

**On the mode of origin and propagation of the epidemic cholera, in
Huddersfield, and the neighbourhood, in the autumn of 1849 / by John
Taylor, M.D.**

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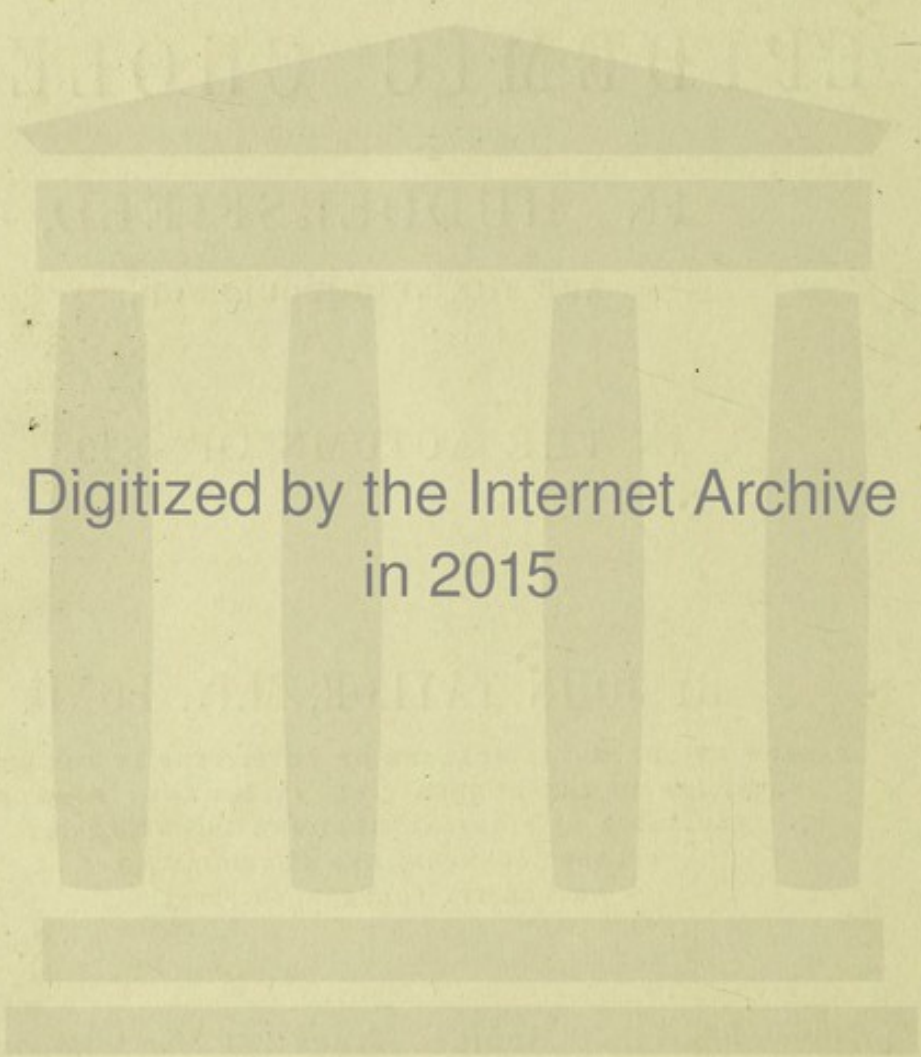
BY JOHN TAYLOR, M.D., LOND.

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ON THE
MODE OF ORIGIN AND PROPAGATION
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Epidemic Cholera,
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By JOHN TAYLOR, M.D. LOND.

Fellow of the Royal College of Physicians in London, and Physician to the
Huddersfield Infirmary. Formerly Professor of Clinical Medicine in
University College, London, and Physician to University
College Hospital.

Case 1.(a)—The first case of cholera in this neighbourhood occurred at the vagrant office, in the town of Huddersfield, on the 18th January, 1849. Francis Donoghue, aged 50, an Irishman, left Hull on Monday, 15th January, and walked in two days to Selby, where he arrived on Tuesday evening. He slept at Selby, and walked next day to Leeds. He had nothing to eat by the way but four raw turnips, which he got from a field by the way-side. On Thursday he walked from Leeds to Huddersfield, a distance of sixteen miles, and had nothing but bread to eat. He arrived at Huddersfield at 5 p.m., and was then well. His clothes were wet with rain, which had fallen during the day. At 10 o'clock the same evening he began to be purged, and had purging, vomiting, and severe cramps all the night. He had medical aid at half-past eight o'clock on Friday morning. I saw him at half-past three p.m., with Mr. Duke, assistant to Mr. Clarke, surgeon to the Union. Between this time and his death, which took place in fifty-seven hours from the time of attack, he was seen by several other medical gentlemen in the town. The symptoms were unequivocally those of Asiatic cholera. Copious vomiting; numerous abundant and liquid alvine

(a) The numbers prefixed to the cases correspond with the general table which will be found in a subsequent page, and indicate the order in which the cases occurred.

evacuations, not however free from bile; severe and very general cramps; suppression of urine; the peculiar collapsed expression of cholera; husky voice; surface cold, livid, and covered with abundant perspiration; pulse barely perceptible at best, and during a great part of the illness not at all. No *post-mortem* inspection was made.

After he was visited professionally, he was placed in a room by himself. During the first nine or ten hours of the attack, other persons slept in the same room. The room was afterwards well cleaned, and the bedding, I believe, destroyed. The disease did not spread.

The man stated that the keeper of the house in which he lodged at Selby died of cholera, which was then, I believe, prevailing in that town. The period of the death of the person referred to could not be clearly ascertained, but it was within a few days before Donoghue's visit. Two men had also died in the next house. I believe the cholera was not in Hull at that time; for only one death from cholera occurred in Hull in the quarter ending March 31st, 1849.

It seems not unlikely that this patient contracted the disease at the house he slept in at Selby, unless (which is not probable) he had previously been exposed to the cholera poison at Hull. The operation of the poison would be favoured by the man's long journeys on foot, want of proper food, and exposure to cold and wet.

Case 2.—The next case, as far as I have been able to learn, occurred July 9th, 1849, in a female at Colne-bridge, a few houses with some mills, about three miles to the north-east of Huddersfield. The patient recovered. She was attended by Mr. Booth, surgeon, who considered the case to be one of cholera. She had been eating cucumbers and fat meat a little before the attack. There was no reason to suspect that the patient had been exposed to any source of contagion.

Case 4 (b) occurred in Huddersfield.—William Leonard, aged 38, a gardener, was attacked, August 22nd, at five a.m., with violent purging, vomiting, and cramps; collapse soon followed. This passed away, and was succeeded by consecutive fever, with delirium. He died comatose, August 28th. He was a very intemperate man, and had lived on

beer alone for fourteen days before the attack, with the exception of a dinner of cold mutton on one day. For a month preceding the fourteen days he had practised total abstinence. He was attacked when in a beer-house, and, not being fit to be removed, he remained and died there. The patient's residence was in a back yard, or large court, in High-street. There was a privy in the yard in an offensive condition. He lived in a good house, and the locality altogether was far from being one of the worst. The water is good, being that used in the town generally. The drains were not bad. A fortnight before his attack, he was at Leeds on business. It is not known whether he was near any cholera patient when there. He was attended by Mr. Rhodes, surgeon, Huddersfield, to whom I am indebted for most of the facts I have stated.

This patient was waited upon by an old man—a drinker, and in bad health—but the disease was not communicated to him. The mistress of the house (who never saw the patient) and another female had some diarrhœa afterwards. The surgeon in attendance likewise suffered from diarrhœa for a day. He had no other cholera patient at the time. No case of cholera occurred near this place until September 22nd (see Case 37), and there was no apparent connexion between the two cases.

Case 5.—Mrs. Hardy, aged 60, was attacked August 26th. Had vomiting, very copious rice-water stools and cramps. She was attended by Mr. Tatham, and recovered. She resides in Lower Head-row, Huddersfield. The situation is low—part of the yard is dirty. There is one privy for five houses, and it was in an offensive state. The house is an old one, the drains are good, the water is good. This patient is in comfortable circumstances, and is not aware that she had been exposed to any source of contagion.

Case 8 (b).—James Atkinson, aged 49, cordwainer, was attacked with diarrhœa August 29th. After seven days

(b) It is stated in the report of the Registrar-General for the quarter ending September 30th, 1849, on the authority of the Registrar of Huddersfield, that the first case of cholera was registered on the 2nd of August, and the second on the 9th. This is an error. I have ascertained from the Registrar of Huddersfield, that the two cases referred to in his report are those marked 4 and 8 in my report.

this passed into cholera, of which he died in four days more. He was a very intemperate man. He took beer chiefly. Did not do a week's work for three months before his death, in consequence of drinking. He took very little food. He lived in Fountain-street, in the lower part of Huddersfield. There are one or two open privies near the house, which were in a very offensive state. Other houses, however, were nearer to the privies than the one in which he lodged. The water is good. It is not known that he had been exposed to the contagion of cholera.

The 9th case was undoubtedly one of Asiatic cholera, and occurred at Cliff-end, a small village two miles *west* of Huddersfield. Grace Bake, aged 29, married, and has several children. In the night between the 3rd and 4th September 1849, was attacked with diarrhœa, having to get up several times. At ten o'clock on the morning of the 4th September she washed her children. At half-past eleven o'clock, the neighbours, hearing a knock against the partition-wall, entered the house, and found her upon the floor. She was very soon visited by Mr. Holroyd, assistant to Mr. Machill, who afterwards saw other cases of cholera, and is satisfied that this was one. This patient was livid, had severe cramps, in addition to vomiting and purging. She died at six p.m., probably not more than seven hours after the symptoms of cholera appeared. No one had any communication with her after the disease was known to be cholera, but her husband, her sister, and the clergyman of the place, the Rev. J. W. Gibson, to whom I am indebted for many of the facts of this and other cases subsequently occurring in the same locality. Part of the linen used by the patient was burnt; the rest was sprinkled with lime before it was washed; the house was fumigated; the husband and children left it, and it has not since been occupied. About thirty persons in the adjoining houses were afterwards affected with diarrhœa, which the medical men ascribed to fright.

The linen used by Grace Bake was washed by her two sisters and another female. Two of these continued well, but a third suffered from diarrhœa, which began four or five days after washing the linen, and continued for some time.

After the most careful inquiry, I have not been able to

discover any ground for supposing that this patient had been exposed to contagion. She had visited Leeds, but this was in the month of July. There were very few deaths from cholera in Leeds in July; the patient's husband had not heard that the disease existed in Leeds at that time; and the time which elapsed between Grace Bake's visit to Leeds, and her attack, (five or six weeks,) is too long to permit the supposition that the disease had been contracted there.

This case was the first that occurred in the district in which the patient lived. The house is situated on the brow of a hill, at a considerable elevation, and on the north side of a rather narrow valley. It is in a "fold," consisting of two short rows of cottages about twelve feet apart. At one end of the fold, there is a cow-house with an open drain from it. This is generally full of dirty liquid, and smells offensively. This drain is about eight yards from the door of the house in which the patient lived, and is nearer to another house in which there was no cholera. On the other side of the fold, not quite opposite to the house, and about fourteen yards from it, is an old privy, at present used as a receptacle for ashes, dirt, and other refuse. There is a well of good clean water in the yard, and another in one of the rooms of the house. The family used both. The water in the yard appeared to me very good—that in the house was described to be so,—but I did not see it. There had been no change in the appearance of either, and no reason to suspect any contamination. The water has not been examined with the microscope.

Several other cases occurred in this fold, but not until *nine days* had elapsed from the death of Grace Bake. They will be noticed hereafter. (See Cases 20, 23, 76.)

Case 10.—On the same day on which Grace Bake was attacked, and only a few hours later, the next case occurred in the village of Lindley, situated about a mile to the north of the place last described, and above two miles to the north-west of Huddersfield,—Mrs. Hirst, aged 53, the wife of a carcase-butcher in easy circumstances. Sept. 4, had diarrhœa all day, but without pain. In the evening, cramps supervened, and she then sought medical aid. She was attended by Mr. Holroyd, assistant to Mr. Machill, the surgeon of the place.

She died at eight o'clock, a.m., on the 5th, in less, probably, than twelve hours after the diarrhoea had merged into cholera.

Mrs. Hirst was much afraid of cholera. She was greatly alarmed when she heard of the case which occurred only a few hours before she was taken ill herself. (No. 9.) It does not appear probable that there was any contagion in this case. I shall mention all the facts bearing on this point which, after careful inquiry, I have been able to elicit. Her husband had not been to buy cattle, or for any other purpose, to any place where cholera existed. She had paid a visit for a few days to Halifax, and returned about a week before her fatal illness. Her husband says she was not near to any cholera patient there. Halifax has been remarkably free from cholera during the epidemic. Whether *any* case existed there at the time of Mrs. Hirst's visit I am not able to say, but I believe there was no case. When at Halifax she had some looseness of the bowels to which she had been subject for several years.

A female relative residing at Hull paid Mrs. Hirst a visit in July. She came to Lindley about the middle of July, and staid a fortnight. The first case of cholera in Hull occurred on the 17th of July. Her husband died of cholera some time after her return to Hull, when the disease had become epidemic. More than a month elapsed between this person's departure and the illness of Mrs. Hirst,—a period probably too long to permit us to ascribe the illness of the latter to contagion derived from this source. No communication by box, parcel, or in any other way, afterwards took place between the parties.

Lindley stands upon elevated and gently-sloping ground, and has a population of perhaps from 1000 to 2000 persons. There are several circumstances about Mr. Hirst's house deserving of notice. Cattle are slaughtered in a building near to the house; the butcher's shop is within a few yards of the door, and the slaughter-house is under the same roof. There is an ash-place attached to a privy, also within a few yards of the door; into this are thrown blood, entrails, and other refuse. The smell was very offensive at the time of the cholera, and even at the time of my visit, six weeks after—

wards. To the south of the house, and within twenty yards, was a dung-heap and a building for calves, with a good deal of liquid manure about it. This place was very offensive at the time of my visit, although it had been cleaned at the outbreak of the cholera. Two cottages are situated close to this filthy place, and their doors open upon it, yet no cholera occurred in them. Within forty or fifty yards of the house is a burying-ground attached to a chapel, but it is not at all crowded. At a distance of 200 yards there is also a place in which offal is boiled for pigs, and the smell from which is very offensive. The drains in the house are said to be good, and I did not perceive any smell from them. The water used for drinking and cooking is obtained from a spring at a little distance, which is also used by many other persons, and is said to be very good.

Only two other cases of cholera occurred at Lindley: the one on the 9th, the other on the 11th September. (See cases 16 and 19.) Both patients were in attendance upon Mrs. Hirst. About the same time, the cases of diarrhœa, many of them accompanied with rice-water evacuations, were very numerous.

Case 12.—William Rhodes, aged 44, a quarryman, was attacked Sept. 6th with cramps, purging, and vomiting. He never fell into a state of collapse, and he recovered. Mr. Allatt, who attended the man, considers the case to have been one of Asiatic cholera. The man resided at Clough, a little west of Paddock, and about half a mile east of the place where the first case in this district occurred (No. 9). He had worked at the railway near Huddersfield; he had had no known communication with any other cholera patient.

Other cases afterwards occurred at Clough, (cases 25, 33, 41, 45.) The place consists of a few small cottages, most of them only one storey high, without any thorough ventilation. The ground is elevated. There are no drains; the refuse is thrown on the surface. The water is procured from a neighbouring well, which is supplied by a spring at a distance; it appears to be very pure.

A nephew of the last patient, a blind boy, named Haigh, hearing that his uncle was ill, went on the first night of his

illness to visit him, and, whilst in the house, was attacked with vomiting and purging. He returned to his home, about a quarter of a mile distant, at a place called "Johnny Moore-hill," where the epidemic afterwards prevailed with the greatest virulence. He procured some medicine from a druggist, and recovered. This case could not be said to amount to cholera, although the attack may have been due to the choleraic poison. If so, it is not likely that the disease was taken from the uncle, the period of incubation being too short; and no other cause can be assigned than the local or general epidemic influences beginning to operate about that time.

About September 22nd, when cholera prevailed in the adjoining houses, this boy, his mother, and several other children, left their home in alarm, and went to reside in the middle of the village of Paddock. They went to a daughter, who was married and had three or four children. They had only one room, and both families now lived in it, yet none of the daughter's family were attacked with cholera. The blind boy's mother had diarrhœa, which began before she left her own home, and continued after she joined her daughter.

Case 14.—Mrs. P. Ganter, aged about 35, was attacked September 8th, at 5½ a.m., with vomiting, purging, and severe cramps. The evacuations were very copious and like rice-water. Mr. Tatham, who attended her, has no doubt the case was one of cholera. He visited her eight times the first day. She recovered. This patient is not aware that she had been exposed to the contagion of cholera. She lives in Church-street, Huddersfield. The house is rather confined. Close to the back of the house is a mews, into which a window of the house opens. Near to this window was a manure heap, on which was thrown offensive refuse. There are also privies with open cesspools. The smell from these places was so offensive, that they were obliged to keep the back window always closed. The drains are not complained of. The water is that used generally in the town. It is brought from a distance of two or three miles, and is very good. There was no known contamination of it about the time of the patient's illness.

Case 16.—Mrs. George Crossland, aged about 30. On Sunday, September 9th, cooked the dinner, and partook of it, but before the afternoon service was so unwell as to be obliged to remain at home. She died about 9 p.m., after not more than about eight hours' illness.

She was the daughter of Mrs. Hirst, of Lindley, (Case 10;) lived in the same house with her mother, and nursed her. She was very much afraid of cholera during her mother's illness, and took brandy freely to keep it off. The day before her attack she took, of her own accord, some salts and senna as an aperient. This acted freely, and Mr. Holroyd, in consequence, sent her some laudanum. In the evening of the same day, however, she again took medicine containing Epsom salts. This patient may have taken the disease from the same causes which gave it to her mother, or she may have received it by contagion. In the latter case, the period of incubation could not have exceeded five days.

Case 17 occurred on September 9th at Lane, about half a mile from Huddersfield. The patient, Joseph Thornton, was attended by Mr. Booth and recovered. There was no known exposure to contagion. The situation is low and unhealthy.

Case 18.—Mrs. Walker, aged 60, resides at Paddock-brow, about half a mile from the nearest patient previously affected with cholera, was attacked September 11th, and was attended by Mr. Allatt. She was pulseless. I saw her September 23rd. She was still in bed and had diarrhœa. She recovered. This woman keeps a mangle, and rarely leaves her house. Had not been out of the row in which she lives for five weeks before her illness, nor more than two or three doors from her house for several days. Her house is situated from a quarter to half a mile from the place where cholera was afterwards most prevalent.

Case 19.—Mary Craven, aged about 35, lived at Lindley. A married woman, pregnant, and within a few days of her expected delivery. She nursed the only two additional patients who suffered in the same village, (Cases 10 and 16.) She also washed their bed and body linen. Was attacked with diarrhœa Sept. 11, at 11 or 12 o'clock a.m. Was seen

professionally at 6 p.m. ; at 7 p.m. had cramps, and died on the 12th, at 2 a.m. Her own residence was in one of a fold of cottages, and about twenty yards from the house of the patients she nursed. There was a heap of ashes and other refuse within a few yards of the door of her house. This patient was exposed to the same local influences as the other two, as well as to contagion. She was attacked seven days after the one, and two days after the other, of the patients to whom she attended.

Case 20.—A female, aged 72, living at Cliff-end, and in a house exactly opposite to Bake's (Case 9), and close to the bad-smelling drain. She was attacked September 13th, had the usual symptoms, and died on the 15th. If this patient caught the disease by contagion, the period of incubation would be nine days. She had no communication, however, with the only patient who was attacked before her.

Case 22.—A patient of Mr. Booth's; had the disease in Union-street, Huddersfield. Was attacked September 16th, and recovered. No other case occurred within about half a mile of this. No source of contagion was known.

Case 23.—The husband of the last patient but one (Case 20) was attacked next. On Sunday, September 16th, the day after his wife's death, was not very well. He worked on the Monday, but looked pale and ill. On Tuesday night he began to be purged, and died on the Thursday, at three or four o'clock p.m., after about forty hours' illness. It is stated, that not long after his wife's death there arose a suspicion that she was not dead. He then got upon the bed, leaned over the body, and put his face to the mouth of the corpse, to feel whether the breathing had ceased. The interval between the commencement of the illness of the wife and that of the husband was three days.

Case 76.—The next case at Cliff-end occurred in the person of the son of the last patient. Their houses are two doors only from each other. He had diarrhœa for about a week; became worse September 29th. Went to Huddersfield Oct. 2nd. He got some porter there; was much worse soon after his return home in the evening, and died on the 3rd, after an illness of about eleven hours.

The son of the last patient was attacked October 1st, (the day before his father's diarrhœa merged into cholera.) The case was not severe, and he recovered.

The sister and also the mother of the last patient had diarrhœa. The former began October 5th. Both recovered.

Two daughters of the old woman and man (Cases 20 and 23) washed the linen after their deaths. One of them has remained well. The other has long had an habitual looseness, and it did not become worse.

Case 25.—This was the second case, (the first was No. 12,) and the first fatal case, which occurred at "Clough," near Paddock. The patient was a female, aged 78. She died Sept. 17th, after 21 hours' illness. This patient was attacked ten days after the first case occurred near to her. Her son had come from Manchester a short time before. He was not ill. It is not known whether he had been near to any person affected with cholera.

Case 26.—Joseph Hinchliffe, aged 61, residing in the village of Paddock, was attacked Sept 17th. He had the cholera in a mild form, and recovered.

Case 27.—Mrs. Hirst, aged about 60. Was not well Sept. 16th. Was better on the 17th, and out of doors. On the 18th, at two o'clock a.m., began to suffer from the usual symptoms of cholera, and died about 4 p.m. the same day. She was attended by Mr. Allatt. I was sent for, but arrived only just after the death. This patient lived at Brierley Mill, near Paddock, about half a mile from any patient who had as yet suffered. The house stands in the bottom of the valley, close to both the river and canal, and not far from an old fish-pond, to be noticed hereafter. There was an offensive privy near to the house. The patient was in comfortable circumstances, and there is reason to believe that there had been no communication with any cholera patient.

Case 29.—Hannah Taylor, aged 55, was attacked Sept. 19th, at 10 or 11 o'clock, p.m., and died after 12 hours' illness. This patient lived at Paddock, in a part known by the name of "Johnny Moore-hill." This was the place where the disease raged with far greater severity than anywhere else in this district. The present may be regarded as the first case of the epidemic in this spot, although a pre-

vious case (probably one of diarrhœa only) has been already given.

Case 30.—Wm. Moss, aged 23, a railway labourer. Lodged in the house of the last patient, and they began to be ill within an hour of each other. He went to Huddersfield (about a mile distant) on the evening of the 19th; returned home about 11 o'clock; complained of cramps and diarrhœa. He died in 10 hours. This man left Paddock Sept 15th, and went to Eccles, near Manchester. He returned on the 17th. He said his mother, who lived in Lancashire, had had the cholera, but recovered. He did not visit her, and was not within two miles of her.

Case 31.—John Alpine, aged 34, a railway labourer. Resides at Johnny Moore-hill. Was attacked Sept. 19th. He passed through the stage of collapse, and died in the consecutive fever, after more than a week's illness.

Case 32.—Sarah Taylor, aged 23; married. Began at 4 a.m., Sept. 21st. Died after 19 hours' illness. She was the daughter-in-law of Hannah Taylor, (Case 29.) She lived near to Hannah Taylor, and nursed her. This patient was attacked in about 30 hours after the commencement of the illness of her mother-in-law.

Case 33.—Mary Tomlinson, aged 20, single. Resides at "Clough," near Paddock, about a quarter of a mile from the last patient. Was attacked at 6 a.m., Sept. 21. The disease was well marked. The patient recovered without consecutive fever. This patient lived in the same house with her grandmother, who died of cholera, Sept. 17th, (Case 25.) If she caught the disease by contagion, the period of incubation was within four or five days.

Case 34.—Allen Micklethwaite, aged 17, strong and healthy. Resides at Johnny Moore-hill. Came home from his work (about a mile distant) at 6 p.m., Sept. 21st, having had several loose stools during the day. At 8 o'clock I saw him in a state of collapse. He died in seven hours after his return home. Micklethwaites ascribe the introduction of cholera into their house to the blind boy (mentioned Case 9) who lived next door, and often visited them. If this were correct, the period of incubation would be not less than 14 days. It has been ascertained that this patient, although

visited by us, was treated exclusively by a homœopathic practitioner.

Case 38.—Aaron Taylor, aged 55, was attacked Sept. 22nd, early in the morning. He recovered, after a protracted illness. He was the husband of Hannah Taylor (Case 29,) and the father-in-law of Sarah Taylor (Case 32.) There was an interval of about 58 hours between the attack of the wife and the husband.

Case 39.—Ezra Whitely, aged 2½ years, residing at Clough, near Paddock. Began Sept. 22nd, and died in four hours. This patient was dying when first visited.

Case 41.—Thomas Dyson, aged 16 months, residing at Clough. Had had diarrhœa for a long time. Became worse Sept. 22nd. Collapse and death, 23rd. This child lived next door to Tomlinson (Case 33.) There was an interval of somewhat more than 24 hours between the beginning of the two cases.

Case 40.—Charles Potter, aged 23, railway labourer, residing at Johnny Moore-hill. Was attacked Sept. 22nd, at two p.m. Died in the consecutive fever after some days.

Case 37.—Thomas Wood, an engineer, was attacked in the morning, Sept. 22nd. Lives in the Dock-yard, at the bottom of Dock-street, Huddersfield—a low situation, and near the canal. Had been up at work all the night before the attack, and had taken some beer, but no food. He recovered. This man lived in the neighbourhood of, but was never in, the beer-shop in which Leonard (Case 4) died three weeks before he was attacked.

Case 35.—Mrs. Micklethwaite, aged 46. Began with diarrhœa on the morning of Sept. 22nd. Passed into cholera in the succeeding night. She recovered, after some weeks' illness.

Case 36.—John Micklethwaite, aged 44, husband of the last patient. Began with diarrhœa, at ten p.m. Sept. 22nd. Collapse succeeded in the night, and death after 17 hours' illness.

These two patients were the parents of Allen Micklethwaite (Case 34.) They both attended upon their son, and rubbed his limbs assiduously for the cramps. If the disease were caught from the son, the period of incubation in the

wife did not, probably, exceed 12 hours, nor in the husband 28 hours.

Case 45.—Jane Dyson, aged $4\frac{1}{2}$ years, residing at Clough, sister to Thomas Dyson (*Case 41.*) Began Sept. 23rd, at twelve o'clock at noon. Died in 18 hours. There was an interval of about 24 hours between the beginning of the illnesses of the two children.

Others were attacked at Johnny Moore-hill, but I cannot give the names and dates of attack of each. (See general table of cases, where the dates are now given.)

Case 54.—Sept. 25th. I began to suffer from the cholera poison myself. I first visited a cholera patient Sept. 18th, but only saw her after death (*Case 27.*) The next one that I saw was Sept. 21st, at eight p.m. I visited, on this occasion, a considerable number in succession, at Johnny Moore-hill, the place where the disease exhibited the greatest malignancy. Sept. 22nd.—I did not see them, in consequence of a sick headache, of which I am frequently the subject. On the 23rd, I was called up at six a.m., to visit the same series of patients. I took the precaution of getting my breakfast before going, especially as I had taken scarcely any food the day before. In the afternoon I saw them again. On the 24th, at five p.m., I accompanied some gentlemen into the fields near Paddock, to select a site for a Cholera Hospital. The grass was damp. I went next to inspect an old fish-pond, which will be described hereafter. I next visited all the cholera patients, and got home late in the evening, after a hurried day's work. Sept. 25th.—My habitual morning evacuation was rather liquid. About nine o'clock I felt rather chilly. Soon after, I visited the cholera patients again. The chilliness and feeling of general indisposition increased in the afternoon, but I did my usual work until five p.m. I then took some warm tea, and lay down upon a sofa near the fire. During the evening I felt hot and chilly at the same time. My head was heavy, and I had a good deal of vertigo and singing in the ears. Pulse frequent, about 120. About nine p.m. had a second evacuation, scanty, but liquid. I was now visited by three of my medical friends (Mr. Greenwood, Mr. Clarke, and Mr. Booth.) By their advice I took a dose of an astringent

mixture, with \mathfrak{mxx} . tinct. opii. I went to bed, and slept until twelve o'clock. On awaking, I had two, or perhaps three motions, within a short time, all scanty, and moderately liquid. The most striking symptom, however, at this time was the prostration of strength. I have suffered many illnesses, attended with much debility ; but the sense of sinking which I now felt exceeded anything that I ever experienced in my life. When placed upon a night-chair, I could not maintain the erect position without being supported. All this had supervened within a few hours, and after only a very small amount of liquid had been discharged by the bowels. My medical friends were again sent for, and thought the prostration so serious, that they did not consider it proper to leave me, and very kindly remained all night. I repeated the astringent (mist. cretæ, conf. aromat., tinct. catechu, with tinct. opii.) The bowels were very little moved afterwards. At three a.m. I had a starch enema, with 40 minims of tinct. opii. This quieted the bowels more than anything. They were not again moved for some hours. Soon after three o'clock I vomited. This was the only time I was sick. The matter ejected seemed to consist almost exclusively of the medicine which had been taken. I had after this a large sinapism on the abdomen.

Sept. 26.—Prostration considerable ; tongue thickly furred ; a loathing of all food ; skin hot ; pulse 100 or more ; several scanty motions, accompanied with tenesmus. From this time my improvement was progressive, and I considered myself convalescent by the 30th September.

The symptoms I have detailed were rather those of dysentery than of the severer forms of cholera. Yet I feel persuaded they were the effects of the choleraic poison. My medical attendants thought the same, both on account of the extreme prostration of strength, and the characteristic expression of countenance. I am satisfied, likewise, that the poison was imbibed at Paddock, either from the patients or the place. I was quite well before visiting the patients, and was not elsewhere exposed to any known causes of the disease. The period of incubation would probably be between 84 and 50 hours.

Case 63.—Richard Berry, aged 64. Resides at Folly Hall, half a mile from Huddersfield, and about a mile from Paddock. He was engaged as a nurse, and went to Johnny Moore-hill, to wait upon Mrs. Micklethwaite and her two sons, all ill of cholera in one house. He began his attendance on the evening of Sept. 25, or the morning of Sept. 26, and was then quite well. On the morning of Sept. 29, he was attacked with cholera, was removed to his own residence the same day, and died on the 30th, within 24 hours from the beginning of the illness. There can be very little doubt that this man took the disease at Johnny Moore-hill. The period of incubation was within three days.

This patient lived in a cellar alone with his wife, who waited upon him. On the evening of the day following his death, she had cramps in the legs but no diarrhœa. His son, also, who waited upon him, but did not live in the same house, soon after his father's death, had pains in the bowels, but no diarrhœa. The disease did not spread in the place into which it was thus introduced.

A few other facts may be briefly mentioned in connexion with the cholera at Johnny Moore-hill.

Edward Brook and his wife, a young couple, left their residence at this place on the first outbreak of the cholera, retiring to a village about a mile distant. They returned home on Friday, Oct. 5th, at ten o'clock, a.m. On Sunday morning, at one o'clock, the wife was seized with cramps in the feet and purging, but no vomiting. Medical aid was obtained, and on the 8th, when the facts were communicated to me, she was better. The husband at the same time had pain in the bowels, but no diarrhœa. A brother of the husband, who lived with them, and who went away and returned with them, continued well when I last heard, a fortnight afterwards. The house was shut up in their absence, and after their return they had no communication with their neighbours before they were taken ill.(a)

Case 67.—John Wm. Taylor, aged 3, left Johnny Moore-

(a) Dec. 21st, 1849.—I have learned to-day that Mrs. Brooke is subject to cramps. She has had them before and also since the attack described above. It is possible, therefore, that she may not have suffered from the choleraic poison.

hill Sept. 28th, and went with his father and another child, to Meltham, a village five miles distant. Sept. 30th, he was attacked with vomiting and purging, and died within 24 hours. The disease was considered to be cholera. The father and several other persons in his house had diarrhœa before he left home. Here, no doubt, the poison was imbibed at home, and produced its effects about 48 hours after leaving the place. The mother, grandmother, and several other children, went to Liverpool at the same time that the father went to Meltham. No communication passed between the divided parties before the child's death.

There was no cholera in Meltham at the time the child went there, and the disease did not afterwards spread.

A family, living at Johnny Moore-hill, next door to Micklethwaites', immediately after the first death in their neighbour's house, (*i. e.*, on September 22,) left their home in terror, and moved to the house of a relative in the centre of the village. The two families, consisting of a considerable number of persons, now lived together in a small house, and occupied, in some instances, the same beds. Diarrhœa had appeared among those migrating before they left home. The disease did not further appear in them, nor were their relatives or new neighbours affected.

DESCRIPTION OF "JOHNNY MOORE-HILL," AT PADDOCK.

The village of Paddock is situated about a mile to the west of Huddersfield. It stands upon the side of a hill, and at the opening of a series of valleys extending for about seven miles to the Standedge hills. The population amounts to several thousands, and consists chiefly of operatives. The drainage is bad. The place called Johnny Moore-hill consists of two rows of houses at the western extremity of the village. They stand upon very steep ground, which is excavated to receive them, and at an elevation of 150 or 200 feet from the bottom of the valley. The houses are two storeys high, the back part of the lower storey being buried in the ground. Each house consists, for the most part, of one lower room, and a chamber over it. The windows and

doors are all in the front, so that there is no thorough ventilation. The drains are very imperfect, the lower rooms damp in various degrees, and the privies badly constructed. The cesspools are open to the air, and very offensive. It is the poorest and most filthy part of the village, and Mr. Allatt, the surgeon, states that it is a place notorious for the prevalence of fever and other forms of disease. About 150 yards west of Johnny Moore-hill, and in the bottom of the valley, there is an old fish-pond. The water in this had been nearly all drawn off a few months before the cholera broke out. The pond has not been cleared out for thirty years, and contains a large accumulation of moist vegetable matter uncovered by water. The surface of this pond measures 1400 square yards.

It has been stated (I cannot say how accurately) that for two days before cholera appeared at Johnny Moore-hill the wind blew from the west, and, consequently, from the pond, towards the dwellings. Mr. Allatt informs me that during nearly the whole of the time in which the cholera was prevailing, the wind was easterly. Had this direction of the wind anything to do with the immunity from the disease experienced by the village at large? and had it any connexion with the appearance of the disease in three places situated respectively at the distance of one, one, and four miles to the west of Johnny Moore-hill during the prevalence of the epidemic at the latter place?

Water.—Nearly all the people at Johnny Moore-hill use the water of a spring which is near to them and partly under the embankment of the Huddersfield and Manchester Railway. They have used the same water for years, but they complain that it has been much harder and less pleasant to the taste; and that after rain it is often muddy, since the construction of the railway embankment a year or two ago. For two months preceding last July or August, two of the families had their drinking water from the portion left at one extremity of the fish-pond. This water is said to be not unpalatable.

Population.—Most of the houses were overcrowded. Many of the occupants were intemperate persons, a number of the lodgers being navigators.

The following table(a) will show the number of houses, the number of inhabitants in each house (distinguishing adults and children), the numbers attacked with cholera and diarrhœa, the number of those dying, and the number of those who fled at the outbreak of the disease.

Lower Row.

Number of House.	Number of Inmates.		Total.	Had Cholera.	Diarrhœa.	Died.	Fled.
	Adults.	Children.					
1	6	0	6	1	2	1	3
2	4	0	4	0	3	0	0
(a) 3	2	4	6	4	0	1	0
4	2	4	6	0	3	0	0
5	2	5	7	0	4	0	0
6	5	4	9	1	0	1	8
7	2	3	5	1	0	1	4
8	3	5	8	1	7	1	0
9	5	4	9	5	1	2	1
10	2	3	5	0	0	0	5
11	3	0	3	0	(b) 1	0	3
	36	32	68	13	21	7	24

Upper Row.

(c) 1	6	0	6	4	0	2	0
2	1	5	6	0	4	0	0
3	1	2	3	0	1	0	3
4	2	3	5	2	0	1	0
5	4	2	6	0	0	0	0
6	2	4	6	1	2	0	0
7	2	2	4	0	2	0	0
8	2	4	6	0	2	0	0
	20	22	42	7	11	3	3
Total...	56	54	110	20	32	10	27

(a) There was only one room in this house.

(b) This patient was attacked after her return. (Mrs. Brook.)

(c) There was only one sleeping room in this house for six adults.

It appears that out of nineteen houses there were only two in which neither cholera nor diarrhœa occurred. The occupants of one of these two all fled, and so escaped. The

(a) For many of the facts contained in this table, as well as in the whole account of the disease at Paddock, I am indebted to the kindness of Mr. Allatt. He has taken great pains to obtain correct information, and has most freely permitted me to make use of it.

occupants of the other were distinguished from their neighbours by their superior cleanliness. No other reason appears to explain their immunity. The house was rather crowded, containing six persons, of whom four were adults, and the cholera occupied the adjoining house on each side.

Of those who fled, all escaped the cholera except one child and a man.

The disease prevailed most in the most crowded houses, except in the house just referred to as distinguished for cleanliness.

There are two cottages placed across the western extremities of the two rows of houses, but situated fifteen or twenty yards from them. In one of these live three persons, adults; in the other eight persons, six being children. None of these eleven persons suffered except one in the second house, who had diarrhœa severely. All these people are members of one family. They are superior to their neighbours in Johnny Moore-hill in station, in cleanliness, and in their habits generally, and do not associate with them.

The inhabitants of the two rows of houses, at the outbreak of the cholera, amounted to 110, including both sexes and all ages. Of these, 52 were attacked with either cholera or diarrhœa, being nearly one-half. A further analysis of the cases is exhibited in the following table :—

Adults Exposed.	Attacked with Cholera.	Proportion.	Attacked with Diarrhœa.	Proportion.
56	13	1 in $4\frac{1}{2}$	19	1 in 3 about
Or Excluding those who Fled.				
40	13	1 in 3	17	1 in $2\frac{1}{2}$ „
Children Exposed.				
54	7	1 in 8	13	1 in 4 „
Or Excluding those who Fled.				
43	6	1 in 7	13	1 in $3\frac{1}{2}$ „

Of those exposed to the disease, therefore, the proportion of attacks of cholera was twice as great in adults as in children. The attacks of diarrhœa occurred in nearly the same proportions in the two classes of subjects.

Of the thirteen adults attacked with cholera, seven, or fully one half, died ; and of the seven children attacked with cholera, three died, or rather less than one half.

Case 64.—Mary Goodyear, aged 39, residing at Cropper's-row, Huddersfield, had diarrhœa for some days. Was attacked with cholera Saturday, Sept. 29, and died in eight or nine hours. She was attended by Mr. Clough. This was the first case that occurred in this part of Huddersfield. The place in which she lived is unhealthy, and the drains are bad. There was a privy close to the house, which had not been cleaned out for twenty years, and the contents of which had soaked into the ashpit, made under the hearth within the house. It has been stated that this patient washed the clothes of cholera patients from Paddock, but the statement is not correct. She had walked one day through Paddock, and near to Johnny Moore-hill, but without stopping there, and had not in any other known way been exposed to contagion.

Case 65.—John Goodyear, aged 45, a cloth finisher, the husband of the last patient, was attacked with cholera Sept. 30th. He recovered.

Case 68.—John Goodyear, the son of the two last patients, aged five years, was attacked with cholera October 1st. He recovered.

Case 71.—Abraham Smith, aged 39. Attacked with cholera Sept. 30th, died Oct. 3rd. Resided at Cropper's-row, fifteen or twenty yards from Mary Goodyear. This man stood on one occasion within the door of Goodyear's house during her illness for about ten minutes, but did not enter further. Was treated by Mr. Booth.

In the beginning of October the cholera broke out at Slaithwaite, a village about $4\frac{1}{2}$ miles west of Huddersfield. For the particulars of the cases which occurred there I am indebted to Mr. Roberts, surgeon.

Case 72.—Mary Quarmby, aged 74. Performs the duties of a barber. Lives in the centre of the village. She was attacked Oct. 1st, and died in twelve hours. She was attended by Mr. Dean, but was not seen until two or three hours before she died. No communication with any cholera patient could be traced.

The house in which she lived consists of two rooms; it is in the middle of a row of houses, and in a narrow street. She and her son (the next patient) alone lived in the house. They were dirty people. There were two heaps of ashes and refuse near the house but no bad drains. The water they used was the same as that used by their neighbours. It was supplied by a spring not far distant, and is considered good.

Case 81.—Josh. Gledhill, aged 50, son of the last patient, and lived in the same house; was attacked October 4th, and died after fourteen hours' illness. The case was well marked and was attended to by Mr. Roberts.

No other cases occurred in this part of the village.

Case 82.—A child, aged 18 months, lived near the river side in Slaithwaite, (at Dry-Mill,) was attacked, October 4th, with well-marked cholera. It rallied after twelve hours, but died a day or two after in convulsions. Mr. Roberts believes it is not possible that this child could have had any communication with the preceding patients. The locality is low, as well as near the water.

The next cases occurred at "Water-Side," in Slaithwaite, about 200 yards to the east of the village.

Case 83.—Charles Varley, aged 36, a small clothier, was attacked October 7th, and died in a few hours, with all the ordinary symptoms of cholera. He was attended by Mr. Dean.

Case 86.—Mrs. Varley, the mother of the last patient, aged 57, was attacked October 10th, and died after fifteen hours' illness.

Cases 87 and 88.—Mr. Varley, the husband of the last patient, and also Mrs. Charles Varley, his daughter-in-law, were both attacked at the same time as Mrs. Varley, or within two or three hours of each other. These two recovered. The last three patients were treated by Mr. Roberts. All the four patients lived in the same house. The house is situated in the bottom of the valley, having a canal immediately behind and the river immediately in front of it. The privies are not very near. The drains are bad. The water is of good quality. Charles Varley was an Odd Fellow, and had been at his lodge and got too much to drink the night

before his attack. No communication with any other cholera patient could be traced.

No other cases of cholera occurred in this village, but diarrhœa prevailed extensively.

A solitary case of cholera occurred at Miln's Bridge, a small village about two miles west of Huddersfield, and in the valley leading to Slaithwaite.

Case 80.—John Saville, aged 57, a small farmer; on the morning of October 4th began to suffer from diarrhœa; in the following night the diarrhœa passed into cholera, and he died at 10 p.m. on the 5th of October. There were three persons living in the house; they were cleanly people, and their circumstances easy. The house is small, and stands close to the river side. The cow-house is near to it but is kept clean. The drains are not offensive. No communication with any other cholera patient could be traced.

During the time that I have been occupied in preparing the preceding account, and since it was written, I have become acquainted with the existence of a number of additional cases of cholera in Huddersfield and the immediate neighbourhood. This additional information does not invalidate the correctness of the particulars already given. Instead of adding a detailed account of the fresh cases, I propose to record, in a tabular form, a brief account of all the cases in the order in which they occurred, adding to the Table a few memoranda respecting such cases as call for further notice. I believe the Table will contain a complete account of all the cases which occurred in the practice of the surgeons resident in Huddersfield. It may not, perhaps, include all the cases which occurred in the adjacent villages, but I shall insert all with which my inquiries have made me acquainted.

The diagnosis in these additional cases is that of the surgeons whose names are attached to them. [*See Table.*]

Notes on some of the cases in the preceding Table:—

No. 3.—This patient was at Liverpool, in a district infected with cholera. He was taken ill very soon after getting home. The disease did not spread in his own neighbourhood.

No. 13.—This man had been at a crowded public meeting

in the Philosophical Hall the night before he was attacked. There was no known exposure to contagion. There was suppression of urine in the attack during a period of eighteen hours.

No. 21.—This was the child of No. 9. After the mother's death, the father went to live at Mold-green, near Huddersfield. The child probably carried the seeds of the disease with it, and was attacked ten or eleven days after. This may therefore be regarded as the period of incubation. The disease did not spread at Mold-green.

No. 48.—This man came from Bradford, where cholera was very rife at the time. He was attacked very soon after reaching Huddersfield. The disease did not spread from the house in which he was ill, although it is in one of the worst quarters of the town.

No. 58.—This man was living at Johnny Moore-hill. He left that place to avoid the disease, and was attacked soon after at his new residence.

Nos. 89 and 91.—These patients both lived in the same house. There was no discoverable source of contagion in the first case. The locality, as the name indicates, is swampy.

No. 92.—This man lived at Slaithwaite. There had been no cholera there for three weeks before he left the place. He was attacked in the first night of his imprisonment.

No. 93.—No contagion could be discovered in this case, but there is a great quantity of filthy refuse near the house.

Having given a complete list of all the cases with which, after much inquiry, I have become acquainted, I am now prepared to examine them, in order to see whether they contain matter calculated to contribute anything towards the elucidation of the very important questions respecting the mode of origin and propagation of the cholera.

1.—CONTAGION.

I. *Origin of the Disease.*—The cases which I have given occurred in *thirty-seven* distinct places. In *thirty* of these places the disease did not arise from any known source of contagion. The following are the names of the places:—Colne Bride, Quay-street, Lowerhead-row, Union-row,

Fenton-square, Stock's-buildings, Cliff-end, Lindley, Fartown, Paddock, Clough, near Paddock, Johnny Moore-hill, Brierley Mill, Thomas-street, Cross Church-street, Lane, Ash Brow, Dead Waters, Swallow-street, Rashcliffe, Hillhouse, Old Post-office-yard, Cropper's-row, Dyke-end-lane, Old-street, Slaithwaite, Greenside, Milnsbridge, Lime-kilns, Crosland Moor.

If this statement requires any modification it is in respect to Quay-street, (Case 4,) Lindley, (Case 10,) and Cropper's-row, (Case 64.)

In the remaining *seven* places, the disease showed itself in persons coming from an infected district. In only *one* of the seven places did more than one case of cholera occur, (viz., Castle-gate,) and in this instance there was no known communication between the first patient and the one or two subsequent ones. The disease does not seem to have spread, therefore, in a single instance. It is probable that in each of these seven instances the patient acquired the disease in an infected locality, and moved to the place in which the disease broke out during the period of incubation. The following are the names of the seven places:—Vagrant Office, Huddersfield; Bradley Mills, Mold Green, Castle-gate, South-parade, Meltham, Huddersfield Prison.

The disease broke out nearly at the same time in distinct points, at considerable distances from each other, and under circumstances which make it appear in the highest degree improbable that it could have been conveyed from one place to another.

From these facts it seems fair to conclude that the cholera did not arise by contagion in any, perhaps, of the thirty places first mentioned; and that it is impossible to suppose that it could have sprung from contagion in all the thirty places.

II. *Propagation of the Cholera.*—1.—We have just seen that, in seven places, the first persons attacked had come from an infected district, yet the disease did not spread in any one of these instances. At page 17 the particulars have been given of the removal of a family under circumstances highly favouring the spread of a contagious disease, yet without any such effect having followed.

2.—In fifteen out of the thirty-seven places in which the cholera was observed, more cases than one occurred in each place.

In two of these fifteen places (Lindley and Dead Waters) all the cases occurred in the same house. In these places, therefore, it is difficult to judge whether the disease was propagated by contagion, or whether all the cases arose from the same source.

In the thirteen remaining places the cases occurred in more houses than one. Under what circumstances did the disease occur in a second or a third house, after it had appeared in the first one, in these thirteen places?

In two of them it may be regarded as certain that there was no communication between the houses first and those afterwards affected. (Paddock and Slaithwaite.)

In nine of them there was very probably no communication. (Quay-street, Union-street-lane, Swallow-street, Thomas-street, Castle-gate, Rashcliffe, Clough, Cropper's-row (?))

In two of them there was communication between some houses, and none, probably, between others. (Cliff-end, Johnny Moore-hill.) (a)

(a) Having enumerated the places in the text, any one may verify the facts by a reference to the details previously given. To save trouble to the reader, however, I here subjoin briefly the particulars of a few of the most important places.

Cliff-end.—Five cases in all. 1st case, Sept. 4th. 2nd case, in another house, Sept. 13th; no known communication. 3rd case, Sept. 15th, child of the first patient; attacked after removal to a distance. 4th case, husband of second patient. 5th case, son of the last patient, Oct. 2nd. There was communication between Nos. 2, 4, and 5. If the last got the disease from either of the others, the period of incubation could not have been less than sixteen days.

Thomas-street.—Two cases. 1st, Sept. 7th. 2nd, Sept. 25th. No known communication, and also an interval of three weeks between the two.

Cropper's-row.—Four cases. 1st, Sept. 29th. 2nd, husband of No. 1, Sept. 30. 3rd, son of Nos. 1 and 2, Oct. 1st. 4th, Oct. 1st; this patient once stood for a very short time in the door of the residence of one of the others, but did not enter. There *may* have been contagion; if so, it must have been very virulent.

Slaithwaite.—Seven cases. 1st house.—1st case, Oct. 1st; 2nd case, Oct. 4th. 2nd house.—3rd case, Oct. 4th; no communication with 1 and 2. 3rd house.—4th case, Oct. 7th; 5th, 6th, and 7th cases, Oct. 10th. The inmates of the 3rd house had no communication with the two other houses.

Clough.—1st house.—1st case, Sept. 6th. 2nd house.—2nd case, Sept. 17th, four or five houses from 1st; probably no communication, patient aged 78; 3rd case, grand-daughter of second patient. 3rd house.—4th case Sept. 22nd; cannot say whether any communication, patient aged two years

In two cases (Nos. 63 and 54) the disease was undoubtedly contracted by visiting an infected place. But whether it was acquired by contagion, or by exposure to certain local influences, independently of contagion, it is not easy to determine. Another case, (Mrs. Brooke's, described at page 16,) in which a person, having left her home at Johnny Moore-hill, for fear of cholera, returned to it after a time, and was taken ill before holding any communication with her neighbours, would point to the inference, that the disease was acquired from the place rather than from the people. But there is room for doubt whether the illness in this case was an effect of the choleraic poison.(a)

4th house.—5th case, Sept. 22nd, aged one year; 6th case, aged four years, Sept. 23; communication possible.

Johnny Moore-hill.—1st house.—1st and 2nd cases, Sept. 19th; 3rd, Sept. 22nd, husband of No. 1; 4th, daughter of Nos. 1 and 3, Sept. 25th. Nos. 3 and 4 *might* be from contagion.

2nd house.—1st case, in night between Sept. 19th and 20th; too soon to have sprung by contagion from first house, even if any communication, which is improbable. Two other houses are interposed between first and second houses.

3rd house.—1st case, in night between Sept. 20th and 21st; daughter-in-law of first patient in first house. Lived in a different row of houses, but nursed mother-in-law. If by contagion, only twenty-four hours incubation. 2nd case, Sept. 27th; began with cholera, but with diarrhœa sooner. Husband of last patient.

The two first cases in house 1, and the case in house 2, if not also the first case in house 3, probably all arose from one cause, and not from each other. The last is the only one of them in which contagion seems *possible*.

4th house.—1st case, evening of Sept. 21st; the patient worked a mile off home, and had diarrhœa when at work during the day; lived in a different row from house 1. Had no communication. Began same day as first patient in house 3. No communication.

2nd and 3rd cases, in night between 22nd and 23rd Sept.; the father and mother of No. 1. 4th case, Sept. 25th, another son. The three last *may* have been from contagion.

5th house.—Near to 2nd house. 1st case, a child, Sept. 21, (diarrhœa only?) Probably no communication.

6th house.—1st case, Sept. 22nd; denied any communication with preceding. This house is in Lower-row, seven doors from house 1, Lower-row, next house to No. 2.

7th house.—1st case, Sept. 22nd; *probably* no communication, but not *certain*.

8th house.—Next to last. 1st case, Sept. 23rd; can't say whether had any communication with house 6; had not with others. If contagion, period of incubation could not exceed twenty-four hours.

9th house.—Lower-row, next to house 5. 1st case, Sept. 24th, diarrhœa, (and on 15th October became cholera?) might have and probably had communication with house 5.

10th house.—Next to No. 1. 1st case, Sept. 24th; one or two had diarrhœa. A child removed, and died elsewhere of cholera. Might have had communication with house 1.

(a) Since the above remarks were written, I have seen the "Report of the General Board of Health on the Epidemic Cholera of 1848 and 1849." At page 34 cases are referred to which strongly support the opinion that the disease, caught by visiting an infected place, was taken from the *place* rather than from the *patients*.

Thus, a careful analysis of the cases leads me to the conclusion that in some of them the disease *certainly* was not propagated by contagion, and that it *probably* was not in most of them. In others, again, it *may* have been, and in a few it is not improbable (although it is by no means certain) that it was propagated by contagion.

If cholera were propagated exclusively by contagion, the poison must be the most virulent, and the most certain in its operation of any of the contagious poisons known to us. Small-pox, measles, and scarlet fever, of all contagious febrile diseases, are perhaps those which are the most certain to be communicated to exposed persons who have not already suffered from them. But these diseases are never observed to spread with a rapidity which admits of an instant's comparison with that of cholera. In the case of cholera, one house is affected to-day, two or three others, near or distant, to-morrow, and as many more each succeeding day, until a whole neighbourhood has been devastated within a period of time that would barely suffice for the propagation of any other contagious fever from one patient to half a dozen more. If the contagion of cholera were so virulent as this opinion supposes, comparatively few persons visiting an infected district could hope to escape the disease; and persons removing from an infected place would *generally* become the centres of a fresh circle of cases, whereas, in this district, the disease never spread from such persons. Washerwomen, and those employed in attending to the dead, would almost always suffer; yet, in the few cases in which I have had the opportunity of inquiring, these persons do not appear to have suffered at all, except when they were at the same time exposed to the other supposed causes of the disease.

Again, diarrhœa accompanied the cholera in such a manner as to lead almost inevitably to the conclusion, that both diseases depended upon the operation of the same poison. In one class of persons, and under one class of circumstances, diarrhœa resulted; in another class, or under other circumstances, cholera. Diarrhœa began to be epidemic a little before, and ceased to be so a little after the cholera. It prevailed to an extent to which, I believe, it is never ob-

served to prevail, except when in conjunction with cholera. Both diseases visited the same places to a great extent. In some houses, villages, and towns, one of these diseases; in others both, occurred. But very few places altogether escaped both. (See the account of Cliff-end and Lindley, pp. 4 and 5.) Within a few days after the appearance of the epidemic in a neighbourhood, it often happened that a great majority of the houses had been visited either by diarrhœa or by cholera. It is not possible to suppose that diarrhœa, when observed under such circumstances, could be propagated to any material extent by contagion; and, if this statement be true of the diarrhœa, it can scarcely be less true of the cholera. (a)

2.—ENDEMIC INFLUENCES.

Having arrived at the conclusion, that the epidemic cholera neither arose nor was propagated, exclusively, nor even to a very material extent, by contagion, I proceed now to inquire what influence was exercised in the production of the disease by causes of a local character.

In *all* the cases in which I have had an opportunity of making the inquiry, (and that is in nearly all of them,) some of the local causes, whose influence is now generally recognised, were found to exist. Many of the places in which the cholera broke out, and all those in which it prevailed to any extent, were previously well known for their unhealthiness, and have been noted for their liability to fever and other epidemic diseases. The following circumstances, either singly or in various combinations, are those which have been chiefly remarked in the places visited by the epidemic:—

1. The accumulation of filth of various kinds, foul privies, bad drains, or the absence of drains, and want of personal cleanliness.

The good effects of cleanliness are strikingly exhibited by the fact, that only one house at Johnny Moore-hill was free

(a) Abundant evidence will be found in the Report of the General Board of Health, already referred to, in support of the opinion, that the epidemic cholera and the diarrhœa, prevalent at the same time, were due to the action of the same poison. See p. 89 et seq,

from both diarrhœa and cholera, and that the occupants of that house were distinguished from their neighbours by their superior cleanliness. (See pp. 19 and 20.)

2. Overcrowded dwellings and bad ventilation. The bad effects of these circumstances were especially seen at Johnny Moore-hill, where they were observed in almost every house, and where the disease prevailed most in the most crowded houses. (See p. 20.) The good effects of removing from such places are noticed at p. 20.

3. A number of the cases occurred in low situations, and near to a river or canal. (See Cases 5, 25, 82, 83, 86, 87, 88, 89, 91.)

The disease broke out in a very severe form, but did not prevail extensively, in several elevated and very airy situations, (Cliff-end, Lindley, Clough, near Paddock, and even Johnny Moore-hill.) In all these instances, the ordinary local causes were present in a high degree, and seem to have operated injuriously, in spite of the beneficial influence of an otherwise pure air.

4. There were abundant materials for the production of malaria in several places, *e. g.*, the old fish-pond near to Paddock and Cliff-end; also at Dead Waters, a marshy locality, as the name indicates. It has been stated (p. 18) that, before the cholera appeared at Johnny Moore-hill, the wind blew from the fish-pond towards the dwellings. After this time the wind was generally easterly, and it is possible this circumstance may have had something to do with the immunity of the general village of Paddock, and with the spread of the disease to several places west of Paddock, as Milnsbridge and Slaithwaite.

5. The condition of the water was inquired into in most places. There was no reason to suppose that it was contaminated in any instance, unless in the case of two families, who had used the water in the old fish-pond in July and August. (See p. 18.)

The influence of the local causes just enumerated appears to have been increased by the personal state or habits of various individuals. Such are—

1. *Intemperate Habits.*—These are noticed in several cases, and certainly existed in many more.

2. One patient was attacked soon after eating cucumbers and fat meat. (Case 2, p. 2.)

3. *Previous Liability to Diarrhœa.*—In Cases 10 and 41 this is mentioned. In one instance, however, an individual subject to diarrhœa, and exposed to the cholera, escaped all further illness. (P. 11, remarks on Case 76.)

In one case the disease came on after purgative medicine had been taken, the patient being exposed at the same time to all the other causes of cholera. (Case 16.)

4. Fatigue, poor food, and exposure to cold and wet, seem to have exercised considerable influence in Case 1.

5. Great fear of the cholera preceded its appearance in several cases. (10 and 11.)

6. *Adult age* appears to have been a predisposing cause. (See p. 20.)

Thus, in this neighbourhood, the disease visited those places only in which one or more of the local influences just referred to were to be found. The same statement, with comparatively few exceptions, is equally applicable to the country at large. We are forced, therefore, to the conclusion, that these local influences are intimately connected with, and that in most, although not in all cases, they may even be said to be necessary to, the development of the disease.

In this fact is probably to be found the explanation of another, viz., that the villages near the town were more severely visited by cholera than the town of Huddersfield itself. The hygienic condition of many of the villages is worse than that of the town. In the epidemic of 1832 not more than one or two cases of cholera occurred in Huddersfield; and I have not heard that any more were seen in the neighbourhood. A large part of the town stands upon a gentle declivity. Its position offers natural facilities for drainage; and the elevation and the arrangement of the streets render it more likely to be well ventilated by the frequently high winds than are many other towns. In 1832 active preventive measures were very generally adopted, under the apprehension of a visit from the epidemic; and these, no doubt, contributed largely to the immunity which the district at that time enjoyed. Since then the rapid increase in the population has led to a

multiplication of local nuisances; and the usual consequences of these would probably have been experienced in a more severe visitation from the last epidemic, had it not been for the efforts of the Commissioners not long before appointed under a new improvement Act. These gentlemen, with an enlightened appreciation of their duties, and in the face of opposition raised on account of the expense, caused many of the worst nuisances to be removed long before the cholera came among us. The jurisdiction of the Commissioners does not extend to those smaller places which were most severely visited, and which, instead of the moderate outlay occasioned by sanitary improvements, have now to bear the far heavier and more permanent expense of maintaining the widows and orphans of those who have been prematurely cut off.

One of the most remarkable singularities of the epidemic cholera is this: that after attacking one, two, or three persons in a bad locality, it will cease there. Again, it will altogether pass by other neighbouring spots, as bad or worse than the one visited. One house will be invaded, whilst others much nearer to the nuisance, supposed to be concerned in the production of the disease, will escape. (See remarks on the cases at Lindley, at Fountain-street, and at Cliff-end.) Upon any hypothesis respecting the origin of cholera, I can only suggest one explanation of these facts, viz., that of a number of persons exposed in an infected place, some are but little or not at all susceptible of the disease; some are exposed to the poison during a shorter period of time, or in a greater state of dilution; others escape it altogether, from changes in the wind, &c.; and the rest are attacked, some with cholera, some with diarrhœa or dysentery, and others with cramps, pains in the bowels, indigestion, and other forms of indisposition.

3.—ATMOSPHERIC PECULIARITIES.

But will air, rendered impure by emanations from filth and foul drains, and by want of ventilation, of itself explain the origin and propagation of cholera? I believe it will not; for all these sources of impurity have existed all over the

country, and in a greater degree than they now do, for years before the epidemic cholera appeared. If this cause were an adequate one, I do not see why the disease should not revisit us every year.

We are forced, then, I think, to adopt the hypothesis that, in addition to local nuisances, and probably also to contagion, there must be some peculiar condition of the atmosphere. That remarkable and unusual atmospheric phenomena of various kinds were observed in many places, is a matter of fact, and has been recorded in several publications upon the disease. The precise nature of these changes remains yet to be ascertained.

Upon this hypothesis we can explain most of the circumstances attending the origin and propagation of the cholera; its simultaneous eruption in separate and distant spots in the same neighbourhood; the escape of other individuals or places apparently equally exposed; the very rapid diffusion of the disease (like influenza) in the same town and over large districts, or even over a whole country; the occasional eruption of it in ships at sea, and also its progress from one country to other and distant countries. When the poisoned atmosphere passes over a town or village, it operates principally upon those who inhabit the worst places, either because its noxious effects are increased by the local atmospheric impurities, (which is probably the principal reason,) or because the persons who inhabit such places, from being less favourably situated in respect to food, clothing, habits, and mental condition, are more liable than others to suffer from any cause of disease applied to them.

The facts I have stated render it impossible for me to believe that cholera was *commonly* propagated by contagion in this district; but I by no means deny, as I have already intimated, that it may have been so propagated in some instances. Many cases, moreover, have been published, upon the authority of trustworthy observers in other places, which seem to prove the contagiousness of the disease. There seems to be nothing to forbid the supposition, that a disease which arose from local impurities or from atmospheric influences may afterwards

spread by contagion. Typhus, small-pox, measles, &c., must, in the first instance, have arisen without contagion, yet it is certain they are now propagated by contagion. Why may not the causes which *first* produced these diseases, frequently *reproduce* them now? Is it not probable, in fact, that they do? If so may not the same thing occur in the case of cholera? I will only add, in conclusion, that I have collected the *facts* I have recorded with much care, and have endeavoured to reason upon them without any bias. Before I analyzed these facts, I had never formed, nor ever expressed, any opinion respecting the mode of origin and propagation of the cholera. The opinion I have now formed and expressed has been suggested to me solely by my own personal inquiries.

Period of Incubation.—When the cholera has been acquired in a particular place, whether through contagion or through other local influences, it is desirable, when possible, to determine the period of incubation of the poison. In most of my cases it is not possible to do this, because the patients lived amongst, and so had been long exposed to, the nuisances which probably had a share in producing the disease. Three cases, however, afford more precise information upon this point. In Case 63 the disease broke out within three days of the time when the patient first visited the spot at which he must have imbibed the poison. In Case 54 the disease broke out in about three and a half days, or eighty-four hours, after the first exposure. In Case 21 the patient, a child, left an infected place, and was not attacked until ten or eleven days after, having removed to a spot where there was no other case of cholera either before or after.

Treatment, Mortality, &c.—There is nothing deserving of remark in the treatment of the cholera at Huddersfield. Various plans were tried by various practitioners, but the cases were too few in number to admit of any plan being tested upon a large scale. The mortality did not differ materially from that observed in many other places. The deaths were 39, the recoveries 54. These numbers are given only because a widely different account has been published.

The treatment of the premonitory diarrhœa was very

generally successful; and, by adopting the plan of house-to-house visitation, many such cases were discovered and stopped, and no doubt many lives were saved.

My experience of the last epidemic would lead me, in the event of another such visitation, to urge the great importance of house-to-house visitation, with a view to the discovery and treatment of all cases in the early and still manageable stages; the removal of the healthy from infected and over-crowded houses to places of refuge in proper situations; the clearing away of all nuisances; lime-washing the houses, and other similar measures.

The most beneficial measures, however, are those sanitary improvements which can only be carried out at leisure, and when no epidemic is pressing upon us. By these means, no doubt the cholera, and also many other diseases, might be, to a great extent, prevented, and much suffering and many lives might be spared. The want of proper persons, possessing the requisite authority to undertake this duty, in some cases, and a mistaken view of the expense in others, have hitherto prevented it from being discharged in a manner adequate to meet existing evils. The great fact, established upon most ample evidence, that it costs very much less to remove nuisances, and thereby to prevent disease, than to maintain the families of disabled men, and to make provision for their widows and orphans, is not yet sufficiently known to, or is not properly appreciated by, the local authorities of most towns and villages. The result is that, in this district as elsewhere, if cholera returned to-morrow, it would find us unprepared to stay its progress. The places that were cleansed have generally relapsed into their former filthy condition, and would afford all the facilities for the development and spread of the disease which they unhappily supplied during the last epidemic. It is to be hoped, that the Huddersfield Improvement Commissioners, who have shown that they understand what is required of them, will not be prevented from doing it effectually within the limits of their jurisdiction, by any short-sighted outcry against the necessary expenditure.

Nearly the whole of the preceding report was written in

December 1849, and January 1850. Since it was completed, the Report of the General Board of Health, already referred to, has been published. The results arrived at are the same in every important particular. The inquiries were totally unconnected with each other.

Huddersfield, December, 1850.

LONDON :

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BOLT-COURT.

Number and Name of Patient.	Age.	Date of Attack.	Occupation.	Residence.	Died or Recovered.	Medical Attendant.
1. Francis Donoghue	50	Jan. 18	Tramp.	Attacked in Vagrant Office.	Died.	Mr. Clarke.
2. Mrs. Thomas	38	Jan. 9	House-work.	Cable-bridge.	Recovered.	Mr. Booth.
3. Josh. Whitaker	27	Aug. 9	Mill-worker.	Bradley Mills.	Do.	Mr. Clarke.
4. William Leonard	38	Aug. 22	Gardener.	High-st., attacked in Quasi at	Died.	Mr. Rhodes.
5. Mrs. Hardy	65 (t)	— 26	—	Lower-head-row.	Recovered.	Mr. Tatham.
6. Mrs. Gibson	—	— 29	—	Union-row.	Do.	Mr. Sissons.
7. Mrs. Kershaw	—	— 30	Factory worker.	Penton square.	Do.	Do.
8. James Atkinson	50	— 30	—	Stocks-buildings.	Died.	Mr. Tatham.
9. Grace Hake	29	Sept. 4	—	Cliff end.	Do.	Mr. Machill.
10. Mrs. Hird	53	— 5	—	—	Do.	Do.
11. William Rhodes	—	— 6	Factory-worker.	For Low.	Recovered.	Mr. Booth.
12. William North	45	— 7	Mason.	Clough (Paddock).	Do.	Mr. Allatt.
13. Abraham North	35	— 8	Weaver.	Thomas-street.	Do.	Mr. Greenwood.
14. Mrs. Gantner	35 (t)	— 8	Shopkeeper.	Cross Church street.	Do.	Mr. Tatham.
15. John Leonard	30	— 9	Factory-worker.	Quay-street.	Do.	Mr. Sissons.
16. Mrs. George Crossland	—	— 9	—	Lindley.	Died.	Mr. Booth.
17. Josh. Thornton	60	— 11	Slabber.	Paddock.	Recovered.	Mr. Machill.
18. Martha Walker	35	— 11	Mangler.	—	Do.	Mr. Allatt.
19. Mary Craven	72	— 13	Nurse.	—	Died.	Mr. Machill.
20. ——— E.	72	— 13	—	—	Do.	Dr. Robinson.
21. Grace Bate's Child	70 or more.	— 16	Cloth Miller.	Attacked at Mould-green.	Died.	Mr. Booth.
22. Henry Beaumont	—	— 16	(Husband of No. 20).	Cliff end.	Do.	Mr. Moxon.
23. John Stocks	—	— 17	Splinter.	Swallow-street.	Recovered.	Mr. Allatt.
24. Sarah Tomlinson	61	— 17	Labourer.	Clough (Paddock).	Recovered.	Do.
25. Hannah Micklethwaite	53	— 18	—	Brierley Mill.	Died.	Mr. Sissons.
26. Josh. Hinchliffe	52	— 18	—	Swallow-street.	Recovered.	Mr. Allatt.
27. Mrs. Hirst	55	— 19	Excavator.	Johnny Moore-hill.	Died.	Do.
28. Hannah Taylor	23	— 19	Excavator.	Do.	Do.	Do.
29. William Moss	40	— 20	Excavator.	Do.	Do.	Do.
30. John Alpine	24	— 21	(Wife of No. 61).	Do.	Do.	Do.
31. Sarah Taylor	20	— 21	—	Johnny Moore-hill.	Recovered.	Do.
32. Mary Tomlinson	48	— 21	Cloth Dresser.	Clough.	Died.	Do.
33. Allen Micklethwaite	46	— 22	(Wife of No. 36).	Do.	Do.	Do.
34. Hannah Micklethwaite	40	— 22	—	Do.	Do.	Do.
35. John Micklethwaite	45	— 22	Engineer.	Dock-yard.	Recovered.	Mr. Booth.
36. Thomas Wood	56	— 22	Cloth Dresser.	Johnny Moore-hill.	Do.	Mr. Allatt.
37. Aaron Taylor	2	— 22	—	Do.	Do.	Do.
38. Ezra Whiteley	29	— 22	Excavator.	Do.	Do.	Do.
39. Charles Potter	1	— 23	—	Clough.	Do.	Do.
40. Thomas Dyson	43	— 23	Factory-worker.	Johnny Moore-hill.	Recovered.	Mr. Sissons.
41. Eli Wilson	7	— 23	Labourer.	Do.	Do.	Mr. Allatt.
42. William Byrom	4	— 23	(Child of Nos. 43 and 55).	Clough.	Died.	Do.
43. Mary Ann Byrom	14	— 24	Factory-boy.	Johnny Moore-hill.	Recovered.	Do.
44. Jane Dyson	2	— 24	Excavator.	Do.	Do.	Do.
45. James Dransfield	26	— 24	—	Castle-gate.	Recovered.	Mr. Clarke.
46. Patrick Connell	13	— 25	House-work.	Johnny Moore-hill.	Do.	Mr. Sissons.
47. Rachael Dransfield	—	— 25	—	Thames-street.	Do.	Mr. Tatham.
48. Mrs. Kaye	19	— 25	(Daughter of No. 38).	Johnny Moore-hill.	Do.	Mr. Allatt.
49. Maria Brown	21	— 25	(Son of Nos. 35 and 36).	Do.	Do.	Do.
50. Ann Taylor	—	— 25	Physician.	South Parade.	Do.	Mr. Greenwood, Mr. Clarke, and Mr. Booth.
51. Samuel H. Micklethwaite	—	— 25	—	Johnny Moore-hill.	Do.	Mr. Allatt.
52. J. Taylor	28	— 25	(Wife of No. 43).	Do.	Died.	Mr. Sissons.
53. Ann Byrom	39	— 26	(Wife of No. 42).	Hill-house.	Recovered.	Mr. Tatham.
54. Mrs. Wilson	30	— 27	Excavator.	Windsor-curt, Castle-gate.	Do.	Mr. Clarke.
55. John Robinson	3	— 27	—	Old Ford, near Lane.	Died.	Mr. Booth.
56. James Jagger	5	— 27	Cloth Dresser.	Leeds-road, near Lane.	Do.	Mr. Allatt.
57. David Taylor	28	— 27	—	Johnny Moore-hill.	Recovered.	Mr. Tatham.
58. Josh. Shepherd	42	— 28	Man Nurse.	Lane.	Do.	Do.
59. Richard Berry	62	— 29	—	Rashcliffe.	Died.	Mr. Clough.
60. Mary Goodyear	39	— 29	Finisher (husb. of No. 64).	Cropper's-row.	Recovered.	Mr. Clarke.
61. John Goodyear	45	— 30	House-work.	Do.	Do.	Mr. Sissons.
62. Mary Walshaw	3	— 30	—	Union-row.	Do.	Mr. Rawcliffe.
63. John William Taylor	5	— 30	Commercial Traveller.	Cropper's-row.	Recovered.	Mr. Clarke.
64. John Goodyear	—	— 30	House-duties	Dyke-end-lane.	Do.	Mr. Sissons.
65. Robert Whitehead	—	— 30	Cloth Dresser.	Old-street.	Do.	Do.
66. Harriett Marriott	39	— 30	Barber.	Cropper's-row.	Died.	Mr. Booth.
67. Mary Smith	7	— 30	—	Slip-street.	Do.	Mr. Dean.
68. Hannah Pick	17	— 30	—	Castle-gate.	Recovered.	Mr. Tatham.
69. Margaret Heaton	37	— 30	—	Do.	Do.	Do.
70. Maria Moxon	32	— 30	(Son of No. 23).	Rosemary-lane.	Do.	Do.
71. Ruth Berry	—	— 30	—	Cliff end.	Died.	Dr. Robinson.
72. Emma Wilcock	—	— 30	Nursemaid.	Foley hall.	Recovered.	Mr. Sissons.
73. James Charlesworth	61	— 30	Farmer.	Green-side.	Do.	Do.
74. John Saville	57	— 30	(Son of No. 72).	Sheep-close.	Died.	Mr. Tatham.
75. Josh. Gledhill	50	— 30	—	Milnbridge.	Do.	Dr. Robinson.
76. Charles Varley	36	— 30	Clothier.	Slathwaite.	Do.	Mr. Roberts.
77. Susan Varley	41	— 30	—	Do.	Do.	Do.
78. Hannah Clarkson	47	— 30	(Mother of No. 83).	Line Kins.	Recovered.	Mr. Dean.
79. Mrs. Varley	57	— 30	(Husband of No. 83).	Slathwaite.	Do.	Mr. Tatham.
80. Mrs. C. Varley	60	— 30	(Wife of No. 83).	Do.	Do.	Mr. Roberts.
81. Mrs. Shaw	36	— 30	Cloth Dresser.	Dead-waters.	Do.	Mr. Sissons.
82. Jasper Dawson	—	— 30	—	Rashcliffe.	Do.	Mr. Booth.
83. Richard 1 barpe	—	— 30	—	Dead waters.	Do.	Mr. Sissons.
84. David Sykes	50	— 30	—	Huddersfield-prison.	Do.	Mr. Clarke.
85. George William Taylor	2	— 30	—	Crosland-moor.	Died.	Mr. Allatt.

