

control the spread of fever, promote or oppose the ravages of cholera. It is not, therefore, because by the Divine blessing cholera has disappeared, that the sanitary proceedings undertaken under the alarm it inspired should cease. And yet, according to the reports of the medical inspectors, in many of the most densely populated districts, the inspectors of nuisances have been dismissed; the cleansing operations have been relaxed; and there is too much reason to apprehend that the courts and alleys will lapse back again into their accustomed filth; that privies and cesspools will again be allowed to overflow; that houses, proved by the evidence of medical officers, inspectors, and local authorities to be unfit for human habitations, "will long continue to remain," to quote the words of the Clerkenwell guardians, "pest-houses, spreading disease around;" and that, in the midst of all these tolerated and accumulated evils, the industrious classes will continue, as heretofore, to be decimated by fever, or, should it again break out, by cholera.

SECTION II.

On the Progress of Cholera in London.

Deficiency of Statistical Details.—Fully to have elucidated this subject, much more ample and detailed information would be necessary than it has been possible to procure. It would, for instance, have been requisite that the number of attacks, whether of the developed disease or of choleraic diarrhœa, and the relative mortality, should be known; the precise seat of these attacks, as to streets, and even courts and alleys, and the sanitary condition of these places; the proportion of attacks to the population in each such case; the age, sex, occupation, and mode of life of the persons attacked. Details like these, applying to a population of two millions and a quarter, would, it is obvious, under any circumstances, be most difficult of attainment; in fact, nothing short of a complete sanitary system could give such statistics. As it was, cholera came upon the metropolis when for the most part as unprepared with any systematic arrangements, as in 1832. Among other evils which flowed from this state of things, was the impossibility of obtaining accurate and complete reports of the daily progress of the disease; and yet this information was indispensable to the General Board of Health, the body intrusted with directing the various measures demanded on the occurrence of the epidemic, among which the amount of medical aid required was of course the most essential. Repeated attempts were made to procure from the local authorities daily returns showing the fresh attacks, but in vain.

A most serious impediment to the application of prompt measures of relief thus arose; and it was not till the Registrar-General, after considerable difficulty, and when the disease had made great progress, succeeded in obtaining a daily return of the deaths in each sub-registration district, that any reliable information was procured. If, unhappily, there should be any recurrence of the disease, some efficient plan ought to be devised for securing from every part of the metropolis regular and accurate daily returns, not only of the mortality, but especially of new cases both of cholera and diarrhœa: if such informa-

tion were not provided, it is to be apprehended that a serious sacrifice of life would be the result.

Sources of Information available.—In the absence of more precise data, the sources of information of which I have principally availed myself are as follows:—

1. The reports of the several medical inspectors who superintended the house-visitation.
2. The evidence of the medical officers of the metropolitan unions and parishes.
3. The mortality returns of the Registrar-General.*

Duration of the Epidemic.—The first undoubted case of cholera in London took place on September 22nd, 1848, at Horsleydown, Southwark; this case proved fatal in 11 hours: the last death recorded appears in the return of the Registrar-General, December 22nd, 1849: the whole of the epidemic having thus occupied a period of 15 calendar months.

There is little or no doubt, however, that some isolated cases of true Asiatic cholera occurred earlier than reported; but they were returned as English cholera. Several such cases are reported by Dr. Gavin to have occurred unquestionably in Bethnal-green, namely, 6 in July, 4 in August, and 2 in September, 1848. Three similar cases occurred also in Southwark prior to September 16, 1848.

First Cases of Cholera.—The history of the first cases of cholera occurring in any new locality is obviously a point of much interest in connexion with the question of contagion. The Board of Health was therefore desirous that the first attacks in London should be investigated; and the inquiry was intrusted to Dr. Parkes, who had had considerable experience of cholera in India. The following particulars of these cases are extracted from the Report of the General Board on Quarantine. It may be premised that the cases of cholera in London were among the first that appeared in Great Britain, being only a few days subsequent to the first case reported in the port of Hull, on board a vessel which had come direct from Hamburg. The first case, as above stated, occurred on September 22nd, 1848.

"From this period to the 10th October (twelve days), 28 cases occurred. An analysis of these cases, from Dr. Parkes' Report, gives the following results:—

- "1. These 28 cases occurred in ten different localities.
- "2. These localities were not near each other, but were situated at remote distances.

* As these returns do not altogether correspond to the more commonly known parochial divisions, it is proper to explain that, for the purpose of registering births, deaths, and marriages, the metropolis is first of all divided into 36 "superintendent registrars' districts," and then again into 135 sub-registration districts. These latter or "sub-districts," will be found, when properly grouped together, to correspond, with some trifling exceptions, to the several unions and parishes; and in this way the respective mortality in these more familiar divisions will appear. (See the tinted map of the metropolis appended to this Report.)

"3. In not a single instance, as far as could be traced, had the first person attacked in one locality been in contact or proximity with a person previously sick in another locality, and in some instances such contact or proximity was impossible.

"Thus the first case occurred (September 22nd) at Horsleydown; eight days afterwards (September 30th) two more cases occurred simultaneously, the one at Lambeth and the other at Chelsea; on the following day (October 1st) another case occurred in the City, in Harp-court, Fleet-street; the next day (October 2nd) a case occurred in the *Justitia Hulk*, at Woolwich; and three days afterwards (October 5th) the disease broke out simultaneously in the *Dreadnought* (hospital-ship) off Greenwich, and in Spitalfields.

"Diligent search was made to trace communication, direct or indirect, between the persons successively attacked in these several districts, but no evidence of it could be discovered; nor could such communication have taken place among persons having no kind of connexion or acquaintance with each other without an extraordinary series of accidents. But in two instances, if not in more, it is absolutely certain that no such accidental encounter could have happened. A convict was seized in the *Justitia Hulk*, at Woolwich, on the 2nd of October; but the convicts at Woolwich, though they work in the Dockyard, are watched by armed soldiers, and are allowed no intercourse whatever with other persons, while the *Justitia* herself lies about three miles below Greenwich, far apart from any other vessel except the convict hospital-ship, no merchant-vessel anchoring at this point of the river; so that, if cholera had been raging in Woolwich and had been prevailing in the vessels in the Thames above Woolwich, the origin of cholera in the *Justitia* would not have been attributable to contagion. But there was no cholera in Woolwich or in the merchant-vessels in the Thames, and the only cases in London which were anterior in point of time to this in Woolwich were those at Horsleydown, seven or eight miles distant; Lambeth, twelve or thirteen miles distant; Chelsea, thirteen or fourteen miles distant; and Fleet-street, ten or twelve miles distant. The occurrence of contact or proximity between these individuals and the convict at Woolwich may therefore be said to have been absolutely impossible.

"So again in the *Dreadnought* hospital-ship, a man was attacked on the 5th October. The *Dreadnought*, as has been just stated, lies off Greenwich, three or four miles distant from the *Justitia*, with which it holds no kind of communication; it is also many miles distant from Horsleydown, Lambeth, Chelsea, and Fleet-street. This man had been on board the hospital-ship under treatment for another complaint a month before his seizure; he could not therefore have been in contact or proximity with any of the 9 cases which occurred previous to his attack; and no sailor arriving from any infected place had been admitted with any complaint whatever for some considerable time. 'By permission of the officers,' says Dr. Parkes, 'I took the opportunity of inspecting the admission book, and learned that no sailor arriving in a ship from any port in or near which cholera was or had been prevalent had been admitted for any complaint whatever for a considerable time. The disease, therefore, could not have been brought on board by the clothes of some non-infected individual arriving from an infected ship.'

"The result of this observation is that cholera, at least in these first 28 cases, did not arise and spread from contact or proximity with persons previously infected: and the greater weight must attach to this conclusion because it is founded on more trustworthy evidence than is commonly attainable on these subjects, inasmuch as, with a full knowledge of the importance of the inquiry, the most careful investigation into each case was immediately made on the spot.

"A similar examination of the circumstances connected with the outbreak of cholera in the several towns of England in which it successively appeared, as far as the analysis has been completed, gives a like result.

"The manner in which the disease spread through particular establishments in the metropolis, wherever an opportunity has been afforded of making a correct observation of facts, fully confirms the conclusion derived from this general experience. For example, from the 15th to the 22nd of October, 1848, 15 cases of cholera occurred among the convicts in the Millbank Prison. With reference to these cases Dr. Baly, the medical superintendent of the prison, in his official Report, observes:—

"It has seemed to me not uninteresting to inquire whether there were any facts to justify a suspicion that cholera had been introduced into the prison, and spread through it, by contagion. The man first attacked, John Fisher, had been between five and six months here. He occupied a separate cell in G ward, pentagon 6, and had no communication with any persons except the officer of his ward, the supervisor of his pentagon, the schoolmasters, the chaplains, and occasionally other prisoners of his own ward. None of the officers mentioned had been in any district where cholera prevailed. No prisoners had been received into the prison from Woolwich, and no stores from any places known to be infected.

"It is then extremely difficult to believe that this prisoner can have taken the disease, even indirectly, from any person already affected with it. The facts are equally opposed to the notion that it was communicated from him to the other prisoners subsequently attacked. No prisoner in the same ward, or even on the same floor of the pentagon, in which Fisher was, has been attacked with cholera; and the successive cases have occurred, for the most part, in the most distant and separate parts of the building.

"In one instance two men occupying contiguous rooms, James Yeomans and Duncan Turner, were attacked, the one two days after the other; but this was in all probability an accidental circumstance, for the two rooms did not communicate directly with each other, and these two men had no direct intercourse; but there were several other prisoners in the cells with them, none of whom were attacked.

"In the infirmary, where there was the most chance of infection occurring—since, although a special room is set apart for the cholera patients, this room communicates with the other parts of the infirmary—none of the patients admitted for other diseases have been attacked with cholera; and, excepting the instances above referred to, the men attacked with cholera in the pentagons have all been in different wards, and where two cases have occurred in one pentagon this has been even on different floors. In each of these cases, it appears to me, there would be the same difficulty in accounting for the production of the disease by contagion, as in the case of Fisher. After an unbiassed consideration of all the facts, therefore, I can but conclude that cholera has not shown itself to have a contagious character in this prison.

"From the preceding evidence, the conclusion is inevitable that the first cases of cholera in London, whether occurring in the metropolis generally or in particular establishments, did not originate and spread by contact or proximity of the infected with the uninfected. This observation is in accordance with the facts recorded with reference to plague by those who have had opportunities of observing the progress of this disease in the countries and cities in which it prevails as an epidemic, who state that on its outbreak the first cases are in like manner isolated; that they appear in localities remote from each other; and that there is no traceable communication between the persons first attacked."

Two Periods of the Epidemic.—The weekly returns show that,

although there was only what can be called one epidemic, since within the period specified there was no single week in which the metropolis was entirely free from cholera deaths, yet it was evidently divided into two distinct and well-marked periods, not only in London, but also, with some considerable differences as to dates, in other parts of England. In the metropolis, the first period may be considered as having extended from September 22, 1848, to the end of March, 1849, during which the mortality amounted to 988. In the month of April the deaths sank from 5 and 2 in the first and second weeks to 1 in each of the two last weeks. In four weeks in May the deaths were respectively 4, 3, 1, and 5. The second, and much more fatal period, evidently commenced in June, when in the first week the deaths rose to 9, increased in the last week to 124, and then went on rapidly and uninterruptedly increasing till the acme was obtained in the week ending September 8, when the deaths from cholera were 2026, and from diarrhoea 272; from this time the disease declined, and ultimately ceased at the period stated above, December 22, 1849. The highest weekly mortality of the first period was 94, occurring in the week ending January 13, 1849; and the highest weekly mortality of the second period was 2026, independently of 272 deaths from diarrhoea and 17 from dysentery, taking place in the week ending September 8, 1849.

Total Mortality from Cholera.—The total mortality from cholera for the 62 weeks ending November 24, 1849, was 14,601. The total mortality in the same time from diarrhoea was 3857, which, deducting the average mortality from this disease for a similar period during the 10 years 1838-47 (namely, 1063), leaves 2794 deaths in excess, a large proportion of which must be attributed to the epidemic influence of cholera. The total mortality from dysentery amounted to 464 in the period in question, which is an excess of 278 above the average, this being about 186. The mortality in London from the late epidemic may then be set down as follows:—

Deaths from cholera	14,601
Excess of deaths from diarrhoea	2,794
Excess of deaths from dysentery	278
Total deaths	17,673

The estimated population of the metropolis in 1849 was 2,206,076; and it will thus appear that 1 person died of cholera in every 151 of the inhabitants, or .66 per cent., independently of the deaths from diarrhoea and dysentery.

Total Mortality in 1832-33.—It is important to show the relation between the late epidemic and that of 1832-33. The latter commenced in London on February 16th, 1832, and finally ended on September 7th, 1833; there being, however, two distinct periods, or rather two epidemics, since there was a complete interval of eight months; the first attack lasting from February 7th to November 30th, 1832; and the second from August 1st to September 7th, 1833. The progress of the disease, as the deaths and cases were reported to the Privy Council, is shown by the following table:—

TABLE showing PROGRESS of CHOLERA during the years 1832 and 1833.

		Attacks.	Deaths.			Attacks.	Deaths.
1832.				Brought forward . . .		3291	1850
Week ending Feb.	23	14	14	Week ending July 20		787	394
„	March 2	104	57	„	„ 27	1,064	445
„	„ 9	277	139	„	Aug. 3	787	299
„	„ 16	381	195	„	„ 10	501	190
„	„ 23	389	225	„	„ 17	637	234
„	„ 30	396	279	„	„ 24	783	325
„	April 6	364	198	„	„ 30	795	350
„	„ 13	170	94	„	Sept. 7	567	309
„	„ 20	87	34	„	„ 14	291	144
„	„ 27	50	27	„	„ 21	301	147
„	May 4	27	20	„	„ 28	56	43
„	„ 11	34	12	„	Oct. 5	162	81
„	„ 18	18	16	„	„ 12	285	150
„	„ 25	12	7	„	„ 19	78	37
„	June 1	28	17	„	„ 26	89	61
„	„ 8	27	13	„	Nov. 2	84	48
„	„ 15	20	15	From Nov. 2 to Nov. 30		26	13
„	„ 22	57	34				
„	„ 29	179	116	Total		10,624	5,120
„	July 6	162	99	Omitted		396	155
„	„ 13	495	239	1833.			
				From Aug. 1 to Sept. 7		3,124	1,454
Carried forward		3291	1850	Grand total		14,144	6,729

Proportion of deaths to cases, 47 per cent.

In 1832 the population of London was 1,681,641, so that, in the epidemic of 1832-33, one person died in every 255 of the inhabitants, or 4-7ths less than in 1849. The highest weekly mortality in 1832 was in the week ending July 27th, when the deaths were 445; whilst, as it will immediately appear, the highest weekly mortality in 1849 was in the week ending September 8th, when the deaths amounted to 2026.

Weekly Mortality.—In the Appendix will be found a table showing the weekly mortality in each sub-district of the metropolis for a period of 60 weeks, as published by the Registrar-General, together with the population. (See Appendix, No. 1.)

Monthly Mortality in 1848-49.—The following table shows the monthly mortality of cholera for 62 weeks in 1848-49 (including diarrhoea), as given by the Registrar-General:—

1848.	Cholera.	Diarrhoea.	1849.	Cholera.	Diarrhoea.
September, last two weeks	11	90	January	262	82
October	122	145	February	181	109
November	215	117	March	73	92
December	131	113	April	9	56
			May	13	65
			June	246	119
			July	1,952	490
			August	4,251	780
			September	6,644	1,187
			October	464	319
			November	27	93
			Total	14,601	3,857

Observations on Temperature, Electrical State of the Air, &c.—If the weekly progress of the epidemic were compared with the mean weekly temperature, it would appear, that, although there is not an uniform relation between the elevation of the thermometer and the progress of cholera, in London, as in other parts of Europe, the main force of the disease corresponded with the three hot months, July, August, and September. It is also worthy of observation, as will appear from the following extract, which refers to what may be called the cholera quarter, that when the epidemic was at its acme, from August 18th to September 15th, the temperature was without exception high, with a thick and stagnant atmosphere.

“The mean daily temperatures of the air from July 1st to July 17th were above their average values; the mean excess was 3°·2. From July 18th to August 5th they were below their average values; the mean deficiency was 2°·2. From August 6th to August 12th the temperature was high; its mean daily excess was 6°·0. From August 13th to August 19th the mean deficiency was 1°·9. From August 20th to September 15th the temperature was high; its mean excess was 4°. This period was distinguished by a thick, stagnant atmosphere; and the air was for the most part very close and oppressive. The temperature was 3°·3 below its average from September 11th to September 21st; and it was 5°·5 in excess from September 22nd to the end of the quarter, namely, the 30th.*

There were considerable variations in the temperature during the quarter, amounting in the whole of England to 56°, the extremes being 86° and 30°. The highest temperature in London for the three months was 87°; the lowest at the Observatory, Greenwich, 39°·5.

The horizontal movement of the air during the months of August and September, was about one-half the usual amount; this observation applies to an elevation at Greenwich 200 feet above the level of the sea. At a less elevation, the movement was much less.

“On many days when a strong breeze was blowing at the top of the Observatory and over Blackheath, there was not the slightest motion in the air near the banks of the Thames; and this remarkable calm continued for some days together, particularly from August 19th to 24th; on the 29th; from September 1st to 10th; and after September 15th. On September 11th and 12th the whole mass of air at all places was in motion; after the 15th of September, to the end of the quarter, the air was in very little motion.”

Disturbance of the Electric and Magnetic Forces.—Dr. Crawford mentions, in his valuable Report on the Cholera, as it prevailed at St. Petersburg in 1848, that the electric force was disturbed, so that machines could not be charged, and thus to a great extent lost their power.

* Remarks on the Weather during the Quarter ending September 30, 1849, by James Glaisher, Esq., F.R.S., of the Royal Observatory, Greenwich. (See Quarterly Return of Registrar-General, p. 40.)

It was also said that the magnetic force was diminished. These statements, in the midst of the profound obscurity in which the efficient cause of cholera is involved, attracted considerable attention; but my own inquiries have not confirmed them. Thus at Hamburg, express observations were made, among others, by Dr. Alexander of Altona, which showed that magnets had lost none of their power. The experience at Berlin was of the same character. Mr. Glaisher's remarks on these points are as follows:—

“The summer had been warm and dry, without great heat; thunderstorms have been very frequent during the quarter; the air has been for the most part unusually dry. The magnets have been seldom disturbed during the quarter; and the amount of electricity, though less than usual, seems to have been so in consequence of the less amount of humidity of the air.”

Estimate of the Number of Attacks.—For the reasons already assigned, it is impossible to attempt any accurate calculation of the number of persons actually attacked by the late epidemic in London. Indeed, even if the necessary returns had been furnished, there are other difficulties which would have prevented, in the present state of knowledge, any correct estimate being formed.

It is, for example, most difficult to assign any limits, which would be universally acceded to by medical practitioners, between cholera and diarrhoea; and the fact is, that the latter runs so insensibly into the former, in a large number of cases, as to defy rigid separation. To which category, for instance, are those numerous cases of rice-water purging, without collapse, to be referred—are they cases of cholera or of diarrhoea? If this point were decided as it ought to be, in the former sense, then there would arise another question concerning the true nature of that much more numerous class of attacks, in which the evacuations, without having the special characteristic first named, are of a thin, pale, and serous character; are often accompanied with vomiting, coldness, cramps; and, still more, exhibit occasionally the same consecutive fever as complete cholera. The consequence of all this was, that during the last, as in the preceding epidemic of 1832, there was the greatest discrepancy of opinion among medical men in all parts of London; some applying the term cholera to attacks which others called diarrhoea; a circumstance not only liable to affect most importantly the point under consideration, but, as must be obvious, the whole statistics of the disease, and especially all that concerns the relative mortality and the effects of treatment. A large part of this incertitude has arisen from the circumstance of so little attention having been formerly paid to the diarrhoea, which so extensively prevails during an attack of cholera; for, so long as the true nature of this is allowed to remain in doubt, no true limits can be assigned to the epidemic.

Definition of the Board of Health.—In all their proceedings and documents, the General Board of Health reported those only to be cases of cholera in which there was actual collapse; that is to say, where the pulse was either extremely weak or entirely lost; where there was

great prostration of strength; shrunken features; coldness of the surface; a marked diminution or total suppression of the urinary secretion; and the characteristic rice-water evacuations. Although pathologically all cases of choleraic diarrhoea, and even many other forms of disturbance both of the alimentary canal and other organs, are, as it will subsequently be attempted to be shown, a part and parcel of the epidemic, yet, as some arbitrary limit must, until medical statistics are in a very different state to what they are at present, be assumed, this definition of cholera, resting on a marked and easily recognized stage of the disease, appears to be sufficient for all practical purposes, and would, if generally adopted, tend to introduce much more precision into published accounts of cases and the results of treatment.

The experience of other European countries, although it is like that of this country imperfect, will throw considerable light on the number of attacks as compared with the deaths; a few examples will therefore be useful.

It is stated by M. Tardieu, that in the first four months of the epidemic of 1832 there were in 39 départements 120,000 attacks and 60,000 or 50 per cent. of deaths; in one département there were 12,393 cases and 5938 or 47 per cent. deaths; in 18 days after the appearance of cholera in Paris, in 1832, from 12,000 to 13,000 attacks were reported and 7000 deaths. The above instances occurred towards the commencement of the epidemic, when the mortality is usually highest.*

Dr. Müller, the Hanoverian Commissioner, who visited St. Petersburg, states that from June 12th to July 22nd, 1848, 20,055 persons were attacked, of whom 11,217 died, 5191 recovered, and 3647 remained under treatment when the report was written.† Now, if of these last it is estimated that half died and half recovered, it would appear that out of the whole number attacked no less than 13,040, or 65 per cent., died. Dr. Müller, in another report, states that in one month at St. Petersburg 5 persons out of every 100 were attacked, and that from 2½ to 3 per cent. (60 per cent.) died.

From July 27th, 1848, when the first case occurred at Berlin, up to November 7th, 1848, when the epidemic had nearly ended, the number of attacks reported was 2370; of deaths, 1523; of recoveries, 690; and of those still under treatment, 157; this will give 1601 deaths or 67·5 per cent. of the whole attacked.

The following statistics are extracted from the official Report of Dr. Buch, transmitted to the General Board of Health, showing the results of the epidemic of 1848 at Hamburg.

Total inhabitants	182,435
Total attacks of cholera	3,687
Deaths	1,765
Recoveries	1,922
Proportion of attacks to inhabitants, 1 in 49.	
Do. of deaths to do., 1 in 103.	
Percentage of deaths to attacks, 47·8.	

* Cholera Epidémique, p. 77.

† Einige Bemerkungen über die Asiatische Cholera, p. 26.

This is a much more favourable result than that of either of the two other cities, the deaths amounting only to 47·8 per cent. of the attacks.

Experience of London.—As regards London, owing to the want of returns already noticed, it is impossible to give the proportion of deaths to the attacks for the whole epidemic. Mr. Liddle has given a return from a part of the medical officers of Islington and Whitechapel, consisting of 569 cases of developed cholera, that is in the state of the collapse, of which number 296, or 52 per cent., were fatal. In 438 cases occurring in Whitechapel Union, 208, or 45·2 per cent., were fatal. Mr. Liddle says,—

“From my own experience I can state that upwards of one-half the cases die when seen for the first time in collapse: at the commencement of the epidemic nearly all die; towards the close the majority recover.”*

Dr. Gavin has sent me a statement of 993 cases attended by some of the medical officers of Shoreditch and Bethnal-green, of which 310, or 31·2 per cent., were fatal. In these cases there were serous purging, vomiting, and cramps; “but it is not to be inferred they were all in the stage of collapse.” One of the surgeons of Chelsea parish had 71 cases of cholera, out of which 45, or 63·5 per cent., were fatal.

Soldiers.—Among the troops quartered in London, there were 69 attacks and 27 deaths, or 39·1 per cent.

Workhouses.—As the Returns showing the progress of the epidemic have not yet been received, only a few instances of the relative mortality among the inmates can be given. In St. Luke's workhouse there were 36 attacks of cholera and 24 deaths, or 66·6 per cent. In the workhouse of Shoreditch the cases were 109 and the deaths 61, or 55·9 per cent. In Hackney workhouse 27 cases and 17 deaths, or 62·9 per cent. In St. Giles's 18 attacks and 15 deaths, or 83·3 per cent.

Mortality in cases admitted into Hospitals.—Into St. Bartholomew's Hospital there were admitted 478 cases of confirmed cholera, of whom 99, or 41·8 per cent., were fatal. At St. Thomas's Hospital 147 cases of developed cholera were admitted, of which 66, or 44·8, were fatal. At the London Hospital 102 cases, of which 40, or 39 per cent., were fatal.† At St. George's Hospital 20 cases were admitted, of which 11, or 55 per cent., were fatal. At the Middlesex Hospital 58 cases, and of these 29, or 50 per cent., were fatal. In King's College Hospital 123

* This remark does not apply to complete collapse, which is as fatal at the end as at the commencement of the epidemic.

† The London Hospital, according to a statement furnished by Mr. Burch, the resident medical officer, was the first among the metropolitan medical institutions to open its doors for the admission of cholera cases, for which two wards were appropriated. The ordinary patients and attendants amounted to about 405, and among them not one case of cholera occurred: all the diarrhoeal cases arising in the hospital were speedily relieved by the ordinary treatment.

great prostration of strength; shrunken features; coldness of the surface; a marked diminution or total suppression of the urinary secretion; and the characteristic rice-water evacuations. Although pathologically all cases of choleraic diarrhoea, and even many other forms of disturbance both of the alimentary canal and other organs, are, as it will subsequently be attempted to be shown, a part and parcel of the epidemic, yet, as some arbitrary limit must, until medical statistics are in a very different state to what they are at present, be assumed, this definition of cholera, resting on a marked and easily recognized stage of the disease, appears to be sufficient for all practical purposes, and would, if generally adopted, tend to introduce much more precision into published accounts of cases and the results of treatment.

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† Einige Bemerkungen über die Asiatische Cholera, p. 26.

This is a much more favourable result than that of either of the two other cities, the deaths amounting only to 47·8 per cent. of the attacks.

Experience of London.—As regards London, owing to the want of returns already noticed, it is impossible to give the proportion of deaths to the attacks for the whole epidemic. Mr. Liddle has given a return from a part of the medical officers of Islington and Whitechapel, consisting of 569 cases of developed cholera, that is in the state of the collapse, of which number 296, or 52 per cent., were fatal. In 438 cases occurring in Whitechapel Union, 208, or 45·2 per cent., were fatal. Mr. Liddle says,—

“From my own experience I can state that upwards of one-half the cases die when seen for the first time in collapse: at the commencement of the epidemic nearly all die; towards the close the majority recover.”*

Dr. Gavin has sent me a statement of 993 cases attended by some of the medical officers of Shoreditch and Bethnal-green, of which 310, or 31·2 per cent., were fatal. In these cases there were serous purging, vomiting, and cramps; “but it is not to be inferred they were all in the stage of collapse.” One of the surgeons of Chelsea parish had 71 cases of cholera, out of which 45, or 63·5 per cent., were fatal.

Soldiers.—Among the troops quartered in London, there were 69 attacks and 27 deaths, or 39·1 per cent.

Workhouses.—As the Returns showing the progress of the epidemic have not yet been received, only a few instances of the relative mortality among the inmates can be given. In St. Luke's workhouse there were 36 attacks of cholera and 24 deaths, or 66·6 per cent. In the workhouse of Shoreditch the cases were 109 and the deaths 61, or 55·9 per cent. In Hackney workhouse 27 cases and 17 deaths, or 62·9 per cent. In St. Giles's 18 attacks and 15 deaths, or 83·3 per cent.

Mortality in cases admitted into Hospitals.—Into St. Bartholomew's Hospital there were admitted 478 cases of confirmed cholera, of whom 199, or 41·8 per cent., were fatal. At St. Thomas's Hospital 147 cases of developed cholera were admitted, of which 66, or 44·8, were fatal. At the London Hospital 102 cases, of which 40, or 39 per cent., were fatal.† At St. George's Hospital 20 cases were admitted, of which 11, or 55 per cent., were fatal. At the Middlesex Hospital 58 cases, and of these 29, or 50 per cent., were fatal. In King's College Hospital 123

* This remark does not apply to complete collapse, which is as fatal at the end as in the commencement of the epidemic.

† The London Hospital, according to a statement furnished by Mr. Burch, the resident medical officer, was the first among the metropolitan medical institutions to open its doors for the admission of cholera cases, for which two wards were appropriated. The ordinary patients and attendants amounted to about 405, and among them not one case of cholera occurred: all the diarrhoeal cases arising in the hospital were speedily relieved by the ordinary treatment.

cholera patients were admitted, of whom 40 died. In the Lunatic Asylums of London 267 attacks are reported, and 166 deaths, or 62·1 per cent. In the prisons 158 cases and 62 deaths (39 per cent.) are recorded.

In the present category may be included the cases admitted from the Union into the infirmary of St. Giles's workhouse: the number was 139, and the deaths 106, or 76·2 per cent.*

Results.—As far as these limited data extend it will be found that the relative mortality was as follows:—

* The General Board of Health, resting on extensive inquiries as to the expediency of cholera hospitals, discouraged their use, except in cases where, owing to extreme destitution or other circumstances, the persons attacked could not receive proper attention at home. The general experience of the late epidemic has confirmed the correctness of these views, and has shown that the effect of removing patients in the developed stage of the disease is, on the whole, unfavourable. Thus I found that at Hamburg, whilst 1075 deaths took place in the town out of 2002 attacked, or 53·1 per cent., in the hospitals 214 died out of 319 cases admitted, or 67 per cent. At Berlin, up to November 25, 1848, 1837 cases had occurred in the city, of which 1201, or 67·2 per cent., died; in the hospitals the cases amounted to 569, and the deaths to 343, or only 60 per cent. These figures, however, do not give the true result, as those deaths were deducted in the hospital returns, when the patients were found to be dead on their arrival. At one of these hospitals no fewer than 17 persons died in the transit. The experience of the London hospitals, as shown above, is much more favourable, the percentage of deaths to attacks being, if St. Giles's Infirmary (a pauper establishment) is excluded, 41·5; whilst the mortality in 2071 attacks among the general population amounts to 859, or 41·4 per cent. If St. Giles's Infirmary be included with the hospitals, the mortality in those institutions is raised to 46.

Although in this metropolis the results are so satisfactory, the general principle of treating all cases at home should be observed. The mere transport of a patient may turn the scale; many instances occurred, for example, where persons who, on leaving home, had a pulse and were warm, were found to be pulseless and cold, or even, as stated above, dead, on their arrival at the hospital. Patients labouring under collapse are, in fact, in a state resembling that caused by large losses of blood; and in that condition it is well known that even trifling movements of the body may bring on a fatal syncope.

The general principle being recognised, it is yet evident that there must be, in the more destitute districts, many instances where none of the necessary appliances can be obtained, and where consequently some kind of hospital accommodation would be necessary in the event of another epidemic. The great difficulty which was experienced in the last year in providing such accommodation renders it essential to inquire how this want can best be met. Having carefully considered all the facts connected with the admission of cholera cases into common hospitals, and having consulted the medical officers of those institutions, I feel myself justified in stating, that, when suitable precautions are in all respects observed, there is no danger attending the practice. Distinct wards should be set apart for the reception of cholera cases, and, if possible, they should be in a detached building.

An ample staff of nurses should be provided, not only for efficient attendance night and day on the patients, but likewise to allow of frequent relays. The experience of the late epidemic has induced me to believe that meritorious and zealous nurses have sacrificed their lives, in some institutions, by over exertion. Considering the nature of the duty, I conceive that no one nurse ought to remain more than 8 hours out of the 24 in actual attendance on the sick; that there should, therefore, be in all cholera wards 3 relays per diem; and that, in the intervals of duty, the attendants should be encouraged to remain in the most healthy atmosphere attainable. This would necessitate extra expense, but society has no right to impose on persons, having for the most part no real choice, duties which are known to endanger life, so long as the question is, like this, merely a pecuniary one.

	Cases.	Deaths.	Percentage of Deaths.
Among the general population	2,071	859	41·4
Among the troops	69	27	39·1
Inmates of workhouses	190	117	61·5
Persons admitted into hospitals	1067	491	46·
Lunatic asylums	267	166	62·1
Prisons	158	62	39·
Mean of all these cases	3,822	1,722	45·

The number of cases above recorded is too limited to justify either any general conclusion as to the mortality in proportion to the attacks, or to institute a comparison between the different classes of persons in hospitals, workhouses, &c. From various sources of information, I believe, however, it may be safely stated that in Western Europe, in fully developed cases, that is, when there is collapse, great diminution or complete suppression of urine, with the pulse extremely weak or lost, the mortality will amount, including the whole epidemic, from 45 to 50 per cent. of the attacks. Assuming this as a mean, and that there were 14,601 deaths, it would appear that the total number of developed cases of cholera in London amounted to about 30,000.

Age.—The number of attacks and the mortality of cholera are known to vary in a remarkable degree according to age.

In the Appendix will be found some tables, which have been carefully prepared by Mr. H. C. Edwards, and which present at one view the influence of age, sex, and of occupation generally, on the progress and mortality of the epidemic. (See Appendix Nos. 2 and 3.)

These tables, as they relate only to the mortality, and not to the whole of the attacks of choleraic disease, are so far imperfect; but notwithstanding this deficiency, which, for reasons already stated, was unavoidable, they still afford data for several important conclusions. Taking the standard of the population for the year 1841, and dividing the deaths into quinquennial periods, it will be seen that the liability to fatal attacks increases in a most marked degree after the age of 50; and this, though with variations, in both sexes. In the first five years the proportional mortality is high, being in the male sex 1·0, and in the female ·8 per cent. of the living; from the age of 5 to 45 in the male sex the mortality keeps below that of the first quinquennial period, the deaths being fewest from 5 to 10 years of age. In the female sex the fatal attacks are also fewest from 5 to 10 years; at 30 to 35 years the mortality is as high as in the first five years of life, and at 40 exceeds it. From the age of 65 in both sexes the relative mortality is much increased; the most fatal period being that from 80 to 85, when it amounts in the male to 5·2, and in the female sex to 6·6 of the living. A considerable part of the increased mortality in advanced age depends on the reduction of the vital powers, and on the greater difficulty then experienced in controlling the progress of the disease, so that out of a given number of attacks

there would be more fatal results. If the absolute number of deaths be regarded, it will be found that the mortality has fallen severely on the most valuable part of life, speaking economically, namely from 20 to 45 years, the deaths at those ages amounting to 4897, being 33·5 per cent. of the total mortality.

Sex.—In the epidemic of 1832, at Hamburg, there were 1626 attacks and 877 deaths (53·9 per cent.) among males, and 1443 attacks and 732 deaths (50·7 per cent.) among females. I am not aware of the proportion of the two sexes in this city, but it may be presumed, from the number of deaths respectively, that the males suffered proportionally as well as absolutely more than the females. In a table by Suerman, relating to the epidemic of 1832 in Holland, in a given number of inhabitants the males suffered more than the females, the attacks being in the former in the ratio of 1·09 and in the latter of 0·93. In the metropolis the deaths were in 1848-49 thus distributed:—

Males	:	:	:	:	:	6957
Females	:	:	:	:	:	7633

The estimated population of London for 1849 is—males, 1,032,630; females, 1,173,446: this gives a percentage of deaths to the living, males ·67, females ·65, the mean being ·66. In the class of gentry the deaths of males are 168, of females 161; among tradesmen, males 989, females 1000; mechanics, males 5026, females 5306. If it be permissible to assume that, in the different districts of the metropolis, the proportionate number of the two sexes is about the same in these three classes, then it will follow that the males and females have suffered in varying degrees of severity in the five districts into which the metropolis is divided in the statistical tables appended to this Report. In the lunatic asylums the percentage of deaths among the males was 6·4, among the females 6·6; the attacks were in the males 8·9, and in the females 11·6 per cent. to the living. In a large pauper establishment the girls suffered more than the boys; but that depended on greater overcrowding. These results, so far as the instances extend, do not on the whole indicate any particular influence of sex on the progress of the disease; though, speaking generally, the male sex appears to have suffered more severely.

Occupation.—The tables in the Appendix show the absolute number of deaths in the metropolis, as they occurred in districts, and among the three well-marked classes of gentry, tradesmen, and mechanics, during the 60 weeks ending Nov. 24, 1849. The following is a brief summary of the results set forth in the document referred to:—

	Males.	Females	Total.	Proportion per cent. of Classes specified.		
				Males.	Females	Total.
1.—WEST DISTRICTS.						
a. Gentry	26	16	42	4·4	2·9	3·7
b. Tradesmen	67	78	145	11·5	14·3	12·9
c. Mechanics.	492	452	944	84·1	82·8	83·5
2.—NORTH DISTRICTS.						
a. Gentry	25	21	46	5·7	4·5	5·1
b. Tradesmen	93	86	179	21·4	18·3	19·8
c. Mechanics.	317	362	679	72·9	77·2	75·1
3.—CENTRAL DISTRICTS.						
a. Gentry	14	10	24	2·0	1·1	1·6
b. Tradesmen	111	78	189	16·1	9·0	12·1
c. Mechanics	566	780	1346	81·9	89·9	86·3
4.—EAST DISTRICTS.						
a. Gentry	15	15	30	1·0	1·1	1·0
b. Tradesmen	198	139	337	13·2	9·9	11·6
c. Mechanics.	1288	1248	2536	85·8	89·0	87·4
5.—SOUTH DISTRICTS.						
a. Gentry	88	99	187	3·0	3·1	3·0
b. Tradesmen	520	619	1139	17·5	19·5	18·5
c. Mechanics.	2363	2464	4827	79·5	77·4	78·5
6.—TOTAL OF METROPOLIS.						
a. Gentry	168	161	329	2·7	2·5	2·6
b. Tradesmen	989	1000	1989	16·0	15·5	15·7
c. Mechanics	5026	5306	10332	81·3	82·0	81·7
Undescribed	774	1166	1940	..	..	..
Total	6957	7633	14590	..	..	..

Owing to the deficiency of statistical information no satisfactory deductions can be formed from these figures concerning the mortality of cholera as connected with occupation; since, as the Registrar-General remarks,—

“the occupations were only returned for the metropolis in a very general way by the Census Commissioners in 1841; and, in the trades, masters were not distinguished from men.”

As these and other omissions will doubtless be rectified in the approaching census of 1851, the ample details contained in Mr. Edwards's tables will hereafter supply very useful data in reference to this subject. At present it can only be stated in a general way, what is known from other sources of information, that the great pressure of the epidemic has, with scarcely an exception, fallen in all parts of the metropolis on the labouring classes; that tradesmen and their families have suffered next in degree; and that the higher classes or gentry experienced a comparative exemption.

Dr. Guy's Rough Approximation.—In the Report of the Registrar-General for the week ending December 22, 1849, Dr. Guy has given a

very interesting account of the professions or occupations of 4312 men of the age of 15 and upwards, who were destroyed by cholera, the ratio to the living being also calculated as accurately as the data available for that purpose would permit. This document will be found in the Appendix (see No. 4).

Medical Men.—The details collected by Dr. Guy would, if carefully scrutinised, afford many instructive results; a few remarks are all that can here be offered. As regards the first class (gentry and professional men), medical men stand fourth in the list, 16 having died out of 4240, or 1 in 265. During the last epidemic, as it prevailed in Hamburg, so few practitioners were attacked, that public attention was attracted to the circumstance. From the official Report of Dr. Buch, it appears that only two medical men were attacked, one of whom was a half-pay English surgeon not in practice; and the second lived out of the city, and had not, I believe, attended any case of cholera. In Berlin very few physicians were attacked, but the exact number is not known to me. This comparative exemption of a class, the members of which were incessantly engaged in attending on the victims of cholera, is an instructive fact, and is doubtless attributable, in addition to the advantages common to the rank of life to which medical men belong, to the care bestowed by them on their health, and especially to the prompt control of any tendency to bowel complaints. In several of the fatal attacks which occurred in London among medical men, the victims had, however, strange to say, suffered previously from neglected diarrhoea. One case is so remarkable as to merit a brief notice. It was that of a surgeon residing in Southwark, who was convinced he could check the attack of cholera by attending to the preceding diarrhoea, and this point he urged upon his patients. This gentleman, who was greatly overworked, and neglected his meals, was attacked with diarrhoea on Friday afternoon; this he neglected, and was in attendance on a midwifery case all Friday night, during which the diarrhoea continued and was still neglected. On Saturday morning, the symptoms becoming worse, advice was procured, and even then the patient objected to take medicine; collapse supervened, and this victim of a neglect which, under such circumstances, is almost incomprehensible, died at 5 A.M. on Sunday. Another decease, which deprived the science of surgery of one of its most successful cultivators, appears to have been in some degree connected with errors of diet, which must have operated most injuriously at a time when the epidemic was almost at its height, and especially in an individual predisposed to an attack by a most irritable state of the bowels. It may be proper to add, that several of the medical practitioners who were attacked had not attended a single case of cholera.

Artizans and Labourers.—In considering the class of "Artizans and Labourers," it will be observed 1 in 65 died among labourers, and only 1 in 1572 of domestic men-servants. Out of 650 undertakers 2 died, or 1 in 325; a point of some interest, when it is recollected that these men have to handle the bodies of those who perished by the epidemic; and in connexion with this I may mention that, according to a statement with which I have been favoured by Mr. Wilkinson, a gentleman who has paid great attention to the sanitary state of Berlin, among the numerous body of men engaged by the company who con-

duct about one-half of the interments in that city, not a single case of cholera has occurred in any of the epidemics. Among persons exposed to the effluvia of organic matter the deaths were as follows:—Dustmen and scavengers, 6 in 234, or 1 in 39; butchers, 32 deaths in 5568, or 1 in 174; tanners, 1 in 39; tallow-chandlers, 1 in 430. These results are, on the whole, more favourable than might have been expected; but it is essential to remark, that the abstract excludes all below the age of 15; whilst the influence of putrid animal effluvia more especially tells on infants and children, who form in all such cases the most delicate test.

Sailors and Watermen, &c.—Taking all the occupations which are connected with the river, such as sailors, watermen, bargemen, ballast-heavers, coal-porters, and fishermen, the results are unfavourable; thus, of 7176 sailors, 299, or 1 in 24, died, and the same mortality prevailed among 168 ballast-heavers; among the sailors, however, are included "Greenwich Pensioners," a class which was doubtless influenced by advanced age as well as locality, the Hospital being on the banks of the river. It has been shown by the Board of Health that seamen suffer to a vast extent from preventible disease, and this irrespective of the noxious influence of climate; thus, in the port of London, the deaths among sailors in the years 1845, 1846, and 1848, from zymotic diseases, were 25.3 per cent. of the total mortality; whilst the deaths in the metropolis generally, from the same class of diseases, among persons above 15 years of age was only 6.7 per cent.*

In some particular occupations of limited extent as to the numbers engaged in them the mortality was very high; for example, among master-tradesmen, one fishmonger died in every 20, one paper-maker in 15, one poulterer in 32, and one egg-merchant in six. In some districts the mortality among the families of tradesmen was unusually high. One striking case, recorded by Dr. Gavin, occurred in Shoreditch, in which the proportionate mortality as to the rank of life was remarkably modified, as will appear in the following table, showing the percentage of deaths in the respective districts of Shoreditch and in the whole parish:—

Districts.	Gentry.	Tradesmen.	Labourers.
Hoxton New Town	18.1	69.0	12.7
Hoxton Old Town	2.7	88.8	8.3
Holywell	1.2	79.4	19.2
St. Leonard's	1.4	68.5	29.9
Haggerstone East . . . .	..	74.3	25.7
Haggerstone West . . . .	..	64.6	35.4
Total	2.3	66.6	30.9

The causes of this excess of deaths among the class of tradesmen will be illustrated in the section on the "habitat" of cholera, relating to the condition of Shoreditch. Dr. Gavin in reference to this peculiarity in vital statistics observes,—

* Report on Quarantine, pp. 92, 94.

"This extraordinary mortality among the class of tradesmen in the parish of Shoreditch corroborates, in a surprising manner, the proof adduced by Mr. Chadwick, in the tables calculated from the Mortuary Returns, of the unhealthiness of different localities, and the pressure with which the local deleterious influences bore upon the different classes of society.

"Thus it was shown, in the tables referred to, that the average age at death of all who died above the age of 21 years, in the parish of Shoreditch, was—

	Among the Class		
	Gentry.	Tradesmen.	Labourers.
	65	47	51
The average number of years' premature loss of life by death above the age of 21 was . . . . .	..	15	11

"The proportionate loss of life, therefore, among the class of tradesmen and labourers, was 57.6 and 42.3, which bears a close relation to the relative mortality per cent. from cholera among the two classes, 66.6 and 30.9."

SECTION III.

On the Habitat or Seat of Cholera.

HAVING in the preceding section traced the progress of the late epidemic, as to the mortality, the influence of age and occupation, it is necessary now to enter upon a question of incomparably more importance, the habitat, namely, or seat of cholera. Notwithstanding the general appreciation of the fact that defective drainage, accumulations of filth, imperfect water-supply, and especially overcrowding and the want of ventilation, conduce to the spread of disease, and especially to the most destructive of all diseases, the zymotic; and notwithstanding, further, the many and strenuous efforts which were made both by the Board of Health and by the public press to expound and enforce this vital truth, it will appear in a subsequent page that all this did not prevent, in the presence of a disease specially liable to the influence in question, a great neglect of sanitary precautions on the part of the local authorities. Nor was a certain amount of scepticism wanting amongst 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. Knowing all this, and having witnessed, on the one hand, the frightful

evils resulting from the general rejection by the parochial authorities of the comprehensive measures laid down by the Board of Health for the public safety, and, on the other, the great and invariable benefits which followed even their partial application, I trust it may be permitted me, in this and some succeeding sections, to elucidate, so far as the metropolis is concerned, this double truth, by setting forth in some detail the large body of evidence acquired during the past year under the auspices of the Board of Health, of which it may be safely affirmed that it exceeds all the information hitherto obtained in Europe in relation to the special causes influencing the progress and spread of cholera.

In viewing the progress of cholera, whether from country to country, from city to city, or even among the inhabitants of any one city, there is, no doubt, much on the surface which appears to indicate that it extends from man to man; this is therefore the conclusion which one would expect the generality of mankind to form, as indeed they have formed, on the subject. It is seen, for example, that great masses of Hindoo pilgrims come together at their annual festivals in some sacred city free from cholera, and that soon afterwards the epidemic breaks forth among them and spreads with destructive energy, sweeping off thousands of victims, and then ceasing so soon as the vast crowd disperses in affright; or, again, in some European kingdom the epidemic decimates the cities, where men abound and intercourse is excessive, and spares the open country, where the population is limited and communication slight; or still further, persons in immediate contact with each other, so to speak, the members of the same families, the inmates of the same house, the wife who watches by the side of her husband's bed, the nurse who waits upon the sick,—these, being exposed to direct communication with an affected person, are sometimes attacked in succession; nay, it has been said that those who have washed the linen of cholera patients have been seized with the fatal malady.* Then, again, it is affirmed, and with much truth, that the disease often follows the great tracts of human intercourse; that it passes, for example, along the banks of navigable rivers, where they form, as in many parts of the Continent, the main channels of communication.

That these and a thousand other instances of a like character which might easily be collected should have led to the inference above stated, is not surprising; but when they are more carefully scrutinized, much, if not the whole, of their weight disappears. It has been found, for example, by experience, that when the Hindoo worshippers quit the pestiferous and foul hovels in which they had been crammed together in their sacred city, though many carry with them the seeds of the affection, and die after their arrival in the pure air of the country, they do not communicate the disease to the villages around; that, although it is true the towns of Europe suffer more than the country, yet, when the circumstances both of the attack and the exemption are cautiously investigated, it becomes evident that neither the one nor the other can be explained on the ground of numbers; for it can be abundantly shown that great masses of people in incessant communication, if living in

* See a note in Appendix, No. 5, on this last point, by Dr. Waller Lewis.