Mr. R.D.R. Sweeting's report to the Local Government Board on the prevalence of diphtheria and enteric fever in the Tottenham urban sanitary district / [R.D.R. Sweeting].

Mr. R. D. R. Sweeting's Report to the Local Government Board on the prevalence of Diphtheria and Enteric Fever in the Tottenham Urban Sanitary District.

R. Thorne Thorne,
Assistant Medical Officer,
August 18th, 1885.

This inquiry was ordered on account of the continued fatal prevalence in Tottenham of Diphtheria and Enteric Fever, shown by the Registrar-General's Quarterly Returns, and in reference also to a petition from some of the inhabitants of Broad Green in this Urban District, complaining of the condition of the Moselle Brook, and of the prevalence of the above-named diseases.

The Local Board District of Tottenham, the Registration Sub-district of Tottenham, and the Tottenham Parish are coterminous. The District has an area of 4,403 acres, and its population is greatly on the increase, having risen from 22,869 in 1871 to 46,456 at the last census; whilst at the present time it is computed to be not far short of 70,000. The population has thus doubled itself in the inter-censual period; and, if the same rate of increase which has taken place since 1881 be continued, Tottenham will at the next census contain at least 100,000 people.

Tottenham is bounded north by Edmonton, west by Hornsey, south by Stoke Newington and Hackney, whilst to the east is the River Lea, separating it from the parish of Walthamstow. The eastern part of the Parish is low-lying and flat, but that to the west, in the Wood Green district, is considerably elevated. Geologically, Tottenham is upon London Clay, which is overlaid in the part of the district adjacent to the River Lea by river gravel and alluvium.

In 1873, on account of a severe outbreak of Enteric Fever, an inspection of the district was made by the late Mr. Netten Radcliffe. He ascribed this outbreak to the effect of a great flood in the Lea valley, which suspended for a time operations at the sewage outfall works. During this flood, sewage became extensively backed up along the whole line of sewers, so that at low levels, house basements and cellars became flooded with sewage escaping upwards through drain-inlets; while at high levels, from diminution of the air space in sewers and increased tension of the sewer air brought about by this backing up of sewage, the sewer air was of necessity driven out into and around dwellings. Mr. Radcliffe also credited the Local Board's water supply with some share in the outbreak, since he found evidence of contamination of the "Land water" (which supplemented the water-works' supply) by the same flood sweeping sewage over the gravel area from which this water was derived. Upon the whole, he considered the persistent prevalence of Enteric Fever in Tottenham to depend for the most part upon want of sewer ventilation, existence of cesspools, defects of house drainage, ditch nuisances, and impure water supply.

It will be convenient to examine the vital statistics of Tottenham Urban Sanitary District during the period which has elapsed since Mr. Radcliffe's inquiry, viz., 1874 to 1884; and to note more particularly the death rate from Diphtheria and "Fever" in each year. This has been done in the following Table:—

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VITAL STATISTICS of TOTTENHAM URBAN SANITARY DISTRICT DURING THE ELEVEN YEARS, 1874–1884.

Year.	Population.	Births.		Deaths.				Deaths from							Mortality Rates per 1,000 at all Ages.		
		Total Number.	Rate per 1,000.	Total Number.	Rate per 1,000.	Under 1 Year.	Rate per 100 Births.	Small-pox.	Scarlet Fever.	Measles.	Diphtheria.	Whooping Cough	"Fever."	Diarrhœa.	Total "Zymotic."	Diphtheria.	"Fever."
1874	27,314	956	35·0	491	17·9	111	11·6	—	9	10	16	13	10	7	2·3	·5	·3
1875	28,850	949	32·5	500	17·3	124	13·0	—	8	6	12	23	8	21	2·7	·4	·2
1876	30,469	1,040	34·1	514	16·8	140	13·4	—	8	3	4	13	5	6	1·2	·1	·1
1877	32,180	1,080	33·5	494	15·7	127	11·8	5	26	4	6	1	8	13	1·9	·1	·2
1878	33,990	1,162	34·1	590	17·5	148	12·7	2	21	13	9	20	16	37	3·4	·2	·4
1879	35,890	1,365	38·0	631	17·5	173	12·6	1	15	4	4	22	12	18	2·1	·1	·3
1880	37,900	1,667	43·8	725	19·1	247	14·8	1	8	19	9	13	12	49	2·9	·2	·3
1881	46,441	1,939	41·5	778	16·8	245	12·6	2	23	10	20	33	10	32	2·7	·4	·2
1882	54,062	2,215	40·9	973	18·0	268	12·1	1	73	29	27	45	13	29	4·0	·5	·2
1883	62,418	2,405	38·3	1,008	16·1	309	12·8	—	28	41	35	27	6	35	2·7	·5	·1
1884	69,783	2,634	37·9	1,148	16·3	342	12·6	6	8	28	48	73	29	48	3·4	·6	·4

It is thus seen that the population of Tottenham, as above estimated, has in the eleven years under consideration increased to more than two and a half times what it was at the beginning of the period. The birth-rate has ranged between 32 and 43 per 1,000. The death-rate from all causes has remained fairly uniform between 16 and 19 per 1,000, and was during the last two years of the period only a little over 16. The proportion of deaths under one year to 100 births has for an Urban District been uniformly low throughout, never exceeding 15 per cent. The total "zymotic" rate has been excessive thrice, viz., in 1878, 1882, and 1884. The "Fever" rate has, except in 1876 and 1883, been uniformly high. That from Diphtheria was excessive in the first two years of the period, but then dropped for the next five years, since which (*i.e.*, from 1881 to 1884) it has again risen, attaining a maximum in 1884. It will be observed that the total "Zymotic," the Diphtheria, and the "Fever" rates were all high in 1884.

The 48 diphtheria deaths occurring in Tottenham during 1884 were distributed in quarters thus:—1st quarter, 10; 2nd quarter, 13; 3rd quarter, 11; 4th quarter, 14. There was thus a slight excess in the last quarter of the year. The 48 deaths occurred in 38 households, and the ages of the fatal cases ranged from 16 months to 29 years. The *age-distribution*, in groups of years, was as follows:—

0–1 year	- - -	0 deaths
1–5 years	- - -	25 „
5–10 „	- - -	19 „
Over 10 years	- - -	4 „

Hence, more than 90 per cent. of the fatal Diphtheria in Tottenham during 1884, occurred in children between one and ten years.

But besides the 48 deaths in 1884 registered as Diphtheria, 33 other deaths were referred to throat-illness, variously designated as "Croup," "Cynanche," "Cynanche membranacea," "Cynanche maligna," "Laryngitis," "Membranous laryngitis," "Ulcerated throat," and the like. They took place in the quarters of the year as follows:—1st, 8; 2nd, 5; 3rd, 10; 4th, 10. Their *age-distribution* was—

0–1 year	- - -	3 deaths
1–5 years	- - -	18 „
5–10 „	- - -	9 „
Over 10 years	- - -	3 „

Here again, over 80 per cent. of fatal throat-illness registered otherwise than as Diphtheria, took place between the ages one and ten years, so that, on classing together Diphtheria deaths and deaths from other throat maladies, it appears that 87 per cent. of the total mortality from throat diseases of all kinds was incident upon the age-period 1–10 years. From consideration respecting the 33 deaths from throat-illness above referred to, I came to the conclusion that they were in essence of a diphtheritic character; hence, if they are added to the 48 undoubted Diphtheria deaths, the mortality-rate from this disease during 1884 becomes 1·1 instead of ·6. Similarly, in other years the rate of Diphtheria mortality would doubtless be raised if deaths under the headings referred to were brought into account.

In 1885, to the end of April, 17 Diphtheria deaths have been registered in Tottenham. They occurred in 11 houses; all were under ten years of age and 13 of them under five years. In addition, 8 deaths were registered from "Croup" and "Cynanche," at ages ranging from seven months to nine years.

The 29 "Fever" deaths which took place in 1884 all appear to have been cases of Enteric Fever. They occurred in 25 separate houses. Four of them, however, took place in the Training Hospital, of which two were cases from other districts, so that the corrected number is 27, and the corrected rate for 1884, ·3 per 1,000. In point of time, these 27 fever deaths took place monthly, as follows:—

January	-	2	July	-	3
February	-	2	August	-	1
March -	-	5	October	-	1
April -	-	2	November	-	3
June -	-	1	December	-	7

Also up to April 9th, 1885, 7 deaths from Enteric Fever have occurred in 7 houses. All the deaths in both years were over fifteen years of age.

Upon commencing my inquiry at Tottenham into the conditions of this serious prevalence of Enteric Fever and Diphtheria, I found my investigation hampered by the circumstance that the Sanitary Authority possessed no Inspector of Nuisances; the old one had left, and the newly appointed one had not yet taken office.

The Chairman of the Local Board was, however, good enough, at the suggestion of the Medical Officer of Health, to arrange that the services of Mr. Poulson, the late Nuisance Inspector, should be placed at my disposal for a couple of days. Another circumstance which was adverse to the completeness of my inquiry in Tottenham was the migratory character of the population, and the consequent difficulty in tracing cases which had left. Having regard to these difficulties, I did not attempt to obtain from the 32 medical practitioners who reside in the Tottenham Urban District, complete lists of cases of Diphtheria and Enteric Fever, but set to work to visit all the localities (and as many houses as possible) in which fatal Diphtheria and Enteric Fever had occurred since December 31st, 1883, as well as a few other localities and houses where non-fatal cases of the above diseases were reported as having prevailed.

As a general result of investigation of this kind I found that fatal Diphtheria and Enteric Fever had been pretty uniformly distributed over the whole district, no part of it seeming to have suffered or to have escaped disproportionately to the rest; and therefore, the unwholesome hygienic conditions of the places visited may be looked upon as affording a fair criterion of the sanitary short-comings of the district.

The chief insanitary conditions thus found associated with fatal Diphtheria and Enteric Fever in 1884 are taken in the following order:—

(I.) *Sewer Ventilation and Flushing.*—Ventilation of sewers is irregularly provided throughout the District, and is in many parts very inadequate. Further, the road orifices of the ventilators are not uncommonly blocked up with mud and *detritus*. No automatic provision for flushing exists. Such flushing as is done is by charging certain flushing chambers with water conveyed to them in water-carts; but even this is not carried out regularly. Neglect of systematic flushing of the sewers in Tottenham becomes the

more serious in view of the fact that storm-water is excluded from them, and of the circumstance that the sewers themselves are in the greater part of the District laid with but little fall, and are therefore especially liable to favour the deposit of contents. How far defects of sewerage arrangement of the above kinds, which are general, have had to do with the general distribution of Diphtheria and Enteric Fever, I am unable to say, since the fact that a large number of houses altogether escaped attack from those diseases, though exposed to the same deleterious influences, must not be omitted from consideration. Locally, however, a very strong belief prevails that the diseases in question have been caused by faulty sewer conditions. Thus, in several instances, particular sewer-ventilators at the street level were accused of having caused both Diphtheria and Enteric Fever, it having been noticed that they became especially offensive in hot and dry weather, and people having stated that they had been obliged to keep their windows shut when indoors, and to put their handkerchiefs to their noses when passing these openings. The ventilators of which such complaint was made were either very near the houses where the cases occurred, or were ventilators passed by persons attacked. Local evidence of a certain sort was adduced as to the influence of certain of the sewer ventilators; as, for instance, that a child stood over a particular ventilator for half an hour, and was attacked with Diphtheria two days afterwards; and again, that a girl, contrary to habit, traversed on her way to school a road in which was placed an especially foul-smelling ventilator, and was seized with Enteric Fever a couple of weeks afterwards.

(II.) *Water-supply.*—As at the date of Mr. Radcliffe's inspection, the Tottenham water-supply is from three sources, viz., the New River Company, the East London Water Company, and the Local Board's waterworks. Since 1873 some of the East London water has been delivered by gravitation to the Local Board's pumping station, the "Land-water" supply has been altogether cut off, the bore-hole at the "Hale well" has been deepened, and the borings at "Longwater" have been extended further into the chalk. With the exception of a small part of the District which is supplied on the constant system by the East London Water Company, the water-supply of Tottenham is intermittent. As a result, water cisterns abound, and in many of them water is stored under unwholesome conditions. Frequently a single cistern affords water both for drinking and for closet flushing purposes; and this common cistern is often so placed as to favour the impregnation of the contained water with emanations from the closet.*

Many houses where Enteric Fever had occurred were provided with cisterns faulty in the above sense.

There is also evidence of deficient pumping power, since the cisterns of closets placed on the upper floors of houses frequently run dry. (I understand, however, that this is to be remedied.)

(III.) *House Drainage.*—The result of my examination of about 120 houses in which Diphtheria and Enteric Fever had prevailed was the following:—

In rather under **20** per cent. of those in which Diphtheria had prevailed did I find any definite defects of house drainage, whereas about **65** per cent. of those in which Enteric Fever had existed showed marked deficiencies in this respect. The contrast between these relative proportions merits notice. The defects in house-drainage referred to as associated with Enteric Fever comprised improper disposal; want of trapping and of disconnection of waste-pipes; broken and disused slop gullies; want of proper ventilation of house-drains, including faulty construction and position of soilpipe ventilators.

(IV.) *Disposal of Refuse.*—The method of refuse disposal throughout the District calls for comment. In many places no ashpits exist, but house refuse is thrown, mixed with vegetable material, on the ground. Many of the existing ashpits are too close to houses, badly and improperly constructed, often uncovered, and not infrequently dilapidated. Scavenging is undertaken by the Authority, but only six carts are in use; householders complained to me

* A more or less inefficient "check valve" is the only means, in most instances, of preventing the access of closet air to the water.

that as a result of this, they had great difficulty in getting their accumulations of ashes and house refuse removed. The want of regular systematic scavenging is especially conspicuous throughout the poorer parts of the District, and constitutes both a serious nuisance and a marked danger to health.

(V.) *Condition of Basements and Yards.*—In many of the houses where the two diseases under investigation had prevailed, basement floors were either found to be constituted of earth, or they were unevenly and irregularly flagged. Damp-courses were seldom found in any but the more recently constructed dwellings, and wooden floors were in consequence often found to be damp and rotten. The paving and channelling of yards were in many cases defective in the extreme or altogether absent; in such yards sheets of water remained after a heavy rain.

(VI.) *The Moselle Brook.*—Since Mr. Radcliffe's inspection, this rivulet, which traverses the District from west to east in its serpentine course to the River Lea, has been culverted in a great part of its length; where still open, its bed and sides have been cemented. In spite of this general improvement it still forms, in the parts of it adjacent to lower class houses, a tempting receptacle for house-refuse; in addition I found the part of it at Broad Green, termed "Hale ditch," foul-smelling and silted up in places with sewage deposit, the result of the emptying into it of the overflow from an 18-inch sewer.

Such then constitute the main unwholesome conditions associated in Tottenham with the sustained and endemic prevalence of Diphtheria and Enteric Fever, and the chief sanitary shortcomings of the District. It remains to refer briefly to other conditions which have tended to favour the spread of these diseases, and more particularly of Diphtheria. They are want of proper means for isolating the sick, and the condition of school attendance.

As to want of *isolation*. The absence of adequate means of isolation throughout the district and the neglect by the Sanitary Authority to supply the want, have been powerful means of fostering the prevalence of infectious disease in Tottenham. Attacks have often been multiple in families. Thus, taking the Diphtheria deaths in 1884, 48 occurred in 38 houses, and in 1885, 17 in 11 houses. Non-fatal cases, too, often followed each other in the same family.

With respect to *school-attendance*, there was some suggestion of this having assisted in the spread of Diphtheria, for it was found that, in families during the autumn and winter of 1884, and beginning of 1885, the children first attacked were in almost every instance attendants at two particular schools, viz., St. Katherine's and Coleraine Park. It was further noticed that cases occurring simultaneously in children residing in separate localities, whose dwellings presented great diversity of local conditions, were attendants at one or other of these schools. Most of the cases whose school-conditions were thus noted were attendants at St. Katherine's; at this school it may be noted that defective fall, imperfect ventilation, and absence of disconnection from the main sewer were discovered in respect of the house-drains.

In regard to *milk-distribution*, no marked disproportion in incidence of Diphtheria and Enteric Fever was observed upon the customers of any particular milk seller, except towards the end of 1884, when, of eight fatal cases of enteric fever during November and December, four had milk from the same source. But these cases were all near each other, and also near the dairy which supplied the milk; further, no local condition of the dairy or of the cows in it was found sufficient to afford ground for suspecting the particular milk as a vehicle for conveying the poison: the fact that these four cases received their milk from the same source may be looked upon therefore as a coincidence.

It was observed that "Sore-throat" often preceded and followed Diphtheria in the same house and family, appearing to act as a link to undoubted cases of Diphtheria. So called "Gastric" attacks were met with in families which were suffering at the time undoubted Enteric Fever.

Action taken by the Sanitary Authority.—The sewerage system and outfall works, described by Mr. Radcliffe in his 1873 Report on Tottenham, and which

were designed for a maximum population of 20,000, still remain, although much has been done in the way of addition and improvement since that date, and several loans for sewerage purposes have been granted by the Local Government Board. Recently, a further scheme for the extension and amelioration of the sewage outfall works at a cost of over 13,000*l.* has been sanctioned. The question of sewer-ventilation has also received attention at the hands of the Sanitary Authority; and a special report on the subject was drawn up by Mr. de Pape, the Surveyor, in 1880, in which he advised further action in connexion with the erection of upcast shafts. Very little, however, has been done towards effectually improving the condition of sewer-ventilation. As regards flushing of the sewers, no self-acting apparatus has apparently been thought necessary for this purpose. It is but right to add that a complete remodelling of the sewers is under consideration, and that already a considerable length of a 3′ 6″ brick sewer has been laid in Broad Lane. The greater number of cesspools have been filled up since Mr. Radcliffe's inspection.

It is also proposed to considerably increase the amount of the Local Board's water supply, and to make the service if possible a constant one. For this purpose fresh borings are being made into the chalk at Longwater, and fresh pumping power is to be provided.

No systematic house-to-house inspection of the district appears to be practised, nor has such action been within the capacity of a single Nuisance Inspector.

No hospital provision has as yet been made by the Sanitary Authority. Paupers suffering from infectious disease are sent to the Edmonton Workhouse Hospital, and non-pauper Small-pox cases to the Highgate Small-pox Hospital. But there is no hospital isolation obtained by the Sanitary Authority for non-paupers suffering from diseases other than Small-pox. Some of the Enteric Fever cases occurring in better class houses are admitted to the Training Hospital at Tottenham High Cross. The sanitary committee of the Local Board are, however, busy looking for a hospital site, but so far they have not been successful in finding a suitable one.

Disinfection of houses by burning sulphur is usually carried out after the occurrence of infectious disease, but the Sanitary Authority possesses no proper disinfecting chamber.

At a meeting of the Local Board on May 5th of this year, it was agreed to adopt a system of voluntary notification of infectious disease by medical practitioners to the Health Officer, a fee of 2*s.* 6*d.* being given for each notice.

No closure of schools for Diphtheria was recommended by the Medical Officer of Health, or carried out by the Sanitary Authority.

Sanitary Administration.—The Local Board consists of 12 members, but it is proposed to considerably extend this number. Mr. Edward Crowne is Clerk, receiving a salary of 450*l.* per annum; Dr. Tyndale Watson, of Tottenham, is Medical Officer of Health, at a salary of 75*l.*; and Mr. Conolly, of Wood Green, Assistant Medical Officer of Health, at a salary of 50*l.* Mr. A. de Pape, C.E., is Surveyor, at an annual stipend of 500*l.*, and is debarred from other professional employment. Mr. C. Easton is the recently appointed Inspector of Nuisances for the whole District, at a yearly remuneration of 150*l.*, and is also debarred from other work. The Sanitary Authority has an excellent series of bye-laws as to new streets and buildings based upon those of the Local Government Board; and a building inspector is appointed to see that they are observed.

R. D. R. Sweeting.

May 25th, 1885.

RECOMMENDATIONS.

(1.) In reference to any improvements in sewerage which are to be undertaken, regard should be had to the urgent need for adequate and proper ventilation; and for efficient flushing of the old sewers.

(2.) The Local Board's water-service should be made entirely constant, so that cisterns for drinking water could be dispensed with.

(3.) No time should be lost in providing a Hospital for the isolation of infectious diseases. For details, the Official Report on Hospitals in the Supplement by the Medical Officer to the Tenth Annual Report of the Local Government Board (issued as a Parliamentary Paper, C. 3,290, of session 1882), might with advantage be consulted.

(4.) A proper disinfecting chamber should be provided by the Sanitary Authority.

(5.) House-to-house inspection of the district should be made with a view to detecting defects of house-drainage, and for securing ventilation of house drains, disconnexion of these from the sewers, and separation of waste-pipes from direct relation with the drains.

(6.) Steps should be taken under section 36 of the Public Health Act, 1875, with reference to houses without ashpits, or with ashpits not properly covered. The present system of scavenging is capable of considerable improvement and extension.

(7.) The nuisance arising in connexion with the state of the Moselle Brook should be dealt with by the Sanitary Authority.

(8.) In view of the rapidly increasing population of the district, particularly in Wood Green, the Authority should consider the question of affording to the Inspector of Nuisances such assistance as may be requisite for the efficient discharge of his duties, especially for such part of them as arises in the neighbourhood of Wood Green (sec. 189 of Public Health Act, 1875).

(9.) The Official Memorandum on school-closure might with advantage be consulted by the Authority.