

Dr. Airy's report to the Local Government Board on an outbreak of diphtheria in 1889 in the Samford rural sanitary district (Suffolk) / [Hubert Airy].

Contributors

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Dr. Airy's Report to the Local Government Board on an
Outbreak of Diphtheria in 1889 in the Samford Rural
Sanitary District (Suffolk).

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GEORGE BUCHANAN,
Medical Department,
June 21st, 1890.

The occurrence of four deaths attributed to diphtheria in the second quarter of the year (1889), followed by six in the third quarter, in the Holbrook sub-district of the Samford registration district, a district hitherto remarkably free from that disease, gave cause for inquiry by the Medical Department of the Board.

Under the instructions of the Board I visited the district on December 10, 1889, and following days, in concert with the officers of the Rural Sanitary Authority, from whom I received the greatest assistance in the prosecution of the inquiry.

The Samford rural district occupies a roughly triangular tract of agricultural country in the south of Suffolk, between the Rivers Orwell on the north, and Stour on the south, with an irregular base to the west, and a well-defined apex to the east at Shotley Point where the two rivers join to form Harwich harbour.

The district is divided, for registration purposes, into two sub-districts (1) Capel St. Mary to the west, and (2) Holbrook to the east. The former comprises 15 parishes, with a population (in 1881) of 5,837; the latter, 13 parishes, population 5,761. In both there was considerable falling off since the previous census.

Geologically this region consists of Suffolk Crag and sands based upon the London Clay, and covered, except on the valley slopes, with a capping of Drift Gravel. Good water is found in, or flowing from, the crag, and sand beds.

Agriculture forms the chief occupation of the people, but at Pin Mill on the Orwell there is a seafaring element, and at Shotley Fort a military element; and at Brantham on the Stour within the last few years the establishment of xylonite works (an offshoot from a parent factory at Hackney) has introduced a thriving manufacturing element.

The health of the population, as indicated by the general death-rate, is good. The average annual death-rate in the 10 years 1861-70 was 19.06 per 1,000; in the next 10 years, 1871-80, it was 17.81, and in the last nine years, 1881-89, it was 17.14.

The mortality from diphtheria in particular, in recent years, has been very small, until we come to the outbreak which is the subject of the present inquiry. In the 10 years, 1861-70, the annual average death-rate from diphtheria was 0.45 per 1,000. In the following 18 years, 1870-88, there were only 18 deaths from diphtheria, giving an annual death-rate of less than 0.09 per 1,000, estimated on the population enumerated at the census in 1881. Indeed in the Holbrook sub-district there had not been registered a single death from diphtheria since the first quarter of 1882. Suddenly in 1889 diphtheria breaks out in a fatal form and kills 15 persons in the Holbrook sub-district, a greater number than this disease had killed in 15 years before in the whole Samford district, giving a death-rate for that year of 1.29 per 1,000, or, if we take only the population of the Holbrook sub-district, to which the epidemic was confined, a death-rate of 2.60 per 1,000.

Outbreak at
Chelmondiston.

The scene of the first outbreak in 1889 was the village of Chelmondiston (population of parish, 861) about five miles south-east of Ipswich, standing at the head of a small valley or sandy ravine which opens northward to the River Orwell. At the mouth of the valley lies the hamlet of Pin Mill, a favourite boating and yachting station, with a "hard" at which barges can be moored and unloaded.

On Friday, May 31, a cargo of London manure was being landed from a barge at this hard and carried in open carts up the lane from Pin Mill to Chelmondiston village and thence along the high road westward to a farm in the neighbourhood. Several of the village children returning from the school (which stands in the village on the west side of the hollow) complained of the stench from the manure carts. One child, Phœbe Halliday, 5½ years, sickened that same evening; another, William Aldridge, 5 years, sickened next day (Saturday June 1), and a third, Emily Wood, 4 years, sickened on Sunday June 2. All three were unmistakable cases of diphtheria, and all three proved fatal. Aldridge died on June 5, Wood on June 9, and Halliday on June 29.

Halliday's cottage is in the upper part of Pin Mill, mid-way in the hollow between the village of Chelmondiston and the river. Wood and Aldridge lived on the high road through the village to the west. All three, therefore, were likely to fall in with the manure carts which were passing backwards and forwards along the high road and the Pin Mill Lane, and in two at least of the three the parents were convinced that the sickness was caused by the stench of the manure. Seven or eight other children from the same families continued to attend the village school for some days before the necessity of isolation was realized, and thus opportunity was given for the spread of the infection to other families. Five children of a family at Pin Mill, named Wright, were attending the school; one of them, Philip, 6 years, was taken ill on June 7, but was not laid up; the others escaped. It is, perhaps, doubtful whether this case should not be referred to the supposed original cause and regarded as one of the initial cases. By the end of June four other families were infected, two of them (Sage and Miles) being near neighbours of Wood (already attacked), one (Webb) being intimate with the Hallidays, and the fourth (Burgess) having close relation with the school, Mrs. Burgess having the duty of sweeping the schoolrooms. Joseph Burgess (5) died on June 30, and Orange Webb (8) on July 3. In all these families the person first attacked was a child attending the village school. Most of them were in the infants' class. The infection was continued by successive cases in the families of Halliday, Burgess, and Webb, but no fresh families in Chelmondiston were attacked during July.

The school was closed for three weeks, July 2-22, then it remained open till the harvest holiday which began on August 9.

Outbreak at
Tattingstone.

At the beginning of August (1889) a second outbreak of diphtheria, having no discoverable connexion with the first, occurred at an isolated thatched cottage on high ground in the parish of Tattingstone, about four miles west of Chelmondiston, in the family of a labourer named Barney Bullard. The whole family, five children and both parents, were attacked in succession, and four of the children were dead before the month was out. Elizabeth Bullard (12) died on August 12, Harriet (11) on August 21, Edith (4) on August 29, and William (9) on August 31; the last three in the infectious wards at Tattingstone Workhouse, whither they were removed as they fell ill.

The first to suffer was Elizabeth Bullard, a girl of 12, strong and healthy. She was taken ill on Friday, August the 2nd, and died on the 12th. On the Tuesday before her illness (July 30th) she had been to Ipswich, by train from Bentley Station, to inquire about a situation at a small shop on the Norwich Road. She returned by carrier. There was no case of diphtheria at the shop in the Norwich Road, nor was it known that the girl had been near any infected place, but there must have been diphtheria in Ipswich at the time, for there were registered six deaths from that cause in the first quarter of the year, one in the second quarter, and four in the third, in different parts of the town; and it is possible that she may have unwittingly been exposed to infection in the course of her journey. However, this is mere conjecture. The isolated and



exposed situation of the Bullards' cottage suggested the idea of something carried by the wind, and on examining the weather charts and returns published by the Meteorological Office it appears that on Tuesday July 30th the wind was blowing from the east, that is from Chelmondiston to Tattingstone.

(The nearest stations in connexion with the Meteorological Office are at Yarmouth and Cambridge. At both these places the wind was E. at 8 a.m. on Tuesday, July 30th. At Woodbridge it was E.N.E. at 9.5 a.m.)

The Bullards' cottage (one of two under the same roof) is old and rather damp. The surface soil is gravelly, the sub-soil, sand. Water for all purposes was drawn from a well. It was analysed and found polluted, but there was no reason to think that this was not its normal condition, and no reason why this solitary well should suddenly have developed the poison of diphtheria.

Another family of Bullards in the same parish was attacked in October. They had done some washing for the first family about a week before.

For two months there were no more cases in Tattingstone, but in the middle of December there were some fresh cases in other families.

Meanwhile the epidemic continued at Chelmondiston and Pin Mill. Four fresh families were infected in August, before and during the closure of the school for the harvest holiday; but in the last fortnight of the holiday there were no fresh invasions. A child named William Miles (8 years) died on September 2nd in a family previously infected. The school was re-opened on September 9th and remained open for a month. In the last two weeks of September two fresh families were attacked. In the first week in October there was an alarming extension of the epidemic. Not only did the disease appear in nine families previously untouched by it in Chelmondiston, and one in Pin Mill, but it broke out also in the parishes of Wherstead to the west and Shotley to the east. There had been a school treat on September 26, at Woolverstone (a parish between Chelmondiston and Wherstead), at which numbers of school children from neighbouring villages were present, and this appeared to give facilities for the spread of the infection.

The Chelmondiston School was closed again from October 9 to November 11.

In Shotley the disease was first recognized in an old man named Palmer, aged 75 years, who was taken ill and died on October 9. His wife had previously fallen ill and died (September 9) after attending one of the cases of diphtheria (Ruffles) in Chelmondiston in August. The circumstances of her death were somewhat obscure, and a Coroner's inquest was held. The cause of death was returned as "Syncope arising from protracted cold and want of nourishment," but I learnt that there was good ground for believing that the illness was diphtheria, quite apart from the relation of this case to others. Another case occurred in Shotley in the latter part of October in a boy named Rivers, who had not been at Chelmondiston for five weeks before he was taken ill, and who was not known to have been exposed to danger of infection in any way.

In Wherstead to the west of Chelmondiston, two cases occurred in two different families, Scott and Theobald. Both ended fatally on October 7; and on the same day, at Chelmondiston, a little girl, Minnie King, 12 years, died very suddenly of "paralysis, post diphtheritic."

About the middle of October, diphtheria broke out in the village of Harkstead, two miles to the south-west of Chelmondiston, among the children attending the Harkstead school. This might possibly be accounted for by communication with Chelmondiston.

Again there was an isolated outbreak in one family in the parish of Erwardon, which abuts on the River Stour and has its own landing-place, at which cargoes of London manure are occasionally discharged. A schoolboy had come home with sore throat from Ipswich a week before; so it was doubtful whether this outbreak was not independent of those under inquiry.

There were also some cases in the village of Holbrook, in the centre of the sub-district, probably traceable to a case which was brought to Holbrook from Chelmondiston.

The last fatal case was that of a boy, George Sharman, 7 years, at Chelmondiston, who died on November 26.

By the end of the year this severe epidemic had subsided; and the first quarter of the present year (1890) has passed without a recrudescence of the infection. It remains to be seen whether a fresh crop will appear next October.

In all there were about 75 cases, of which 15 were fatal, or 16, including Mrs. Palmer. In five families one or both of the parents caught the disease from the children. There was one fatal case (Samuel Palmer) at the age of 75, and another (Sarah Palmer) at 73; and three non-fatal cases in young people of 20, 18, and 15. All the rest were children from 1 to 12 years. The most susceptible age appeared to be from 5 to 6 years. There was evidence of remarkable difference in degree of susceptibility in different families. In many families only one child was attacked out of four or five, while in others the infection spread rapidly from one child to another. In Barney Bullard's family at Tattingstone, all five children and both parents were attacked, and four of the children died; while of five children in Aldridge's family none caught the disease from the boy who was first attacked, though one of them slept in the same bed with him.

As to the probable cause of the outbreak, it is difficult to deny a certain weight to the considerations on which the earlier cases were ascribed by local belief to the malodorous traffic in London manure.* I tried to learn from what part of London the particular cargo in question had come, but did not succeed. The manure barges take their freight at many points on both sides of the Thames. Some significance attaches to the circumstance that this traffic has (it is stated) increased considerably in recent years; while at the same time diphtheria has become increasingly prevalent in London. For example, in the fourth quarter of 1882 the deaths from that cause in London were 229; but in the fourth quarter of 1888 they were 460. This necessarily implies increase of such danger as diphtheria-infected refuse conveyed from London may cause to the agricultural districts where the manure is used on the land.

The Medical Officer of Health, Mr. G. S. Elliston, informed me that some years ago he had reason to think that an epidemic of scarlet fever which broke out at Shotley was connected with a deposit of London manure in that parish; and only last year (1889) there was an outbreak of scarlet fever, fortunately of a mild type and unattended by any fatal consequences, in the village of Stutton, and this appeared to arise from two children playing about a heap of London manure that had recently been carted into a field.

Similar occurrences have also been reported from other districts receiving London refuse.†

The subject is one that might well repay comprehensive inquiry.

Seeing that Chelmondiston is only five miles distant from Ipswich, and that there is frequent communication between them, it might be thought not unlikely that the infection had been derived from that town, especially as there had been three deaths from diphtheria in Ipswich in the fourth quarter of 1888, and six in the first quarter of 1889. I give, below, a table showing the registered diphtheria mortality in the two sub-districts of the Samford Union, and in Ipswich respectively. It cannot be said that there has been any evident correspondence between them in former years, but it is certainly noteworthy that the recent mortality in the Holbrook sub-district is found occurring side by side with a heavy mortality in Ipswich, suggestive of some re-action between the two districts, or else of common exposure to the same cause, or to the same set of conditions favourable to the development of the disease. Beyond this parallelism, however, there was no evidence of connexion between the cases of diphtheria in Ipswich and those in the Samford district.

* In view of the case I shall presently have to record, of an occurrence of diphtheria in Chelmondiston antecedent to the June outbreak, and in view of our habitual difficulty of recognizing diphtheria in its minor phases, the suggestion has been made to me that the foul effluvia of this London manure may have operated to hasten forward the development of some home growth of the disease, rather than to introduce the disease, in its already full grown form, from the metropolis. For practical purposes, I may include this suggestion in the accusation against London manure propounded in the text.

† *E.g.*, the Strood Rural Sanitary District in Kent.

DEATHS FROM DIPHTHERIA registered in the two sub-districts of the SAMFORD DISTRICT and in IPSWICH, 1870-1889.

Year and Quarter.	Capel.	Holbrook.	Ipswich.	Year and Quarter.	Capel.	Holbrook.	Ipswich.
1870. I.	—	—	2	1880. I.	—	—	4
II.	—	—	—	II.	—	—	4
III.	—	—	1	III.	—	—	2
IV.	—	1	—	IV.	—	—	1
1871. I.	—	—	—	1881. I.	—	—	—
II.	—	—	—	II.	—	—	2
III.	—	—	—	III.	—	—	1
IV.	—	—	—	IV.	—	—	5
1872. I.	—	—	1	1882. I.	—	1	1
II.	—	1	—	II.	—	—	2
III.	—	—	1	III.	—	—	—
IV.	2	—	1	IV.	—	—	—
1873. I.	—	—	—	1883. I.	—	—	—
II.	—	—	2	II.	—	—	1
III.	1	1	—	III.	—	—	3
IV.	—	—	1	IV.	—	—	2
1874. I.	—	—	1	1884. I.	—	—	—
II.	—	—	4	II.	—	—	—
III.	—	—	3	III.	1	—	1
IV.	—	—	5	IV.	—	—	1
1875. I.	—	—	1	1885. I.	1	—	1
II.	—	—	—	II.	—	—	1
III.	—	—	—	III.	1	—	—
IV.	—	—	—	IV.	—	—	1
1876. I.	—	—	3	1886. I.	—	—	3
II.	—	—	2	II.	—	—	—
III.	—	—	1	III.	—	—	1
IV.	1	—	4	IV.	—	—	1
1877. I.	—	—	1	1887. I.	2	—	1
II.	—	2	2	II.	—	—	2
III.	—	—	2	III.	—	—	4
IV.	—	1	5	IV.	—	—	1
1878. I.	—	—	—	1888. I.	—	—	—
II.	2	—	—	II.	—	—	1
III.	—	—	—	III.	—	—	1
IV.	—	—	3	IV.	—	—	3
1879. I.	—	—	2	1889. I.	—	—	6
II.	—	—	1	II.	—	4	1
III.	1	—	1	III.	—	6	4
IV.	—	—	1	IV.	—	5	18

In the course of the inquiry it came to light that there had been a case of diphtheric sore throat in March 1889 in the person of a farmer living at a roadside farmhouse at the west end of Chelmondiston parish. There was an untrapped sink-pipe in the kitchen, leading to a filthy catch-pit with an overflow to a cesspool. Adjoining the kitchen was a small dairy. The dairy produce, I understood, was disposed of in Ipswich, not in Chelmondiston. There was no evidence to connect this case with the outbreak in June (*but see footnote on previous page*).

There was no evidence that milk had played any part in the spread of the infection. The villagers get very little milk. The little that was used in Chelmondiston came from various sources.

I did not hear of any epizootic disease having been observed in the district during the course of the epidemic.

The sanitary state of the dwellings in which diphtheria appeared was not conspicuously bad, though some of them had offensive privies and pigsties, and others (*e.g.*, B. Bullard's cottage at Tattingstone) had polluted water. A good deal had been done, or was being done, at the time of my visit, for the improvement of these places. Properly constructed privies with small cemented pits were erected in place of old ones condemned; a new well was sunk at Bullard's cottage, on the other side of the house, and a new supply of water was brought in pipes from a spring to a cluster of cottages in Pin Mill.

The sanitary authority have byelaws (dated August 1879), regulating the deposit of filth on land for purposes of agriculture; but they have no power under these byelaws, or under the Public Health Act, 1875, to regulate the

landing from barges and carting of filth along the public roads and through the villages. The nuisance would be much diminished if the manure could be conveyed in covered carts instead of open. At present the farmers use for this purpose the ordinary "muck-tumbrils" in which they cart their farm-yard manure.

The Medical Officer, Mr. George Sampson Elliston, M.R.C.S., holds the same office in the Ipswich urban and rural sanitary districts, and also in the Bosmere and Claydon rural district to the north of Ipswich, and is therefore in a position to study the relations between them in respect of infectious disease. The Samford Rural Sanitary Authority have not yet adopted the Infectious Diseases (Notification) Act, and therefore the information at Mr. Elliston's command in the recent epidemic has been somewhat incomplete, especially as regards certain cases treated by medical men who resided not in the Samford district but in Ipswich. The great majority, however, of the diphtheria cases in the Holbrook sub-district came under the care of the Holbrook district Medical Officer, Mr. R. M. Fleming, who gave prompt and full information to the Medical Officer of Health, and who also very kindly aided my inquiry.

The infectious wards at the workhouse at Tattingstone are the only place of isolation. There is none at the command of the sanitary authority as such. The workhouse infectious wards were not used for any of the Chelmondiston cases.

May 23, 1890.

HUBERT AIRY.

No.	Street	House No.	Age	Sex	Date	Initials
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In the course of the inquiry it was ascertained that there had been a case of diphtheria in March 1889 in the person of a farm labourer living at a roadside farmstead at the west end of the village. This man was a milkmaid and was in the habit of carrying milk pails to the farmstead. On the day of the outbreak, the man was seen to be coughing and to have a sore throat. On the next day he was found to be unable to work and was taken to the workhouse. He died on the 12th of March. The man was the only person in the village who had been in contact with the infected man. It is not clear how the infection was introduced into the village. It is possible that the man was infected while working at the farmstead. It is also possible that the infection was introduced into the village from another source. The infection was not traced to any other source. The infection was not traced to any other source. The infection was not traced to any other source. The infection was not traced to any other source. The infection was not traced to any other source.