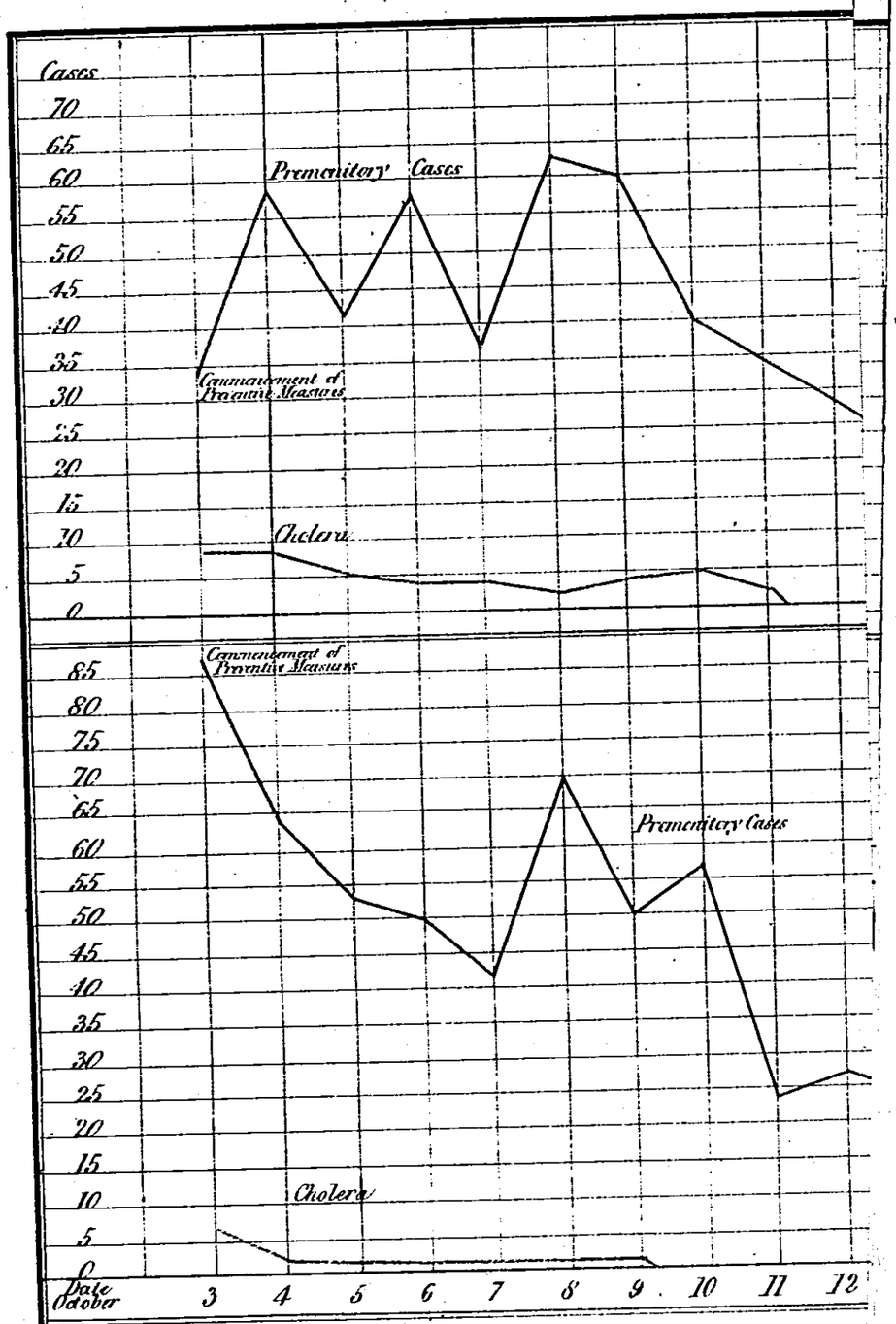
Plate 13



Diagrams of Premonitory Cases and Cholera in the following Districts of Manchester Township._ N.º1 Deansgate, N.º2, S.t Georges.

D.r Sutherland's Report.

Standidge & Co.s Lith. Leeds
245.P.25



Diagrams of Premonitory Cases and

efficient was the visitation in this district, that throughout the entire epidemic the premonitory cases amounted to no less than 2,379 per cent. of the cholera cases. On some days the premonitory cases were to those of developed cholera in the proportion of 3,000, 3,300, 5,900, and even 6,000 per cent., and the result on the cholera, as will be seen by referring to Table IV. and the diagram plate 7, Appendix A., was the complete breaking up of the disease, leaving entire days during which all the cases appeared in the premonitory schedule only, to which it was indeed confined, with a few exceptions, during the whole month of February.

In DUNDEE the visitors discovered 10,792 premonitory cases, of which 705 were on the verge of cholera.

The opinions expressed by the medical officers as to the result of the visitation in these and other towns are stated in Dr. Sutherland's Report. (Appendix A.)

In MANCHESTER the visitors discovered, in all, 3,807 premonitory cases, 261 of which were on the verge of cholera; yet only 27 actually passed into it; and one-half of these were, within the three first days of the visitation, and before it was brought into full operation. Plates 11, 12, and 13, from Dr. Sutherland's Report, show that within a few days after the visitation was in activity, the developed cholera almost entirely disappeared, and the influence of the epidemic was confined to the production of diarrhœa. Plate 11 shows the result for the whole township; and plates 12 and 13 that for each of the five districts, in which it will be observed that the disease was retained and cured in its premonitory stage, and, as a consequence, cholera disappeared. The black lines mark the proportion of diarrhœa cases, and the red lines those of cholera.

"It appears to me," (says Dr. Sutherland,) "that these diagrams exhibit as strong proofs of the success of the preventive measures adopted in Manchester, as the nature of the case admits of."

The medical superintendants and officers were so struck with the immediate check put upon the full development of cholera, that they report severally:—

"Cholera cases diminished at once and rapidly, incipient

cholera or diarrhœa raged for nearly three weeks after the measures were in operation, but confirmed cases had become of rare occurrence."

"The working of the system has been admirable; it is the sole cause to which the rapid decline of the epidemic can be ascribed; the house visitor appears to banish the disease as he progresses.

"The daily searching inspection instituted appears to me to be the only decided means of staying the progress of the disease and of saving life.

"From the very day of the system being established, as will be seen by the returns, the disease gradually gave way, each day bringing in succession a most extraordinary and rapid decrease.

"By inspiring confidence, by the immediate and effectual treatment which it affords to all premonitory cases, and by the removal of many causes of disease which would have been otherwise overlooked, I have come to regard house-to-house visitation as the most important of the preventive measures in epidemic cholera."

The deplorable consequences of the neglect of the authorities of the united parishes of HULL in delaying the adoption of preventive measures has been elsewhere stated. When at length the town was brought under visitation, there were discovered 5,894 premonitory cases, of which 351 were passing into cholera; but the progress of all these was arrested with the exception of 17. A reference to Table V. in Appendix A., will show the enormous preponderance which the premonitory held over the developed cases. In this town the registrar's returns, as compared with the deaths occurring in the practice of the district medical officers, when the regulations of the Board were in full operation, exhibit the melancholy spectacle of the better classes, and particularly the industrious artizans, in the receipt of wages, perishing in large numbers, while the very poorest people were placed by preventive measures in comparative security. Dr. Cooper, who had the superintendence of Sculcoates, after adverting to the sad proof of the virulence of the disease afforded by the number of the medical staff that were attacked, as well as the numerous other persons in the higher walks of life, states, that after the humbler classes, who were the chief subjects of the measure, were placed under visitation, the

disease maintained a singularly equable and rapid decline.

The conduct of the authorities of SHEFFIELD affords a striking contrast to that of the local Board of Hull.

"Soon after Asiatic cholera appeared in this country," (says Dr. Sutherland,) "a few members of the Sheffield Board of Guardians, in conjunction with their clerk, Mr. Watkinson, began the work of preparation for the anticipated outbreak of the epidemic. They took the documents published by the General Board of Health as their guide, and proceeded with the determination of doing all that could be done, and at whatever cost, to save the town from the danger which impended over it.

"Active measures were taken for continuous cleansing and for keeping the town free of nuisances, and suitable officers were appointed for the purpose, the object being to remove as far as practicable every source of atmospheric impurity, so as to enable the population to resist the epidemic influence when it came upon them. The gentlemen on the Sanitary Committee availed themselves of every means of information, and when the advance of the disease became more threatening, they summoned the medical profession together, and consulted with them in regard to the proceedings which ought to be followed.

"The results of this cordial co-operation were most beneficial. With a thorough knowledge of the habits of the people, and an enlightened appreciation of the importance of the great leading points in the preventive measures laid down by the General Board of Health, and guided also by the results of experience elsewhere; the Committee agreed to a certain definite plan of procedure of a medical preventive kind, to be put in operation as soon as the epidemic appeared.

"It is hardly possible to overrate the importance of these preliminary steps. Unlike other Boards of Guardians, they had used the most available means for preparation, and they had nothing to seek when the emergency arrived. All their plans of operations were settled, and their machinery arranged. In this the Sheffield Board of Guardians stands almost alone. They are, I believe, the only body in the country which had the enlightenment to perceive the full extent of their duty, and the courage and energy to perform it. This, I believe, was done without regard to expense, and in the firm conviction that apart altogether from the humanity of the course they had taken, the ratepayers would be large gainers in the ultimate saving of widowhood and orphanage which was, without doubt, effected.

"In addition to the ordinary cleansing operations, the lead-

ing points which were kept in view in the plan of relief measures adopted, were: 1st. Directing the medical treatment almost entirely against the premonitory period of the disease. 2nd. The removal of the healthy from infected houses and neighbourhoods. 3rd. The use of quick-lime wash to a large extent as a preventive measure. 4th. The home treatment of cholera cases.

"It will be perceived that the Board of Guardians adopted those principles so often fruitlessly enforced on other similar bodies by the General Board of Health."

From the period when the first outbreak of cholera took place in the town to the final disappearance of the epidemic, there were brought under treatment 5,319 cases of diarrhœa, and 76 cases of cholera. It is stated, that not a single case came under observation in which diarrhœa passed into cholera, after treatment; and it appears, that out of 145 persons admitted from infected houses into an excellent house of refuge, one-half of which became affected with diarrhœa, only two deaths occurred.

"No person," (says Dr. Sutherland,) "who looks at the nature of these cases, can doubt that they would have exhibited a much greater proportion of cholera attacks had the preparatory steps not been taken. The population was in fact enabled to resist the epidemic influence, and the small number of cholera cases when compared with the large number of those of diarrhœa is a sufficient proof that the object of the sanitary measures was to a great extent fulfilled.

"It will be perceived, that Sheffield exhibits the first and only instance of a faithful and voluntary application of those principles of preventive medicine which the General Board of Health has been so long endeavouring to enforce. The authorities recognized the unity of the preventive measures, and the necessity of working them all together, in order to obtain the best practicable result. While in almost every instance in which the General Board of Health has been called on to interfere, measures have had to be taken hurriedly and on the spur of the moment, not only to prevent or limit the ravages of the epidemic, but to endeavour by every means to save human life from instant danger."

It must be observed, however, that the modified plan of medical inspection adopted at Sheffield, instead of the simple house-to-house visitation, was not successful.

It failed to bring the cases of true cholera that did occur under early treatment; for it is expressly stated, that they were either in a state of collapse, or bordering upon it, when they were found.

"Had the visitation of houses," (observes Dr. Sutherland,) "been so active as to have ensured the early discovery of all these cases, either in the premonitory stage or before the period of collapse, the carrying out of the preventive measures would have approached as near to perfection as possible; but the occurrence of so many cases in the stage of collapse confirms the experience of other localities as to the danger of trusting to the poor to apply for medical aid of their own accord. I attribute the comparative immunity which Sheffield enjoyed from developed cholera, and the appearance of the epidemic in its milder forms, mainly to the very efficient preparatory measures which were instituted and actively carried out for so considerable a time before the disease showed itself among the population.

"The removeable causes were summarily and effectually dealt with, and hence districts escaped with diarrhœa, which, in other towns, would probably have been the seats of cholera. Causes which there were no legal powers to remove were left in operation, and under these cholera localized itself. Perhaps no more instructive illustration of the connexion between epidemic attacks and local sanitary defects could be given."

While these various measures were in operation in the principal towns, nothing efficient was done or attempted in the Metropolis. The arrangements adopted in the city of London Unions were so unsatisfactory as to lead to the interposition of the Lord Mayor and the City Committee of Health. We repeatedly and earnestly urged on the Boards of Guardians of the other metropolitan districts the importance to the saving of life of making immediate arrangements for the introduction of special measures of prevention, suited to their respective localities; but our representations were made in vain. The local authorities could not be induced to carry into effect the preventive measures we proposed, and we ourselves had no means of putting them in practice. Our entire staff consisted of two medical inspectors, one of whom was laboriously and exclusively occupied in grappling with the epidemic in Scotland; and the other, during the 11 months while the pestilence was incu-

bating in the metropolis, besides being called to visit various towns in England in which sudden and violent outbreaks of the disease occurred, was engaged in attending to the demands made upon him by the several metropolitan districts and establishments in which the disease was already fully developed, and, in some instances, prevailing with extreme violence. It was not until the last week of August, 1849, that is, eleven months after the actual appearance of the disease in London, and when the returns of the deaths from cholera amounted to upwards of 1,200 weekly, that we were enabled to engage the services of a sufficient number of medical men to superintend the visitation of the infected districts. Even then several Unions and parishes, among which were some of the most wealthy and populous, positively refused to comply with our directions, so that several of the largest districts were never under visitation at all; in others the plan was adopted only after delays which cost the lives of many hundreds of the people, and in all it was so partially and imperfectly adopted, that we are aware of scarcely a single metropolitan parish in which it can be said to have been thoroughly in practice.

At length, with a staff of eight medical men to superintend the visitation for the whole of the metropolis, and with such medical visitors acting under them as the Unions and parishes could be induced to appoint, the system of visitation was brought into operation in the first week in September, at a period when the weekly deaths from the pestilence amounted to 2,026. The details of the arrangements and the precautions adopted to secure the accuracy of the returns are fully described in the 9th section of Mr. Grainger's Report, p. 145, *et seq.*

The general results of the visitation, imperfectly as it was carried into effect are the following:—

During the 8 weeks in which it was in operation, namely, from the 1st of September to the 27th of October, 1849, with the above staff of medical officers superintending the visitation, there were discovered and placed under immediate treatment:—

Cases of premonitory diarrhœa . . .	43,737
Cases approaching to cholera . . .	978
Cases of developed cholera . . .	780
Cholera corpses, cases in which death took place without any medical attendance whatever.	17
Cases which passed into cholera after treatment	52

From this return it appears that the cases of premonitory diarrhœa were to those of developed cholera nearly as 60 to 1; and that of these premonitory cases, even including the 978 which were on the verge of cholera, not 1 in 800 passed into the developed form of the disease.

For the purpose of exhibiting a few of the results somewhat more in detail, we select three instances in which the visitation was comparatively the most efficient.

Bethnal Green.—Before this district was brought under visitation, in the three weeks August the 11th, 18th, and 25th, the deaths from cholera were respectively 35, 125, and 127. So great was the virulence of the disease that, in the four days from August the 12th to the 15th there took place no fewer than 92 deaths from cholera, and three from diarrhœa.

The registrar of the district states in his returns:—

"The 12th, 13th, and 14th of this month will long be remembered in this neighbourhood, the outbreak of this fatal disease being without any adequate preparation—surgeons wanted in many places at once: the hurried passing and repassing of messengers, and the wailing of the relatives filled the streets with confusion and woe, and impressed us all with a deep sense of an awful calamity."

"In the previous week's return the Registrar remarks; 'Medical men are called in when the people are dying, but it is then too late.' Up to this time no house visitation had been attempted, and the medical staff, as to numbers, was totally insufficient to undertake the work."

Under these circumstances we issued, on the report of the superintendent of the district, a special order directing the immediate appointment of four medical visitors, one additional medical officer to aid in treating cholera cases in the infirmary, a sufficient number of nurses to

take charge of persons attacked; suitable hospital accommodation; a dispensary to be kept open day and night in the centre of each infected locality, two inspectors of nuisances, and a staff of lime washers. Under the urgent circumstances of the case, the Board of Guardians appointed no medical visitor for five days; they provided no nurses; they established no hospital; they opened no dispensary; they appointed one inspector of nuisances instead of two; and they made no provision for extensive and effectual lime-washing.

With the imperfect means at his disposal the visitation was commenced under Dr. Gavin, the medical superintendant of the district, who states that the disease chiefly prevailed in a space comprised in about 400 yards by 150. The registrar of the district in the previous week recorded:—

"From the registration of the last fortnight I find that 99 out of 107 fatal cases of cholera and diarrhœa have occurred in a space occupying less than a tenth of my district.

"Here then," (says Dr. Gavin) "was the proper spot to which to allocate the medical visitors, and to test the practical utility of the preventive measures adopted. The amount of deaths in the week, ending 31st August, in the locality referred to, was 48 of cholera and 6 of diarrhœa. In the week succeeding it was 27 of cholera and 4 of diarrhœa.

"All care has been taken to include every case of the disease which can be discovered to have died elsewhere than in the district, but which could fairly be attributed to the district. *A reduction in the mortality of* 42·6 *per cent. was effected in the first week of the visitation.* As it might be objected that this was merely the reduction natural to the decline of the epidemic, it is necessary to contrast it with the mortality in the town district, where the epidemic had broken out at nearly the same time, and which was then only partially under visitation. In the week preceding the visitation the mortality from cholera and diarrhœa was, 31 cholera and 4 diarrhœa. In the week succeeding it was, 36 cholera and 2 diarrhœa, thus showing an increase of 8·5 per cent. on the previous week, and a difference, as compared with the Hackney-road district, of 50·1 per cent.

"Up to the evening of the 7th September, which may be fairly called the first week of the visitation, as it was not properly organized till the 4th, no less than 1,025 cases of diarrhœa, 38 cases of approaching cholera, and four corpses had been discovered by the visitors.

"In the second week the following were the results:—

Cases of diarrhœa . . .	1,331
Cases of approaching cholera .	26
Cases of cholera	8
Corpses discovered . . .	2"

From a table given in Dr. Gavin's Report it appears—

"That in 54 days, no less than 14,845 persons received gratuitous medical relief, of which number 9,992 were discovered by the medical visitors to be actually suffering from choleraic disease. This gives a proportion of 1 in rather more than every 8, or, in decimals, 1 in every 8·51 inhabitants, who were discovered by the visitors to be actually ill from choleraic disease; and, in every 5, or, more exactly, 1 in every 5·19 inhabitants, who were treated at the public expense. This proportion is so great as to prove two facts:—First that choleraic disease prevailed in this parish to an enormous extent; secondly, that the means used to check the disease were most efficiently brought home to a very large proportion of those who were affected. On the very first day of the visitation, with but one visitor, four cases of unattended cholera were discovered; and on the next day three cases. On the third day, with two visitors, three cases, likewise, were discovered.

"It further appears that, within four days after the visitation had been thoroughly organized, 47 cases of approaching cholera, 42 cases of cholera, and the corpses of five persons who had received no medical relief whatever, were discovered. These numbers formed the following proportions of the total amount of the same kind of disease discovered in the whole of the remaining period of the visitation:—39·2 per cent., 61·5 per cent., 62·5 per cent.; thus proving that immediately on the commencement of the visitation the disease received a marked and sudden check.

"The total number of cholera cases which came under treatment during these nine days, exclusive of the workhouse cases, which, of course, were not amenable to the system of visitation, amounted to 183, while only 199 came under treatment during the subsequent 45 days.

"The disease is thus shown to have been remarkably amenable to measures of prevention when carried out with vigour and promptitude; and I am positive I understate the truth when I give it as the result of all my experience and knowledge, that, with these measures in full operation, at the commencement of the epidemic, and before the severe outbreak on the 11th and 12th of August, in the town and Hackney-road districts had taken place, the lives of three-fourths of those who subsequently perished in the spots already defined as the hotbeds of disease might have been saved."

Shoreditch.—In this parish 8,742 cases of diarrhœa, 30 cases approaching cholera, 11 of fully developed cholera, besides 8 cholera corpses were discovered by the visitors, irrespective of 12,873 persons who applied for and received relief at the surgeries of the medical officers. Altogether, there were brought under treatment in this district 21,116 cases of premonitory diarrhœa; 343 cases approaching cholera, and 197 cases of developed cholera. Of the number of the cases of diarrhœa discovered on visitation only one, and of the cases approaching cholera only two are known to have passed into cholera.

"These results being so remarkable," (reports Mr. Grainger,) "it is proper to state that Dr. Gavin took every precaution to secure accuracy. He met the medical visitors every night to receive a detailed account of the day's work. Whatever case of premonitory attack passed into cholera, after being discovered and treated by these gentlemen, was reported; but as some of the cases discovered by the visitors might have subsequently passed into cholera while under the charge of the parochial medical officers, Dr. Gavin established inquiries with reference to the point. The answers of these officers were to the following effect:—'My experience does not furnish me with a solitary case of simple diarrhœa under treatment passing into cholera.' 'I know of no case of simple diarrhœa sent me by the visitors passing into cholera.' 'I am not aware of any cases of diarrhœa sent me by the visitors having subsequently passed into cholera.'"

It may, therefore, be safely concluded from this scrutiny that, even supposing that some few cases did pass into collapse unknown to the visitors, the results of seeking out and promptly treating diarrhœa in this parish, were pre-eminently successful, preventing a large number of patients from falling into the fatal stage of collapse.

In the Western District comprising St. George's Hanover Square, Kensington, and Chelsea, there were discovered during the few weeks in which the visitation was in practice upwards of 7,000 cases of premonitory diarrhœa, only seven of which appear, after careful inquiry to have passed into cholera. Dr. Waller Lewis, the superintendent of this district, states:—

"That the visitation was no sooner in full operation than the number of cases of cholera rapidly diminished; a greater proportion of recoveries took place among the individuals who

were attacked; instead of cholera the worst form of the disease showed itself in rice-water purging, and soon even this choleraic diarrhœa became rare, and the disease made its last efforts in the form of simple feculant diarrhœa, a stage in which it could be mastered almost with certainty."

The following occurrence is illustrative of the result of efficient visitation. The parish of St. George Hanover Square, had authorized their medical officers to engage whatever extra medical assistance they might deem necessary during the prevalence of the epidemic. They were of opinion that no extra assistance was required; two facts, however, which were one day brought under the notice of Dr. Lewis, at an interview which he had with the medical officers, satisfied him that they were in error. One of the surgeons of the out ward had been called the day before to two cases of cholera; in one of which death took place before he arrived at the house; and in the other the patient lived only one hour and a half after having been first seen. Admitting the danger of thus waiting till they were sent for, the medical officers now consented to the adoption of a vigilant visitation Four assistants were engaged for this purpose.

"From that time," (reports Dr. Lewis,) "although very many severe cases of diarrhœa were discovered and treated, the medical officers were not called upon to attend a single fresh case of cholera. The disease soon abated, so that the visitors were dispensed with after having been employed a fortnight. During that time they discovered about 290 cases of premonitory symptoms, nearly 40 of which they believed would have run into cholera if not brought under treatment."

The diagram facing page 26, in addition to showing the weekly mortality from cholera during the late epidemic, and the corresponding atmospheric conditions, indicates in a striking manner the result of the preventive measures which were at length adopted in the metropolis. In 1832 no preventive measures were in operation; and until the last week in August, in 1849, the metropolis was equally without the protection of any such measures; so that up to this period the disease in both cases went on unchecked. In the first week of September 1849, the house-to-house visitation was brought into active operation. The deaths in that week

were 2,200, but from that time the further progress of the epidemic appears to have been arrested. This will be seen by tracing the blue line on the diagram. No new outbreak was witnessed; the mortality fell in one continuous and rapid course, and in seven weeks had entirely ceased. In 1832 the mode in which the epidemic terminated was widely different. The highest mortality, 900, was attained in the third week in July; it then fell in six weeks to 250; rose during the next four weeks to 650, then went down to 400; rose in the next week to 600, and afterwards, after two more outbreaks of less intensity, gradually declined, and the disease finally disappeared in the latter end of November, *eighteen weeks* after the greatest mortality had occurred.

This would seem to be conclusive evidence, that the house-to-house visitation was the primary cause of the sudden arrest of the epidemic in 1849, as in the one case the mortality fell from 2,200, and the epidemic was at an end in seven weeks, whilst in the other it was 18 weeks, or nearly three times as long before it completely subsided.

We may add to these examples those afforded by another and entirely independent body of observers, namely, the Superintending Inspectors under the Public Health Act, who, in conducting their local preliminary inquiries since the epidemic of last year, have had evidence laid before them as to the efficacy of house-to-house visitation in arresting cholera in districts where the system was carried out by the Boards of Guardians themselves.

In Mr. Lee's Report on Nantwich, Mr. Williamson, Union Medical Officer, states, that—

"The house-to-house visitation was adopted on the 14th July, and was continued with great success until the decline of the disease. The third day after the visitors commenced, I visited and prescribed for upwards of 50 cases of diarrhœa. In many of those cases the parties would not in all probability have applied for medical assistance, and the diarrhœa would undoubtedly have run on to cholera. In the week before the visiting commenced, there were 37 deaths; afterwards, the diarrhœa cases increased, but the lapsed cholera declined."

A similar statement is made by Mr. Nicholson, Surgeon to the Huntingdon Union, who says, that—

"Two cases of Asiatic cholera have occurred, while bilious cholera and diarrhœa have been very prevalent and severe, mostly terminating in low typhoid fever. House-to-house visitation has been adopted, with a decided remission of these disorders, owing to the early employment of remedies; had this system not been efficiently carried out, it is impossible to say how frightful would have been the progress of the epidemic."

In reviewing the general results of this important measure, it is proper to premise that in consequence of information which we received that our regulations were not complied with, even in places in which cholera had actually broken out, and was committing great ravages among the people, we found it necessary in numerous instances to issue Special Regulations, and to direct our Medical Inspectors to visit the parishes infected, in order to see to their execution. Previously to the adoption of this measure, with one or two exceptions, no effectual steps appear to have been taken to bring the disease under early treatment in its diarrhœal stage, and consequently we have received no account of the number of premonitory cases which, in these instances, ushered in and accompanied the first outbreak of the pestilence. Returns, it is true, were obtained from some infected localities, but the whole number of premonitory cases entered in them was so insignificant, as to prove that no machinery was in action by which the real facts could be known. No sooner, however, were the measures directed in operation, no sooner were the medical visitors in the infected districts, inspecting the houses of the sufferers, giving assistance on the spot to those already attacked by the disease, and directing others, probably the next to be seized, to the dispensaries, where, in their absence, they might receive prompt relief, than the returns showed a remarkable change. The existence of the premonitory stage was now, in every instance, without exception, reported in enormous numbers, and the succeeding returns invariably indicated a corresponding diminution in the proportion of developed cholera, and in that of the deaths. Even under the best organized

system of visitation, however, the reporting was scarcely ever full and accurate, although it was probably as much so as could have been reasonably expected, considering the urgent and incessant calls on the time of the medical officers. From numerous districts severely visited by the pestilence no returns at all of premonitory cases were received, while in several of those about to be enumerated, the list of dispensary cases is altogether omitted. Notwithstanding these deficiencies, the returns from Dumfries, Glasgow, Manchester, Hull, Sheffield, Liverpool, Wolverhampton, Dundee, Hamilton, Coatbridge, Carnbroe, Leeds, Sunderland, Bristol, and the metropolis, a portion only of which was under visitation, and even that at a very late period of the epidemic, exhibit 130,000 premonitory cases in various stages of development, about 6,000 of which were passing into developed cholera. Of this enormous number of premonitory cases, not above 250 actually went on to the developed stage of the disease, and the reports show that the larger part even of this small proportion occurred within the first few days of the introduction of the preventive measures, and before they came into full operation. Thus in certain of the metropolitan parishes nearly 28,000 premonitory cases were treated in one month, and of these 11 passed into developed cholera, but seven of this number occurred in the first week. In Manchester, out of 3,807 premonitory cases, a comparatively large number (27) passed into developed cholera; but this happened with respect to 13 of these cases in the first three days, before the visitation was properly organized; and out of the whole 27, 22 went into cholera within the first week. Of all the cases that passed from the premonitory into the developed stage, at Hull, only two did so during the last 20 days of the visitation; and the returns show that similar results took place in nearly all the other districts.

We have selected these 15 towns as examples of the results effected by preventive measures, because those measures were there carried into operation more systematically than in any other towns, and because more complete statistical returns of the results have been received

from them. In Table B will be found an enumeration of about 700 cities, towns, Unions and parishes, many of them returned to us as having been severely visited by cholera, and we have reason to believe that other places were attacked, from which no returns whatever were made. In some of those places the Boards of Guardians and other local authorities may have adopted preventive measures with success, but imperfectly as those measures have been in the great majority of instances carried into effect, the 15 towns above enumerated are those in which they are known to have been the most systematically and perseveringly practised, and from which reliable statistical returns of the results have been received. From these returns it appears, that out of a population thus limited, compared with the extent of the population attacked by the pestilence, no fewer than 130,000 persons in the first stage of the disease, were by the system of visitation, sought out and placed under immediate and appropriate treatment, with such efficacy, that of this whole number, only 250 actually went on into developed cholera, although no less than 6,000 were, when discovered, on the very point of passing into the fatal stage of the malady.

The total returns of cases of developed cholera, during the same period, from the 15 towns above enumerated, including those under the charge of the ordinary medical officers, as well as those discovered by the visitors, amounted to about 8,500. Of those cholera cases, which were discovered by the medical visitors, a large proportion were either in perfect collapse or in a state nearly approaching it. None of the returns show the precise number of deaths among the cases that were discovered, but it is known that the mortality even from developed cholera is much less in localities under visitation than in places where the infected are left to apply for relief of their own accord. Assuming, however, that the deaths were in the usual very unfavourable proportion of one-half of the attacks, it will follow that in the most populous cities of Great Britain the total deaths which occurred under the preventive measures, where these were specially enforced, were only about 4,250. This result was

obtained under the disadvantage of having to introduce a new machinery often in the very midst of the epidemic seizure; not unfrequently in spite of the opposition of the Boards of Guardians, who in several instances persisted in attempting to break it up; in spite of the numerical deficiency of the visiting staff in many parishes; and in spite of the ignorance of the people as to its objects; for they had to be instructed in the purpose and details of the measures introduced to save their lives while the pestilence was at their doors, and in many instances while it was already within their dwellings.

It has been shown that the total mortality from cholera for the whole of Great Britain, amounted to upwards of 60,000. The 15 towns above enumerated include, together with the metropolis, the largest cities in the kingdom, containing the densest masses of the population, crowded together in the closest and filthiest localities, in all of which at the time when the preventive measures were brought into operation the pestilence was raging: yet these masses, unquestionably the most predisposed and susceptible of the general population, contributed only about 4,250 to the 60,000 victims of the disease. Deep as may be the regret that the portion of the general population covered by efficient protective measures was thus limited, there is still consolation and encouragement for the future in the fact that in the most crowded localities in the largest cities, extensively and severely attacked by the pestilence, 130,000 infected persons were visited in the moment of their danger, themselves for the most part unconscious of that danger, and were placed in comparative security, having been sought out in their abodes and brought under prompt and appropriate treatment; the result being, the saving of suffering and life to a vast extent, and affording an instance, on a large scale, in which help was extended to those who were unable to help themselves.

That those who received this help in their time of need were duly sensible of its value, the following statements may suffice to show.

With reference to the metropolis, Mr. Liddle states,

that the four medical visitors of the Clerkenwell district report:—

"The poor almost universally regard the system of house-to-house visitation as a great boon. Mr. Ferguson says,—'They have looked upon our staff as messengers of mercy, and welcomed us with many kind outpourings of grateful hearts; they felt that, though hitherto uncared for in their dire and dreadful calamity, at last the Board of Health has come forward as beneficent guardians of their health, and quieted alarm by efficient preventive measures.'"

Dr. M'Loughlin reports, that in Stepney the poor, seeing in a very brief period that the progress of the disease was arrested by the medical visitation, exclaimed, partly in reproach and partly in sorrow, "Ah! if this had been done sooner, our relatives, who are now in their graves, would have been alive."

Dr. Lewis reports as follows of the feelings of the poor in the parishes and unions under his charge:—

"The medical house visitation was received with the greatest thankfulness. In the overcrowded districts the poor eagerly told the visitors their complaints, and received the medicines most gratefully. The instructions and advice were anxiously obeyed, and the visits were looked for in future. The people told me in several cases that they believed their lives were saved by being called upon by a medical man, while suffering from the weakness consequent upon the premonitory symptoms, instead of having to go to the surgeon, and finding then that he was attending another case. Two or three instances occurred within my own knowledge, of proposals being made by the poor for the purpose of presenting the visitors with some small testimonial, to mark their thankfulness for the benefits derived from their having been visited and comforted during a period of great affliction."

Dr. Gavin says:—

"It seems to have given them a new confidence in the spirit of the institutions of their country, and to have inspired a feeling of regard for those above them which was quite unknown before. From my own personal inquiries I am satisfied it has done more to establish a bond of union in feeling between the neglected poor and the classes above them, than could have been aroused in any other way, or by any other means."

Similar testimonies as to the gratitude evinced by the poor for the watchful inspection kept over them have been received from the provincial towns.

Mr. Lythgoe, one of the medical officers at Manchester, says:—

"I have had the most unbounded confidence and reliance shown me by the patients and their friends which may have tended in some degree to their security. My suggestions as to prophylactic measures in general, and the treatment of cholera, whenever practicable, have always been strictly and energetically carried out; in short, even among the most indigent, I have met with a ready acquiescence and obedience to any suggestions offered. I have much pleasure in stating that, with very few exceptions, the most grateful feeling has been evinced by the necessitous poor for the services rendered."

Mr. Golland writes, that before the introduction of the visitation system in Manchester, "there was great alarm amongst the people, and a general feeling of irritation and distrust in the minds of the poorer classes, at the delay and difficulty experienced in procuring medical aid, which rendered them often apathetic and careless in applying for assistance;" but as soon as the new arrangements were in force, "the alarm almost entirely subsided."

Dr. Cooper, medical superintendent at Hull, writes,—

"The unanimous testimony of the visitors is in favour of the high value which the poor set upon house-to-house visitation as a mark of attention to their welfare, and of their readiness to give information and assistance, and their thankfulness for the relief afforded."

Dr. Duncan, of Liverpool, says, that the poor were "grateful with very few exceptions."

Dr. Sutherland gives the following conclusions as the results under his observation of the visitation system:—

"That it has been proved by melancholy experience, that during severe epidemic seizures persons labouring under premonitory symptoms will not, of their own accord, apply sufficiently early for medical aid, and that therefore the great proportion of cholera cases are not seen at all till they are in the stage of collapse. To this circumstance is to be attributed the high mortality of the epidemic.

"That consequently the main dependence for arresting the ravages of the disease, and saving human life, must in future be placed neither in any specific mode of treatment nor in trusting to the application for relief of the patient or his friends, but chiefly on an active and systematic house-to-house visitation by medical officers specially appointed for the purpose throughout all localities where the disease prevails, and the treatment on the spot of all persons found labouring under cholera or its premonitory symptoms.

"That there is ample evidence to show that the system of household visitation, adopted during the late epidemic, has been the means of saving a vast number of lives, both by preventing the development of cholera and by bringing many developed cases of the disease under successful treatment which otherwise would not have been seen until the stage of collapse, while it also led to the discovery and removal of many local causes of disease which would have escaped notice."

Mr. Grainger, under whose superintendence the visitation in the metropolis was conducted, sums up his experience as follows:—

"In considering the various circumstances detailed in the preceding pages, the main and leading fact to be deduced from them is the extraordinary efficiency of house visitation in controlling the ravages of epidemic cholera. Whatever difference of opinion may arise as to the precise amount of this preventive influence, one thing is beyond dispute, namely, that as compared with all other modes of managing this terrific disease, medical visitation is incomparably the most successful. In all parts of London practitioners and medical officers became converts on observing the results; every individual who was engaged in carrying out the plan, whether as inspector or visitor, whatever may have been his previous opinions, has given his unqualified approval of the system. In various parts of the country the plan has been adopted, and everywhere the physicians and surgeons engaged in it have expressed their conviction of its entire efficiency. But if all other testimony were wanting, there is one which is of a nature that can be touched neither by friend nor foe; it is the witness of hundreds, perhaps we ought to say thousands, of the poor in every part of this metropolis, who have found in their own unlooked-for safety the proof that a remedy had been for them provided, for the want of which their relatives and friends had perished.

"Results of this important character would, under any circumstances, be sufficient to stamp this system as the one effective method; but it must not be forgotten that it was not put into operation until great efforts had been made, by the provision of extra medical aid, by the admirable devotion of the ordinary medical staff of the several unions and parishes, by placards and other means, to secure early and effectual aid to the suffering poor. A plan which, after such exertions as these had been in operation for several months, was so much more successful as to attract the general attention, and secure the approbation of all who witnessed its operation, must have had

within itself a principle of great excellence. There are, however, other considerations which suggest themselves in connexion with the house visitation. This great measure is the first general effort that has yet been made in the metropolis to investigate and rectify, by the direct agency of medical men, the sanitary evils afflicting the poor; and from the improvement which, in every instance, is reported by the visitors to have followed even the partial application of the appropriate means, some idea may be formed of the advantages and comfort which would be secured to the labouring population from their universal adoption.

"I cannot conclude this section of the present Report without offering my humble tribute of respect to what, among so many painful circumstances, is so gratifying as to the past, and so full of promise for the future—the admirable conduct of the people under the awful calamity with which it pleased Almighty God to visit this metropolis. In the midst of an amount of physical misery which no language can depict, and exposed to the ravages of a pestilence which within the limits of Europe, nay, within these kingdoms, have in this last epidemic created in the popular mind dark suspicions of the higher classes of society, and specially of those who know no other mission but to mitigate the bodily sufferings of mankind, the industrious poor of London have submissively borne their trials—so submissively, indeed, that no voice of complaint reached the public ear; though it is proved, by the unanimous testimony of a large body of medical men, that our humbler fellow-citizens are as acutely sensible to the manifold evils by which, in the filthy courts and alleys of the metropolis, their health is undermined, and their lives are sacrificed, as they are ready to tender their gratitude for any well-directed efforts designed for their relief."

Houses of Refuge.—We regard the opening of houses of refuge in healthy and uninfected situations as an essential auxiliary to the system of visitation. We called attention to the importance of this measure in our Second Notification, when we stated that, as the proportion of attacks to the population had nowhere in this country been so large as to render it impracticable, or even difficult, to make provision for the temporary removal of such indigent persons as appeared to be in imminent danger; it was a subject deserving consideration whether, instead of the indiscriminate removal of the sick, it would not be more effectual, as well as less expensive, while provision is made for the proper treatment of the sick, to take some care of those who, in all probability, will be the next victims of the disease, though the blow may not yet have actually fallen on them. As an extensive trial of this plan of removal had already been made in Edinburgh, during the prevalence of the pestilence in that city in 1832, with such success, that the authorities were anxious for its renewal; we authorized, with the advice of the Edinburgh College of Physicians, the re-adoption of this measure in Scotland, and deemed it our duty to confer, by our regulations, the requisite authority for carrying it into effect in England. Extended experience has afforded additional evidence of its great usefulness.

Dr. Sutherland states that, in the severe outbreaks of the pestilence witnessed by him in provincial towns, 87 per cent. of attacks took place in houses where more than one person had suffered from the disease; and that when the attacks thus occurred in groups in the same or adjoining houses, the danger to the inhabitants was enormously increased by leaving them in their dwellings; while very few attacks, and scarcely any deaths, took place among these people, if they were removed from the infected locality to houses prepared for their reception, and were kept there in comfort and under observation until their own localities and rooms were cleansed. Thus, in the late experience of the epidemic, out of 270 inmates of the House of Refuge re-opened in Edinburgh, no case of cholera occurred. Out of 807 inmates in two Houses of Refuge opened in Glasgow, there occurred 25 cases of cholera, and eight deaths. In Dundee, out of 250 inmates, there were four attacks, but no death. In Sheffield, out of 145 inmates, there were four attacks, and two deaths. In Bristol, out of 210 inmates, there was no case of cholera, and no death. The following illustration of the utility of the Houses of Refuge, is given by Mr. Goldney, of Bristol:—

"In a certain lodging-house in Bristol, there were 35 attacks of cholera, and 33 deaths, during the epidemic of 1832. There was then no house of refuge in existence. During the late epidemic a case of cholera occurred in the same house, and I went, and by the aid of the police, turned out of it 64 people, 49 of whom were sent to the House of Refuge. Out of that

number not a single case of cholera took place, but there was a good deal of diarrhœa, which was immediately arrested."

A similar illustration of the beneficial results of dispersion is given by Dr. Milroy.

"Cholera broke out in the month of July, in the Clock-house at Peckham, containing at the time between 50 and 60 inmates. Eleven were seized with the malignant disease. All the unattacked were instantly dispersed, and the sick alone were allowed to remain. Of the 45 who were thus removed from the focus of infection, 25 were affected with diarrhœa at the time; but not in a single one of these cases did the diarrhœa pass into cholera."

The inmates of Houses of Refuge were all taken from houses in which cholera was actually prevailing, the very foci of the epidemic, or from the immediate vicinity of such houses, and it is certain that most of them had imbibed the poison before their removal, for they were either labouring under diarrhœa when admitted, or cholera developed itself soon afterwards; yet, taking together the whole of the Houses of Refuge in the towns just enumerated, it appears that out of 1691 inmates, there occurred only 33 attacks, and 10 deaths.

The value of this result will be appreciated when it is considered that the general mortality from the epidemic, has varied from 1 per cent. to 3, 4, and even 7 per cent on the entire population of towns, including not merely the infected localities, but also the unaffected population; and yet, among the inmates of the Houses of Refuge, who must be regarded as consisting of the most susceptible subjects, the proportion of deaths was less than 0·6 per cent.

"It is very much to be regretted," (says Dr. Sutherland,) "that this system was so inefficiently carried out in many of the affected parishes. I found almost everywhere a want of intelligence in appreciating its importance; and I hardly know an instance, except in a few of the Scotch towns, in which a House of Refuge was prepared before the disease made its appearance. Even after hundreds of persons had died, I have occasionally experienced great difficulty in inducing Boards of Guardians to provide the needful accommodation. This has arisen partly from the obstacles which popular prejudice has thrown in the way of obtaining suitable premises,—one of the necessary fruits of the doctrine of contagion,—and partly from

the fear that pauperism might be increased. The marked beneficial results which have been observed wherever a House of Refuge has been properly worked, warrant me in stating that a great many lives have been sacrificed all over the country from want of attention to the orders and notifications of the General Board of Health, in regard to this matter."

With reference to the metropolis, Mr. Grainger states—

"It is one of the best established facts that in the management of cholera there is not, next to prompt medical aid, any measure susceptible of immediate application so effectual as the removal of those who are yet well, but threatened with the pestilence, out of the crowded and miserable abodes usually selected for attacks of the epidemic. There was therefore no provision more urgently demanded for controlling the force of the epidemic than houses of refuge; and yet I do not recall more than two or three instances in which any such places were opened by the authorities. I am again not unmindful of the difficulties which were met with in this respect, for there is no doubt that the objections which applied to the letting of premises for cholera hospitals, also operated, though in a much less degree, as regarded a house of refuge. The testimony of the medical officers was uniform as to the enormous evils that resulted from the impossibility they experienced of removing families living in single rooms when one or more of their members were attacked. In every part of the metropolis these instances were constantly recurring; members of the same family were again and again attacked in succession, as many as three, four, five, and six persons, succumbing one after another in the same house; in fact, the mortality tables in many localities were swollen by such catastrophes as these."

In towns and villages in which no suitable premises for houses of refuge were to be obtained, we recommended the erection of a temporary building in some open and healthy situation to which individuals might be removed until their own dwellings could be purified. In cases of extreme emergency we applied, in a few instances, to the Board of Ordnance for a supply of tents for the temporary accommodation of the population in places where no preparation had been made for the visitation of the pestilence, and where it was impossible, in the height of the epidemic seizure, to obtain suitable buildings for houses of refuge. Our request was readily acceded to, with the effect, in several instances, of rapidly arresting the progress of the disease.

This was the case at the town of Mevagissey, in Cornwall, for example, consisting of about 400 houses; this town lies in a valley, bounded by two cliffs of considerable altitude, the streets being tortuous and irregular, and the houses generally so arranged that any thorough draft or proper ventilation is impossible. The houses in general are small, dirty, imperfectly supplied with light, over-crowded, and wholly unprovided with sewers or drains to carry off refuse. Out of a population of 2,100 inhabitants, 136 persons died of cholera. Mr. Bowie, jun., visited the town when the epidemic was at its height, and finding it impossible properly to cleanse and ventilate the place, he resolved on removing as many of the people as practicable to some healthy spot in the neighbourhood. He formed an encampment at Port Mellon, a distance of about half a mile from Mevagissey; here he erected tents, and fitted up lofts, taking care to prevent overcrowding, and succeeded in persuading 1,300 persons to leave the town, of whom 452 took up their temporary residence in this encampment. There happened to be on this spot an abundant supply of excellent water, celebrated for its purity. The persons located at Port Mellon were taken from the parts of the town where cholera was the most prevalent, yet out of the whole number (452) not a single case of cholera occurred, while of those who persisted in remaining in Mevagissey, scarcely one escaped an attack of the disease.

Dr. Milroy, who visited Mevagissey at the beginning of the epidemic, strongly urged on the local authorities the absolute necessity for removing the people, as the only means of saving them from death. But no efficient steps were taken, until we deemed it necessary to enforce observance to our directions. The deaths from cholera had amounted to three times the average annual mortality of the town before the epidemic was arrested, and adverting to this fact, and the subsequent results of the dispersion of the people, Dr. Milroy says—

"There cannot be a reasonable doubt, that had the dispersion of the people been effected at the beginning of the visitation, comparatively few lives would have been lost."

Tents were also extensively used with great advantage

in the Wolverhampton Union. The medical superintendent of the Union thus reports of them—

"Being in possession of the requisite information daily, I was enabled with great effect to remove to the tents large masses of the people, *i.e.* from Wolverhampton, in some cases as many as 40 at a time, who on the removal of the nuisances and purification of their dwellings were restored to their homes. The tents were found to be admirably adapted to provide shelter, and during every variety of weather afforded ample protection, the health of the people being not only preserved, but improved in a marked degree. I have to express my regret that similar advantages were not afforded to Bilston and Willenhall, where, although tents were provided, local Boards of Health discovered disinclination to supply that accessory accommodation which was essential."

"I have mentioned the case of two parishes," (says Dr. Sutherland,) "in which the great remedy required to save the people was their removal from affected houses. In this case tents were sent for their relief, but the local committees would not put the necessary bedding into them. The people consequently would not use them and died."

Dispensaries were found to be highly useful when forming a part of the system of visitation; but much sacrifice of life followed whenever they were relied on alone or principally.

CHOLERA HOSPITALS COMPARED WITH HOME-TREATMENT.—From the experience of Great Britain and other countries in 1831-32, we came to the conclusion that the treatment of cholera patients in hospitals was not successful, and we discountenanced the use of these establishments, recommending that the best provision practicable should be made for affording assistance to the individuals who might need it at their own homes, particularly by the selection of proper persons instructed as nurses in the special services required on the occasion, and paid for devoting their whole time to attendance on the sick at their own habitations, under the direction of the medical officers.

The experience of the late epidemic has placed the correctness of this view beyond doubt.

"The results of the treatment of cases of cholera in hospitals," (says Dr. Sutherland,) "as compared with those of home-treatment, have fully borne out the statement made in the first Notification of the General Board of Health, in regard to the

experience of the former epidemic, namely, that 'the establishment of cholera hospitals was not successful.' When we consider the wretched, over-crowded dwellings occupied by a great proportion of the parochial cholera patients, and the apparent impossibility of bestowing on them that amount of medical care and assiduous nursing which they so much require; and when we contrast with this the great apparent advantages possessed in hospitals for the treatment of so virulent a disease, we should naturally expect the balance of recoveries to be in favour of the latter. The parochial surgeons had in general every disadvantage to contend with in the home-treatment of cholera, while the patients in hospital were watched over with unremitting care, by night and by day, and every appliance of the healing art brought to bear on their cases. I believe that nothing was left untried which afforded the patients a chance of recovery, and yet the statistical results of the two modes of treatment preponderate greatly in favour of leaving the patient at home."

The illustrations selected as an example of the evidence received on this point, are the returns from three cholera hospitals in Glasgow and four in Liverpool, from which it appears that out of 5,168 cases treated at home, the deaths were 1,909, or 36·9 per cent, while out of 2,040 cases treated in hospital, the deaths were no less than 1,099, or 53·8 per cent., making a difference of 16·9 per cent. in favour of home-treatment, which, on the whole number of hospital cases, would amount to the saving of about 345 lives.

The fatigue consequent on removal appears to have been alone sufficient to make this great difference in the comparative mortality of the disease.

"Many of the fatal cases," (continues Dr. Sutherland,) "were transferred to hospital in an early stage of the disease; and it was a general instruction to all parochial surgeons, on no account to direct the removal of a case to hospital which was at all approximating to the stage of collapse. I have known a patient taken out of bed with a warm skin and a good pulse arrive in a state of fatal collapse at the hospital, though not above a quarter of a mile distant. The effect of distance has even been made the subject of statistical inquiry; and although the number of cases which have been examined into is not, perhaps, large enough to obviate error, yet the results are so very striking as to be worthy of notice. At the Woodside cholera-hospital, Glasgow, it was found that, out of 32 cases brought from the immediate neighbourhood, the deaths were in the ratio of

37½ per cent., whilst out of 64 cases, brought from more distant localities, the deaths were about 47 per cent."

Dr. Duncan, of Liverpool, has made a similar observation as to the effect of distance in increasing the mortality of the disease. He found that the statistics of three cholera hospitals, two of which were in infected districts, and the third at some distance from them, showed a mortality of 7·3 per cent. in favour of the hospitals nearest to the dwellings of the patients who had to be transferred to them. The experience of Glasgow, which is worthy of being recorded, because the question received there the consideration of a large and intelligent staff of medical officers, is thus stated by Dr. J. M. Adams:—

"Almost from the instant of an attack a cholera patient may be considered as engaged in a death struggle. To be raised in this dying condition, carried along crooked stairs and narrow passages to a cholera van, to be then rattled and jolted for a distance of a half-mile or upwards, followed by a second transference to the hospital ward, cannot be considered an unimportant process by any medical man who has witnessed the disease. I set aside any consideration of the probable effect on the mind of a patient, as I have observed that in cholera the patient is singularly apathetic, presenting in this respect a contrast to a fever patient. At first, when I had all my experience to gain with regard to the treatment of cholera, I was favourably disposed to the employment of hospitals, and looked with painful apprehension to the treatment available to the sick poor residing in dwellings abounding in negations, *sans* food, fire, bedding, clothing, light, air, quiet, attendance, &c. I am now, however, clearly satisfied that a pauper patient lying on his wisp of straw, on the bare floor, with a relative or other attendant to supply him with a drink of cold water, and to surround him with a few hot bricks, has the chance of recovery fearfully diminished by removing him to all the comforts and refined treatment of an hospital. If my experience on the subject were singular, I would hesitate to venture so decided an opinion; but from careful inquiry which I have made among many of the parochial surgeons, I find their experience so entirely corroborative that I feel justified in condemning the principle of hospital treatment for cholera patients."

Contemplating, however, the probability of the occurrence of cases of extreme destitution in neighbourhoods and houses wholly unfit for the curative treatment of the

sick, we recommended that separate apartments specially prepared for the purpose, and properly warmed and ventilated, should be provided for the reception of such cases.

"The accommodation which will perhaps always be required during cholera epidemics," (says Dr. Sutherland,) "should consist of scattered rooms, as near the affected houses of the worst districts as possible. So thoroughly am I convinced of this, that were it impossible to find suitable rooms near enough to the worst districts of the worst towns, I should make the home-treatment of cholera the only alternative by providing no hospital accommodation whatever, and remove the convalescents, as soon as it could safely be done, to proper wards, in an airy, healthy locality."

Mr. Grainger states that great difficulties were experienced by the Guardians of the Poor in their endeavours to procure suitable accommodation of this kind in the metropolis.

"In Lambeth, for instance, I know that repeated efforts of the kind were made by the authorities, but unavailingly; in other cases, on the contrary, I feel assured that by proper exertions this important desideratum might have been secured. There was during the prevalence of cholera another serious defect, which, there can be no doubt, might, by ordinary care, have been entirely obviated; I allude to the great want of nurses, both as regarded number and qualification. On this point I received repeated complaints from the medical officers; and yet, considering the absence of hospital accommodation, which prevented the removal of the sick when desirable, and the want of all the articles required to minister relief to the sufferers in the miserable dwellings of the poor, nothing would have conduced so much to second the efforts of the medical attendants as a staff of respectable and trustworthy nurses provided with the necessary requirements. In most parishes some few nurses, it is true, were supplied; but they were usually insufficient in number, and being for the most part paupers, were often not qualified for their office. Repeated instances of misconduct were mentioned to me, again causing regret that a parsimonious economy was allowed to interfere with the mitigation of suffering in its most awful and afflictive form."

EARLY REMOVAL OF THE DEAD.—The Legislature having in the statute directed special attention to the need of regulations for the early removal and proper interment of the corpse, we issued to medical officers a general order authorizing and requiring them, in the

event of the fatal termination of any case of cholera, in any room occupied as a living or sleeping-room by one family or more, or by numerous persons, to cause to be removed as speedily as may be, either the corpse or the persons occupying such rooms, until the corpse could be conveniently removed and properly interred.

On a review of the evidence, showing in what manner and to what extent these regulations were carried into effect, Dr. Sutherland reports:—

"Generally the people appear to have been aware of the necessity of interring the body as early as possible; but in a considerable number of cases, either from ignorance or indisposition, there has been a tendency to delay. In such instances the regulations of the Board have come into beneficial operation, but rather by a moral than by a legal agency."

Many statements are cited (Appendix A., page 130), from medical officers to the effect that their expostulation, supported, as the people knew it to be, by the power conferred by the regulations, were in most instances sufficient to effect the object, and that in the few exceptional instances in which it was necessary to call in the assistance of the police, the people consented to what was required without opposition. On this subject, and on the necessity for some further provision for the establishment of intermediate reception houses, Dr. Sutherland reports:—

"The evidence shows that the power has been exercised with much discrimination, judgment, and humanity; and that its exercise has been highly beneficial. The regulation has in fact worked extremely well, and has affected all that could have been contemplated from it, but nevertheless some further provision for the early removal of the dead appears absolutely necessary.

"Every one conversant with the dwellings and habits of the poorer classes in England must be aware that overcrowding exists to a great extent in all our large towns, and they must frequently have observed the strange intermixture of the dead with the living which this circumstance at present necessitates. During epidemics, as for example the recent outbreak of cholera, the necessity for some place for receiving the dead previous to interment must have pressed itself on every one who was really conversant with the state of the poor during that terrible visitation.

"I have received a great deal of evidence on this subject from

medical men in all parts of England and Scotland, a few specimens of which I subjoin. The retention of the dead in rooms occupied as living or sleeping rooms is necessarily almost universal among the poor. During the late epidemic, however, it very frequently happened that two or more corpses were laid out in the room at the same time. I have seen three adult corpses in one room, and a person ill with cholera in the only other room in the house. On another occasion, on a hot summer's day, I saw two corpses in a small apartment in which there were three persons sitting. There was a fire at the same time in the room. Dr. Duncan, of Liverpool, states that he has met with 15 instances of two corpses in the house at the same time. Mr. Trahan, one of the Union officers at Liverpool, mentions 24 such instances. Mr. Cooper, medical officer to Wolverhampton Union, says that he has had 18 or 19 such cases; and similar information has been derived from many localities. Corpses of persons who have died from typhus, scarlet fever, and other epidemics, are also retained for a period beyond what is safe, if, indeed, any retention be safe in such cases. The practice in many districts appears to be to keep such corpses three, four, or five days. Mr. Pearse and Dr. Tripe, of Plymouth, state that they 'have seen much evil and delay in cases of death from typhus and epidemics,' from the undue retention of the corpse. Mr. Kimpton, surgeon, says, 'I have known corpses of persons who died of typhus and scarlatina kept several days in rooms with the living, and believe in some instances it was the cause of disease extending to other persons in the house.' Dr. Duncan, of Dundee, writes, that interments of persons who have died of epidemic disease are 'in general delayed too long amongst the poorer classes.' Dr. Roe, of Plymouth, says, 'I have seen the coffin lying on the bedstead in one part of the room, the food cooking in another, and the dressmaker making mourning in a third. . . . . I have never known an interment hurried in the slightest degree because the person died of typhus or other epidemic—not even when there was only one room for the living and the dead.' Mr. White, surgeon, Dowlais, writes, 'It is a very common event to see a large party of relatives sitting around a table partaking of food, and a corpse lying in one corner of the room.'

"It is in vain to look for any alteration in this state of things until proper accommodation for the dead be provided. The difficulty must be obvious, and it has struck many careful observers. Mr. Stott, surgeon, Manchester, says, 'I know no instance in which the removal of a corpse from a dwelling-house preparatory to interment took place; *no place that I am aware of having been provided for such purpose.* The withdrawal of the living from the dead would be *most difficult* in the majority of instances. A receptacle for the dead appears a desideratum, and I think would be well received by the people themselves.' Mr. West, surgeon, Hull, writes, 'I have known the corpses of persons who have died of typhus, scarlatina, measles, and smallpox, retained in the dwellings of the poor for a much longer period than I considered safe;' and he adds, 'there should be immediately provided some places in convenient localities where the poor might deposit their dead under proper regulations, having due regard to their feelings; and although objections would be raised at first, they would soon give way to the urgent persuasion of the persons who would be placed in charge of such depositories.'

"Mr. Pearse and Dr. Tripe also point out the importance of providing reception-houses. They say, 'We would beg respectfully to suggest the propriety, during the prevalence of malignant diseases, of buildings being provided for the immediate reception of the dead, especially for the working classes, who, in large towns, are generally compelled to live in single, confined, badly-ventilated and badly-lighted apartments.' Other medical practitioners make similar suggestions Even the poor themselves have felt the evils of being compelled to retain their dead, and have been obliged to resort to precipitate interment. A number of such instances are given by the parochial medical officers in all parts of the country. They chiefly take place in cases where death has occurred in the lower class of lodging-houses, in order that 'the room may be occupied again.' In some cases no medical aid appears to have been sent for. Mr. Cripps, surgeon, Liverpool, says, 'I have often been called up during the night in order to give a certificate of death, for the purpose of having the corpse interred the first thing in the morning, the person having only died in the early part of the night.' Dr. Duncan, of Liverpool, bears important testimony to the desire for getting rid of the dead in some cases. He says, 'During the recent epidemic, from 30 to 40 applications were made to me to procure the removal of bodies, retained for a period longer than I judged safe.'

"This obvious necessity led to the actual opening of a reception-house at Leeds during the late outbreak of cholera. Mr. Radcliffe, surgeon to the Union, states that, on the first appearance of cholera in Leeds, the Board of Guardians, at his request, erected such a house in connexion with one of the cholera hospitals; 'and to this place,' he says, 'I caused to be conveyed many bodies from *single* and other rooms previous to interment—indeed, almost immediately after death; and when the poor found that the dead were treated with decency and respect, I found no opposition to their being sent there.'

"Here, then, was a very natural solution, and at the same

time a successful one, for a great difficulty arising from the overcrowded state of our cities and towns. Perhaps no clearer proof of the existence of the evil could be given, and no more satisfactory method of getting rid of it indicated, than the preceding evidence affords."

The question of the expense of epidemics as connected with parochial rates, has hitherto not attracted the attention which its importance deserves. We have experienced considerable difficulty in obtaining correct returns of the number of widows, widowers, and orphans who have been left permanently chargeable on the several unions throughout the country on account of death from cholera. Up to the present time only a small proportion of the unions have made returns. From those, however, which have been received we have selected twelve (Table A.) as illustrative of the amount of the cost to which the ratepayers have been put.

It is estimated that the average cost for the maintenance of an adult is 4*s.*, and of a child 3*s.* per week, amounting severally to 10*l.* 8*s.* and 7*l.* 16*s.* per annum.

Taking for example the parish of Lambeth, it will be seen that there were 81 cholera widows and widowers, and 234 cholera orphans thrown upon the parish for support at an annual cost of 2,667*l.* 12*s.* But this expense cannot be considered as terminating at the end of one year, since some of the children may have to be maintained for 10 or 12 years; and a considerable portion of the adults may continue chargeable to the parish for several years. Assuming, therefore, 4 years as the average period for which support must in each case be provided, which will scarcely be regarded as a high estimate, the cost to the ratepayers of Lambeth for cholera widowhood and orphanage alone would amount to 10,667*l.* In Leeds it would amount to 25,251*l.* 4*s.*; in Portsea to 9,380*l.* 16*s.*; and in the whole of the twelve places selected, the total cost would amount to 121,576*l.*

If the whole of the unions throughout the country had made returns; and if all these returns had been subjected to a similar calculation, it would have been seen that the epidemic disease tax is not the least formidable of the taxes which must, in the existing state of things, be borne.

Before concluding this Report we deem it our duty to represent the result of our experience of the working of the "Nuisances Removal and Diseases Prevention Act," with its existing machinery. It is a matter of deep regret to us that, during the entire prevalence of the epidemic we have, in many instances, been wholly unable to carry into effect the beneficent intentions of the Legislature, in consequence of the inappropriate and inadequate machinery provided by the Act for its local administration, and this regret is increased by a consideration of the extent to which suffering and loss of life have been prevented in the towns in which we have succeeded in inducing the local authorities to exercise in an efficient manner the powers intrusted to them for the prevention of disease.

The following considerations may suffice to illustrate the chief defects of the machinery at present appointed for the administration of the law.

The object of the Nuisances Removal and Diseases Prevention Act is to make provision for the protection of the public health and life on the breaking out of epidemic and contagious diseases, and especially such as are peculiarly formidable in their nature and likely to spread extensively. It is a special provision applicable not merely to one class but to all classes; for though in a season of pestilence some classes may be in greater danger than others yet none are exempt. The speciality of the case requires special knowledge and fitness in those who are to take the practical steps for fulfilling the intentions of the Legislature.

The Diseases Prevention Act contemplated the Poor Law Boards generally as the most eligible local administrative bodies for the execution of its provisions. With the aid of the staff of medical officers, and with the fever wards of the Union houses as provided in England and Wales, there can be no doubt that they are far more eligible bodies than the common parochial bodies, which were the only ones available in 1832. In the rural districts there are no other bodies now eligible; if it were absolutely requisite to have recourse to an existing

body, and not to provide a special one for the extraordinary emergency.

The obstructions to the execution of remedial measures by the Boards of Guardians arose generally from the following circumstances:—

The provision intended by the Legislature was one for the common protection against impending dangers, as has been stated to *all* classes, against which the individual means of private persons were inadequate.

But the common functions of the Poor-law Guardians relate exclusively to one class, the destitute or the pauper class only. Notwithstanding the scope of the Act, and explanatory notifications, the first and common impression of the guardians of the poor was, to confine the measures of prevention to the destitute, and administer it according to their settled practice, as respects the relief of paupers, which is to do nothing except on application, and then only upon proof given of the urgency of the case. Acting on this impression, they, with few exceptions, treated the whole preventive measures as common medical relief, which they would not allow to be given, without a previous order obtained upon inquiry and adjudication into the circumstances.

Mr. Grainger, in reporting on the system of medical relief adopted, says :—

"The most serious, or rather, as it ought from its results to be called, the most fatal mistake which pervaded the whole of these remedial measures, from first to last, was this:—the guardians—herein departing diametrically from the injunction of the General Board, that cases should be sought out—in all their arrangements acted upon the principle that the poor, when attacked, should apply to the medical officer, who thus, instead of discovering cases in their first incipient stage, waited for an application—a delay which led, as I am prepared to show, to the most fatal consequences. The evidence collected from all parts of the metropolis points but to one conclusion: the patients who suffered from cholera, and who were treated under the system of the guardians, were in the great majority of cases, seen for the first time by the medical officers when in complete or incipient collapse; when consequently the aid of medicine was almost as nothing; when, whatever mode of treatment was adopted, from 40 to 50 per cent. of those attacked would perish. So generally, or rather universally, was this the case, that on reflection I cannot recall the instance of a single parish or union in London where, so far as the proceedings of the local authorities were concerned, apart from the Board of Health, any plan was adopted for seeking out persons affected with the premonitory, first, and curable stage of cholera. That partial steps were taken—that the medical officers overtaxed their powers in the effort to supply assistance to the multitudinous sufferers—that they again and again visited the afflicted localities, is true; but, large as were the numbers relieved by their meritorious exertions, still larger numbers were overlooked, many of whom subsequently fell into collapse, and swelled the weekly tables of mortality."

There may be no question of the general soundness of the rules adopted by the Guardians, as rules for the relief of mere pauperism, nor that it would be repugnant to the parochial authorities to go round from house to house in search of objects of pauper relief; but it is equally clear that these rules are repugnant to a measure intended to provide, not relief to paupers, but protection and warning to all classes against a common danger, the real form and force of which the people had usually no means of appreciating and guarding against individually, at all events, in time.

The independent classes had extensively a natural mistrust of the approaches or services tendered by the agency for the relief of paupers.

The persons serving in the office of Guardians could scarcely be expected to take steps upon wide estimates of remote contingencies such as might be the basis of insurances, as required by all measures of prevention, or to act upon any other than measures of immediate and manifest danger, even where their time and attention were not pre-occupied.

In particular rural districts it was reported to us that there was much done in the removal of gross and palpable nuisances: but in some districts visited by our inspectors, even these operations were frequently found to be carried into effect in such a manner as to aggravate the evil; such as cleansing ditches without regard to time or method, by spreading the mud on the banks and increasing the extent of evaporating surface. In the towns, however, the Boards of Guardians were preoccupied by

their existing duties; and were reluctant to undertake new and extraordinary duties. The effect of this reluctance, notwithstanding distinct warnings and particular instructions and exhortations, are displayed in the Reports, dated 19th January, 1848, of Dr. Farre, Mr. R. Martin, and Mr. Toynbee, sent round to examine the fitness of the Union-houses in the metropolis for the reception of cholera cases; and the Report of Dr. Farre and Mr. Grainger, dated 26th March, 1849, on the second examination of the same places to ascertain how far the first recommendations had been acted upon.

The existing Act not only regarding the guardians of the poor as the executive body, but at the same time naming several other local authorities such as the town-council, trustees, or commissioners for draining, paving, lighting, and cleansing, and also commissioners of sewers, has created a divided power, and consequently a divided responsibility, which, during the late epidemic, has led to much neglect and delay and consequent loss of life.

Mr. Grainger reports, as an instance of the evils arising from this divided responsibility, a case in connexion with a coroner's inquest, held on the body of a person who had died from cholera. The place where the person had lived was in a most filthy condition, with overflowing privies and obstructed drains, and had, indeed, attracted considerable attention; one of the medical officers had reported that it was ill paved, ill drained, and likely to be productive of disease. This Report was presented to the Board of Guardians before the attack of cholera occurred, and was by them referred to the Commisioners of Paving, which led to considerable delay, and in the interval the person was attacked and died.

Another cause of delay throughout the epidemic arose out of the intermittent meetings of the Boards of Guardians, which were usually held only once a week; till towards the close of the epidemic no arrangement was made to secure more prompt action, and from this cause alone, a considerable sacrifice of life ensued.

It has been represented to us that the Boards of Guardians themselves have frequently expressed an opinion that they are not proper authorities for the execution of the Nuisances Removal and Diseases Prevention Act; their duties as guardians being scarcely compatible with those of an effectual administration of measures for the prevention of disease. Dr. Gavin states that —

"At an interview with the Board of Guardians of Bethnal-green, the chairman of the Board, who is a magistrate, expressed himself to the effect, that they were quite sick of having charge of the medical arrangements for the relief of the poor, and that they would be heartily glad to get rid of it. This statement was made deliberately, and appeared to be the unanimous feeling of the Board. Though expressed in consequence of the feeling of responsibility, arising from the charge of the extraordinary arrangements imposed upon the Board by the prevalence of cholera, yet I know the opinion is the same with reference to the ordinary superintendence of medical relief. Universally, the clerks of the guardians, with whom I was in official communication during the recent prevalence of the epidemic, complained of the hardship inflicted on the guardians by the Act which imposed on them the responsibility of carrying into effect the arrangements for the prevention of disease. They contended very earnestly, that the administration of the law for the relief of the poor had nothing whatever to do with the arrangements for the prevention of disease; and that the Boards of Guardians were not the parties fitted to undertake such onerous and responsible duties. They uniformly declared their conviction, that their ordinary duties under the Poor Law were such as to prevent their fulfilling the extraordinary duties imposed upon them by the Nuisances Removal and Diseases Prevention Act; and that though such duties might be imposed, it would be impracticable to carry them out with any efficiency."

Dr. Sutherland thus concludes his account of the manner in which, on the late trying occasion, the local authorities, under his observation, have executed the duties imposed upon them:—

"I have endeavoured to do justice to those parishes which willingly carried out the preventive measures of their own accord; and I have shown that a great deal of human life was saved in all the towns by directing the local measures until they were in full operation. I must not be considered therefore as in the slightest degree undervaluing the importance of the great work which has been accomplished. It is possible also that many epidemic attacks may have been prevented by the preparatory measures of Boards of Guardians in parts of

the country which did not come within the sphere of my own observation; but I should fail in my public duty if I did not express my decided conviction that many lives were lost which might have been saved, and that this calamity arose out of the very nature of the machinery employed."

Adopting a large remedial interpretation of the authority given under the Act "for taking measures of promptitude, according to the exigency of the case, by such directions and regulations as the said Board shall think fit for the prevention, as far as possible, or mitigation of such epidemic disease," we were prepared to issue directions to special local bodies for the execution of the measures of prevention; but we were debarred from that course by the opinion of the law officers, that the general words of the statute could not be so construed as to warrant such a combination of the local authorities as we proposed for the purpose.

A review of the general experience now adduced as to the peculiar nature of preventive measures, and as to the constitution of local bodies, will suggest one conclusion, that the only chance of executing such measures promptly and efficiently, will be by new and special local and general administrative arrangements, the particulars of which we may have a fair opportunity of submitting for consideration, as part of the amendments which may be required for the execution of the Public Health Act.

In conclusion we would call attention to the unanimous testimony borne by all classes to the exemplary manner in which the medical officers of the parishes and Unions, and the medical visitors specially appointed for this service, have performed their difficult and dangerous duties. Our own Superintending Medical Inspectors have had the best opportunities of forming a judgment on this subject. With reference to the medical service of the metropolis, Mr. Grainger says:—

"At a time when all who were able quitted even the healthiest parts of London, the medical officers, often debilitated by their incessant labours, and even suffering under unmistakeable symptoms of the disease, never quitted their post, though that was of necessity in the very focus of the pestilence. Many among their number were, after the exhausting fatigues of the day, disturbed in their rest at night for

weeks and weeks together: one surgeon did not change his clothes for eight or nine days, sleeping at intervals on a sofa; another for 18 days had not two hours' consecutive sleep; and all these great services, it should be recollected were, for the most part, performed amidst the obscurity of dark alleys and pestilential dwellings, unseen by the public eye, frequently undervalued, even where known, and always miserably underpaid. Examples are not wanting of surgeons who, after a year of such labours and such services, have received for their recompence actually less than would defray the additional outlay caused by the enormous amount of expensive medicines, and by the provision of an extra assistant. In other instances no extra remuneration whatever was granted."

Dr. Sutherland reports:—

"I would bear the strongest testimony to the self-denying zeal and ability with which the medical officers so nobly discharged the highly responsible duties confided to them during a great public emergency.

"The question of remuneration for services rendered by medical officers, though not coming under the regulations, nevertheless arises out of the recommendation of the Board that they should be liberally dealt with on account of the heavy additional duties thrown on them. I know a number of instances in which a suitable payment has certainly been made; but the complaints of the miserable remuneration afforded have been so numerous, that I question very much whether it would be wise to encounter another epidemic such as the last, without other arrangements. I feel satisfied that in the majority of instances which have come under my own observation, nothing but the dictates of humanity would induce the medical officers to undertake the work anew, with the chances of being similarly paid for it."

Though the late extended experience has shed no light on the primary or proximate cause of this pestilence; though that remains involved in the same impenetrable mystery as ever; and though little has been added to our knowlege of any effectual mode of treatment in the developed or collapsed stage of the malady, yet we apprehend that a consideration of the various matters of evidence which have been now adduced, will show that recent observation has elicited truths of the highest practicable importance to the people of this country and of other nations.

On a review of the whole of the late experience, we con-

ceive that its main results are in strict accordance with the conclusions at which the Metropolitan Sanitary Commissioners arrived from their official investigations in 1847. Before the second visitation of the pestilence had yet returned, but when the calamity appeared to be impending, from a consideration of the rise and spread of cholera in 1831, and a comparison of the circumstances which marked the severity and extent of its prevalence in the principal towns, both of Great Britain and of Europe, the Commissioners arrived at the conclusion, contrary to the view which was then commonly entertained, that the pestilence would present nothing peculiar in its course; but that it would be found to be governed by the same laws as other epidemics, and to attack in the largest numbers, and with most severity, the same classes of persons and the same places as typhus, scarlet fever, diarrhœa, and the entire class of zymotic diseases. We submit that the history of the pestilence which we have now given, relative to the persons and places that have suffered as well as to those that have been exempt, has placed this matter beyond further question.

On a consideration of the evidence which was at that time submitted to the Commissioners that the conditions which favour the origin and spread of typhus, and the other common epidemics of this country, particularly overcrowding, which year by year has gone on steadily increasing, by the increase of the population as well as by immigration, without a proportionate provision of proper habitations, or any additional means for the removal of the increased filth, necessarily consequent on augmented numbers; the congregation of great numbers of the population in all our large towns into compact masses, without fresh air and without pure water; living, many of them, over cesspools, or close on foul and overflowing privies—considering that these and other circumstances conducive to an impure condition of the atmosphere had not diminished since the former epidemic, but had materially increased, the Commissioners expressed an apprehension that the approaching epidemic would be more extensive and fatal than that of 1831. Instructed as we now are by experience as to the extent to

which this apprehension has been realized, it is matter of regret that this apprehension was not at the time more forcibly urged on the attention of the legislature. It has been already stated that the deaths in the recent have been more numerous than the recorded attacks in the former epidemic, while the attacks have been more than double: the total number of recorded deaths in England and Wales in the whole of the former epidemic being only 16,437, whereas in the single year of 1849 they amounted, including diarrhœa, to 72,180.

The terror with which the re-appearance of this disease was universally regarded at the time when its second return was expected, arose principally from the prevalent opinion that it was a sudden and uncontrollable malady, neither to be prevented nor remedied. In our First and Second Notifications, we made representations which appeared to us to be calculated to remove this false and pernicious popular impression, and by a large body of evidence derived from the experience of the disease in India, and in the principal towns of Europe, as well as from the experience of our own country in 1832; we endeavoured to show that, with a few exceptional cases, occurring chiefly at the first outbreak of the pestilence in a new locality, the disease gives distinct warning of its approach, in time for effectual precautions to be taken against it; and that if that time is not lost, and proper precautions are not neglected, in the immense majority of instances, the malady may be stopped in its first or premonitory stage, and its progress to a fatal termination arrested. We submit that the truth of this view, which was at that time doubted even by the highest medical authorities of this country, is established by the entire body of evidence which has been detailed in the preceding pages.

It was stated in the Metropolitan Sanitary Report, that when cholera first appeared in this country, the general belief was, that the disease spreads principally, if not entirely, by communication of the infected with the healthy, and that therefore the main security of nations, cities, and individuals, consists in the isolation of the infected from the uninfected,—a doctrine which naturally

led to the enforcement of rigorous quarantine regulations; the establishment of military and police cordons; the excitement of panic; and the neglect, and often the abandonment of the sick, even by relations and friends: but that since opportunities had been obtained of a closer observation of the character of this disease, and of the mode in which it spreads through continents, nations, cities, towns, and families, facts had been ascertained which were incompatible with this view of its mode of dissemination, and of its prevention; that the disease is not in the common acceptation of the term contagious, but spreads by an atmospheric influence, its progress consisting of a succession of local outbreaks. We submit that the facts which we have now detailed relative to its progress from Asia to Europe, through the several countries of Europe, through the principal towns of Great Britain, and through the districts, streets, courts, and houses of each individual town, is in strict accordance with this view.

At the commencement of these investigations, it was believed that cholera, typhus, and other epidemic diseases were imported; this impression being derived from the observation of the frequency of their recurrence in migratory populations, whereas we have shown in our Report on Quarantine that in overcrowded low lodging-houses, the worst of fever nests in every town, as well as in close, overcrowded, and filthy ships, the conditions being the same as in a stationary population, the results are the same; and that the tramping about from town to town in the open air, except when the strength is exhausted by fatigue, instead of increasing, tends to lessen disease.

We have elsewhere stated that whereas it was formerly believed that the most powerful predisposition to this disease is induced by deficient food and clothing, and that for this reason its chief victims are found among the destitute or persons on the verge of pauperism, a closer observation of facts showed that, while the unfavourable influence of destitution is not to be denied, a far more powerful predisposition is the habitual respiration of an impure atmosphere; that the highest degree of susceptibility is produced where both these conditions are combined, that

is, where people live irregularly, or on unsuitable diet, and at the same time filthily; and that, in places in which a great degree of cleanliness is maintained, the poor as well as the rich enjoy exemption from this disease.

We submit that the tenor of the evidence derived from recent experience affords complete confirmation of these views.

It was stated by the Metropolitan Sanitary Commissioners, that even at that time experience had sufficiently proved that the circumstances which influence the origin and spread of typhus and other epidemic diseases were generally removable by proper sanitary arrangements; that consequently typhus and its kindred diseases are, to a great extent, preventible. and that there was reason to believe that the spread of cholera might be prevented by the like means, namely by general and combined sanitary arrangements.

We submit that the late experience has added to our previous knowledge of the efficiency of sanitary arrangements in checking the extension of this formidable disease. For the evidence which we have now detailed shows,

That where combined sanitary arrangements have been carried into effect the outbreak of the pestilence has been sometimes averted.

That where its outbreak has not been prevented its course has been gradually, and, in several instances, suddenly arrested.

That where material improvements have been made in the condition of the dwellings of the labouring classes there has been an entire exemption from the disease, and that where minor improvements have been introduced the attacks have been less severe and less extensive, and the mortality comparatively slight.

That with reference to the measures of prevention and alleviation which we have thought it our duty to recommend, and in the instances in which circumstances appeared to require it, to enforce, the immunity from the disease has been in proportion to the extent to which those measures have been carried into effect systematically and promptly,

Upon the whole we submit that the facts and results given in this Report have placed in the hands of the Legislature, for administrative execution, measures for checking the progress and lessening the severity, if not entirely preventing the occurrence, of this pestilence; and that the measures preventive of this one epidemic, which only attacks at distant intervals some of our towns and cities, are preventive of typhus and other epidemics, some or other of which are at all times in all our towns and cities, and which produce, as a constant result, nearly as great an average mortality as the apparently more destructive pestilence on its occasional visitations.

But the chief obstacles to the general and early adoption of measures of prevention arise from the difficulty of communicating to those whom it is necessary to convince, such information as may satisfy their minds of the incomparably greater efficacy of measures of prevention than of those that are merely palliative or curative; a persuasion which is only now beginning to make a due impression on the minds, and to direct the professional inquiries even of medical men, and the full importance of which cannot therefore be expected to be at present appreciated by classes less instructed on these subjects.

The Legislature, however, has recognized the full importance of this principle, by adopting it as the fundamental one, both of the Public Health Act and the Nuisances Removal and Diseases Prevention Act; and the late experience has not been wanting in pointing out where the law is defective, and what further provisions are required for fulfilling the intentions of the Legislature. We regard as one of the most important of the results of the experience which we have now endeavoured to describe, the additional ground which it affords for the expectation that material improvement in the physical, and through the physical, in the moral and social condition of the people will result from those permanent works which, under the Public Health Act, may be effected in towns and cities; and we submit that it is, in the mean time, essential to the protection of the public life and health that adequate legislative powers should be given for dealing effectually with those extra-

ordinary and formidable states of disease, the occasional occurrence of which must be expected, until these sanitary works have been completed and have been introduced into all the towns of the kingdom.

All which we humbly certify.

ASHLEY,
EDWIN CHADWICK.
T. SOUTHWOOD SMITH.

Gwydyr House, 14*th August*, 1850.

TABLE A.

ESTIMATED Burden on the undermentioned 12 Unions of England for Four Years' Maintenance of Widows, Widowers, and Orphans, become chargeable in consequence of Deaths of Relatives from Cholera and Diarrhœa during the Epidemic period of 1848-9.

NAME OF UNION.	Expense of Relief at 4s. per week per head.						Total Expenses of Relief.				
	No. of Widows and Widowers.	One Week.		One Year.		Four Years.	No. of Widows and Orphans.	One Week.		One Year.	Four Years.
		£.	s.	£.	s.	£.		£.	s.	£.	£. s.
Bradford	27	5	8	280	16	1,123 4	109	17	14	920 8	3,681 12
Cockermouth	41	8	4	426	8	1,705 12	165	26	16	1,393 12	5,574 8
Dudley	30	6	0	312	0	1,248 0	113	18	9	959 8	3,837 12
Lambeth	81	16	4	842	8	3,369 12	315	51	6	2,667 12	10,670 8
Leeds	211	42	4	2,194	8	8,777 12	739	121	8	6,312 16	25,251 4
Manchester	62	12	8	644	16	2,579 4	243	39	11	2,056 12	8,226 8
Newcastle-under-Lyne	41	8	4	426	8	1,705 12	129	21	8	1,112 16	4,451 4
Portsea	68	13	12	707	4	2,828 16	278	45	2	2,345 4	9,380 16
Sunderland	66	13	4	686	8	2,745 12	228	37	10	1,950 0	7,800 0
Tynemouth	106	21	4	1,102	8	4,409 12	385	63	1	3,278 12	13,114 8
West Bromwich	51	10	4	530	8	2,121 12	220	35	11	1,848 12	7,394 8
Wolverhampton	205	41	0	2,132	0	8,528 0	643	106	14	5,548 8	22,193 12
Total 12 Unions	989	197	16	10,285	12	41,142 8	3,567	584	10	30,394 0	121,576 0

NAME OF UNION.	Expense of Relief at 4s. per week per head.						No. of Orphans.	Expense of Relief at 4s. per week per head.					
	No. of Widows and Widowers.	One Week.		One Year.		Four Years.		One Week.		One Year.		Four Years.	
		£.	s.	£.	s.	£.		£.	s.	£.	s.	£.	s.
Bradford	27	5	8	280	16	1,123	4	82	12	6	920	3,681	12
Cockermouth	41	8	4	426	8	1,705	12	124	18	12	1,393	5,574	8
Dudley	30	6	0	312	0	1,248	0	83	12	9	959	3,837	12
Lambeth	81	16	4	842	8	3,369	12	234	35	2	2,667	10,670	8
Leeds	211	42	4	2,194	8	8,777	12	528	79	4	6,312	25,251	4
Manchester	62	12	8	644	16	2,579	4	181	27	3	2,056	8,226	8
Newcastle-under-Lyne	41	8	4	426	8	1,705	12	88	13	4	1,112	4,451	4
Portsea	68	13	12	707	4	2,828	16	210	31	10	2,345	9,380	16
Sunderland	66	13	4	686	8	2,745	12	162	24	6	1,950	7,800	0
Tynemouth	106	21	4	1,102	8	4,409	12	279	41	17	3,278	13,114	8
West Bromwich	51	10	4	530	8	2,121	12	169	25	7	1,848	7,394	8
Wolverhampton	205	41	0	2,132	0	8,528	0	438	65	14	5,548	22,193	12
Total 12 Unions	989	197	16	10,285	12	41,142	8	2,573	386	14	30,394	121,576	0

TABLE B.

PROGRESS of EPIDEMIC CHOLERA in GREAT BRITAIN, during the 64 weeks ending December 24, 1849, showing the date of the first attack on each Town, as reported to the General Board of Health, exclusive of the Metropolis.

FIRST OUTBREAK, 1848.

October 5.
Edinburgh.
Leith.

November 6.
Sunderland.
Hounslow.
Lasswade.

November 8.
Chelmsford.
Tynemouth.
Falkirk.

November 10.
Ecclesall Bierlow.

November 11.
Honiton.

November 15.
Haddington.
Brechin.

November 16.
Glasgow.
Cramond.

November 17.
Dumfries.

November 20.
Dysart.

November 22.
Chesham, Bucks.

November 23.
Great Grimsby.
Selby.

November 24.
Lowestoff.

November 25.
Barking.
Libberton.
Inveresk.

November 27.
Staines.
Chesham.

November 29.
Monkwearmouth.
Dalkeith.
Maxweltown.
Dunbar.

November 30.
Preston Pans.

December 1.
Epsom.
Coldstream.
Bothwell.
Kelso.

December 2.
Tranent.

December 4.
Wisbeach.
West Ham.
Waltham Abbey.

December 5.
Pontefract.
Larkhall.

December 6.
Plaistow.

December 7.
Yetholm.
Kilpatrick.

December 11.
Ruthwell.
Cadden.
Rothsay.

December 13.
Berwick-on-Tweed.
Newcastle-on-Tyne.
Campsie.
Cumnock.
Castle Douglas.
Glencairn.
Cranston-by-Ford.

December 14.
Chatham.
Hoddam.

December 15.
Tinwold.

December 16.
Hertford.
Stirling.
Kirkintilloch.
Builth.

December 18.
Cambridge.
Preston-Kirk.
Greenock.
Thornhill.
Monkland.
Blantyre.

December 19.
Liverpool.
Clossburn.

December 20.
Isle of Wight.
Buittle.

December 21.
Holyhead.
Coatbridge.
Paisley.

December 22.
Dumbarton.
Jedburgh.
Renfrew.

December 23.
Dalziel.

December 26.
Hemel Hempstead.
Downham Market.
Cardross.
Hamilton.

December 27.
Bromley.
Moffatt.
Bo'ness.
Cambeltown.
Eastwood.

December 28.
Bury St. Edmonds.
Carlisle.
Crail.

December 29.
Reading.
Chesterfield.
Durrisdeer.
Tarbert.

December 30.
Strauraer.
Bathgate.

FIRST OUTBREAK, 1849.

January 1.
Radford.

January 2.
Bury St. Edmunds.

January 4.
Kilsyth.
Wishawtown.

January 5.
Shotts.

January 6.
Thorne.
Dundee.
Ayr.
Port Glasgow.
Eaglesham.

January 8.
Mauchline.
Both Kennar.
Inverness.

January 9.
Kilbarchan.

January 10.
Wakefield.
Kilmadock.
Donne.

January 11.
Knapdale.

January 12.
Reedham.
Gateshead.
Mid-Calder.
Bonhill.
Kilmadock.

January 13.
Margate.
Howden.
Mileham.

January 15.
Melrose.
Dumpace.
Stevenston.
Aldenham.

January 16.
Selkirk.
Cambuslang.

January 17.
Wiston.

January 18.
Bowmore.

January 20.
Galston.
Kilmarnock.

January 22.
Anderston.
London.
Kilbirnie.

January 23.
York.
Glendale.
Rickerton.
Oban.
Dumblane.
Dreghorn.

January 24.
Dunoon.
Kincardine.

January 27.
Goole.
Rickmansworth.
Queensferry.

January 29.
Alcester.
Dunfermline.
Helensburgh.

January 30.
Aberdeen.

January 31.
Thames Ditton.
Dundonald.

February 1.
Ware.
Irvine.
Peebles.

February 2.
Ancram.

February 5.
Eastry.
Kircaldy.
Tillicoultry.
Clackmannan.

February 7.
St. Quivox.
Lochwinnoch.

February 12.
Hitchin.
Girvan.
Alloa.

February 13.
Swaffham.
Carshalton.
Galashiels.
Auchinleck.

February 14.
Stow.
Ayr.

February 17.
Epping.
Freebridge Lynn.
Kilmorie.

February 22.
Woodford.
Hexham.

February 23.
Darlington.
Bowmore.

March 1.
Bradford, Yorkshire.
Rugby.
Kilbride.
Isle of Lewis.

March 14.
Morpeth.

March 15.
Kinnaird.

March 25.
South Shields.

March 27.
Gravesend.
Durham.

March 29.
Dailly.

April 14.
Kinnoul.

May 3.
Sproutson.
Crosshill.

SECOND OUTBREAK, 1849.

May 10.
Gloucester.
Liverpool.
Durham.
Rhymney.

May 14.
Keynsham.

May 21.
Oldham.
Holyhead.
Cramond.

May 31.
Neath.
Merthyr Tydfil.
Kingsclere.

June 2.
Clifton.
Cardiff.
Dundee.

June 4.
Swansea.
Newport (Monmouth.)
Rainham.

June 7.
Monmouth.
Tewkesbury.

June 8.
Plymouth.
Bradford.

June 9.
Stony Kirk.

June 13.
Manchester.
Birkenhead.
Bristol.

June 16.
Garliestown.
Wolverhampton.

June 18.
Wheatenhurst.
Dowlais.
Newton Ferrers.

June 20.
Stroud.
Hambledon.
Bideford.

June 25.
Carnarvon.
Aberavon.
Taibach.

June 26.
Harwich.

June 28.
Cuckfield.
Salford.

June 29.
Arlingham.
Plaistow.

June 30.
Worcester.
Nantwich.

July 2.
Wootton-under-Edge.
Plympton St. Mary.
Monefieth.

July 3.
Staines.

July 4.
Chorlton.
Gaydon.
Suffolk Hospital.
Burslem.

July 5.
Warrington.
Aberdeen.

July 6.
Tynemouth.
Ship "Tory," Gravesend.

July 7.
Portsmouth.
Newbury.

July 9.
Isle of Wight.
Devonport.
Rochford.

July 11.
Ipswich.

July 12.
Pontypool.

July 13.
Milton-next Sittingburn.
Dartford.
Brecon.
Salisbury.
Frampton-on-Severn.
Arundel.
Gosport.
Warminster.

July 14.
Ashton-under-Lyne.
Poole.
Wisbeach.
Morton.
Brighton.

July 16.
Market Drayton.
Stoke-upon-Trent.
West Ham.
Leeds.
Inverness.
Findhorn-Forres.

July 17.
Bromsgrove.
York.

July 18.
Anglesey.
Egham.
Coventry.
Whitstable.
Prescot.
Mevagissey.

July 19.
Newent.
Bury.
Epsom.
Romsey, Hants.
Rye.
Findham.
Wrexham.
Newtown, Montgomeryshire.

July 20.
Llanelly.
Yeovil.
Burnley.
Padiham.
Leith.

July 21.
Alton
Sunderland.
Leigh.
Basingstoke.
Edinburgh.

July 23.
St. Austell.
Cambridge.
Canterbury.
Hales Owen.
Axbridge.
Hull.

July 24.
Aberdare.
Alderbury.
Errol.
West Derby.
Holywell.
Southampton.
Sheffield.
Bingley.
Wokingham.

July 25.
Stanstead.
Great Marlow.
Bradwell.
Portpatrick.
Bourne.
Stockport.
Ellesmere.
Castle Donnington.
Bletchingham.
Guildford.

July 26.
Isle of Sheppey.
Bedminster.
Shrewsbury.
Lancaster.
Godstone.
Stonehouse.
Little Stanmore, Hendon.
Gomersal.
Bridgend and Cowbridge.
Newton Abbot.
Ormskirk.
Stone.

July 27.
Bromley.
Gravesend.
Aylesbury.

SECOND OUTBREAK, 1849—*continued.*

July 27—continued.
Bridgnorth.
Deal.
Burnham.
Stanwell.
Yelmpton.
Selby.
Kinloss.
Orsett.
Hollingbourn.
Cliff, Rochester.

July 28.
Reading.
Tormorden.
Morecroft.
Horsham.
Wilton.

July 30.
Sculcoates.
Finchley.
Isle of Thanet.
Thetford.
Fareham.
St. Germans.
Milford Haven.
Clydach.
Spalding.
Kembach, Cupar.

July 31.
Hastings.
Arbroath.

August 1.
Maidstone.
Darlington.
Berkhampstead.
Romford.
Brechin.
Crickhowell.

August 2.
Faversham.
Preston.
Runcorn.
Ferrylwidge.

August 3.
Barking, Essex.
Carmarthen.
Woodford.
Maesteg.
Truro.
Ewell.
Donington, Lincoln.
Richmond, Surrey.

August 3—continued.
Kingston, Surrey
Crayford.
Wallingford.
Chiswick.
Foleshill.
Mortlake.
Chester.
Newcastle-under-Lyme.

August 4.
Redwick, Thornbury
Tavistock.
Reigate.
Westerham.
High Wycombe.
Malton.
Twickenham.
Grantham.
Seacomb, Birkenhead.
Britford, Salisbury.
Erith.
Old Brentford.

August 7.
Goole.

August 8.
Ulverstone.
Penydarran
Claydon.
Gunville, Isle of Wight.
Dagenham.
Garratt, Surrey
March, Cambridge.
Oxford.
Ramsgate.
Marston, Oxford.
Broadstairs.
Stourbridge.
Skelton, Stoke-upon-Trent.
Atherton, Leigh Union.
Amersham.
Woolton, Prescot Union.
Beccles, Suffolk.
Whitby.
Caistor, Lincoln.
Halifax.
North Bierley Union.
Horton.
Easington Union.
Horwick, Bolton.
Epworth-Thorne.
Ecclesall Bierlow.

August 8—continued.
Longbenton, Tynemouth.
Thorne.
St. Andrews.
Birgham-Eccles by Coldstream.
Hawick.
Gainsborough

August 10.
Kelso.

August 13.
Bolton.
Morristown, Swansea.
Wellington, Salop.
Madeley Union, Salop.
Pilton, Barnstaple.
Harrow.
South Brent, Totnes.
Dean Prior.
Brentford.
Beeralston, Tavistock.
Uxbridge.
Beerferris, Tavistock.
East Stonehouse.

August 14.
Kenton St. Thomas.
Southover Wells, Somersetshire.
Broseley, Rusholme.
Marden, Maidstone.
Yarmouth, Isle of Wight.
Newport, Isle of Wight.
Coddington, Aylesbury
Tunstall, Wolstanton.
Hunslet.
Market Weighton.
Newport-Forgan.
Enfield.
West Houghton.
Hillingdon.
Crail.
Bentford.

August 15.
East and West Looe, Cornwall.
Howden Union.
Maryport.
Whittlesey.
Dewsbury.
Tranmere.
Keele, Newcastle.

August 16.
Liskeard.
St. Asaph.
Rotherham.
Wolstanton and Burslem.
Bridgwater.
Greenock.
Wakefield.
Gateshead.
Somerset, Dewsbury Union.

August 17.
Bromley Union.
Hosham.
Lausanilet.
Logierait.
Cupar Angus.

August 18.
Huddersfield.
North Aylesford.
Devizes.
Shepton-Mallet.
Sheerness.
Tredegar.
Haddington.

August 20.
Fordingbridge.
Weymouth.
Lockersbie.
Crediton.
Poole, Montgomeryshire.

August 21.
Stockton.
Corwen.
Bridlington.
Welwyn Union.
Fortrose.

August 22.
Portland.
Kirkham, Lancaster.
Eton.

August 23.
Seaham Harbour.
Sunbury.
South Stoneham.
Beith.
Long Ashton, Bristol.
East Ashford Union.
Cavers.
Wigan.

SECOND OUTBREAK, 1849—*continued.*

August 23—continued.
Great Bolton.
Chirton, Tynemouth.
Swindon, Wilts.
Potterne, Devizes,
Middleborough, Scotland.

August 24.
Headington, Oxford.
North Petherton.
Ilford.
Leek.
Chertsey.
Hertford.
Eltham.
West Ashford.
Croydon.
Thatcham.
Keston.
Habersham Eaves.
Carnoustie.

August 25.
East Sheen.
Dover.
Alderbury, Salisbury.
Margate.
Hartleford.
Woodford Bridge.
Barnes.

August 27.
Congleton.
Melcombe Regis.
Worfield, Bridgnorth.
Linton.
Handborough.
Roxeth.

August 28.
Ware.
Droitwich.
Bowling.
Great Grimsby.
Great Yarmouth.
Wilton by Hawick.

August 29.
Dunstable.
Barnet.
Folkestone.
Hanwell.
Twyning.
Perth.
Hardingstone.
Merton Rush.
Upton.
St. Leonard's, St. Andrews.
Cullercoats.

August 30.
Kingstanton, Devon.
Clarborough.
Headcorn, Maidstone.
Windsor.
Yarm.
Hitchin.
Manningham.
Woodspeen East by Newbury.
Maidenhead.
Liff and Benvie
Yetholme.

September 1.
Kilspindie, Errol.
Llangfelach, Swansea.
Dorchester.
East Grinstead.

September 3,
Blair Drummond.
Chard.
Barnstaple.
Chipping Norton.
Kirkinnen, Wigton.
Stokesley Union, North Allerton.
Kingswinford, Stourbridge.
Penzance.
Norwich.

September 4.
Claycross, near Chesterfield.
Walton.
Woburn, Bucks.
Barnard Castle.
Bellbutts.
Farnworth and Hulton, Bolton Union.

September 5.
Skipton Union.
Staniford.
Chesterfield.
Clitheroe.
Shipley, Yorkshire.
Pemberton.
Ferryport-on-Craig.

September 6.
Chorley.
Scholes District, Wigan Union.
Wells.
Ashton-in-Mackerfield.
Haslingden Union.

September 7.
West Bromwich.
Sutton Valence and Otham, near Maidstone.
Totnes.
Northwich Union.
Rudston.

September 10.
Stilton.
Tormaham.
Chailey.
St. Ives.
Kerriemuir.
Denholm.
Richmond, Yorkshire.
Auchmithie.
Dores.

September 11.
Kidderminster.
Wallasey.
Swaffham.

September 12.
Witney.
Rockingham.
Pocklington.
Blackrod, Wigan.
Rugby.
Herwain, Merthyr Tydvil.

September 13.
Seaton Delaval.
Wincanton.
Great Easton, Lincolnshire.
Stirling.
Kinnoull, Perth.

September 14.
Tunbridge.
Wallsend, Tynemouth.
Bishop Stortford.
Kinfauns, Perthshire.
Dumbarton.

September 15.
Beaconsfield.
Lower Tooting.
Haughley, Stowmarket
Reeham, Norfolk.
Hanley and Shelton.
Willenhall.
Alnwick.
Roseneath.
Dunfermline.
Montrose.

September 17.
Cottisham.
Blyth and Newsham.
Tenterden.
Pembroke.
Hexham.
Kettering.
Wednesfield.
Eyemouth, Berwickshire.
Gwennap, Redruth Union.
Uppingham.
Mangotsfield.

September 18.
Walton, West Derby.
Wylam, near Newcastle-under-Lyme.
Stratford-on-Avon.
Maldon.
Dunbar.
Knockbain.

September 19.
Caton Gilbert.
Feltwell.
Epping.
Bo'ness.
Preston Kirk.

September 20.
Kirsby, near Bolton.
Redruth.
Berwick-upon-Tweed.

September 21.
Haverfordwest.
Amlwch.
Corbridge.
Row-by-Helensburgh.

September 22.
Hutton District.
Dysart.
East Retford.
Carisbrooke, Isle of Wight.
Burnley and Haverg-ham Eaves.
Eccles.
Depwade.

September 24.
Bawtry, Yorkshire.
Buxton.
Aylesbury Union.
Kingsbridge, Devon.
Old Machar, Aberdeen
Shiffnall.
Herne-bay.

PROGRESS of EPIDEMIC CHOLERA in Great Britain, &c.—*continued.*

SECOND OUTBREAK, 1849—*continued.*

September 25.
Hucknall Terard.
Catterick District.
Tain.
Munlochy.
Pailsley.

September 26.
Nuneaton.
Tweedmouth.
Market Lavington, Devizes.
Staithes.
Leven, Fife.
Abernethy.

September 27.
St. Mary Church, Torquay.
Upway, Dorchester.
Kinclaven.

September 28.
Bedford.
Sandgate, Kent.
Lauder.
Portwilliam.

September 29.
Colne, Burnley.
West Calder.
Perm, Staffordshire.
Lochgilly, Auchtenderran.
North Nibley.
St. Vigeans, Arbroath.
Gamlingay (Cambridgeshire).
Abbotshall, Kirkaldy.
Kersley, Bolton.
Braunton, Barnstaple.
Langharne.

October 1.
Buckden, Hunts.
Preston Pans.
Guisborough.
Chelmsford.
High Littleton, Bristol
Thorn Falem, Taunton
Glendall.

October 2.
Plomesgate Union.
Fraserburgh.

October 3.
Ketley.
Derwent, Weardale.
Hanston, Pasley.

October 4.
Godney.
Lichfield.
InverallochyandCairnbulg, Aberdeenshire.

October 5.
Bangor.
Sandy, Bedfordshire.
Ratcliff on Trent.
Inverkeithing.

October 6.
Long Handborough, Woodstock.
Ferrydar, Craig, Montrose.

October 8.
Girtford.
Wick, Caithness.
Belhaven, Dunbar.

October 9.
Chilton Super, Polden Hill.
Upholland District.

October 10.
Burton-upon-Trent.
Hillingbourne.

October 11.
Boddon, Peterhead.
Newark.
Cottishall.
Dunse.

October 13.
Hutches, near Fareham.
Dalgety, Inverkeithing.

October 15.
Port Glasgow.

October 16.
Langholm.

October 17.
Ince District, Wigan.
Peebles.
Ancrum.

October 19.
Kenwyn.

October 20.
Loughborough.

October 22.
Colsham.
Kinghorn.

October 23.
Riecall.
Upholtam.
Houston, Renfrewshire.
Panbride, Carnoustie.

October 24.
Ilkeston.
Nigg, Aberdeen.

October 25.
Peterhead.

October 27.
Clutton Union.

October 30.
Newtown, Bo'ness.
Greasley.

November 2.
Milton by Balgerine, Markwick.

November 3.
East Normanshire.

November 5.
Outwell, Norfolk.
Lilliesleaf.

November 7.
Carnock by Dunfermline.

November 8.
St. Combs, Linmay, Aberdeenshire.
Culross.

November 12.
Alloa.

November 13.
Kirkaldy.

November 14.
Mexbro' District, Doncaster.

November 16.
Maryhill, Glasgow.
Polwarth, Dunse, Berwickshire.

November 19.
Coldingham by Ayton, Berwickshire.

November 20.
Forse by Libster, Caithness.

November 21.
Cairnbulg, Inverallerhay and Charleston, Saline, N. B.

November 22.
Eastry Union.
Althorpe, near Crowle.

November 23.
Gifford, Yester, Haddington.

November 27.
Bolton by Haddington.

November 28.
Petsligo.

December 1.
Cockpen, Edinburgh.

December 3.
Preston Kirk, East Lothian.

December 7.
Paulton, Clutton.
Camesten and Radstock, Clutton.
Torryburn.

December 13.
Ash, Eastry.

December 24.
Burntisland.

		75 and under 80.	80 and under 85.	85 and under 90.	90 and under 95.	95 and under 100.	100 and upwards	?	Total.	Grand Total.	Proportion per cent. of classes specified.		
											Males.	Females	Total.
		1	..	..	..	..	..	..	16	42	4·4	2·9	3·7
		6	..	..	..	..	..	..	78	145	11·5	14·3	12·9
		12	2	2	1	..	..	..	452	944	84·1	82·8	83·5
		5	2	..	..	..	..	..	82	128			
		24	4	2	1	..	..	..	628	1,259	100	100	100
		3·8	0·7	0·3	0·2	..	..	..	100				
		2	..	..	..	..	..	..	21	46	5·7	4·5	5·1
		5	..	5	..	..	..	..	86	179	21·4	18·3	19·8
		6	7	2	2	..	..	..	362	679	72·9	77·2	75·1
		4	5	1	1	..	..	..	39	62			
		17	12	8	3	..	..	..	508	966	100	100	100
		3·3	2·4	1·6	0·6	..	..	..	100				
		..	1	1	1	..	..	..	10	24	2·0	1·1	1·6
		3	1	..	..	..	..	..	78	189	16·1	9·0	12·1
		18	12	5	..	..	..	4	780	1,346	81·9	89·9	86·3
		3	1	2	..	..	..	..	106	180	..	..	..
		24	15	8	1	..	..	4	974	1,739	100	100	100
		2·5	1·5	0·8	0·1	..	..	0·4	100				
		2	1	..	..	..	..	..	15	30	1·0	1·1	1·0
		5	5	1	1	..	..	..	139	337	13·2	9·9	11·6
		38	23	12	2	2	..	..	1,248	2,536	85·8	89·0	87·4
		4	2	2	..	..	..	..	170	315			

No. 2.—Analysis of Deaths from Cholera in the Metropolis during the 60 Weeks ending 24th November, 1849.

Districts of the Metropolis, and Classes of the Community.	MALES.																														
	Under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and under 45.	45 and under 50.	50 and under 55.	55 and under 60.	60 and under 65.	65 and under 70.	70 and under 75.	75 and under 80.	80 and under 85.	85 and under 90.	90 and under 95.	95 and under 100.	100 and upwards	?	Total.	Under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and under 45.
West Districts.																															
Gentry, &c.	..	..	1	..	..	1	1	..	1	2	1	2	3	5	4	1	2	2	..	..	..	..	26	..	..	..	1	..	1	..	1	4
Tradesmen, &c.	10	..	5	4	2	2	4	2	7	7	8	3	5	3	3	1	1	..	..	..	..	..	67	11	2	5	1	3	3	6	5	7
Mechanics, &c.	74	13	49	22	28	33	39	30	45	20	42	28	29	18	12	8	2	..	..	..	..	..	492	62	14	33	19	14	19	39	22	41
Undescribed	5	..	7	3	1	1	5	3	2	3	2	3	..	1	6	1	2	..	..	..	..	1	46	8	1	3	1	4	8	9	3	4
Total	89	13	62	29	31	37	49	35	55	32	53	36	37	27	25	11	7	2	..	..	..	1	631	81	17	41	22	21	31	54	31	56
Proportion per cent. at each age to deaths from Cholera	14·0	2·1	9·8	4·6	4·9	5·9	7·8	5·5	8·7	5·1	8·4	5·7	5·9	4·3	4·0	1·7	1·1	0·3	..	..	..	0·2	100	12·9	2·7	6·5	3·5	3·4	4·9	8·6	4·9	8·9
North Districts.																															
Gentry, &c.	1	..	1	..	1	1	..	1	3	1	2	5	1	4	..	2	1	1	..	..	..	..	25	..	2	1	2	1	1	..	..	..
Tradesmen, &c.	14	2	6	2	..	3	6	6	5	11	12	6	12	4	3	1	..	..	..	..	..	..	93	5	..	2	1	2	4	3	6	6
Mechanics, &c.	51	10	30	8	16	21	34	18	23	27	19	13	21	8	10	6	2	..	..	..	..	..	317	35	7	23	15	10	25	26	27	35
Undescribed	4	..	2	2	1	2	1	2	1	1	3	2	2	..	..	..	..	..	..	..	..	..	23	2	1	1	..	..	2	− 1	2	4
Total	70	12	39	12	18	27	41	27	32	40	36	26	36	16	13	9	3	1	..	..	..	..	458	42	10	27	18	13	32	30	35	45
Proportion per cent. at each age to deaths from Cholera	15·3	2·6	8·5	2·6	3·9	5·9	8·9	5·9	7·0	8·7	7·9	5·7	7·9	3·5	2·8	2·0	0·7	0·2	..	..	..	..	100	8·3	2·0	5·3	3·5	2·5	6·3	5·9	6·9	8·8
Central Districts.																															
Gentry, &c.	..	..	1	..	..	1	..	..	1	1	1	1	2	2	2	2	..	..	..	..	..	..	14	..	..	..	..	..	1	..	..	..
Tradesmen, &c.	8	2	2	2	3	7	12	14	10	7	11	5	12	3	8	3	2	..	..	..	..	..	111	4	3	1	3	1	5	7	4	6
Mechanics, &c.	80	13	51	24	25	35	41	39	69	37	41	34	24	27	12	8	3	1	..	1	..	1	566	84	15	50	27	29	44	63	55	91
Undescribed	7	6	6	4	..	3	8	2	8	4	3	2	9	6	3	2	..	1	..	..	..	..	74	9	..	2	6	10	7	13	9	8
Total	95	21	60	30	28	46	61	55	88	49	56	42	47	38	25	15	5	2	..	1	..	1	765	97	18	53	36	40	57	88	68	105
Proportion per cent. at each age to deaths from Cholera	12·4	2·7	7·8	3·9	3·7	6·0	8·0	7·2	11·5	6·4	7·3	5·5	6·1	5·0	3·3	2·0	0·7	0·3	..	0·1	..	0·1	100	10·0	1·8	5·4	3·7	4·1	5·9	9·0	7·0	10·8
East Districts.																															
Gentry, &c.	..	..	..	..	..	..	..	..	..	2	1	4	2	..	2	2	2	..	..	..	..	..	15	..	..	..	..	1	..	..	1	1
Tradesmen, &c.	19	1	13	9	10	9	12	12	12	17	23	19	16	11	5	8	2	..	..	..	..	..	198	13	2	7	6	7	5	8	11	16
Mechanics, &c.	195	32	123	73	75	71	104	107	114	74	86	51	52	61	32	16	12	6	3	..	..	1	1,288	140	29	95	55	48	80	103	97	125
Undescribed	21	6	11	8	4	11	13	15	17	5	13	5	8	3	2	2	..	..	..	..	..	1	145	12	5	11	3	2	10	24	14	16
Total	235	39	147	90	89	91	129	134	143	98	123	79	78	75	41	28	16	6	3	..	..	2	1,646	165	36	113	64	58	95	135	123	158
Proportion per cent. at each age to deaths from Cholera	14·3	2·4	8·9	5·5	5·4	5·5	7·7	8·1	8·7	6·0	7·4	4·8	4·7	4·6	2·5	1·7	1·0	0·4	0·2	..	..	0·1	100	10·5	2·3	7·2	4·0	3·7	6·0	8·6	7·8	10·0
South Districts.																															
Gentry, &c.	4	..	3	..	1	5	4	1	10	4	10	5	9	8	10	5	5	3	1	..	..	..	88	7	1	4	3	2	3	2	5	6
Tradesmen, &c.	82	17	38	27	17	23	38	47	27	39	34	32	35	17	23	12	9	3	..	..	..	..	520	57	11	42	17	23	23	36	54	68
Mechanics, &c.	447	66	255	122	108	151	169	180	166	107	140	111	112	94	63	36	20	12	1	..	..	3	2,363	382	58	224	89	70	130	190	181	183
Undescribed	79	15	45	22	36	51	41	34	25	28	28	23	22	16	12	6	2	1	..	..	..	..	456	88	19	46	28	40	71	55	61	69
Total	612	98	341	171	162	230	252	262	228	178	212	171	178	135	108	59	36	19	2	..	..	3	3,457	534	89	316	137	135	227	283	301	326
Proportion per cent. at each age to deaths from Cholera	17·7	2·8	9·9	4·9	4·7	6·7	7·3	7·6	6·6	5·1	6·1	4·9	5·2	3·9	3·1	1·7	1·0	0·6	0·1	..	..	0·1	100	13·5	2·2	8·0	3·5	3·4	5·7	7·2	7·6	8·2
Total of Metropolis.																															
Gentry, &c.	5	..	6	..	2	8	5	2	15	10	15	17	17	19	18	12	10	6	1	..	..	..	168	7	3	5	6	4	6	2	7	11
Tradesmen, &c.	133	22	64	44	32	44	72	81	61	81	88	65	80	38	42	25	14	3	..	..	..	..	989	90	18	57	28	36	40	60	50	103
Mechanics, &c.	847	134	508	249	252	311	387	374	417	265	328	237	238	208	129	74	39	19	4	1	..	5	5,026	703	123	425	205	171	298	426	382	475
Undescribed	116	27	71	39	42	68	68	56	53	41	49	35	41	26	23	11	4	2	..	..	..	2	774	119	26	63	38	56	98	102	89	101
Total	1,101	183	649	332	328	431	532	513	546	397	480	354	376	291	212	122	67	30	5	1	..	7	6,957	919	170	550	277	267	442	590	528	690
Proportion per cent. at each age to deaths from Cholera	15·8	2·6	9·3	4·8	4·7	6·2	7·6	7·4	7·9	5·7	6·9	5·1	5·4	4·2	3·0	1·8	1·0	0·4	0·1	0·01	..	0·1	100	12·0	2·2	7·2	3·6	3·5	5·8	7·7	7·3	9·0
Population (1841)	113,197	95,439	88,340	82,080	92,694	84,861	80,772	58,988	61,068	39,340	38,728	20,588	22,730	11,440	9,509	4,027	1,942	575	161	42	7	5,473	912,001	117,047	98,109	89,086	96,743	120,693	103,855	95,700	67,244	68,726
Proportion per cent. of deaths from Cholera (1849) to population (1841)	1·0	0·2	0·7	0·4	0·3	0·5	0·7	0·9	0·9	1·0	1·2	1·7	1·7	2·5	2·2	3·0	3·5	5·2	3·1	2·4	..	0·1	0·76	0·8	0·2	0·6	0·3	0·2	0·4	0·6	0·8	1·0

ES.												
50 and under 55.	55 and under 60.	60 and under 65.	65 and under 70.	70 and under 75.	75 and under 80.	80 and under 85.	85 and under 90.	90 and under 95.	95 and under 100.	100 and upwards	?	Total.
1	2	3	5	4	1	2	2	..	..	..	..	26
8	3	5	3	3	1	1	..	..	..	..	..	67
42	28	29	18	12	8	2	..	..	..	..	..	492
2	3	..	1	6	1	2	..	..	..	..	1	46
53	36	37	27	25	11	7	2	..	..	..	1	631
8·4	5·7	5·9	4·3	4·0	1·7	1·1	0·3	..	..	..	0·2	100
2	5	1	4	..	2	1	1	..	..	..	..	25
12	6	12	4	3	1	..	..	..	..	..	..	93
19	13	21	8	10	6	2	..	..	..	..	..	317
3	2	2	..	..	..	..	..	..	..	..	..	23
36	26	36	16	13	9	3	1	..	..	..	..	458
7·9	5·7	7·9	3·5	2·8	2·0	0·7	0·2	..	..	..	..	100
1	1	2	2	2	2	..	..	..	..	..	..	14
11	5	12	3	8	3	2	..	..	..	..	..	111
41	34	24	27	12	8	3	1	..	1	..	1	566
3	2	9	6	3	2	..	1	..	..	..	..	74
56	42	47	38	25	15	5	2	..	1	..	1	765
7·3	5·5	6·1	5·0	3·3	2·0	0·7	0·3	..	0·1	..	0·1	100
1	4	2	..	2	2	2	..	..	..	..	..	15
23	19	16	11	5	8	2	..	..	..	..	..	198
86	51	52	61	32	16	12	6	3	..	..	1	1,288
13	5	8	3	2	2	..	..	..	..	..	1	145
123	79	78	75	41	28	16	6	3	..	..	2	1,646
7·4	4·8	4·7	4·6	2·5	1·7	1·0	0·4	0·2	..	..	0·1	100
10	5	9	8	10	5	5	3	1	..	..	..	88
34	32	35	17	23	12	9	3	..	..	..	..	520
140	111	112	94	63	36	20	12	1	..	..	3	2,363
28	23	22	16	12	6	2	1	..	..	..	..	486
212	171	178	135	108	59	36	19	2	..	..	3	3,457
6·1	4·9	5·2	3·9	3·1	1·7	1·0	0·6	0·1	..	..	0·1	100
15	17	17	19	18	12	10	6	1	..	..	..	168
88	65	80	38	42	25	14	3	..	..	..	..	989
328	237	238	208	129	74	39	19	4	1	..	5	5,026
49	35	41	26	23	11	4	2	..	..	..	2	774
480	354	376	291	212	125	67	30	5	1	..	7	6,957
6·9	5·1	5·4	4·2	3·0	1·8	1·0	0·4	0·1	0·01	..	0·1	100
8,728	20,588	22,730	11,440	9,509	4,0[illegible]	1,942	575	161	42	7	5,473	912,001
1·2	1·7	1·7	2·5	2·2	3·0	3·5	5·2	3·1	2·4	..	0·1	0·76

FEMALES.																										
Under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and under 45.	45 and under 50.	50 and under 55.	55 and under 60.	60 and under 65.	65 and under 70.	70 and under 75.	75 and under 80.	80 and under 85.	85 and under 90.	90 and under 95.	95 and under 100.	100 and upwards	?	Total.	Grand Total.	Proportion per cent. of classes specified.		
																								Males.	Females	Total.
..	..	..	1	..	1	..	1	4	2	1	1	2	2	..	1	..	..	..	..	..	..	16	42	4·4	2·9	3·7
11	2	5	1	3	3	6	5	7	7	4	8	6	2	2	6	..	..	..	..	..	..	78	145	11·5	14·3	12·9
62	14	33	19	14	19	39	22	41	41	32	26	26	29	18	12	2	2	1	..	..	..	452	944	84·1	82·8	83·5
8	1	3	1	4	8	9	3	4	1	7	6	7	7	6	5	2	..	..	..	..	..	82	128			
81	17	41	22	21	31	54	31	56	51	44	41	41	40	26	24	4	2	1	..	..	..	628	1,259	100	100	100
12·9	2·7	6·5	3·5	3·4	4·9	8·6	4·9	8·9	8·1	7·0	6·5	6·5	6·4	4·2	3·8	0·7	0·3	0·2	..	..	..	100				
..	2	1	2	1	1	..	..	..	1	3	1	1	1	5	2	..	..	..	..	..	..	21	46	5·7	4·5	5·1
5	..	2	1	2	4	3	6	6	18	5	3	7	8	6	5	..	5	..	..	..	..	86	179	21·4	18·3	19·8
35	7	23	15	10	25	26	27	35	22	29	22	24	27	18	6	7	2	2	..	..	..	362	679	72·9	77·2	75·1
2	1	1	..	..	2	1	2	4	1	1	1	4	3	5	4	5	1	1	..	..	..	39	62			
42	10	27	18	13	32	30	35	45	42	38	27	36	39	34	17	12	8	3	..	..	..	508	966	100	100	100
8·3	2·0	5·3	3·5	2·5	6·3	5·9	6·9	8·8	8·3	7·5	5·3	7·1	7·7	6·7	3·3	2·4	1·6	0·6	..	..	..	100				
..	..	..	..	..	1	..	..	..	1	1	1	1	2	..	..	1	1	1	..	..	..	10	24	2·0	1·1	1·6
4	3	1	3	1	5	7	4	6	5	10	9	7	5	4	3	1	..	..	..	..	..	78	189	16·1	9·0	12·1
84	15	50	27	29	44	68	55	91	65	49	41	42	50	31	18	12	5	..	..	..	4	780	1,346	81·9	89·9	86·3
9	..	2	6	10	7	13	9	8	9	8	3	8	..	8	3	1	2	..	..	..	..	106	180	..	..	..
97	18	53	36	40	57	88	68	105	80	68	54	58	57	43	24	15	8	1	..	..	4	974	1,739	100	100	100
10·0	1·8	5·4	3·7	4·1	5·9	9·0	7·0	10·8	8·2	7·0	5·5	6·0	5·9	4·4	2·5	1·5	0·8	0·1	..	..	0·4	100				
..	..	..	..	1	..	..	1	1	..	..	1	3	1	4	2	1	..	..	..	..	..	15	30	1·0	1·1	1·0
..	..	..	..	1	..	..	1	1	..	..	1	3	1	4	2	1	..	..	..	..	..	15	30	1·0	1·1	1·0
13	2	7	6	7	5	8	11	16	7	10	8	12	8	7	5	5	1	1	..	..	..	139	337	13·2	9·9	11·6
140	29	95	55	48	80	103	97	125	72	72	77	57	71	50	38	23	12	2	2	..	..	1,248	2,536	85·8	89·0	87·4
12	5	11	3	2	10	24	14	16	12	16	12	8	5	12	4	2	2	..	..	..	..	170	315			
165	36	113	64	58	95	135	123	158	91	98	98	80	85	73	49	31	15	3	2	..	..	1,572	3,218	100	100	100
10·5	2·3	7·2	4·0	3·7	6·0	8·6	7·8	10·0	5·1	6·2	6·2	5·1	5·4	4·6	3·1	3·0	0·9	0·2	0·1	..	..	100				
7	1	4	3	2	3	2	5	6	10	4	16	13	13	2	3	3	1	1	..	..	..	99	187	3·0	3·1	3·0
57	11	42	17	23	23	36	54	68	55	42	36	36	39	33	25	14	7	1	..	..	..	619	1,139	17·5	19·5	18·5
382	58	224	89	70	130	190	181	183	194	165	144	128	109	93	61	39	18	4	..	..	2	2,464	4,827	79·5	77·4	78·5
88	19	46	28	40	71	55	61	69	48	43	40	27	41	35	23	19	16	..	..	..	..	769	1,255			
534	89	316	137	135	227	283	301	326	307	254	236	204	202	163	112	75	42	6	..	..	2	3,951	7,408	100	100	100
13·5	2·2	8·0	3·5	3·4	5·7	7·2	7·6	8·2	7·8	6·4	6·0	5·2	5·1	4·1	2·8	1·9	1·1	0·2	..	..	0·1	100				
7	3	5	6	4	6	2	7	11	14	9	20	20	19	11	8	5	2	2	..	..	..	161	329	2·7	2·5	2·6
90	18	57	28	36	40	60	80	103	92	71	64	68	62	52	44	20	13	2	..	..	..	1,000	1,989	16·0	15·5	15·7
703	123	425	205	171	298	426	382	475	394	347	310	277	285	210	135	83	39	9	2	..	6	5,306	10,332	81·3	82·0	81·7
119	26	63	38	56	98	102	89	101	71	75	62	54	56	66	39	29	21	1	..	..	..	1,166	1,940			
919	170	550	277	267	442	590	558	690	571	502	456	419	423	339	226	137	75	14	2	..	6	7,633	14,590	100	100	100
12·0	2·2	7·2	3·6	3·5	5·8	7·7	7·3	9·0	7·5	6·6	6·0	5·5	5·6	4·4	3·0	1·8	1·0	0·2	0·03	..	0·1	100				
117,047	98,109	89,086	96,743	120,693	103,855	95,700	67,244	68,726	43,194	44,820	23,038	28,156	14,606	13,219	6,125	3,428	1,137	338	80	16	1,008	1,036,368				
0·8	0·2	0·6	0·3	0·2	0·4	0·6	0·8	1·0	1·3	1·1	2·0	1·5	2·9	2·6	3·7	4·0	6·6	4·1	2·5	..	0·6	0·74				

N

No. 3.—Analysis of Deaths from Cholera in the Metropolis during the 60 Weeks ending 24th November, 1849.—Males and Females.

Districts and Classes of the Community.	Under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and under 45.	45 and under 50.	50 and under 55.	55 and under 60.	60 and under 65.	65 and under 70.	70 and under 75.	75 and under 80.	80 and under 85.	85 and under 90.	90 and under 95.	95 and under 100.	100 and upwards.	?	Total.	Proportion per cent. of classes specified.	E... P...
West Districts.																									
Gentry, &c.	..	..	1	1	..	2	1	1	5	4	2	3	5	7	4	2	2	2	..	..	.	..	42	3·7	
Tradesmen, &c.	21	2	10	5	5	5	10	7	14	14	12	11	11	5	5	7	1	..	..	..	..	..	145	12·9	
Mechanics, &c.	136	27	82	41	42	52	78	52	86	61	74	54	55	47	30	20	4	2	1	..	..	..	944	83·5	
Undescribed	13	1	10	4	5	9	14	6	6	4	9	9	7	8	12	6	4	..	..	..	..	1	128		
Total	170	30	103	51	52	68	103	66	111	83	97	77	78	67	51	35	11	4	1	..	..	1	1,259	100	
Proportion per cent. at each age to deaths from Cholera	13·4	2·4	8·2	4·1	4·1	5·4	8·2	5·2	8·8	6·6	7·7	6.1	6·2	5·3	4·1	2·8	·9	·3	·1	..	..	0·1	100		
Population (1841)	31,232	26,213	24,386	27,295	36,284	32,845	29,546	21,009	21,223	13,168	12,726	6,589	7,840	3,849	3,337	1,464	829	252	80	15	5	524	300,711		
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841)	0·5	0·1	0·4	0·2	0·1	0·2	0·3	0·3	0·5	0·6	0·8	1·2	1·0	1·7	1·5	2·4	1·3	1·6	1·3	..	..	0·2	0·42		
North Districts.																									
Gentry, &c.	1	2	2	2	2	2	..	1	3	2	5	6	2	5	5	4	1	1	..	..	..	..	46	5·1	
Tradesmen, &c.	19	2	8	3	2	7	9	12	11	29	17	9	19	12	9	6	..	5	..	..	..	..	179	19.8	
Mechanics, &c.	86	17	53	23	26	46	60	45	58	49	48	35	45	35	28	12	9	2	2	..	..	..	679	75·1	
Undescribed	6	1	3	2	1	4	2	4	5	2	4	3	6	3	5	4	5	1	1	..	..	..	62		
Total	112	22	66	30	31	59	71	62	77	82	74	53	72	55	47	26	15	9	3	..	..	..	966	100	
Proportion per cent. at each age to deaths from Cholera	11·8	2·3	6·9	3·1	3·2	6·1	7·4	6·4	7·9	8·5	7·7	5·5	7·5	5·6	4·7	2·6	1·6	0·9	0·3	..	..	..	100		
Population (1841)	42,872	36,693	33,244	33,672	41,800	37,802	34,973	25,086	25,827	16,267	16,294	8,241	9,517	4,869	4,343	2,010	1,131	324	118	21	4	863	375,971		
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841)	0·3	0·1	0·2	0·1	0·1	0·2	0·2	0·2	0·3	0·5	0·5	0·6	0·8	1·1	1·1	1·3	1·3	2·8	2·5	..	..	..	0·26		
Central Districts.																									
Gentry, &c.	..	..	1	..	..	2	..	..	1	2	2	2	3	4	2	2	1	1	1	..	..	..	24	1·6	
Tradesmen, &c.	12	5	3	5	4	12	19	18	16	12	21	14	19	8	12	6	3	..	..	..	..	..	189	12·1	
Mechanics, &c.	164	28	101	51	54	79	109	94	160	102	90	75	66	77	43	26	15	6	..	1	..	5	1,346	86·3	
Undescribed	16	6	8	10	10	10	21	11	16	13	11	5	17	6	11	5	1	3	..	..	..	..	180		
Total	192	39	113	66	68	103	149	123	193	129	124	96	105	95	68	39	20	10	1	1	..	5	1,739	100	
Proportion per cent. at each age to deaths from Cholera	11·2	2·2	6·6	3·8	3·9	6·0	8·5	7·1	11·1	7·3	7·2	5·5	6·0	5·5	3·8	2·3	1·1	0·5	0·1	0·1	..	0·2	100		
Population (1841)	41,183	33,169	31,854	36,658	44,228	38,149	35,512	24,945	26,103	16,172	16,534	8,257	9,134	4,306	3,729	1,624	825	262	59	9	1	892	373,605		
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841)	0·5	0·1	0·4	0·2	0·2	0·3	0·4	0.5	0·7	0·8	0·7	1·2	1·1	2·1	1·8	2·4	2·4	3·8	1·7	11·1	..	0·6	0·47		
East Districts.																									
Gentry, &c.	..	..	..	..	1	..	..	1	1	2	1	5	5	1	6	4	3	..	..	..	..	..	30	1·0	
Tradesmen, &c.	32	3	20	15	17	14	20	23	28	24	33	27	28	19	12	13	7	1	1	..	..	..	337	11·6	
Mechanics, &c.	335	61	218	128	123	151	207	204	239	146	158	128	109	132	82	54	35	18	5	2	..	1	2,536	87·4	
Undescribed	33	11	22	11	6	21	37	29	33	17	29	17	16	8	14	6	2	2	..	..	..	1	315		
Total	400	75	260	154	147	186	264	257	301	189	221	177	158	160	114	77	47	21	6	2	..	2	3,218	100	
Proportion per cent. at each age to deaths from Cholera	12·4	2·3	8·1	4·8	4·5	5·6	8·2	7·9	9·3	5·7	6·8	5·5	4·9	5·0	3·6	2·4	2·0	0·6	0·2	0·1	..	0·1	100		
Population (1841)	52,847	44,457	38,382	35,446	38,572	34,358	33,066	24,014	24,898	16,060	16,710	8,857	10,305	5,287	4,665	2,013	976	337	105	33	10	1,046	392,444		
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841)	0·8	0·2	0·7	0·4	0·4	0·5	0·8	1·1	1·2	1·2	1·3	2·0	1·5	3·0	2·4	3·8	4·8	6·2	5·7	6·1	..	0·2	0·82		
South Districts.																									
Gentry, &c.	11	1	7	3	3	8	6	6	16	14	14	21	22	21	12	8	8	4	2	..	..	..	187	3·0	
Tradesmen, &c.	139	28	80	44	40	46	74	101	95	94	76	68	71	56	56	37	23	10	1	..	..	..	1,139	18·5	
Mechanics, &c.	829	124	479	211	178	281	359	361	349	301	305	255	240	203	156	97	59	30	5	..	..	5	4,827	78·5	
Undescribed	167	34	91	50	76	122	96	95	94	76	71	63	49	57	47	29	21	17	..	..	..	..	1,255		
Total	1,146	187	657	308	297	457	535	563	554	485	466	407	382	337	271	171	111	61	8	..	..	5	7,408	100	
Proportion per cent. at each age to deaths from Cholera	15·6	2·5	8·9	4·2	4·1	6·2	7·2	7·6	7·4	6·5	6·2	5·5	5·2	4·5	3·6	2·2	1·5	0·8	0·3	..	..	0·1	100		
Population (1841)	62,110	53,016	49,660	45,521	51,765	44,853	42,927	30,908	31,619	20,811	21,267	11,676	14,090	7,735	6,654	3,041	1,609	537	137	44	3	2,665	502,548		
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841)	1·8	0·4	1·3	0·7	0·6	1·0	1·2	1·8	1·1	2·3	2·2	3·5	2·7	4·4	4·1	5·6	6·9	11·4	5·9	..	..	0·2	1·47		
Total of Metropolis.																									
Gentry, &c.	12	3	11	6	6	14	7	9	26	24	24	37	37	38	29	20	15	8	3	..	..	..	329		
Tradesmen, &c.	203	40	121	72	68	84	132	161	164	173	159	129	148	100	94	69	34	16	2	..	..	..	1,989		
					423																				
					98																				
					895																				

Districts and Classes of the Community.	Under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and under 45.	45 and under 50.	50 and under 55.	55 and under 60.	60 and under 65.	65 and under 70.	70 and under 75.	75 and under 80.	80 and under 85.	85 and under 90.	90 and under 95.	95 and under 100.	100 and upwards.	?	Total.	Proportion per cent. of classes specified.	Estimated Population to July, 1849.	Proportion per cent. of deaths to population.
ST DISTRICTS.																										
Gentry, &c.	..	..	1	1	..	2	1	1	5	4	2	3	5	7	4	2	2	2	..	..	.	..	42	3·7		
Tradesmen, &c.	21	2	10	5	5	5	10	7	14	14	12	11	11	5	5	7	1	..	..	..	..	..	145	12·9		
Mechanics, &c.	136	27	82	41	42	52	78	52	86	61	74	54	55	47	30	20	4	2	1	..	..	..	944	83·5		
Undescribed	13	1	10	4	5	9	14	6	6	4	9	9	7	8	12	6	4	..	..	..	..	1	128			
Total	170	30	103	51	52	68	103	66	111	83	97	77	78	67	51	35	11	4	1	..	..	1	1,259	100	346,509	0·36
Proportion per cent. at each age to deaths from Cholera	13·4	2·4	8·2	4·1	4·1	5·4	8·2	5·2	8·8	6·6	7·7	6.1	6·2	5·3	4·1	2·8	·9	·3	·1	..	..	0·1	100			
Population (1841)	31,232	26,213	24,386	27,295	36,284	32,845	29,546	21,009	21,223	13,168	12,726	6,589	7,840	3,849	3,337	1,464	829	252	80	15	5	524	300,711			
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841)	0·5	0·1	0·4	0·2	0·1	0·2	0·3	0·3	0·5	0·6	0·8	1·2	1·0	1·7	1·5	2·4	1·3	1·6	1·3	..	..	0·2	0·42			
ATH DISTRICTS.																										
Gentry, &c.	1	2	2	2	2	2	..	1	3	2	5	6	2	5	5	4	1	1	..	..	..	..	46	5·1		
Tradesmen, &c.	19	2	8	3	2	7	9	12	11	29	17	9	19	12	9	6	..	5	..	..	..	..	179	19.8		
Mechanics, &c.	86	17	53	23	26	46	60	45	58	49	48	35	45	35	28	12	9	2	2	..	..	..	679	75·1		
Undescribed	6	1	3	2	1	4	2	4	5	2	4	3	6	3	5	4	5	1	1	..	..	..	62			
Total	112	22	66	30	31	59	71	62	77	82	74	53	72	55	47	26	15	9	3	..	..	..	966	100	444,448	0·22
Proportion per cent. at each age to deaths from Cholera	11·8	2·3	6·9	3·1	3·2	6·1	7·4	6·4	7·9	8·5	7·7	5·5	7·5	5·6	4·7	2·6	1·6	0·9	0·3	..	..	..	100			
Population (1841)	42,872	36,693	33,244	33,672	41,800	37,802	34,973	25,086	25,827	16,267	16,294	8,241	9,517	4,869	4,343	2,010	1,131	324	118	21	4	863	375,971			
Proportion per cent. of deaths each age from Cholera (1849) to pop. (1841)	0·3	0·1	0·2	0·1	0·1	0·2	0·2	0·2	0·3	0·5	0·5	0·6	0·8	1·1	1·1	1·3	1·3	2·8	2·5	..	..	..	0·26			
TRAL DISTRICTS.																										
Gentry, &c.	..	..	1	..	..	2	..	..	1	2	2	2	3	4	2	2	1	1	1	..	..	..	24	1·6		
Tradesmen, &c.	12	5	3	5	4	12	19	18	16	12	21	14	19	8	12	6	3	..	..	..	..	..	189	12·1		
Mechanics, &c.	164	28	101	51	54	79	109	94	160	102	90	75	66	77	43	26	15	6	..	1	..	5	1,346	86·3		
Undescribed	16	6	8	10	10	10	21	11	16	13	11	5	17	6	11	5	1	3	..	..	..	..	180			
Total	192	39	113	66	68	103	149	123	193	129	124	96	105	95	68	39	20	10	1	1	..	5	1,739	100	384,213	0·45
Proportion per cent. at each age to deaths from Cholera	11·2	2·2	6·6	3·8	3·9	6·0	8·5	7·1	11·1	7·3	7·2	5·5	6·0	5·5	3·8	2·3	1·1	0·5	0·1	0·1	..	0·2	100			
Population (1841)	41,183	33,169	31,854	36,658	44,228	38,149	35,512	24,945	26,103	16,172	16,534	8,257	9,134	4,306	3,729	1,624	825	262	59	9	1	892	373,605			
Proportion per cent. of deaths each age from Cholera (1849) to pop. (1841)	0·5	0·1	0·4	0·2	0·2	0·3	0·4	0.5	0·7	0·8	0·7	1·2	1·1	2·1	1·8	2·4	2·4	3·8	1·7	11·1	..	0·6	0·47			
T DISTRICTS.																										
Gentry, &c.	..	..	..	..	1	..	..	1	1	2	1	5	5	1	6	4	3	..	..	..	..	..	30	1·0		
Tradesmen, &c.	32	3	20	15	17	14	20	23	28	24	33	27	28	19	12	13	7	1	1	..	..	..	337	11·6		
Mechanics, &c.	335	61	218	128	123	151	207	204	239	146	158	128	109	132	82	54	35	18	5	2	..	1	2,536	87·4		
Undescribed	33	11	22	11	6	21	37	29	33	17	29	17	16	8	14	6	2	2	..	..	..	1	315			
Total	400	75	260	154	147	186	264	257	301	189	221	177	158	160	114	77	47	21	6	2	..	2	3,218	100	445,859	0·72
Proportion per cent. at each age to deaths from Cholera	12·4	2·3	8·1	4·8	4·5	5·6	8·2	7·9	9·3	5·7	6·8	5·5	4·9	5·0	3·6	2·4	2·0	0·6	0·2	0·1	..	0·1	100			
Population (1841)	52,847	44,457	38,382	35,446	38,572	34,358	33,066	24,014	24,898	16,060	16,710	8,857	10,305	5,287	4,665	2,013	976	337	105	33	10	1,046	392,444			
Proportion per cent. of deaths each age from Cholera (1849) to pop. (1841)	0·8	0·2	0·7	0·4	0·4	0·5	0·8	1·1	1·2	1·2	1·3	2·0	1·5	3·0	2·4	3·8	4·8	6·2	5·7	6·1	..	0·2	0·82			
TH DISTRICTS.																										
Gentry, &c.	11	1	7	3	3	8	6	6	16	14	14	21	22	21	12	8	8	4	2	..	..	..	187	3·0		
Tradesmen, &c.	139	28	80	44	40	46	74	101	95	94	76	68	71	56	56	37	23	10	1	..	..	..	1,139	18·5		
Mechanics, &c.	829	124	479	211	178	281	359	361	349	301	305	255	240	203	156	97	59	30	5	..	..	5	4,827	78·5		
Undescribed	167	34	91	50	76	122	96	95	94	76	71	63	49	57	47	29	21	17	..	..	..	..	1,255			
Total	1,146	187	657	308	297	457	535	563	554	485	466	407	382	337	271	171	111	61	8	..	..	5	7,408	100	585,047	1·27
Proportion per cent. at each age to deaths from Cholera	15·6	2·5	8·9	4·2	4·1	6·2	7·2	7·6	7·4	6·5	6·2	5·5	5·2	4·5	3·6	2·2	1·5	0·8	0·2	..	..	0·1	100			
Population (1841)	62,110	53,016	49,560	45,521	51,765	44,853	42,927	30,908	31,619	20,811	21,267	11,676	14,090	7,735	6,654	3,041	1,609	537	137	44	3	2,665	502,548			
Proportion per cent. of deaths each age from Cholera (1849) to pop. (1841)	1·8	0·4	1·3	0·7	0·6	1·0	1·2	1·8	1·1	2·3	2·2	3·5	2·7	4·4	4·1	5·6	6·9	11·4	5·9	..	..	0·2	1·47			
OF METROPOLIS.																										
ntry, &c.	12	3	11	6	6	14	7	9	26	24	24	37	37	38	29	20	15	8	3	..	..	..	329	2·6		
esmen, &c.	223	40	121	72	68	84	132	161	164	122	150	109	146	94	84	63	20	6	2	..	..	..	1,494			

	5																							
age to deaths from Cholera)													6·2	5·3	4·1	2·8	·9	·3	·1	..	..	0·1	100	
Population (1841) . .	31,232	26,213	24,386	27,295	36,284	32,845	29,546	21,009	21,223	13,168	12,726	6,589	7,840	3,849	3,337	1,464	829	252	80	15	5	524	300,711	
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	0·5	0·1	0·4	0·2	0·1	0·2	0·3	0·3	0·5	0·6	0·8	1·2	1·0	1·7	1·5	2·4	1·3	1·6	1·3	..	..	0·2	0·42	
NORTH DISTRICTS.																								
Gentry, &c.	1	2	2	2	2	2	..	1	3	2	5	6	2	5	5	4	1	1	..	..	..	..	46	5·1
Tradesmen, &c. . . .	19	2	8	3	2	7	9	12	11	29	17	9	19	12	9	6	..	5	..	..	..	..	179	19.8
Mechanics, &c. . . .	56	17	53	23	26	46	60	45	58	49	48	35	45	35	28	12	9	2	2	..	..	..	679	75·1
Undescribed	6	1	3	2	1	4	2	4	5	2	4	3	6	3	5	4	5	1	1	..	..	..	62	
Total	112	22	66	30	31	59	71	62	77	82	74	53	72	55	47	26	15	9	3	..	..	..	966	100
Proportion per cent. at each age to deaths from Cholera	11·8	2·3	6·9	3·1	3·2	6·1	7·4	6·4	7·9	8·5	7·7	5·5	7·5	5·6	4·7	2·6	1·6	0·9	0·3	..	..	..	100	
Population (1841) . .	42,872	36,693	33,244	33,672	41,800	37,802	34,973	25,086	25,827	16,267	16,294	8,241	9,517	4,869	4,343	2,010	1,131	324	118	21	4	863	375,971	
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	0·3	0·1	0·2	0·1	0·1	0·2	0·2	0·2	0·3	0·5	0·5	0·6	0·8	1·1	1·1	1·3	1·3	2·8	2·5	..	..	..	0·26	
CENTRAL DISTRICTS.																								
Gentry, &c.	..	..	1	..	..	2	..	..	1	2	2	2	3	4	2	2	1	1	1	..	..	..	24	1·6
Tradesmen, &c. . . .	12	5	3	5	4	12	19	18	16	12	21	14	19	8	12	6	3	..	..	..	..	..	189	12·1
Mechanics, &c. . . .	164	28	101	51	54	79	109	94	160	102	90	75	66	77	43	26	15	6	..	1	..	5	1,346	86·3
Undescribed	16	6	8	10	10	10	21	11	16	13	11	5	17	6	11	5	1	3	..	..	..	..	180	
Total	192	39	113	66	68	103	149	123	193	129	124	96	105	95	68	39	20	10	1	1	..	5	1,739	100
Proportion per cent. at each age to deaths from Cholera	11·2	2·2	6·6	3·8	3·9	6·0	8·5	7·1	11·1	7·3	7·2	5·5	6·0	5·5	3·8	2·3	1·1	0·5	0·1	0·1	..	0·2	100	
Population (1841) . .	41,183	33,169	31,854	36,658	44,228	38,149	35,512	24,945	26,103	16,172	16,534	8,257	9,134	4,306	3,729	1,624	825	262	59	9	1	892	373,605	
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	0·5	0·1	0·4	0·2	0·2	0·3	0·4	0.5	0·7	0·8	0·7	1·2	1·1	2·1	1·8	2·4	2·4	3·8	1·7	11·1	..	0·6	0·47	
EAST DISTRICTS.																								
Gentry, &c.	..	..	..	..	1	..	..	1	1	2	1	5	5	1	6	4	3	..	..	..	..	..	30	1·0
Tradesmen, &c. . . .	32	3	20	15	17	14	20	23	28	24	33	27	28	19	12	13	7	1	1	..	..	..	337	11·6
Mechanics, &c. . . .	335	61	218	128	123	151	207	204	239	146	158	128	109	132	82	54	35	18	5	2	..	1	2,536	87·4
Undescribed	33	11	22	11	6	21	37	29	33	17	29	17	16	8	14	6	2	2	..	..	..	1	315	
Total	400	75	260	154	147	186	264	257	301	189	221	177	158	160	114	77	47	21	6	2	..	2	3,218	100
Proportion per cent. at each age to deaths from Cholera	12·4	2·3	8·1	4·8	4·5	5·6	8·2	7·9	9·3	5·7	6·8	5·5	4·9	5·0	3·6	2·4	2·0	0·6	0·2	0·1	..	0·1	100	
Population (1841) . .	52,847	44,457	38,382	35,446	38,572	34,358	33,066	24,014	24,898	16,060	16,710	8,857	10,305	5,287	4,665	2,013	976	337	105	33	10	1,046	392,444	
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	0·8	0·2	0·7	0·4	0·4	0·5	0·8	1·1	1·2	1·2	1·3	2·0	1·5	3·0	2·4	3·8	4·8	6·2	5·7	6·1	..	0·2	0·82	
SOUTH DISTRICTS.																								
Gentry, &c.	11	1	7	3	3	8	6	6	16	14	14	21	22	21	12	8	8	4	2	..	..	..	187	3·0
Tradesmen, &c. . . .	139	28	80	44	40	46	74	101	95	94	76	68	71	56	56	37	23	10	1	..	..	..	1,139	18·5
Mechanics, &c. . . .	829	124	479	211	178	281	359	361	349	301	305	255	240	203	156	97	59	30	5	..	..	5	4,827	78·5
Undescribed	167	34	91	50	76	122	96	95	94	76	71	63	49	57	47	29	21	17	..	..	..	..	1,255	
Total	1,146	187	657	308	297	457	535	563	554	485	466	407	382	337	271	171	111	61	8	..	..	5	7,408	100
Proportion per cent. at each age to deaths from Cholera	15·6	2·5	8·9	4·2	4·1	6·2	7·2	7·6	7·4	6·5	6·2	5·5	5·2	4·5	3·6	2·2	1·5	0·8	0·2	..	..	0·1	100	
Population (1841) . .	62,110	53,016	49,560	45,521	51,765	44,853	42,927	30,908	31,619	20,811	21,267	11,676	14,090	7,735	6,654	3,041	1,609	537	137	44	3	2,665	502,548	
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	1·8	0·4	1·3	0·7	0·6	1·0	1·2	1·8	1·1	2·3	2·2	3·5	2·7	4·4	4·1	5·6	6·9	11·4	5·9	..	..	0·2	1·47	
TOTAL OF METROPOLIS.																								
Gentry, &c.	12	3	11	6	6	14	7	9	26	24	24	37	37	38	29	20	15	8	3	..	..	..	329	2·6
Tradesmen, &c. . . .	223	40	121	72	68	84	132	161	164	173	159	129	148	100	94	69	34	16	2	..	..	..	1,989	15·7
Mechanics, &c. . . .	1,550	257	933	454	423	609	813	756	892	659	675	547	515	494	339	209	122	58	13	3	..	11	10,332	81·7
Undescribed	235	53	134	77	98	166	170	145	154	112	124	97	95	82	89	50	33	23	1	..	..	2	1,940	
Total	2,020	353	1,199	609	595	873	1,122	1,071	1,236	968	982	810	795	714	551	348	204	105	19	3	..	13	14,590	100
Proportion per cent. at each age to deaths from Cholera	13·9	2·4	8·2	4·2	4·1	6·0	7·7	7·3	8·5	6·6	6·7	5·6	5·4	4·9	3·7	2·4	1·4	0·7	0·2	0·02	..	0·1	100	
Population (1841) . .	230,244	193,548	177,426	178,823	213,387	188,716	176,472	126,232	129,794	82,531	83,548	43,626	50,886	26,046	22,728	10,152	5,370	1,712	499	122	23	6,481	1,948,369	
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	0·9	0·2	0·7	0·3	0·3	0·5	0·6	0·8	0·9	1·2	1·2	1·8	1·6	2·7	2·4	3·3	3·7	5·9	3·6	2·5	..	0·3	0·75	

Mean Age at Death 32 years and 3 months.

e to deaths from Cholera	13·4	2·4	8·2	4·1	4·1	5·4	8·2	5·2	8·3	8·6	7·1	6·2	6·2	5·3	4·1	2·8	·9	·3	·1	..	..	0·1	100			
Population (1841) . .	31,232	26,213	24,386	27,295	36,284	32,845	29,546	21,009	21,223	13,168	12,726	6,589	7,840	3,849	3,337	1,464	829	252	80	15	5	524	300,711			
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	0·5	0·1	0·4	0·2	0·1	0·2	0·3	0·3	0·5	0·6	0·8	1·2	1·0	1·7	1·5	2·4	1·3	1·6	1·3	..	..	0·2	0·42			
North Districts.																										
Gentry, &c.	1	2	2	2	2	2	..	1	3	2	5	6	2	5	5	4	1	1	..	..	..	..	46	5·1		
Tradesmen, &c. . . .	19	2	8	3	2	7	9	12	11	29	17	9	19	12	9	6	..	5	..	..	..	..	179	19.8		
Mechanics, &c. . . .	86	17	53	23	26	46	60	45	58	49	48	35	45	35	28	12	9	2	2	..	..	..	679	75·1		
Undescribed	6	1	3	2	1	4	2	4	5	2	4	3	6	3	5	4	5	1	1	..	..	..	62			
Total	112	22	66	30	31	59	71	62	77	82	74	53	72	55	47	26	15	9	3	..	..	..	966	100	444,448	0·22
Proportion per cent. at each age to deaths from Cholera	11·8	2·3	6·9	3·1	3·2	6·1	7·4	6·4	7·9	8·5	7·7	5·5	7·5	5·6	4·7	2·6	1·6	0·9	0·3	..	..	..	100			
Population (1841) . .	42,872	36,693	33,244	33,672	41,800	37,802	34,973	25,086	25,827	16,267	16,294	8,241	9,517	4,869	4,343	2,010	1,131	324	118	21	4	863	375,971			
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	0·3	0·1	0·2	0·1	0·1	0·2	0·2	0·2	0·3	0·5	0·5	0·6	0·8	1·1	1·1	1·3	1·3	2·8	2·5	..	..	..	0·26			
Central Districts.																										
Gentry, &c.	..	..	1	..	..	2	..	..	1	2	2	2	3	4	2	2	1	1	1	..	..	..	24	1·6		
Tradesmen, &c. . . .	12	5	3	5	4	12	19	18	16	12	21	14	19	8	12	6	3	..	..	..	..	..	189	12·1		
Mechanics, &c. . . .	164	28	101	51	54	79	109	94	160	102	90	75	66	77	43	26	15	6	..	1	..	5	1,346	86·3		
Undescribed	16	6	8	10	10	10	21	11	16	13	11	5	17	6	11	5	1	3	..	..	..	..	180			
Total	192	39	113	66	68	103	149	123	193	129	124	96	105	95	68	39	20	10	1	1	..	5	1,739	100	384,213	0·45
Proportion per cent. at each age to deaths from Cholera	11·2	2·2	6·6	3·8	3·9	6·0	8·5	7·1	11·1	7·3	7·2	5·5	6·0	5·5	3·8	2·3	1·1	0·5	0·1	0·1	..	0·2	100			
Population (1841) . .	41,183	33,169	31,854	36,658	44,228	38,149	35,512	24,945	26,103	16,172	16,534	8,257	9,134	4,306	3,729	1,624	825	262	59	9	1	892	373,605			
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	0·5	0·1	0·4	0·2	0·2	0·3	0·4	0.5	0·7	0·8	0·7	1·2	1·1	2·1	1·8	2·4	2·4	3·8	1·7	11·1	..	0·6	0·47			
East Districts.																										
Gentry, &c.	..	..	..	..	1	..	..	1	1	2	1	5	5	1	6	4	3	..	..	..	..	..	30	1·0		
Tradesmen. &c. . . .	32	3	20	15	17	14	20	23	28	24	33	27	28	19	12	13	7	1	1	..	..	..	337	11·6		
Mechanics, &c. . . .	335	61	218	128	123	151	207	204	239	146	158	128	109	132	82	54	35	18	5	2	..	1	2,536	87·4		
Undescribed	33	11	22	11	6	21	37	29	33	17	29	17	16	8	14	6	2	2	..	..	..	1	315			
Total	400	75	260	154	147	186	264	257	301	189	221	177	158	160	114	77	47	21	6	2	..	2	3,218	100	445,859	0·72
Proportion per cent. at each age to deaths from Cholera	12·4	2·3	8·1	4·8	4·5	5·6	8·2	7·9	9·3	5·7	6·8	5·5	4·9	5·0	3·6	2·4	2·0	0·6	0·2	0·1	..	0·1	100			
Population (1841) . .	52,847	44,457	38,382	35,446	38,572	34,358	33,066	24,014	24,898	16,060	16,710	8,857	10,305	5,287	4,665	2,013	976	337	105	33	10	1,046	392,444			
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	0·8	0·2	0·7	0·4	0·4	0·5	0·8	1·1	1·2	1·2	1·3	2·0	1·5	3·0	2·4	3·8	4·8	6·2	5·7	6·1	..	0·2	0·82			
South Districts.																										
Gentry, &c.	11	1	7	3	3	8	6	6	16	14	14	21	22	21	12	8	8	4	2	..	..	..	187	3·0		
Tradesmen, &c. . . .	139	28	80	44	40	46	74	101	95	94	76	68	71	56	56	37	23	10	1	..	..	..	1,139	18·5		
Mechanics, &c. . . .	829	124	479	211	178	281	359	361	349	301	305	255	240	203	156	97	59	30	5	..	..	5	4,827	78·5		
Undescribed	167	34	91	50	76	122	96	95	94	76	71	63	49	57	47	29	21	17	..	..	..	..	1,255			
Total	1,146	187	657	308	297	457	535	563	554	485	466	407	382	337	271	171	111	61	8	..	..	5	7,408	100	585,047	1·27
Proportion per cent. at each age to deaths from Cholera	15·6	2·5	8·9	4·2	4·1	6·2	7·2	7·6	7·4	6·5	6·2	5·5	5·2	4·5	3·6	2·2	1·5	0·8	0·2	..	..	0·1	100			
Population (1841) . .	62,110	53,016	49,560	45,521	51,765	44,853	42,927	30,908	31,619	20,811	21,267	11,676	14,090	7,735	6,654	3,041	1,609	537	137	44	3	2,665	502,548			
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	1·8	0·4	1·3	0·7	0·6	1·0	1·2	1·8	1·1	2·3	2·2	3·5	2·7	4·4	4·1	5·6	6·9	11·4	5·9	..	..	0·2	1·47			
Total of Metropolis.																										
Gentry, &c.	12	3	11	6	6	14	7	9	26	24	24	37	37	38	29	20	15	8	3	..	..	..	329	2·6		
Tradesmen, &c. . . .	223	40	121	72	68	84	132	161	164	173	159	129	148	100	94	69	34	16	2	..	..	..	1,989	15·7		
Mechanics, &c. . . .	1,550	257	933	454	423	609	813	756	892	659	675	547	515	494	339	209	122	58	13	3	..	11	10,332	81·7		
Undescribed	235	53	134	77	98	166	170	145	154	112	124	97	95	82	89	50	33	23	1	..	..	2	1,940			
Total	2,020	353	1,199	609	595	873	1,122	1,071	1,236	968	982	810	795	714	551	348	204	105	19	3	..	13	14,590	100	2,206,076	0·66
Proportion per cent. at each age to deaths from Cholera	13·9	2·4	8·2	4·2	4·1	6·0	7·7	7·3	8·5	6·6	6·7	5·6	5·4	4·9	3·7	2·4	1·4	0·7	0·2	0·02	..	0·1	100			
Population (1841) . .	230,244	193,548	177,426	178,823	213,387	188,716	176,472	126,232	129,794	82,534	83,548	43,626	50,886	26,046	22,728	10,152	5,370	1,712	499	122	23	6,481	1,948,369			
Proportion per cent. of deaths at each age from Cholera (1849) to pop. (1841) .	0·9	0·2	0·7	0·3	0·3	0·5	0·6	0·8	0·9	1·2	1·2	1·8	1·6	2·7	2·4	3·3	3·7	5·9	3·6	2·5	..	0·3	0·75			

Mean Age at Death 32 years and 3 months.

REPORT

OF THE

GENERAL BOARD OF HEALTH

ON THE

EPIDEMIC CHOLERA

OF

1848 & 1849.

Presented to both Houses of Parliament by Command of Her Majesty.

LONDON:
PRINTED BY W. CLOWES & SONS, STAMFORD STREET.
FOR HER MAJESTY'S STATIONERY OFFICE.
1850.