

Mr. Spear's report to the Local Government Board upon the prevalence of diphtheria in the Fareham registration district, and upon the occurrence therein of enteric fever.

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**Mr. Spear's Report to the Local Government Board upon
the Prevalence of Diphtheria in the Fareham Regis-
tration District; and upon the occurrence therein of
Enteric Fever.**

GEORGE BUCHANAN,
Medical Department,
April 23rd, 1889.

THIS registration district comprises the Fareham Urban and the Fareham Rural Sanitary Districts. The former is situated in the centre of the registration area, and includes an acreage of 6,386 and a population, according to the last census, and including the county asylum, of 7,183. The rural district extends over an area of 35,491 acres, and contains a population, according to the census returns, of 9,748. General description.

The district is bounded on the south and south-west by Stokes Bay and Southampton Water, on the west by the Hamble River, and on the north by the Chalk Downs. On the east the ramifications of Portsmouth Harbour encroach upon it. Geologically, it is occupied by the Middle and Lower Eocene formations—the Bagshot Sands and London Clay, the latter covered in parts of Fareham town and elsewhere by diluvial deposit of flint and chalk gravel; on the north and east a small portion of the district stands on Chalk.

The occupations of the district are mainly connected with agriculture. Fareham is a market town, and here, and along the coast, there is a small sea-faring population. Breweries at various places afford employment to a number of persons.

Scattered cases of diphtheria, or small groupings of cases, have occurred in various localities, but the epidemic spread of the disease has been confined to the large parish of Titchfield in the western part of the Rural Sanitary District. Diphtheria prevalence.

The area chiefly affected extends for some four miles, from the Hamble River on the western boundary of the Rural Sanitary District across the Titchfield Common to the Titchfield River. It includes the hamlets of Swanwick and Sarisbury on the west, a number of scattered houses on the now much enclosed Common and the town of Titchfield on the east. Swanwick and Titchfield, at the two extremities, are respectively situated by the two waterways spoken of, at the foot of the slopes leading from the elevated intervening Common. At Titchfield the soil is alluvial; on the Common, and at Swanwick, it is for the most part sandy. The people on the Common are engaged largely in vegetable and fruit growing (the soil being specially adapted to the cultivation of strawberries), and a small jam factory has been established. At Swanwick there is a quay at which barges with manure from Portsmouth and Southampton occasionally unload. Infected area.

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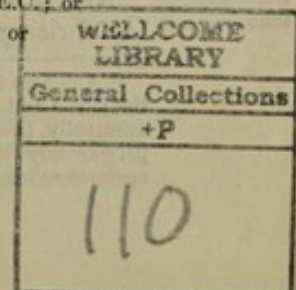
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According to the census returns of 1881 the population of this limited area was some 2,600, 1,600 being in the little town of Titchfield. Since then a number of houses have been built at Sarisbury and Swanwick and on the Common, so that the population now exceeds 3,000. Good roads traverse the district; the common school for the outlying parts (Swanwick, Sarisbury, and the Common) is on Sarisbury Green, and Titchfield is the resort for shopping purposes.

Earlier
history.

The locality in question appears to have been comparatively free from diphtheria for many years previous to 1886. In the death returns of the 20 years preceding, I find only two deaths, both in 1872, specifically recorded under this head, although during the same period seven were ascribed to "croup." Dr. Hoar, who practices in Titchfield and the neighbourhood, tells me that for 30 years previous there had been nothing approaching an epidemic of the disease.*

The previous history of diphtheria in neighbouring localities appears likewise to have been, on the whole, uneventful. At Warsash, a little village on the coast, two miles from Sarisbury—a village ill-drained, badly supplied with water, and subjected to occasional nuisance from the unloading of manure barges—one death was registered from diphtheria and one from croup in 1882, and in 1884 one death from diphtheria and two from laryngitis. At Wickham, an inland village four miles up the Titchfield river, one death was registered from diphtheria in 1865, three in 1871, one in 1872, and one in 1873, besides a death from "croup" and another from "cynanche trachealis" in the latter year. Previous to 1886 these were all the noticeable occurrences of fatal diphtheria or croup, during recent years, in the Titchfield Registration Sub-District.

In the Fareham Sub-District I have not examined the mortality registers for such a lengthened period. Since 1880 to this present date the deaths registered from diphtheria and croup have been as follows:—In the Fareham Urban District (about two-and-a-half miles from Titchfield), in 1882, two from croup; in 1884, three from diphtheria and one from croup; in 1885, two from diphtheria; in 1886, three from diphtheria and one from croup; in 1887, three from diphtheria, one from croup; in 1888, two from diphtheria. In the remaining part of the Sub-District, comprising parts of the Fareham Rural Sanitary District further removed from Titchfield: two deaths from diphtheria in 1880; one in 1883; four in 1884, and one from "angina trachealis"; three from diphtheria in 1886, and one in 1887.

Between the more or less isolated appearances of diphtheria, previous to 1886, here noted, and the epidemic prevalence of the disease that commenced in that year in the western portion of the district, I could trace no connexion.

Diphtheria
at Sarisbury,
Swanwick,
and the
Common.
Infected
families
1—5.

So far as can be ascertained, the first case of the prolonged prevalence of diphtheria in the Titchfield parish occurred in July 1886, in a row of houses known as "Long Shore," remotely situated on the banks of the Hamble River. The row in question contains 11 dwellings and 46 inhabitants; and between the date named and the beginning of the following September five families were invaded by diphtheria. In all 26 per cent. of the inhabitants were attacked, and there were besides two or three cases of mild sore throat. Of the cases of diphtheria, three terminated fatally; and, in addition, one convalescent died of what was registered as typhoid fever and another of "consumption."

The sufferers of the first family attacked (six in number) were not medically treated, but the history leaves little doubt as to the nature of their ailments. Two boys, aged respectively 15 and 17, first sickened, and this within a few days of each other while employed in fruit picking on grounds where a number of strangers worked. In three of the remaining four families, the first sufferer was a young child (not a school attendant) who apparently contracted the infection on the spot; and this is probable also as regards the first case in the fifth family, although this child had perhaps opportunities also of infection at the elementary (infant) school.

The sanitary conditions under which this little community was living were exceedingly unfavourable. The houses are small and low, and ill-ventilated, and very damp; sewage nuisances polluted the atmosphere of all the back premises, while that in front was contaminated by a particularly foul fold yard hard by; sewage, too, was percolating into the well.

Sarisbury
schools.

Nearly all the children of school age from the western part of the parish (comprising the hamlets of Swanwick and Sarisbury, but not including Titch-

* Amongst isolated occurrences, the repeated appearance of "diphtheritic sore-throat" amongst the pupils and teachers of a private boarding-school at Titchfield was mentioned. The school was eventually (February 1888) broken up in consequence of the ill health suffered, and removed permanently from the town. One attack had terminated fatally, it was believed, after the sufferer's removal to his own home in another district.



field town) attend either the "mixed" or the infant school on Sarisbury Green. As soon as it was re-opened after the summer holidays, on August 2nd, children from two infected houses at "Long Shore," who were themselves afterwards attacked, attended the mixed school, and within about ten days of the re-opening one child from another infected house in this locality attended the infant school also.

The "mixed" school had at this time 131 children on its books, and the infant school 69, although the average attendance in each case was considerably smaller. Both schools were closed on October 15th on account of diphtheria prevalence.

Between August 10th (eight days after re-opening) and October 11th (four days before closure) seven children of the "mixed" school, being the initial cases in their respective families, and living for the most part in localities widely separated, sickened of diphtheria. At the infant school, on the other hand, no initial case occurred at this time amongst the pupils, save for the child already referred to who lived at Long Shore, and who had abundant opportunities of infection from the several sick children in the same row of dwellings.

There were, however, between the beginning of September and the middle of November, six "initial" cases amongst persons not attending school. In four of these, the families of immediate neighbours and friends (in one case the master's family) had been previously infected; and in the two remaining ones infection may have been conveyed by individuals not themselves ailing. Thus, a woman, nursed by a person coming from an infected house, was attacked ten days after her confinement; and an infant in an isolated cottage, who was infected, had brothers attending the "mixed" school.

During the five weeks of the schools' closure, there appear to have been only two fresh family invasions (two of the six above referred to); and on November 22nd (the medical officer of health not, however, being consulted on the matter) the schools were re-opened.

At the re-opening, 11 children who had passed through an attack of diphtheria still remained absent from the "mixed" school on account of their late ailment. As to others thoroughly convalescent and attending school, there is, perhaps, insufficient assurance that their clothing was free from infection; for, although carbolic powder, sanitas oil, &c., had been supplied by the sanitary authority, no proper disinfection of clothing, &c., by heat had been performed. Further, the instructions of the medical officer of health as to the cleansing of the school premises had not been carried into effect.

On the 26th of November (four days after re-opening) two children of different families left the mixed school on account of sickness that proved to be diphtheria; on the 29th, four other children, one of them belonging to one of the families infected on the 26th, and three to two other families, left from the same cause; and on the 30th another child of a fifth family. There were thus, within eight days of re-opening, seven children of five families, living in houses widely separated, newly infected. No other family, so far as I have been able to ascertain, suffered at that time; and the disease showed comparatively little disposition to spread in the households invaded, so that, although these included nine other (healthy) children, only two attacks in these families, beyond those of the school children referred to, occurred. Nevertheless, the disease was of a severe type, although not rapidly fatal. Of the nine sufferers, five died, after intervals of, respectively, 5, 11, 12, 14, and 20 days.

The schools were again closed on December 2nd, and remained closed until February 28th, 1887. During the interval no further case of diphtheria appears to have occurred, but on March 14th, a fortnight after the re-opening, another of the pupils of the "mixed" school was attacked; on April 25th, a second, and on April 26th, a third, fell ill; these three being all of different families, and occupying houses widely separated. Although there were 10 other children in these three families, none of them were infected. Two of the three attacks terminated fatally, on the fifth day and on the eighth, respectively.

In one case, however, the disease appears to have spread to a neighbouring family. At the first infected house a little shop was kept, and shortly after the child's seizure there a woman living in the same row and a visitor at the

shop suffered from sore throat. Her child, a pupil of the infant school, was a few days later attacked by diphtheria. The schools were again closed on May 2nd, and the above were all the cases at this time.

School closed (May 2nd). Re-opened (June 13th). Six weeks afterwards, on June 13th, the schools were again re-opened, but only until the 30th of the month, when the ordinary summer holidays commenced.

Family invasion 28. School closed (June 30th). Within a day or two of this date, a child living in an isolated cottage at Locks Heath, some two miles from Sarisbury Green, sickened of the disease. She was a pupil at the infant school, but was accustomed with a few other children to take her dinner in the "mixed" school-room, her own school being closed during the dinner hour. This case also was a single one in the family, although some four and a half months later (after fresh exposure to infection in the house of a friend) the mother herself sickened.*

School re-opened (Aug. 1st). 29-31. On August 1st work was resumed at Sarisbury schools, and nothing more was heard of diphtheria until November 11th. On that day a child left the "mixed" school ill of diphtheria; on November 24th a second child of another family; and on December 2nd another child of a third family. In two of these cases (both non-fatal), in families where five other children were living, the attacks were single. In the case of the child who left school on November 24th (a fatal attack), the disease spread through the family, attacking the remaining four children and the mother; it spread too to the family at the only adjoining cottage, and through them to a visitor, perhaps to two visitors, from another part of the parish. To these secondary cases I will again refer.

32 and 33. At the infant school a pupil sickened on the 14th November; the child lived in a house where a case of diphtheria had occurred in November of the previous year; and on the 20th of the month another child of another family, also a pupil of the infant school, fell ill. Both these cases were single, although in the two households there were six other children.

34-37, and one "recrudescence." Five families were infected at this period (November and first half of December), in which the initial sufferer was not an attendant at either of the schools. Certain of these cases have already been spoken of. One was that of the family living next door to the child who left the "mixed" school ill on November 24th. A woman was the first here of two sufferers. She was a constant visitor at her neighbour's house, and the drainage, closet accommodation, and water supply were in common. Another was the case of a woman who visited the one last named from another part of the parish, and two or three days later sickened of the disease. A third was the mother of the child at Locks Heath that had sickened about July 1st; she also had, just before her own seizure, visited at the same infected house. In the two remaining cases (these, like the two last recorded, single cases) the disease had appeared in the same house in November of the preceding year.

Schools closed (Dec. 16). Re-opened (Jan. 2nd). 38 and 39. On December 16th the schools were closed for Christmas, and re-opened on January 2nd, 1888. On January 6th a boy at the "mixed" school fell ill, and his sister, a pupil at the infant school, who apparently continued her attendance at that school after her brother's seizure, sickened on the 16th of the month. Another pupil of the infant school had gone home sick on the 12th, and some days later two other children of that family sickened. The two cases in the family first named, and the initial one of the second all terminated fatally.

The sequence of the above-recorded cases and in a measure their relation to school attendance is shown in tabular form, as follows:—

* The child above referred to was sent on her recovery, about the middle of September, to a little school at Warsash, a village about two miles in the other direction from Sarisbury. Another pupil at the school, and a companion of the convalescent child, without any other discoverable risk of infection, sickened of diphtheria about October 1st; and subsequently—between that date and the middle of the following December—four other families in that village were invaded. In all there appear to have been eight cases at Warsash.

1886.		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.		November.		December.
											1st to 15th.	School closed.		22nd to 30th. School open.	School closed.
												15th to 31st.	1st to 22nd.		
Initial cases in families.	Mixed school	-	-	-	-	-	-	-	1	2	4			5	
	Infant school	-	-	-	-	-	-	-	-	1	-			-	
	Non-attendants	-	-	-	-	-	-	2	2	2	2	1	1	-	-
Total families invaded		-	-	-	-	-	-	2	3	5	6	1	1	5	-
Total cases		-	-	-	-	-	-	4	5	13	14	3	2	7	2
Deaths		-	-	-	-	-	-	-	-	4	1	2	-	-	5

1887.		School closed.	School closed.	School open.		Closed.	Closed 1st to 13th.	Open 13th to 30th.	Closed.	School open until 16th December.			Closed 16th to 31st.
				1	2								
Initial cases in families.	Mixed school	-	-	1	2	-	-	-	-	-	-	2	1
	Infant school	-	-	-	-	-	+1	-	-	-	-	2	-
	Non-attendants	-	-	1	-	-	-	-	-	-	-	3	1
Total families invaded		-	-	2	2	-	1	-	-	-	-	7	2
Total cases		-	-	3	2	-	1	-	-	-	-	11	4
Deaths		-	-	1	1	-	-	-	-	-	-	-	1

1888.		* Took dinner in mixed schoolroom.														
Initial cases in families.	Mixed school	-	1	-												
	Infant school	-	1	-												
	Non-attendants	-	-	-												
Total families invaded		-	2	-												
Total cases		-	5	-												
Deaths		-	2	1												

SUMMARY.			
Initial cases, "Mixed" school children	-	-	19
" Infant " " "	-	-	5
" Non-attendants " " "	-	-	15
Families invaded	-	-	39
Total cases	-	-	77
Deaths	-	-	19

In order that the evidence implicating the mixed school as a centre of infection may be appreciated, the details given in the foregoing text must, however, be studied. The 19 initial cases amongst the children of that school were not only the first in their own families, but notably the first also in new outbreaks and in freshly infected localities; and in this respect they markedly contrasted with the "initial" cases amongst non-attendants and infant scholars. Of the 15 non-attendants, four were at Long Shore in one row of houses; four others were living next door to houses just previously infected; two (in November 1887) were living in houses infected 12 months before, and two had admittedly visited at infected dwellings.

Of the five initial sufferers amongst the infant school children, one lived at the much infected row of dwellings at Long Shore; another, although attending the infant school, took her dinner in the "mixed" school-room, and a third lived in a house that had previously (some 12 months before) been infected.

Looking at the evidence, it would seem that the disease spread in the mixed school, either by the repeated introduction there of convalescent but still infected children, or by their still infected clothing (*i.e.*, by "fomites"), or by some continuing focus of infection attaching to the school itself. In the foregoing history, other evidence is not wholly wanting of the spread of disease

by convalescents and by clothing from infected houses; on the other hand, there is the fact that in the majority of the cases amongst school children the attacks were isolated, that is to say, were single in their respective families. If personal infection were the sufficient factor in these repeated outbreaks at the mixed school, it would seem to have gained a potency there not possessed either outside or in the infant school.

[Careful inquiry was made for obscure attacks of sickness that might have been Diphtheritic, and, so far as possible, the facts collected concerning all reported cases of sore-throat in the neighbourhood. In a few cases reports of the existence of sickness of this sort were found to be without foundation; in others, the ailments had been of an altogether trivial kind, with hardly anything either in the clinical or etiological history to suggest diphtheria. I do not think it possible that undiscovered cases of diphtheria could have existed in this locality, and during this period, in any number, or could materially modify the observations recorded above.]

Sanitary
condition of
the schools.

The two schools stand on sandy soil at one corner of Sarisbury Green, a narrow plantation and the high road separating them. The mixed school consists of one long room divided by a partition; the whole giving floor space equal to some 1,350 square feet, or a trifle more than 10 square feet per head supposing the total number of children on the books were present, and a cubical capacity of some 14,400 feet. The building stands on a slope, so that a considerable space is left beneath the floor. In one part this is vacant although enclosed, and the inspector of nuisances, who had examined it, reported it was practically unventilated; dry, but permeated by an exceedingly "musty" smell. The remainder is utilised as the kitchen and scullery of the schoolmaster's house, and until the autumn of 1887, when a new house adjoining was built for him, his sitting-room was situated here also.* An internal staircase provides direct communication between this basement and the school room. In April 1887, when the premises were examined by the medical officer of health and inspector of nuisances, it was found that much stagnant water lay beneath the kitchen and scullery floor, and that a defective and leaky drain was likewise contaminating that space. Within some 10 feet of this drain, moreover, the well was situated, and the water (to which it is believed the children had occasional access), was found to be polluted by soakage from the drain. These drainage defects were remedied about September 1887, and a new house, as I have said, was built for the schoolmaster. A little earlier in the year ventilators, of the "Tobin tube" variety, were inserted in the school room (before inadequately ventilated), and the school-room was lime-washed. The school privies, situated some yards from the building, are reported to have been, until June 1887 (the third time of closing the school on account of diphtheria), exceedingly foul; and now their defects have only been partially remedied by curtailing the size of the cesspits, and by the provision of a small pipe shaft as a ventilator.

The infant school is built on level ground and has no basement, dwelling, or drain in connexion with it. Ill-kept earth or ash closets stand, however, in very close proximity to the school-room door.

Sanitary
condition of
villages.

Referring to the sanitary circumstances of the locality generally, the houses are for the most part built in very small groups or wholly detached. Some few are dilapidated and ill-ventilated and dirty, but this is not the general condition. The ground water rises very near to the surface in times of rain, and dampness of dwellings is a very common feature. Means of drainage and of excrement disposal are often such that nuisance results. Privy pits are in general use, and slops and other liquid sewage are cast into open pits often not far from the dwelling. The wells are much subject to surface contamination, and those of several of the infected houses were found on examination to contain a considerable quantity of mud and surface washings.

There are a few rows of dwellings that require special notice on account of their unwholesomeness. One of these, "Long Shore," has already been referred to. Swanscombe Terrace and Nightingale Terrace, have, unlike Long Shore, been built quite recently. The drains, from original faults of construction, are in a chronic state of dis-repair and are usually stopped; the closets and cesspools are overflowing, and the surface around the dwellings rapidly becoming thoroughly sewage sodden. The water, from wells sunk amongst this filth, is complained of as obviously befouled. Neither of these rows, consisting of about 30 dwellings, chanced to be infected with diphtheria.

* The schoolmaster's family consisted at that time of two adults and two elder children. They do not appear to have suffered from any symptoms of diphtheria.

During all the period of diphtheria prevalence in the western part of the parish, the town of Titchfield on the eastern boundary had remained free from the disease, except for the occurrence of "diphtheritic sore throat" in a single household—the private boarding school already referred to.* In February 1888, however, two cases occurred almost simultaneously in opposite parts of that town, and except that both children belonged to tradesmen's families, and were allowed to frequent shops (one a grocery and the other a public bar) to which it is possible infected individuals from the outlying villages may have come, I could obtain no suggestion in either case implying risk of exposure to personal infection; nor did there seem to be any condition of food supply or the like in common. Both the cases were single ones in their respective families. One child, in common with some $\frac{7}{8}$ ths of the children of school age in the village, was a pupil at the national schools; the other had not reached school age, and as to the latter, it has to be noted that he lived in a house almost immediately adjoining the boarding school (closed just at this time) where diphtheritic sore throat had before prevailed, a narrow back lane and a butcher's premises only intervening. By both the neighbours, this butcher's slaughter house had been much and justly complained of; and, moreover, the house now invaded by diphtheria was exposed to the entrance of sewer air by reason of its own defective drainage; namely, to air coming from a sewer into which the drains of the boarding school referred to, as well as the overflow from an exceedingly foul slaughter house and watercloset cesspool on the butcher's premises, discharged.

These two isolated cases occurred quite at the beginning of February. By the end of the month, six other houses in the town had been invaded; three by what was recognized at the time as unequivocal diphtheria, and three by a severe and infectious form of sore throat that was, there is little doubt, of the same nature. By the 14th of March, three other houses were infected; and then the children of the localities specially involved, Frog Lane and Coach Street that is to say, were excluded from the national schools; and a week later, on the 21st of March, six additional houses having been infected in the interval, these schools were closed. In the last few days of March and during April, there were four fresh family invasions, and a second case occurred in a house that had been apparently free for some two months. In June another family was attacked, and in August two more, in addition to one in which the disease re-appeared after some five months interval.

In all, there appear and have been in Titchfield town, from February 2nd to August 21st, 24 family invasions and some 55 cases. In 15 of the families the attacks were multiple; and in two, cases recurred after intervals of apparent freedom of two and five months respectively. Eleven of the cases terminated fatally.

Of the initial attacks, 11 were amongst males and 13 amongst females; of the total number, the figures are 22 and 33 respectively. As to age, initial attacks were thus distributed: under 4 years, 2; 4-14, 18; above 14, 4; and the total number as follows: under 4, 7; 4-14, 39; above 14, 9.

For estimating the influence of school attendance, the initial cases may be classified as follows:—

—	Average Attendance.	Attacks during			
		Feby.—Mch 14. (Schools open.)	Mch. 14th—21st. (Partially closed.)	Mch. 21—Aug. 13th. (Closed.)	Aug. 13th—21st. (Open.)
Non-attendants -	—	2	1	5*	*
Mixed School -	143	3	2	—	—
Infants' School -	90	5	4	—	2

* And 1 "recrudescence."

* The most recent occurrences of the kind in this school, which numbered some 30 or 40 boys, were as follows:—September 1885; 17 boys attacked and one mistress. October 1887; three or four boys attacked and one servant. The school was removed at the beginning of 1888.

Diphtheria
at Titchfield
village.
Cases 1 and
2.

Families
3—8.

„ 9—11.

„ 12—17.

„ 18—21.

„ 22—24.

The first to be attacked in the little outburst in August was not a school attendant, but was one of a family that had suffered in the previous February from the sore throat spoken of above. The other two houses invaded were in the immediate vicinity (all three being in Coach Street), and the children of this locality were accordingly, on August 31st and for three weeks, again excluded from school.

Localization. The localization of the disease was marked. A line drawn diagonally from N.W. to S.E. through the bottom of West Street, would approximately bisect the town; in the S.W. section (containing 54 per cent. of the total number of dwellings) all but four of the 24 family invasions occurred. In these four single cases only occurred. One was the early case referred to as in the house adjoining the boarding school, and the other three were perhaps associated with school attendance, each of the sufferers being pupils either at the mixed or infant schools up to the time of their seizure.

Sanitary circumstances. Titchfield stands on alluvial soil on one side of the Titchfield stream. The situation is somewhat low-lying, and the fields on the opposite bank of the stream are often in winter flooded. Sewers, partly of brick and partly of socketed pipes, pass down the main streets, and in their course catch-pits are situated at frequent intervals; these collect much foul matter and are cleansed about once a year only. Scarcely any ventilation for the sewers is provided; flushing is neglected, and the sewage is discharged by two main and three or four subsidiary outlets into the stream.

The water supply of this village is derived from shallow wells for the most part. Some few of these are said to afford good water, but the majority are obviously polluted. A certain number of the inhabitants resort to the stream, and below the spots where sewage is discharged.

Much of the cottage property is in an unsatisfactory state, the houses being damp and ill-ventilated, and some dirty. The ground around dwellings is very commonly uneven, unpaved, and sewage sodden.

Of infected and non-infected area. The most noticeable difference in the sanitary circumstances of the much infected and the comparatively non-infected quarter of the village, appears to be found in the condition of the sewers. Excluding the outlying cottages, all of those infected in the first-named quarter (in common with nearly all that part of the village) drain to one common sewer. Unlike the sewers of the other quarter this one is of brick, it is flatter in its gradient, and possesses a larger number of the objectionable catch-pits above spoken of. In other respects the sanitary condition of the two quarters is much the same; excrement disposal is almost universally by privy-pits.

Of the schools. As at Sarisbury, the sanitary condition of the schools was found to require improvement. "Tobin" ventilators, although still in insufficient number, were introduced, and the privies and urinal were removed further from the school building. These, however, are still imperfectly constructed, and will, unless improved, become a source of contamination to the atmosphere of the school-rooms.

Prevalence of typhoid fever. Looking at the sanitary condition of this village, it is not surprising that typhoid fever has been unduly prevalent in it. Dr. Hoar tells me that not a year passes but cases of the disease come under his notice, and that in his experience of 30 years a very large proportion of the houses have been invaded. The mortality statistics show that during the last 20 years 27 deaths have been registered from this cause, giving the excessive average rate of .9 per 1,000 of the population per annum.

Sanitary administration. I visited other parts of the rural district with a view of ascertaining the progress that had been made since my inspection in connexion with the sanitary survey in 1885. At Cosham, the largest village in the district, the authority have constructed a system of sewers, with which private drains are now being connected. A number of privies have already been converted into water-closets, and there is evidence of important diminution in the village of sewage nuisances. For dealing with infectious and epidemic disease in the district a small isolation hospital has been provided near Fareham, and has already, since its opening in the spring of last year, done some service.

Byelaws for the regulation of building, &c., have been obtained quite recently, but have not yet been put in operation. Their enforcement is greatly needed in various parts.

Except for that above recorded, the evidence of activity on the part of the authority is meagre. Sewage nuisances are prevalent in various localities; water supplies are often spoken of as contaminated; many cottages are damp and ill-ventilated; the provisions of the Public Health (Water) Act of 1878, as they apply to rural districts, have not been enforced, and no action has been taken by the authority under the Dairies, Cowsheds, and Milkshops Order.

FAREHAM URBAN SANITARY DISTRICT.

In this district the following deaths have been registered from diphtheria and croup in recent years:—In 1882, two from croup; in 1884, three from diphtheria and one from croup; in 1885, two from diphtheria; in 1886, three from diphtheria and one from croup; in 1887, three from diphtheria and one from croup; and in 1888, two from diphtheria. The cases in the town of Fareham during the last two years appear to have been few in number and isolated. At Fontley, however, an outlying hamlet, there was a serious outbreak in the latter half of 1888. In the infected locality the cottages are only 15 in number. Five of these were invaded by diphtheria, while in a sixth there was a doubtful case of severe sore throat. The sanitary condition of the locality is wretched in the extreme. A foul and stagnant sewage ditch is just at the back of the houses, the surface about the doors is sodden with filth, and the wells are spoken of as obviously polluted. Several of the cottages are very damp, and two of them I found overcrowded.

Diphtheria
in the Fare-
ham Urban
District.

The first case of this outbreak occurred in July 1888. I could not discover any exposure to risk of infection, but it was remarked that next door a prolonged and severe case of diphtheria had occurred some 18 months previously. In this most recent outbreak the first sufferer (a girl) was taken to the little isolation hospital belonging to the rural authority on July 29th, about a fortnight after her seizure, and discharged on August 26th. It was about a fortnight after her return home that the next case, in the same family, one occupying an overcrowded house, occurred; and thence the disease spread, first to the house next door, and then further down the row to the extent already spoken of. In three families the first sufferer was not attending school.

In 1885 the town of Fareham suffered from a severe outbreak of typhoid fever. Exclusive of certain fatal cases in the neighbouring lunatic asylum, 15 deaths from this cause were registered in this district during the year, six of them occurring during the month of August. The authority had before this, in the summer of that year, on the occasion of my survey inspection, been warned of the danger incurred of pollution of their water supply through the very numerous direct connexions between water mains and sewers, and between service pipes and watercloset pans; and to this cause the medical officer of health attributed the outbreak of fever which subsequently occurred. The defect in question was at length, in December 1885, remedied, a constant in lieu of an intermittent water service was likewise introduced, and the medical officer of health informs me that typhoid fever has since been much less common in the town. During the three years that have elapsed since the date of the alteration eight deaths from typhoid fever have been registered amongst the general population (*i.e.*, exclusive of the inmates of the lunatic asylum).*

Typhoid
fever in the
Fareham
Urban
District.

The sanitary authority have contented themselves in the main with the improvements above spoken of. In other matters existing conditions of the place are very much what I found them in the summer of 1885. The sewers and drains need much additional ventilation; and systematic examination should be made of the latter with a view to the removal of nuisances arising from their frequent defective construction and situation. There are a few cottages in small back courts that in their present state are scarcely fit for habitation. The sanitary department needs especially to be placed on a more satisfactory

Sanitary ad-
ministration
(Fareham
U.)

* At the time of my sanitary survey the authority were unwilling to attempt a constant service of water, finding that under the intermittent system the supply was short. I am informed, however, that the change has led to an absolute economy in the amount required.

footing. The medical officer of health is not under the Board's Order and makes no annual report. The mortality returns are, in fact, not supplied to him, so that it is difficult to see how he is effectually to study the distribution and cause of disease. The authority possess no hospital for dealing with infectious diseases, but have on one or two occasions been allowed the use of the Rural Sanitary Authority's building.

Typhoid fever
at the County
Asylum.

In the County Lunatic Asylum, which although remotely situated is within the limits of the urban district, certain outbreaks of typhoid fever have occurred under circumstances deserving of notice. The subject in its various relations has been reported upon by Dr. Worthington, the medical superintendent, and by Mr. Rogers Field, C.E., and Dr. Dupré, amongst others, who were specially retained by the committee of management for the purpose. Dr. Worthington records the following cases as having occurred during recent years:—

Years.	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888
Cases of Typhoid	3	—	2	—	2	—	3	3	9	14	4	—	75

The cases have been widely distributed in the institution—male and female patients, officers, and servants being amongst the sufferers.

Notable periodicity in the occurrence of the disease in the several years has, however, been observed. All the cases have occurred during the last seven months of the year; then their more particular distribution has been as follows:—

June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
2	60	29	9	7	6	2

There has been great and hitherto quite unexplained variation in the fatality of the disease in the outbreaks of different years. In 1885 the fatality amongst those attacked was equal to 57 per cent., in 1888 to only 5·3 per cent.

It will be remembered that 1885 was the year in which the disease was epidemic in the town of Fareham. As to any immediate cause, however, there appears to be no possible connexion between these two experiences. The asylum is complete in itself, and isolated as regards sewerage, water supply, &c. When Mr. Rogers Field made his examination in January 1886 he found that, although various alterations had been made, the drainage of the building was exceedingly defective. Reason also was found for concluding that the water supply of the institution was contaminated; and a series of analyses conducted by Dr. Dupré strongly supported this view. The drainage of the institution was remodelled at a cost of upwards of 4,000*l.*, the work being completed in the course of 1887. Nevertheless the disease showed a greater prevalence in 1888 than it had ever done before, although the type was then comparatively mild.

The asylum stands upon a thick bed of gravel overlying the chalk formation, and water is obtained from a deep well in the asylum grounds. Mr. Rogers Field reported (January 1886) that many of the drains of the institution were leaky, and that "two of the worst of these were within a few yards of the well." Moreover, he found by various observations that the movement of the underground water in this locality naturally tends from the direction of an adjoining cemetery and of plots of ground upon which the sewage of the asylum is discharged, towards the well; and that continuous or even ordinary pumping of the well will influence the level of the underground water beyond the distance at which these possible sources of pollution stand. The committee of management are now endeavouring to devise some other means of water supply.

JOHN SPEAR.