

4. *Incurable diseases* comprehend only obliteration of the Eustachian tube, and deaf-dumbness.

It would be wrong to conclude the treatment of disorders of the ear, without adverting to the application which M. Kramer makes of electro-magnetism, in the treatment of nervous deafness and tingling of the ear. This practitioner has ascertained, that an electro-magnetic current is a powerful stimulant of the organ of hearing, principally when this current is directed from the lower orifice of the Eustachian tube, towards the external auditory canal of the same side. This stimulant action is indicated by convulsive movements and pains in the ear, by a temporary increase in the auditory power, which is ordinarily not of long duration, and by increase in the tingling in the ear, either at the time or some time after application. It is a remedy which cannot be employed, except with great prudence and caution, and which must be instantly abandoned, if the tingling is remarkably increased, without any favourable modification in the auditory power, or at least without continuance of this favourable modification. It is further a method of sufficient certainty for ascertaining the existence of nervous deafness.

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ART. IV.—*Cholera among the Pauper Children of Tooting.*

THE question of the contagious origin and propagation of cholera is not yet everywhere decided. Several persons in this part of the United Kingdom, looking to the attacks among nurses and others in contact with the patients, have either had their ideas on this subject strengthened, or, from being neutral and undecided, have adopted the inference that the disease is contagious in its origin and mode of propagation.

Many strong facts and arguments might be adduced to show that, if we adhere to fact, this idea is untenable; and that the inference that cholera is contagious, cannot be reconciled with the facts observed. On the other hand, many facts concur to show that the disease owes its origin, in some instances, to atmospheric causes operating probably upon, and aided by, local peculiarities and the physical circumstances of particular districts. Other facts show that its development is favoured by modes of living, articles of food, and similar circumstances.

Without entering into a formal consideration of the circumstances now referred to, and their modes of operation, it may be proper to advert to one or two facts, which contradict rather strongly the idea of contagion either as to the origin or the propagation of the disorder.

One of the most decisive facts against the contagious character and origin of cholera, and which has been overlooked by all,—both partizans and opponents of the contagious hypothesis,—is the fact to which we directed attention in volume seventieth, in the account of the treatise of Dr Prout. That physician, we showed, found, that during the prevalence of cholera in 1832, all the common lateritious sediments disappeared from the urine, and that every individual whose urine was examined, presented those appearances, which are characteristic of the presence of oxalic acid. In short, the oxalic acid diathesis was then prevalent in London and its vicinity. This state of the secretions was connected, Dr Prout further ascertained, with a positive increase in the weight of the atmospheric air, similar to what might be produced by the diffusion of a heavy gaseous principle through the lower regions of the atmosphere. Dr Prout, therefore, drew the conclusion, that the cause of the disappearance of the common lateritious sediment, and the presence of the oxalic acid in the urinary secretion, as well as of cholera, was a poisonous body analogous to malaria, whose high specific gravity and feeble diffusive powers kept it near the surface of the earth, along which it insensibly crept, particularly in low damp situations.

In additional confirmation of the great change which had taken place in the fluids and secretions of the human body during the presence of the cholera constitution, and the existence of the oxalic state of the urine, Dr Prout states that he likewise observed in almost every individual, an unusually acid state of the saliva and of the cutaneous exhalations, such as he had never before witnessed, except in the last stages of chronic diseases, and in malarial disorders. During the same period, and for some time afterwards, also, a greater number of cases of oxalate of lime, renal calculi, and formidable hemorrhage from the kidneys, than he had previously seen during a long course of observation, or since that time.

Now, it is of comparatively little moment whether the above-mentioned explanation of the existence in the atmosphere of a dense, heavy, poisonous agent be correct or not. The fact is uncontroverted, and cannot be controverted, that a great and striking change in the fluids and secretions of the human body then took place. This is not the manner of a contagious disease, but that of a great, general, and extensively-operating agent. A contagious disorder is one which is spread from one person to another by some poisonous principle elaborated in the system of the former, and communicated to that of the latter. In this instance, hundreds, and probably many thousands of persons were affected simultaneously in the same manner. The affecting agent, there-

fore, must have been one of universal or general influence, and which at once affected many thousands in the same manner.

We have always maintained that the mode in which diseases, and especially cholera, appears and disappears in different places, is the great test of the contagious or non-contagious character of such diseases. If any disorder appears suddenly, and at once affects great numbers; or if, though it appear more slowly, it affects, within a short space of time, great numbers, and who have no communication with each other, then the probability is, as near to demonstration as can be obtained, in subjects of this nature, that the disease is not contagious, but atmospheric, telluric, miasmatic, or in some manner dependent for its origin on general causes. No one, except old ladies, now considers influenza to be contagious; yet, between seventy and eighty years ago, and even later, that disease was universally called contagious catarrh, and considered contagious by physicians. No one considers ague or remittent fever contagious; yet these diseases were also spoken of as contagious. The reason of this change in medical opinion is, that it is now understood that these diseases arise from the operation of general and local physical causes.

Many examples might be adduced showing cholera to be of this nature. One of the most convenient, if not the very best, for deciding the question, is that of the epidemic attack among the pauper children at Tooting, in the beginning of the present year.

Tooting or Graveney, or Tooting-Graveney, as it is occasionally named, is a considerable village in the county of Surrey, in the western division of the hundred of Brixton, six miles from London, in a direction south south-west. It contains many seats and mansions of the gentry and wealthy merchants of the metropolis. Through the parish passes the river Wandle, turning mills for grinding corn and other mechanical purposes. The population in 1831 was 2063. The population was in 1841, 2840 persons, of whom 1429 were males, and 1411 were females. Of this total number in 1841, 618 were young children of both sexes, from 2 to 14 years, in the establishment of Mr Drouet, presently to be noticed. The proper population of the village, therefore, in 1841, was 2222; so that in the course of ten years, the increase had been about 159, or 16 persons annually. Reasoning from this fact, the population may be inferred to have been augmented in the course of eight years by at least 128 or 130 persons. This raises the population of the village at the beginning of 1849 to 2350 persons; and to this number must then be added 1370 or 1372, the number of children maintained in the pauper establishment of Mr Drouet at the beginning of the present year. The total population, therefore, according to this rating amounts to 3722; a number not far from

the truth, and certainly not above the actual number, which, in all probability, borders on 4000 persons.\*

Tooting, or Lower Tooting, or Tooting-Graveney, forms a small town or large village, and contains the greater part of this population.

The whole parish contains 680 imperial English statute acres. In 1841, the village contained 339 inhabited houses, and 17 unoccupied.

Tooting consists of Upper and Lower Tooting, the relations of which will be best understood by the following statements:—

Near the village flows a small stream, a tributary of the Wandle, which it joins a little to the west of Tooting; while the Wandle itself, pursuing a northward course and slightly west, after passing the town of Wandsworth, falls into the Thames a little below Fulham Bridge.†

The parish of Tooting is bounded by Streatham on the east, Mitcham on the south and west, and Wandsworth on the north.

The great road from London to Guildford and Farnham, which, in the days of mail-coaches, was wont to be traversed by the Poole Mail, passes through the county of Surrey in a south south-west direction, and the parish and part of the village of Tooting; and upon this road, at the fifth mile-stone, consequently nearer the metropolis by one mile, stands the hamlet which is called Upper Tooting. This place, however, is not within the parish of Tooting, but belongs to the adjoining parish of Streatham. One mile farther south and west, on the same road, is placed the village of Lower Tooting or Tooting Graveney. Another road branches off at this place on the left, supposing the visitor to proceed from London, from the Great Guildford and Farnham road; and this proceeds to Mitcham, Sutton, and Reigate.

* Population in 1841,	. . . . .	2840
Pauper Children,	. . . . .	618
		<hr/>
		2222
Population in 1831,	. . . . .	2063
		<hr/>
Increase in 10 years,	. . . . .	159
In round numbers, 160, or 16 annually.		
Population of Tooting proper in 1841	. . . . .	2222
Estimated increase in the course of 8 years,	. . . . .	128
		<hr/>
		2350
Pauper Children in Establishment of Mr Drouet in January 1849,		1372
		<hr/>
		3722

† The river Wandle rises among the chalk hills at Croydon, and, after passing through Beddington, Carshalton, Mitcham, and Merton, in a northern direction, and slightly west, crosses the town of Wandsworth, under a bridge built in 1602, and joins the Thames below Fulham, as already stated. In this course it furnishes water-power to numerous flour-mills and valuable manufactories. Wandsworth is merely Wandlesworth.

The facts now stated regarding the course of the Wandle and its tributaries show that the whole of this part of the county has a general declination to the north and west towards the river Thames and its basin. The surface is, with the exception now stated, level and flat, and the principal elevations occur towards the east,—at Bleak Hill on the north-east, at Knight Hill, Timber Hill, and Beagar's Hill, on the east, and at Morden on the south. The soil consists of gravel mixed with clay, covered by a layer of vegetable and animal mould, varying from ten inches to two feet in thickness. The land of the parish is principally arable. The ground rests on the formation denominated London Clay.

This, it may be proper to explain, is a bed or deposit of clay varying from 150 to 250 feet, and, in some parts, 300 feet in thickness. The clay is generally chestnut-coloured near the surface, that is, from five to twenty feet down; farther down, it is of a lead colour; then, at the depth of thirty or forty feet, the whole mass is bluish; and, as it approaches the bottom of the deposit, it becomes almost black. The deposit is remarkable for containing *septaria* and numerous organic remains; shells among the aspondylous animals, and bones of fishes among the vertebrated classes, sometimes with tusks and bones of elephants and other remains of mammalia. This bed of clay contains little water, and whatever water is obtained from it, is turbid and brackish.

This formation of clay has been dug through in sinking wells at Clapham, Stockwell, Brixton, Norwood, Balam, Morden, Wimbledon, Richmond Park, and other places in the north-east side of Surrey. It is believed, indeed, to extend over the whole north side of the county of Surrey.

Below this deposit of blue or London Clay are found in some parts beds of oyster-shells and other marine shells; but the most usual is an extensive deposit of sand, which, from resembling that found near the surface at Blackheath, is sometimes called by the older geologists Blackheath Sand. The bed of shells now mentioned is not uniform, and is found chiefly on the north side of the county of Surrey, that is, not far from the Thames. The sand, on the other hand, is almost constant. It is of a fawn colour, loose at the surface, more compact below, and varies from ten and fifteen to forty feet in thickness. This deposit abounds with water; and when wells require to be made, the perforation must be carried entirely through the clay. Artesian wells are usually carried through the clay and the upper portions of the bed of sand.

Subjacent to this deposit of sand is one of chalk, of very great thickness, estimated in some places at between 800 and 900 feet. This abounds with oyster and other marine shells, sharks' teeth,

and various other organic remains. At and near the surface, the chalk deposit is porous, loose, and dry. Lower down, it is more compact; and at two-thirds or three-fourths of its depth, is obtained the firm brownish chalk which is burned for mortar, and which is often called Dorking Lime.

The most recent and pointed information regarding the geological structure of this division of Surrey, namely, Brixton Hundred, is communicated by the account of the section of a deep well sunk at Streatham Common, in the immediate vicinity of Tooting Parish, by Mr Thomas Yeats. This well was sunk first through the London Clay to the depth of 100 feet, and, by a subsequent boring, to the further depth of 185 feet, forming altogether a depth of 285 feet, the greatest to which at that time (1824) perforation had been carried in that neighbourhood. The London Clay at this point was of considerable thickness, being not less than 180 feet, when it became much mixed with sand. At the depth of 200 feet, the auger went through a bed of shells, principally oysters, which was estimated to be 30 feet in thickness. At the depth of 235 feet, hard water was procured. At 240 feet was a bed of mottled clay, which Mr Yeats classes under the head of Plastic Clay. At 256 feet, was a bed of red, green, and yellow mottled clay, also plastic. This was followed, at 260 feet, by green sand with rounded carious flint pebbles; at 265 feet, by a mixture of iron pyrites and sand very hard; below this, to 278 feet, green sand; and there to 280 feet, light coloured sand. Below this last stratum was plenty of soft water.\*

From this section it results, that, in the neighbourhood of Tooting, London Clay is the principal formation, and rests on a pretty thick bed of Plastic Clay.

These facts show that there is in the soil of Tooting nothing which can render it necessarily and naturally insalubrious and productive of disease. It is, indeed, a very healthy situation; and, though alluvial, yet the declination of the surface is quite sufficient to allow means for adequate drainage. It is true, that all argillaceous soils are retentive of moisture and not very easily made dry; but while the perforations by various Artesian wells tend to draw off all superfluous moisture, it is certain that Tooting is quite as salubrious as any other place in Surrey, and that neither its soil nor its climate possesses any peculiarities which ought to render it the easy prey of endemial or epidemic diseases.

It is very true that various adventitious circumstances, and probably neglect, tend to render the drainage less perfect than it ought to be. Thus, a stream, which crosses the Mitcham and

\* Transactions of the Geological Society of London. Second Series. Vol. ii. London, 1829. Vol. xii. p. 135.

Streatham road, the tributary of the Wandle already mentioned, is often foul in the summer when the water is low and scanty. It is said not to be the subject of complaint in the winter season. Various ditches, however, it will be seen, which are either not kept clean, or which it is difficult to keep clean, are a considerable source of nuisance and offensive exhalation.

On the other hand, there is direct evidence to show that Tooting is a healthy situation.

Mr Erasmus Gilbert Livesey, who keeps there a boarding school, states that not only is it in general a healthy situation, and that he has rarely illness among his pupils, but that having formerly kept a similar establishment at Guilford, he never had his expenses for medical attendance so low, in proportion to the number of pupils, as they have been at Tooting. During last year (1848), he had in his establishment about fifty pupils, and altogether sixty-four persons within the premises, yet never was their health so good as during the last half year; and he had no deaths. The establishment of Mr Livesey is situate about half a mile distant from a particular turn of one of the ditches, which, from its being difficult to clean, and favouring stagnation and accumulation of filth, he calls the cesspool of Tooting. This spot is from forty to fifty feet long, and about seven feet broad.

This ditch, it may be proper to mention, is close upon a lane leading to the small town or hamlet of Garrett, noted for its mock and not very decorous elections, and which has acquired a dramatic reputation by the once celebrated farce of Foote, the Mayor of Garrett. Garrett itself belongs to the adjoining parish of Wandsworth.

The Registrar of Tooting further bears evidence to the fact, that the deaths in Tooting form a small annual average. He had registered no deaths from cholera except those taking place at Mr Drouet's establishment.

At this village is kept, by Mr Bartholomew Peter Drouet, an establishment for the accommodation and boarding of pauper children at a certain rate (4s. 6d.) weekly. The establishment consists of cottages and other small buildings, with about fifty-two acres of ground, which is employed by the proprietor in agricultural purposes. About one-eighth of the ground is occupied by the buildings and grounds of the asylum. The dormitories of the elder girls are situate in two old family mansions facing the main road in the village of Lower Tooting, and a portion of these houses is occupied by Mr Drouet himself and his principal officers.

That portion of the establishment appropriated to the accommodation of the boys, consists of a number of detached out-buildings, extending on the right or north-eastern side about half-way

down, and on the left or western side the entire length of the playground. Beyond these detached buildings, on the same side, is a range of cottages, situate over a stagnant ditch passing along the end of the grounds. These cottages are employed as dormitories for the elder boys.

The detached buildings in the yard consist of seven distinct compartments, each compartment on the ground floor being 50 feet long,  $10\frac{1}{2}$  feet high, and 24 feet wide; and above these are apartments of the same dimensions used as dormitories for the younger children.

The cottage rooms referred to above, in which the elder boys sleep, form a range of buildings 150 feet in length. The boys' school-room is 91 feet long and 24 feet broad. The girls' school-room is of similar dimensions. The average number attending each school is from 500 to 600 daily. To the entire assemblage of buildings thus situate, the general name of Surrey Hall is given.

The ditch already mentioned, as that over which the dormitories of the senior boys are erected, formerly ran from Tooting to Wandsworth; but its direction is now changed, and it passes in a north-easterly direction towards the Surrey County Lunatic Asylum. After passing along the end of the asylum for a short distance, this ditch becomes considerably wider, and again returns towards Tooting, abutting on the eastern side of the asylum, and 349 feet from the centre of the main building of the institution.

In answer to a question put by the inspector, Mr R. Drouet stated, that this ditch had been cleaned about six weeks previously by a number of the elder boys and some men, and that the matter it contained had been deposited on the bank, in order to be used as manure for the adjoining land.

Besides this, there is in the adjoining field belonging to Messrs Rollison, nurserymen, at Upper Tooting, another stagnant and filthy ditch of extraordinary dimensions. This ditch, which is situate in a north-easterly direction between Mr Drouet's establishment and the adjoining fields, is connected with a large tank, which receives all the refuse from the Surrey Lunatic Asylum, situate at the distance of about a quarter of a mile. This ditch is about 3 feet deep and from 18 to 20 feet wide; and, when examined on Friday the fifth of January, the filth which it contained is reported to have been from  $1\frac{1}{2}$  to 2 inches from the surface, and the ditch, it is added, exhaled a most offensive odour. On the northern side of the field, it is stated that the ditch was dammed up or obstructed, for the express purpose of collecting filth in order to manure Messrs Rollisons' land.

This, however, is positively contradicted by William Rollison and Sons. According to their representation, the ditch referred to was formed many years previously by the then proprietor of



the Springfield estate, of which Messrs Rollison's nursery is a part ; and that person is represented to have, by permission of the inhabitants of Lower Tooting, diverted the common sewer from its ancient course, in order to obtain the means of irrigating the Springfield meadows. When Messrs Rollison purchased one portion of Springfield Meadows, the proprietor retained the right of damming the ditch in question, that he might still flood the meadows unsold ; and Messrs Rollison consequently have no control in the matter.

They further say, that the manure is of little or no value, while its course through their grounds is a positive evil ; and they have every wish that the sewer should resume its original course.

At first sight, Mr Grainger, the medical inspector, was inclined to order these ditches to be emptied and their contents removed. But, on further consideration, he was doubtful how far this measure might be safe, and he was inclined to think that, as the fall was not deficient, sending through them a copious current of water would be the best plan.

The village of Tooting is entirely supplied with water by Artesian wells ; and the Reverend Dr Lord, rector of the parish, stated at one of the meetings of the Sanitary Committee, that the inhabitants were willing to place the whole available water of these wells at the service of the committee, if it were thought expedient to clean out the ditches and drains.

In the asylum now described at Lower Tooting, the following fifteen parishes in London and the neighbourhood farm or board their pauper children, viz., Kensington, Newington, St Andrews, Holborn, Wandsworth Union, St Pancras, Chelsea, Clerkenwell, Islington, Strand Union, Fulham Union, Richmond Union, St George's in the East, Kingston Union, and Streatham.

The whole of these amounted to about 1400 children of both sexes.

It appears that in the end of November and beginning of December 1848 the number of children was rather above 1400 ; indeed it is allowed that there were at certain times more than 1500. At the end of December 1848 and the beginning of January 1849, however, there appear to have been 1370 or 1372 children.

It appears that the children thus accommodated in the several buildings of Surrey Hall did not enjoy very good health. Cutaneous eruptions were very common, mostly, it is said, of pustular character. *Impetigo* is especially mentioned. Itch also prevailed among many of them. The bellies of the children were large and swelled ; while the limbs were shrunk and extenuated ; their complexion was pale ; and their external appearance not that of children in health. Ulcers were observed on the extremities and

feet; and, when these appeared, they were always difficult to be healed. In several the joints are stated to have been in a morbid state; and ophthalmic disorders were so prevalent, and so little manageable, that one practitioner thought them contagious; and the children so affected were placed in separate wards. It is also important to observe that, during November and December, various attacks of diarrhoea and dysentery had taken place; and some of the children were convalescing from dysentery in the course of the latter month.

In short, the morbid properties, and the debilitating influence of the management at Surrey Hall, on whatever they depended, appear to be at once efficient and manifest. Thus, at one of the inquests on the St Pancras children, it is proved that, among the children sent from that parish in the summer of 1848, considerable numbers had not been long there when they presented various unequivocal marks of general impaired health. These boys, to the amount of at least 156, were sent to Tooting in May 1848. The directors of the poor had ordered monthly reports on the state of the health of these boys to be returned to St Pancras Union. The first report was presented on the 8th of June, when some of the children complained that they had not so much food as in the workhouse, and several had run away. On the 11th July a report was presented by Mr Douglas, approving of the cleanliness and general management of the establishment at Surrey Hall, and stating that the boys were reconciled to the place, and more orderly than formerly.

On the 22d of August 1848 a report was received from Mr Johnson, one of the district medical officers, stating that he had been requested to visit two boys,—one, Joseph Sherrard, aged 11; and the other, Henry Sherrard, aged 9,—who had been removed from Tooting to the St Pancras Workhouse. The former had, in consequence of a hurt, a sore in the leg, which would not have taken place in a boy in a sound state of health. The latter had on the head a wound, alleged to have been the effect of a blow inflicted by the schoolmaster. The children, who were residing with an uncle and aunt in William's Mews, were both in a condition of great feebleness and emaciation. In consequence of the receipt of this report, the board of directors sent to Tooting Mr Robinson, the workhouse surgeon, and Mr Johnson, in order to examine the children of the St Pancras parish. Mr Robinson returned, on the 28th of August, a report stating that there were 58 cases of ophthalmia and other diseases, chiefly cutaneous eruptions, and that the health of all the children was more or less deteriorated. The following is the concluding paragraph of the report:—

“ I did not fail to notice, from the examination of the above-

mentioned boys, that they had undergone a change certainly not for the better. The general characteristics were wasting of the limbs, debility, boils, &c. Although some 15 or 20 boys, upon leaving the workhouse, were more or less indisposed, I am prepared to say that they were not so delicate generally as at present. As to the cause which may have operated in producing this alteration, perhaps recent removal from friends and change of air may have contributed; but the symptoms are decidedly characteristic of bad food or insufficiency of food. With regard to the cases of the two children, Sherrard, one of whom is since dead, Mr Johnson has reported; and I need not add anything to that report. I think a great deal of severity, not to use a harsher term, has been exercised by the masters and others in authority, as well as some out of authority, towards the boys.”\*

Thus, so early as the 28th of August, three months after the arrival of the children at Tooting, it was known to the St Pancras guardians that their health was not satisfactory, and was in truth much and decidedly deteriorated. To the alleged deficiency of food it will be requisite afterwards to recur.

Neither did cholera attack this establishment altogether without giving some previous warning. On Friday the 15th of December three girls were attacked with diarrhœa and vomiting, which were speedily followed by collapse. It is stated that the occurrence of these cases of gastric disorder were ascribed by the resident medical officer to cold and dampness. It is not mentioned whether they recovered or not. But it is probable that they did; as, had they terminated fatally, it is scarcely possible to conceive that measures should not have been taken, to ascertain particularly the state of health of the other children in the institution. No inquiry, however, as to the presence of diarrhœa among the children appears to have been made; and, accordingly, no prophylactic means were adopted.

It is, nevertheless, well established that, during the end of December 1848, diarrhœa had been prevailing very extensively among the children. It is distinctly in evidence in the report of Mr Grainger, that, “as in all similar circumstances, a large amount of diarrhœa has been prevailing among the children at this establishment, viz. Surrey Hall, both previous to and since the outbreak of cholera; and, on the 5th of January 1849, one of the assistant masters stated in evidence that the boys had been purged during the last (the previous) fortnight, and especially since yesterday week.”

This carries back the prevalence of diarrhœa among these children to the 21st or 22d December 1848, and to Thursday the

\* Report of 28th August 1848, by H. C. Robinson, Surgeon to St Pancras Workhouse.

28th of December 1848. One of the female teachers also stated, on the 5th January, that "many of the children had been taken ill with pain in the bowels;" and the resident medical officer allowed, that many of the children attacked by cholera had informed him, that they had suffered from diarrhœa before the attack, some for one or two days, others for a longer period.

The truth is, that the disease had commenced in its incipient and premonitory stage evidently about the 21st or 22d; but probably the poison had not acquired that degree of virulence, as to destroy so rapidly and speedily as it afterwards did. The cases of diarrhœa after the 28th December must be regarded as cases of cholera in the early stage. Fatal cases then began to appear.

It is, if not distinctly stated, at least insinuated with considerable confidence by Mr Grainger, that, had the warning, which the occurrence of these cases in the month of December was calculated to convey, been properly understood and acted upon, in all probability much of the subsequent sickness, and all the mortality might have been prevented from taking place. This opinion he founds on the fact, that in the month of December, out of 400 children in the Mile-End Workhouse, 60 were attacked by violent purging and vomiting. Appropriate medical treatment, however, was immediately adopted by the surgeon; and not one of these children presented symptoms of cholera. Every one conversant with the disease must admit that to check the preliminary diarrhœa is a point of the highest importance.

Among the inmates of Surrey Hall, at all events, cholera broke out somewhat suddenly and violently at the close of 1848.

According to the accounts first published, it was stated that the disease broke out on the 3d of January 1849, and on the night between the 3d and 4th January. But, according to the report of Mr Kite, the resident surgeon, as subsequently given before the Coroner, the first case took place on Friday the 29th of December, and the first death on the 30th. On the same day more attacks must have taken place; for on the 31st of December three children died. On the 1st of January, 3 are said to have died; on the 2d, 7; on the 3d, 5; on the 4th, 12; on the 5th, 19; on the 6th, 14; on the 7th, 11; on the 8th, 20; on the 9th, 14; on the 10th, 10; on the 11th, 5; on the 12th, 9; and on the 13th, 8. These numbers differ somewhat from those rendered to the Board of Health, to which it is convenient to adhere.

On the 4th, 60 children were reported as labouring under distinct cholera, and of these 16 were fatal. On the 5th, 15 cases were reported, and 10 deaths; on Saturday the 6th of January, it was reported by Mr Kite, the surgeon, that 40 new cases had taken place since four o'clock P. M. of the previous day; and during the same time, 12 deaths had taken place. At this date, namely, Saturday the 6th of January 1849, the cases stood as follow:—

Number of cases of cholera since the commencement,	229
Deaths,	52
Under Treatment,	160
Recovered,	16

On Friday evening, the 5th, the Guardians of the Holborn Union removed of the children belonging to their parish, 186 in number, to the Royal Free Hospital in Gray's Inn Lane, either 154 or 156, the latter being the number given by Mr Whitfield the surgeon. 30 children, too ill to be removed, were left at Tooting. The same evening the Directors of St Pancras Parish ordered the children entrusted to their care, amounting to between 200 and 300, to be removed; and in consequence of the Wandsworth and Clapham Union, and the parishes of St Mary, Newington, St Mary, Islington, and St James's, Clerkenwell, adopting the same course, one-half of the children had been removed from the Tooting Asylum. The only children that remained were those of Chelsea, and the parish of St George's in the East, St Luke, and Clerkenwell.

On Saturday evening, and during the night, 7 deaths took place; and between Saturday night and Sunday at 5 P.M., 9 more; making altogether from Saturday the 30th December 1848 to Sunday the 7th January 1849, 68 fatal cases. The new cases on Sunday were 13.

After this period cases of cholera continued to take place both among the children removed, and among those left at Tooting, some terminating fatally; and both cases and deaths were reported regularly to the Board of Health. On Monday the 8th January, 10 new cases were reported as having taken place at Mr Drouet's Asylum, and 7 deaths; on Tuesday 9th, 14 new cases and 16 deaths. On Wednesday the 10th, and Thursday the 11th, 17 new cases took place, and 22 children died. The number under treatment was stated to be 103. On the 12th of January, the disease had undergone some abatement. The new cases were only 2, but there were 6 deaths. On the 14th, the new cases were in like manner 2, but 13 deaths occurred. On the 15th, the official report rendered to the Board of Health by the resident surgeon, was—

Death from cholera,	1
Death from consecutive fever,	3
Under treatment,	84
Convalescent,	79

No new case had taken place, but there were two of disordered bowels

On the same day, Mr Popham reported that there was not in the establishment at Tooting a single case of cholera; that is, evidently understanding no new case. It was then reported on

the 17th, that since Sunday the 14th, no new case had occurred; one death took place on the 17th; 16 cases were convalescent, and 65 were under treatment.

This time appears to have been the termination of the epidemic, for, on the evening of Saturday the 20th of January 1849, the report was to the following effect:—

The total number attacked from the 29th December to the 20th of January, amounted to 360. Of these, 150 had died either from cholera or its effects. 43 were still under treatment; and 167 were convalescent. No new case had taken place on 22d since the evening of the 20th; and no death during 48 hours. The cases under treatment were several of them suffering under the secondary fever.

Some discrepancy is observed in the numbers returned, owing probably to the slightly different heads under which they are ranked. Thus, some difference of opinion appears to have existed, whether certain cases were to be referred to the head of diarrhoea, or cholera, and to that of mesenteric disease or cholera. It is very likely that a child labouring under any intestinal disorder would be carried off by cholera. Altogether the number of deaths up to the 20th January, returned as caused by cholera, is 155. The total number of deaths registered as having taken place in Surrey Hall and in children removed from it, in the course of three weeks, amounted to 182. Of the 27 residual cases, it is probable that the deaths were more or less closely connected with the epidemic visitation.

Various cases took place among the removed children; those of St Pancras at the Royal Free Hospital, those of Holborn Union at the Workhouse, and among some children sent to Margate. These, however, it is unnecessary here to specify.

Mr Grainger visited the children still at Tooting on Thursday 25th January, along with Dr Farre, by order of the Board of Health. With the exception of the sick and convalescent, the only children now at Mr Drouet's were those belonging to the parishes of St George's in the East and Chelsea. The total number of children now at Mr Drouet's was 175, belonging to St George's in the East, and 97 belonging to the parish of Chelsea. Among 68 boys belonging to St George's in the East, examined by Dr Farre and himself, 17 had itch or other cutaneous diseases; and among 70 girls, 25 were suffering from cutaneous diseases principally itch. Among 45 boys belonging to Chelsea parish, 14 were labouring under itch or diseases of the skin; and among 32 girls, 7 were suffering under similar disorders. Many of the children had swelled bellies, emaciated extenuated limbs, and pale flaccid skin. Sores, the consequence of chilblains, were very common.

51 children were under treatment from the effects of cholera; most convalescent or approaching to convalescence, few were now seriously ill. The last death took place on the 16th January, and the last new attack on the 18th January.

Of children belonging to the parish of St George's in the East, 20 were under treatment; of those belonging to Chelsea, not quite 12.

Among the children belonging to St George's in the East, 26 new cases and 16 deaths had taken place; and among those belonging to Chelsea, 11 new cases and 14 deaths,—subsequent to the 6th of January. Between the 7th and 10th January inclusive, 23 new cases and 8 deaths among the children of St George's in the East, and within the same period 9 children, were attacked among those belonging to the parish of Chelsea.

The disease as it appeared among the pauper children at Tooting is stated by Mr Kite, the resident surgeon, not to have been preceded by the usual premonitory symptoms; to have commenced at once with sickness, vomiting, and diarrhœa, and then to have proceeded speedily to the stage of collapse, with great weakness. Mr Popham, the surgeon to St Pancras, gives a view nearly similar.

This statement, however, is completely contradicted by the report of Mr Grainger, and by a subsequent admission of the surgeon, which has been already given above. These cases were preceded by diarrhœa, exactly as in other attacks.

It was further ascertained, by means of an inquiry suggested by Mr Grainger and conducted by several medical gentlemen, after the disease had been established for several days, that on Saturday the 6th and Sunday the 7th January, there were 38 cases of diarrhœa, though the number of children had been by this time diminished one half by removals. Of these cases of diarrhœa, only one proceeded to cholera. It is idle, therefore, to assert that cholera began in this place suddenly and without warning. It is clearly proved by the whole course of the facts that have come to knowledge since the inquiries were made, that it began at Surrey Hall exactly in the same manner as it has commenced everywhere else—that is, by diarrhœa and gastric disorder lasting for several days.

On the other hand, Mr Popham states, in his evidence of Friday the 19th January, that when, on Saturday the 6th, he examined the St Pancras children, 96 in number, he found only four or five instances of diarrhœa among them; and that in one case there were no premonitory symptoms; and the child aged between four and five years died in two hours from the commencement of the attack. Mr Penny, of Walworth, who had been called by

Mr Drouett on the 5th, stated that he examined 400 boys, and found among them only 4 instances of diarrhœa, and among 150 girls 11 instances of diarrhœa. These statements it is not very easy to reconcile. They may possibly receive some new explanation afterwards.

The cases appear to have been rapid in progress; and, indeed, this result clearly follows from the fact of the great number of fatal terminations between the 1st of January and the 9th, amounting, according to the reports during that space of time, to 93.

Notwithstanding this, and that all of the medical officers of the unions and parishes concerned who had seen the cases up to the 8th, declared the disease to be cholera, one surgeon expressed publicly an opinion that the sickness of the Tooting pauper children was a bilious fever with diarrhœa. It is of little avail to dispute about a name; and it is, perhaps, of no great moment whether the disease be called bilious fever with diarrhœa or not; but it is quite impossible to doubt or deny that the disorder affecting these children was cholera, and that of a very active and virulent character.

All doubt upon this point, however, has been since completely dispelled. By the united testimony of the resident surgeon and various medical officers sent from the metropolitan Parishes and Unions, it has been established beyond question, that the disease which caused the sickness and mortality was cholera and nothing but cholera, or its subsequent effects. The symptoms, according to the testimony of all these observers were, first, in general the preliminary diarrhœa, then, in rapid succession, discharges of watery and rice-water liquors from the bowels, with vomiting and cramps, then coldness and blueness of the extremities and surface, suppression of the urinary secretion, and, in the worst cases, the fatal termination. Several bodies also had been inspected; and the usual appearances found in the bodies of persons destroyed by cholera were recognized.

The consideration of the causes of this disorder has occupied the attention of many observers. None seem to think of contagion; and, indeed, it must be difficult to imagine a contagious disorder introduced among these children and affecting so many in so short a space of time. On the other hand, the opinions of the medical observers all look to one of three or four circumstances as causes of this outbreak of disease. These are, the local situation of the establishment, with two large stagnant foul ditches in the immediate neighbourhood; the state of the atmosphere—that is, some atmospheric poison; the imperfect warming of the apartments and insufficient clothing of the children; the great num-



ber accumulated within an establishment rather small ; and a form of dietary not sufficiently nutritious.

1. The local situation may be understood from what has been already stated. There is little doubt, that masses of water or watery soil, whether stagnant or not, are favourable to the formation of cholera during an epidemic state of the atmosphere. Much more is the disease likely to be developed in situations in which the soil is saturated and the air impregnated with moisture from foul stagnant ditches.

Yet was all this unfavourable local influence artificial and adventitious in origin. It has been shown how hurtful must be the proximity of the large and extensive ditches or receptacles of stagnant water. Either from this or some other cause, the whole locality was rendered damp. "The yard or play-ground," says Mr Grainger, "was damp and wet, owing, as it appeared, to its limited size, and to the buildings by which it is more or less surrounded."

Another mode of contaminating the local atmosphere of this abode is too remarkable to be omitted. About five or six months previous to the close of 1848, according to the testimony of Mr Walter Chapman, one of the then medical attendants at Surrey Hall, a low range of buildings, constituting one long room, was erected in the immediate vicinity of a yard or court, in which were kept a large number of animals,—pigs, cows, horses, and poultry. These buildings were placed very near to the two foul open drains or ditches formerly mentioned. When this building was erected, and before any of the children were placed in it, Mr Chapman expressed his opinion that the Commissioners of the Poor or of the Board of Health would insist on the removal of the pig-sties, if the children were to live there. Notwithstanding this representation, 150 children were placed in this apartment. The present medical officer also expressed his opinion of the unsuitableness and dangerous character of this place as a residence ; and, in consequence of all these representations, it is believed some of the animals had been removed ; but, at the date of the report of Mr Grainger, 5th January 1849, a large number of poultry were still kept in this court, and some pigs were also its occupants.

It results, further, from inquiries made by Mr Grainger, that, notwithstanding all these factitious causes of insalubrity as to the establishment of Surrey Hall, the inhabitants of the village itself enjoy most perfect health. No case of cholera, or any other serious disorder, had taken place either among the respectable and wealthy inhabitants of the village or among the labouring classes. The medical officer of the district made particular inquiry, and ascertained that neither any of the inhabitants nor the children of the poor had been labouring under diarrhœa, or presenting any

symptom of cholera. There has been, indeed, in this village, no excess of disease above the average.

Mr Withall, Registrar of Tooting, stated that he had registered about 150 deaths from cholera from the Surrey Hall Establishment since the 29th December 1848. The population of the district is from 9000 to 10,000 persons. No deaths had taken place from cholera in the whole district except those at Mr Drouett's establishment. Only seven deaths had been registered during the last quarter, exclusive of those at Surrey Hall.

2. As to the atmosphere, our knowledge is very uncertain. All that can be said is, that for a considerable time past—four months at least,—the atmosphere of many places on the coast and the rivers of this island has been charged with those principles which favour the production of cholera. That the disease has been so virulent in character and rapid in progress among the pauper children at Tooting, is probably to be ascribed to the fact, that the peculiar epidemic state of the atmosphere, as well as the miasmatic condition of the locality, was strongly aided by the imperfect clothing of the children and the cold humid state of their apartments at this season of the year. One medical witness (Dr Bermingham) states, that all the children whom he saw, appeared to be imperfectly clothed, considering the cold of the season.

3. One cause to which a considerable number of witnesses attach great importance is that of the small and confined accommodation, both during the day and the night, in proportion to the number of children. It has been already stated, that the numbers accommodated in the Surrey Hall Asylum at Tooting in 1841 were 618; and this number was probably as great as the establishment could conveniently contain, and certainly as great as any single individual could properly and satisfactorily manage with due attention to health, comfort, morals, and education. The numbers, nevertheless, soon rose above this standard. From facts brought out in the course of the late inquiries, and especially some which transpired in the course of a negotiation between the guardians of the Holborn district and the proprietor, it results that, between the 25th of October 1847 and the beginning of November in that year, there were in the asylum 800 occupants, pauper children as we understand. The license is stated, at the same time, to extend to 1200. On the 9th November, the guardians had resolved to send thither 90 boys, who were accordingly removed soon after the 19th November; and, in the course of a month after, several more boys and some girls were sent. On the 2d of December, about one hundred girls were sent; and, at the end of 1847, 211 children from the Holborn Union was the number then in the Tooting or Surrey Hall Asylum. In this manner, the number of children was raised, at the end of 1847, above one thousand. It

appears, from the testimony of Mr Hall, the Assistant Poor-law Commissioner, that on the 14th December 1847 there were 1065 inmates in the asylum.

It appears that, at the same time, this functionary thought the accommodation too small and limited; and he recommended the numbers in the schools to be confined within certain limits; not more than 400 boys for the large school; not above 160 girls for the senior girls' school; 120 for the junior girls'; nor more than 250 for the infant school. As these numbers amount to 930, it leaves 135 unprovided for; and the statement is equivalent to saying that there were at least, during the daytime, 135 children more than ought to be.

The numbers, nevertheless, continued to increase. The guardians of the parish of St Pancras resolved on sending to the Tooting Establishment the children under their care; and, accordingly, 156 boys were sent in May 1848, as already stated; and in November and December, 110 girls were in like manner sent, making of both sexes 266 children. More must have been speedily added; for it is in evidence, that at December 1848, the Guardians of St Pancras had at Tooting 282 children. By this addition the number of pauper occupants was raised to 1347 persons; and as they amounted to 1370 or 1372 at the beginning of 1849, more must have been added.

In this manner, in the course of seven or eight years, the population of this institution has been more than doubled; and during the last 20 months, it had risen from 800 to 1370, an augmentation of more than 500 persons.

It is allowed that the institution was enlarged by the addition of new buildings; but it is much more than doubtful, whether the increased accommodation was in any sense or degree commensurate with the increased number of persons accommodated. It is stated by many of the witnesses, that the sleeping rooms were excessively crowded, and that, in various instances, three children were sleeping in one bed. Upon this point it is unnecessary to enter into particular details. It is sufficient to state, that the establishment contained 640 beds, which at the rate of two children in each, could accommodate not more than 1280, leaving, consequently, 90 children unprovided for. These 90 must have been dispersed among the others; so that 90 beds must have held 3 children each.

The great evil, in short, was crowding so many young persons within apartments so limited, that the means of ventilation either during the day or night were quite inefficient.

Dr W. Marsden, one of the medical attendants at the Royal Free Hospital, to which it has been stated the Holborn Union children were removed, took some pains to ascertain exactly the

available amount of respirable air. He states that the total atmospherical contents of the 44 (48) dormitories at Tooting amounts to 196,705 cubic feet. Deducting for bedsteads and the persons of the children  $\frac{1}{20}$ , gives 186,870 cubic feet, and he infers that there would be left for each child, not quite 136 cubic feet of respirable air, or an amount equal to what would be contained in a box 5 feet 2 inches in every direction, that is, length, breadth, and depth. Now, it is only necessary to imagine a box of these dimensions air-tight, and to place in it a boy or girl for eight or ten hours to breathe over and over again the same air. It is true that the 1370 boxes were not exactly air-tight; but they admitted only a quantity of air which must, during the night at least, have been respired over and over again; and if it was at all removed and other supplies of air admitted, these new supplies entered the chambers loaded with the emanations of decomposing animal and vegetable matters from the neighbouring ditches and drains, and the air contaminated by the respiration of pigs, poultry, and other animals, as well as the exhalations and excrements of those animals.

Dr Marsden argues that the quantity of air contained within the 5 feet 2 inch boxes, with doors and windows closed, is not adequate to support life for more than 8 hours, because every expiration yields 4 per cent. of carbonic acid gas. The boys' schoolroom, he states, which was occupied for 3 hours twice daily, contained 19361 cubic feet; and deducting  $\frac{1}{20}$  for the persons of the boys and the furniture, there could be only 18583 feet, or there could be only 37 feet for each boy. Ventilation was, in short, very insufficient. From all these facts, and from what is known as to the effects of confinement within the hold of a vessel upon cattle in the voyage from Holland, Dr Marsden regards the mischief produced as asphyxia, and not cholera.

It is not of much moment to dispute about the exact inferences deduced. The premises may be admitted as useful facts, while the conclusions drawn are different from those given. It is sufficient to show under this head, that there was a most deficient system of ventilation, a most imperfect supply of fresh air, considering the number of human beings requiring to be supplied with that essential element of existence and health. If the supply of fresh air was inadequate, then it could not fail to operate on the general health of the inmates. The blood, overloaded with impure air, and not adequately renovated, would become diseased and unfit for nutrition; and the health thus impaired would render the children easy victims to any disease, to the causes of which they might be exposed, and especially to one dependent on the influence of a morbid poison, such as there is every reason to believe cholera to be.

4. On the subject of the kind and allowance of food for the children, there was at first some difference of opinion. The Guardians of the Holborn and St Pancras Union regarded the allowance of food as sufficient in quantity and good in quality, at the periods when they agreed to send to the Tooting Asylum the children of their respective parishes; and for several months afterwards, at their periodical visits, the reports which they made to the General Board were to the effect, that the food was adequate in amount, and that the children were thriving on it. On the other hand, the practised eye of some of the medical officers had seen in the aspect of the children particular appearances which led them to doubt whether the food was sufficiently nutritious. The statement of Mr Robinson has been already mentioned. Latterly, the whole of the medical officers examined agree in representing the food to be deficient in quantity, and, in the quality and form in which it was given, not sufficiently nutritious. The dietary is the following:—

**BREAKFAST.**—The breakfast every day is the same—namely, pottage, composed of flour, arrowroot, and milk, with water and salt in sufficient proportions: this is for the strong children. The infants—those newly admitted, and the weakly, have boiled bread and milk. The allowance of bread to the healthy children is according to age, being six, five, and four ounces each.

**DINNER.**—There are three meat dinners in each week—viz., Sunday, Tuesday, and Friday. The quantity of meat, free from bone, to each child, is regulated according to age, being five, four, and three ounces each, with three quarters of a pound of potatoes—if with cabbage, unlimited. On Monday, Wednesday, and Saturday, soup made from the liquor in which the meat had been boiled, assisted with legs and shins of beef, peas, and a proper quantity of vegetables, pepper, salt, &c.; each child one pint, with bread, on these days, the same quantity as at breakfast.

On Thursday, suet pudding, the quantity being twelve, ten, and eight ounces, according to age, &c., to each.

**SUPPER.**—The suppers every evening are either bread and butter or bread and cheese; sometimes treacle, with milk and water. Should milk be scarce, which sometimes may be the case, then the children have good broth.

Little children are dieted in the best way I can, as no fixed diet can be adopted. Some have meat and porter daily.

In sickness, the diet is regulated by the doctor.

It is needless to enter into the particulars of the dietary. The main charge brought against it, is, that it was too limited in quan-

tity, and that the food was given in a form too liquid. The gruel or stirabout provided for breakfast especially is represented as quite liquid, and after taking it, the children complained, whether right or wrong, that they were as hungry as before. Then the allowance of bread is alleged by all the medical witnesses to have been too small. And, lastly, it is stated, that the soup provided for dinner was not nutritious,—that the potatoes were of bad quality,—black, and unfit to be used as human food; (Evidence of Mr Wynch of the Holborn Union, on 9th and 30th May 1848); and that, in short, there was a general system of scanty allowance and short commons.

It appears also from the evidence of the same witness, that whatever might be represented in the Diet-Table, the Guardians had no assurance that the children actually received the allowances there specified.

The medical witnesses, by whom the evidence is given as to the deficient quantity and innutritious quality of the food, are Dr Bermingham, Mr Whitfield, Dr Peacock, Dr Marsden, Mr Jackson, and indeed almost all who were interrogated on the subject.

Dr William Marsden, already referred to, took some pains to ascertain experimentally the effects of the diet of Tooting upon the inhabitants of Surrey Hall.

He compared the children who came from the Tooting Asylum with 25 of the Welch School boys. The aggregate age of the Tooting children was 255, that of the Welch boys 259. He weighed them carefully, and found that the weight of the Tooting Asylum children was 1.339 pounds 8 ounces; and that of the Welch School boys, 1516 pounds 12 ounces; giving a balance in favour of the Welch School boys of 176 pounds 12 ounces. The children from the Tooting Asylum measured in the aggregate  $161\frac{3}{4}$  inches round the arm, while the Welch School boys  $179\frac{3}{4}$  inches, giving 18 inches in favour of the Welch children. Conversely, the boys from the Tooting Asylum measured 595 inches round the abdomen; while the boys of the Welch School were only  $567\frac{1}{2}$  inches, giving 18 inches less for the circumference of the abdomen than in the Tooting children. The inference which Mr Marsden deduced from this fact of the large state of the belly in the children from Tooting Asylum was, that their food was too liquid, and not sufficiently nutritious; for in all instances in which the limbs are small and the abdomen large, this arises from the kind of food, and is an indication of its innutritive qualities.

It is unnecessary to enter into the question of the nutritive or innutritive qualities of the dietary, as all that will probably be

made the subject of more deliberate inquiry. Meanwhile, it is obvious that the dietary was not only allowed to be sufficient, in quantity at least, by the guardians of two of the parishes, but it is very doubtful whether its alleged low rate be sufficient to account for all the effects ascribed to it. It may be asked, are the children of the poor and working classes maintained at their own houses much better fed? Are they not often worse? These questions may be resolved by reference to the Reports of Mr Chadwick. The allowance of food might be sufficient, yet it might not be digested. It appears that the great evil with these children was the confinement and the want of exercise. The great means of counteracting even imperfect feeding is the sense of freedom, the fresh air which children enjoy, and constant exercise. All these elements of health were either deficient or much curtailed in the case of the children of the Tooting Asylum. They were confined nearly as much and as completely as if they had been a large prison. Never were they permitted to get out; and even when relatives applied to see them, they were permitted only to go the length of the gate. Several, it is stated, ran away. It is not too strong a conclusion to say, that the confinement and want of exercise were as hurtful as the deficient food, if deficient it was.

5. Lastly, it appears from the accounts given by the Medical Officers of the Free Hospital, that the Children of the Holborn Union were imperfectly clothed, and that none had any flannel next the skin. To this some may be disposed to answer, that many children, especially among the working classes and poor, are brought up without ever having flannel, and apparently without suffering from it. This may be true; but it is to be remembered also, that many of these children are cut off during the early years of life by diseases, the effect of exposure to cold, and imperfect clothing generally; and it is impossible to deny, that, in a climate like this so variable, and with winters so cold and moist, the only mode of maintaining the action of the skin in a healthy state, and consequently protecting the important organs of the chest and abdomen, is by the use of flannel during the cold period of the year. It may also be safely asserted, that the use of flannel under-clothing upon the chest and abdomen would have contributed greatly to have protected the inmates of the Surrey Hall Asylum from the operation of the epidemic state of the atmosphere.

Thus the circumstances specified as concerned in the production of cholera at Surrey Hall may be shortly stated as the following:—*1st*, the local and physical peculiarities of the buildings; *2d*, the state of the atmosphere acting on these physical peculiarities; *3d*, imperfect and inadequate means of ventilation; *4th*,

food insufficient in quantity, of questionable nutritious qualities, and not presented in the proper form to maintain health and strength ; and 5th, the want of sufficient clothing.

No evidence of contagion or contagious propagation has been given, or appears to be expected. One or two nurses have been attacked by the disease, and one medical assistant had a slight attack. These are explained by the circumstance that these persons were in the poisonous locality, and were exposed to the atmosphere of Surrey Hall. Various cases occurred among the children removed from Tooting. These as evidently depended on the fact, that the poisonous principle had been lurking in their systems for days previous to the manifestation of the characteristic symptoms and effects. That no case of cholera has appeared in the neighbourhood or in the village of Tooting, has been already mentioned. In short, the conclusion appears to be irresistible, that cholera at Tooting Asylum was the result of circumstances inseparably connected with that establishment ; that it was not imported from without, but arose independent of contagion, and that the causes now referred to, were in a great degree, if not altogether, adventitious and acquired ; and that, consequently, by the exercise of proper precaution and care, they might have been prevented from producing the effects which resulted.

In confirmation of the last conclusion now stated, the fact of the exemption of the children of the Mile-End Workhouse has been already mentioned. Another similar fact is adduced from the history of an establishment for pauper children at Norwood, which, like Tooting, is in the county of Surrey. In this establishment, kept by Mr St Aubyn, there were at the beginning of the present year 1114 children, and of these only one had itch. Among 530 children in this establishment, taken indiscriminately, namely, 200 boys, 200 girls, and 130 infants, and examined by Dr Farre and Mr Grainger, there was no case of itch, and only twelve instances in which cutaneous disease could be said to exist at all. In other respects, these children were in the most perfect health.

It is unnecessary, and would be improper at present, to say one word on the proprietor or superintendent of this establishment. The several verdicts of coroners' juries have already expressed opinions, the correctness of which can only be determined by careful judicial inquiry. Three of these juries have returned verdicts of manslaughter. The jurors have spoken in decided terms as to the share which the proprietor and his conduct may have had in producing so much sickness and mortality. It is nevertheless very idle and short-sighted to lay the whole blame upon him. The proprietor of Surrey Hall acted only after his kind. Money was to be made by providing, for pauper children,



food, clothing, lodging, and education, at certain rates; and it would have been very unreasonable or very silly to expect, that he was to undertake all this labour and responsibility without being sure of making money. The superintendent of Surrey Hall, therefore, is not more to be blamed than any other man or any set of men. But other parties are as deeply involved in this matter as the superintendent and contractor.

In the first place, the Guardians of the different parishes and unions went voluntarily into the arrangement, and, by so doing, gave it the sanction of their authority.

In the second place, the Poor Law Commissioners and their agents, either gave this arrangement a direct sanction or a tacit approbation, and allowed to be carried on, within seven miles of Somerset House, transactions which have been characterized in language not to be repeated in these pages. Something has been said about their having no power or control over this establishment. If this be the case, it is the first time that these gentlemen have seen any limits to their authority, or bounds to their proceedings. Had the question been the employment of a medical officer to a Union in Cumberland, Northumberland, or the extremity of Cornwall, the Poor Law Commissioners would have had no difficulty in showing their willingness to exert authority at these distances. But it seems that within seven miles of London concentrated authority fails to act. Such at least seems to be the view taken by Mr Richard Hall, Poor Law Inspector:—

“ I think the establishment in Tooting is not under the control of the Poor Law Commissioners. I know no regulations of the Commissioners by which this institution can be governed; but still they require, from time to time, certain information respecting it, in consequence of which I visited it, as my predecessors had done. I visit as the informant of the Poor Law Board. I do not consider that I have authority to make any orders for the establishment; and I believe the opinion of the Poor Law Commissioners is, and always has been, that they have no power to make such orders. I have certainly considered the provisions of the new Poor Law with reference to Mr Drouett's and other similar establishments. The first of such establishments that came under my notice, with reference to the power of the Commissioners to regulate them, were two contractors' establishments, in which the adult paupers of the City of London Union were kept, at Marlborough House, Peckham, and at Stepney Green. I was led to remark, soon after I came into office, that no workhouse rules were enforced in these two establishments. I found that, at some previous period, an order had been issued to the Board of Guardians, containing regulations for their workhouses; that in 1842, this order and similar orders had been revised by the Poor Law Commissioners, with a view to embody the regulations of workhouses in a general order; but in process of deliberation, it

was decided that the City of London Union should not be included in the general order. The City of London Union, therefore, is under no regulations as to the management of its work-houses, and I believe those establishments stand upon the same footing as Mr Drouett's establishment. I think that the Poor Law Commissioners can exercise no power directly over Mr Drouett's establishment; but I think they can do so indirectly by requiring the parishes to withdraw their children."

If such be the state of matters and authority as to the Poor Law Commissioners, it may well become a question what good is done at all by a system of machinery so complicated and expensive?

In the third place, it must occur to every one that the Sanitary Commission have surely been created in vain, if such specimens of poor-house regulation and domestic economy as that furnished by Tooting have received their sanction and approbation. Or is it to be ascribed to the clause in the Sanitary Act, by which the metropolis is or was to be exempted from their powers, that the multiplied sources of insalubrity mentioned in the report of Mr Grainger were permitted to exist? It appears, on the one hand, that the City of London Union is exempted from the controlling powers of the Poor Law Board; and that, on the other, the formation of drains and ditches, and the establishment of all sorts of nuisances in the metropolis and vicinity, is not within the power and the authority of the Sanitary Act. It may well become a subject of inquiry, what is the nature and use of that system of legislation, which overlooks and neglects matters most requiring to be placed under some regulation?

Lastly, the window tax is manifestly to be charged with a considerable share of influence in the matter of the Surrey Hall Asylum. With the proprietor of that, as with those of all similar establishments, it must have been a primary object, not only to have the buildings and apartments constructed on as moderate and limited a scale as might be practicable, considering the uses to which they were to be applied; in other words, to make them of dimensions no larger nor more spacious than to accommodate their occupants, and to place in them after construction as many occupants as they could be made by any means to contain;—but also to construct these buildings with the smallest possible number of windows, and to have no unoccupied room, no superfluous channels for the admission of light and air. It could not be expected, that the contractor was to have large, spacious, well-aired, and well-lighted apartments with elevated ceilings, if small narrow chambers, with few windows and low ceilings, would answer the purpose. The window tax has been the cause of much mischief to domestic architecture generally, and of incalculable evils to all classes of the community in this country, but

especially to the working classes who ply their labour within doors. In workshops, manufactories, and in every possible situation in which men and women are assembled to work, with the aid of light and air during the short months of summer, and artificial light and heat during the long period and shorter days of the winter months, the window tax has been the means of causing infinite mischief, and suffering which is not easily calculated. In no situation, however, have its effects been so manifest, so palpable, and so directly injurious as in the cholera epidemic of Tooting Pauper Asylum. There it lent its powerful aid in contracting the dimensions of the apartments used either during the day, or as dormitories in the night, in diminishing the proportion of light and fresh air, and in rendering the persons of the occupants sickly, feeble, and unhealthy, like plants growing in cellars and vaults, or in the damp, cheerless atmosphere of the coal-mine. For all this evil, who should be made responsible?—the proprietor of the establishment or those who, by tempting him to have recourse to contrivances, which might prevent that establishment from being a source of loss, have led him to overlook the pernicious effects of these contrivances, in supposed advantage to himself? Justice requires that all these circumstances be taken into account in forming a correct conclusion.

From all the facts which have been hitherto elicited, it results, that the great error and chief cause of the subsequent evils was allowing so many persons to be congregated within one establishment, under the superintendence of one individual. With nearly 1400 persons, all young and many of those of tender years, assembled within one institution, and the necessary staff of teachers, servants, and attendants, it is impossible to understand, how one individual could perform the duties of superintendence, and see that every condition relating to food, clothing, education, and moral management, was accomplished in a satisfactory manner. It is no violent conclusion to assert, that these duties neither could be performed, nor in this instance were performed, by one individual, in such a manner as to justify public confidence, that they were adequately performed. In all probability, if the system of farming pauper children and boarding them in country situations be continued, care should be taken, that not more than 500 persons, certainly not exceeding 600, should be placed in one establishment and under the care of one person. With such a number, there may be reason to believe that the health, education, comfort, and moral training of the children might be adequately provided for, under the eye of a vigilant and conscientious superintendent. With greater numbers there is no security that either of these ends can be attained. It is likely, nevertheless, that public

opinion has by this time pronounced its judgment on the practice, and that it must be doomed to that termination which probably it deserves.

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ART. V.—*Observations on various points connected with the Physiology of Vision ; on the Luminous Spectra excited by Pressure on the Retina, and their application to the Diagnosis of the Affections of the Retina and its Appendages.* By AUGUSTUS WALLER, M. D., Kensington. ✓

LUMINOUS appearances, such as in ordinary circumstances we find produced by the agency of rays of light, are occasioned by pressure upon certain parts of the eyelids, and which are more vivid when in a darkened room. These luminous appearances are caused whenever the retina is irritated or acted upon by any mechanical agent, and are produced in a variety of circumstances which I shall enumerate. Their proximate cause is so far understood by physiologists, that the various sensorial nerves and their peripheric extremities are generally admitted to be agents adapted and predisposed to a certain action of a character peculiar to each.

In the instance of the organ of vision, which we have now to examine, the retina is particularly disposed to be excited by the rays of light, and by the images they form in certain conditions. But although the sensorial nerves manifest a peculiar predisposition to be stimulated by one single physical agent in preference to all others, various other agents exist, which, when applied with sufficient force, are capable of stimulating these nerves. Thus, independently of the rays of light, we may use the electric current or shock, simple mechanical action, probably caloric and some other agents, to stimulate the optic nerve. If, in place of this nerve, we substitute those belonging to other senses, each of them will be found to be excited by these various causes. The manner in which they obey the action of the stimuli is peculiar to each ; for instance, in the organ of hearing there is the sensation of sound, in the tongue that of taste. The organ of touch, and the skin in general, serve the double purpose of conveying the sensations arising from mechanical contact and the temperature of bodies ; and, accordingly, the irritation of a cutaneous nerve gives rise to a feeling of pricking or of pins and needles entering the parts to which it is distributed, as it is generally termed, and also of tingling, and even of a sharp degree of heat, &c. The appearance of light in the eye is but a consequence of this law, and is