

Dr. S. Monckton Copeman's report to the Local Government Board on prevalence of measles, enteric fever and diphtheria in the borough of Lowestoft, and on general sanitary administration in that town / [S. Monckton Copeman].

Contributors

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Dr. S. Monckton Copeman's Report to the Local Government Board on prevalence of Measles, Enteric Fever, and Diphtheria in the Borough of Lowestoft, and on General Sanitary Administration in that Town.

R. THORNE THORNE,
Medical Officer,
July 30th, 1896.

The Board learnt through the Registrar-General's Returns for the last quarter of the year 1895 that during that period fifty-seven deaths had occurred from measles and eight from diphtheria in the Lowestoft Registration sub-district of which the Borough of Lowestoft forms by far the greater part. In February of the present year also, the Board learnt in ordinary course of the occurrence during the last ten days of 1895 and in the month of January 1896 of sixteen cases of enteric fever in the Borough of which six were notified in December and ten in January.

Under these circumstances I received instructions from the Board to visit the town and to make inquiry into the sanitary administration of the Borough with special reference to the recent prevalence there of different forms of zymotic disease.

I.—GENERAL SANITARY CIRCUMSTANCES.

Lowestoft is a town situate on the sea-coast at the extreme north-east of the county of Suffolk, on either side of an artificial cutting connecting the River Waveney with the sea, and which forms what are known as the inner and outer harbours. The Borough covers an area of 2,306 acres; its rateable value is 97,885*l.*, and its estimated population is 27,162. The trade of the town is chiefly concerned with fishing and other cognate industries.

The town is divided by the river and harbours into two distinct portions. That on the north bank is known as the old town, that to the south of the river, which includes Kirkley and Pakefield, being for the most part of very recent growth.

From the level of the river the ground to the north slopes somewhat rapidly upwards, some parts of the old town being therefore at a considerable height above the sea level. There are, however, a number of houses built on the Denes, at the foot of the cliff, and consequently at so slight an elevation above the sea, that it is practically impossible to connect them with the sewerage system. The town, south of the river, is built on a plateau of sand, which, at the southern limit of the Borough, gradually rises towards the

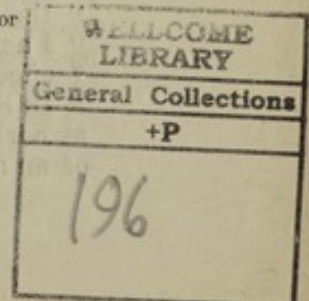
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cliffs which commence at Kirkley. This, the new town, is almost entirely a residential quarter, being made up in large part of boarding and other lodging houses with a certain proportion of hotels and shops. The majority of the houses here have been erected within quite recent years, and for the most part therefore the general sanitary arrangements are of a more satisfactory character than is found to be the case in many parts of the old town.

WATER SUPPLY.

Lowestoft is supplied with water in part from the mains of the Lowestoft Gas and Water Company, and to a less extent from surface wells, these latter being most numerous in the older portions of the town.

The Water Company obtain their supply from the "Mill-water," an extension of a lake known as Fritton Broad, situate in the parish of Lound, and about seven miles distant from Lowestoft. The Company's Act empowers them to take water also from Fritton Broad itself, should the present source of supply become inadequate. The works of the Water Company are situate on the extreme south-west corner of the "Mill-water," and at a considerable elevation above it. The orifice of the pipe connected with the pumping engines is at a point opposite the works, and close to the water's edge on that side. From the lake, water is pumped up to the filter beds, six in number, of which four measure 70 feet by 40 feet, while two larger ones, which have been constructed quite recently, measure 120 feet by 80 feet.

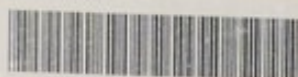
The filtering material in each case is said to consist of a layer of sand 3 feet in depth, below which are shallower layers of shingle and stones, the size of which increases in each layer from above downwards.

From the filter beds, any one of which can be thrown out of action at will, the water passes into a single catchment chamber, 12 feet in depth, from which in turn it is pumped to covered reservoirs at Lowestoft. From these it is distributed by mains to various parts of the town. The elevation of the reservoirs is such that it is possible to supply water to every house in the town by gravitation, although in the case of a few dwellings at its northern extremity the upper floors cannot be reached.

In all, the Company's water is supplied to 4,755 houses out of a total number of 6,000 in the Borough, of which no less than 2,343 are unprovided with water-closets. As to the quality of the water supplied by the Company, there seems to have been, in the past, considerable difference of opinion.

The most recent chemical analysis which I have been able to obtain is one dated February 17th, 1896, by Mr. Francis Sutton, the Public Analyst for the county of Norfolk, and who also acts for the Water Company. Concerning the results of this analysis, Mr. Sutton says: "The water is in excellent condition, and suitable in every respect for a public supply. No better water, in my opinion, could be desired." He adds that the sample examined was "clear, bright, and well filtered." In November of last year, a number of samples of water were taken by the Medical Officer of Health, by direction of the Town Council, and submitted to Dr. Thomas Stevenson, of Guy's Hospital. Of these samples, five were taken on November 14th, 1895, from hydrants, after previous thorough flushing. These specimens were all turbid and unsightly in appearance, and this condition Dr. Stevenson declared to be due to inefficient filtration. The water was found to be free from sewage or other organic pollution. Three additional samples were sent on November 18th, 1895, taken respectively, as I was informed, from (1) the fountains of the filter beds, (2) the catchment chamber, and (3) a house-tap in the London Road. Concerning these, Dr. Stevenson remarks that "the unfiltered water is satisfactory as regards organic purity . . . but the filtered waters do not show the marked purification one would expect from efficient filtration, and I am led to the conclusion that the filter beds are inefficient, and do not effectually free the water from organic contamination."

In September 1895 an order was made on an owner of cottage property at Kirkley to close a well. This the owner objected to do on the strength of an analysis of the Company's water supplied to his own house, which he



had obtained from Mr. West Knight, the Public Analyst for Cambridge. As the result of his analysis, Mr. West Knight stated that he considered the water to be polluted with organic matter and quite unfit for drinking purposes. This being so, the Town Council did not enforce closure of the well. A somewhat similar opinion was expressed by Mr. Bernard Dyer, Public Analyst for Leicestershire, after examination of a sample of the Company's water obtained on December 19th, 1895, from a tap at St. John's Vicarge, where just previously there had been cases of typhoid fever.

It is only right to state, however, that all these analyses, with the exception of Mr. Sutton's, were made previously to the new filter beds at Lound being in working order. The marked turbidity of some of the samples is therefore probably, as I was informed, to be explained by the fact that as the old filter beds were unequal at times to the filtration of the total quantity of water required, a certain amount of unfiltered water was, on occasion, turned directly into the mains.

Although none of these analyses show any very large amount of organic contamination in the water, I came to the conclusion, as the result of my visit to Lound, that occasional danger in this respect was to be anticipated from the fact that a small brook which originally entered the upper end of the "Mill-water" close to the waterworks, passes just beforehand through a tract of swampy land, which in places is heavily manured with privy-midden and pigsty refuse, derived in part, at any rate, from a number of cottages in the immediate vicinity. Above this particular spot, the water of this brook or "run," as it is called, is used by cottagers for drinking purposes, being collected from a small pool where the roadway crosses the "run." This water, as I was told by persons on the spot, is liable to cause diarrhoea and sore throat in those drinking it, unless it has previously been boiled.

At the present time, the point of outfall of the "run" into the "Mill-water" is blocked by a wooden barrier, and a new channel has been excavated parallel with the edge of the lake, by which its water is carried off, being finally turned into the lake at a point about 60 feet further on, and below the position of the waterworks intake. The manager of the waterworks assured me that it was improbable that any of this water could be taken up in pumping, as more than the quantity required daily was supplied by springs in the bed of the lake, thus obviating the possibility of any backward flow of water derived from the "run." As, however, he had not instituted any float or lithia experiments in reference to this point, his mere expression of opinion cannot be regarded as altogether decisive.

A not inconsiderable proportion of the houses in the Borough, about 1,000, as I was informed, obtain their water not from the Company's mains, but from surface wells, generally within their own curtilages. In many instances which came under my own notice these wells, the sides of which for the most part are by no means watertight, were in proximity to privy middens, the floor and sides of which are seldom or never properly cemented. As the natural consequence, the intervening soil and eventually the contents of the well become fouled with organic matter of excremental origin, so as to render the well water unfit for human consumption. That this is so has been shown repeatedly as the result of chemical analysis of the water drawn from these surface wells.

In a number of cases in which, up to the present time, evidence of contamination of wells has been obtained, orders have been made for closing them and for the provision of a better water supply. Latterly, however, orders have not in all cases been made, or, if made, compliance with such order has not always been insisted on, in consequence of serious doubt which, as I have already stated, has arisen as to the desirability from the hygienic standpoint of the water supplied by the Waterworks Company being brought into more general use for drinking purposes than is the case at present. It is to be hoped, however, that the increased facilities which the Company have recently provided for the efficient filtration of their water supply may have the desired effect, in which case it will be desirable to close, at any rate, the greater number of the surface wells at present existing in the town.

SEWERAGE AND DRAINAGE.

The town possesses a main drainage system, which is made up of three sub-divisions; two serving the area north of the harbour to be termed the northern and central system respectively, the third serving that portion of the town which is situated south of the river.

The sewers of these three systems all converge to a point called Lowestoft Ness, the easternmost spot in England, where they are supposed to discharge to the sea. The main sewer of the central system, which serves the greater portion of the old town, is built of brick, and is 4 feet in diameter. The main sewer of the northern system is composed of 30-inch earthenware pipes, while the terminal portion of the sewer serving the south town is a 12-inch iron pipe. Formerly this latter used to open directly into the harbour, but, in consequence of complaints as to the condition of the water in the harbour at certain periods, the sewer was continued by an invert under the harbour, and allowed to discharge into a pumping well on the north bank, whence the sewage was forced by means of ejector pumps on the Shone system to the present outlet at the Ness point.

Here the north town sewers were originally carried to a "valve chamber,"* to which, later, the contents of the south town sewer were also pumped and from which twin outfall pipes, supported on piers and protected by groynes, carried the sewage out to sea. For some years past, however, the sea has been encroaching on the beach in the vicinity of the Ness point, more particularly to the south of the outfall works, and, in consequence, in 1884, Mr. Henry Law, C.E., was called in to advise as to what steps should be taken to protect the works. On visiting the locality he formed the opinion that the safety of the valve chamber and the 4-foot sewer from the old town had, on its way to the valve chamber, become seriously endangered by such encroachment. As the action of the tide was apparently enhanced by the obstruction offered by the groynes and jetties, he recommended that the obstruction should be reduced to the least possible dimensions, by removing the groynes and by cutting down the piles to the level of the pipes which they carried. In this way he anticipated that free movement of shingle from the north would be permitted, and that the disturbance and agitation of the water which appeared to be the cause of the scouring action on the south side of the jetty would be prevented.

As the result of Mr. Law's report the height of the piles was reduced and the groynes removed, in consequence of which the expenditure on maintenance was for a time considerably reduced. The sea has, however, gradually continued to encroach and to so great an extent that eventually the valve chamber settled down so much as to close up one of the converging sewers, while a large fracture in about the centre of the structure also resulted. This shifting of the beach due to encroachment of the sea in the vicinity of the Ness point has now been progressing, especially during the autumn and winter, for many years and to so great an extent that the 4-foot and 30-inch main sewers between the valve chamber and the town have been frequently exposed, and during heavy seas and strong spring tides have been considerably weakened and damaged, the main 4-foot sewer suffering most by reason of its more exposed position. Between December 1893 and January 1895, indeed, portions of the 4-foot sewer collapsed from time to time so that at present about 100 feet of it are wrecked, the chief part of the damage having been occasioned by a very high tide which occurred on December 22nd, 1894. At the present time therefore the contents of this sewer do not reach the valve chamber, but escape to the sea as best they can across the beach.

While in Lowestoft I visited the site of the outfall works when I found that the terminal portion of the 4-foot or intercepting sewer broken away in several places for some considerable distance before reaching the valve chamber, and the end of the section, as yet intact, completely blocked with sand and shingle so that no solid matter whatever could escape, while

* This "valve chamber" is a square brick collecting tank to which the three main sewers all converge. The exit opening towards the sea is provided with a flap valve in order to prevent ingress of sea-water at high tide.

even the liquid contents of the sewer could only manage to escape towards the sea in a mere trickle down the sand. This state of affairs follows, as I was informed locally, on every high tide, at which period the shingle is swept up by the sea, notwithstanding the fact that at every ebb tide men are employed to dig away such accumulations and so free the sewer once more. Under existing circumstances, therefore, during a considerable portion of the 24 hours the 4-foot sewer becomes practically converted into an elongated cesspool, and during times of rainfall especially, grave nuisance, if nothing worse, is likely to arise from the backward pressure exerted by its liquid and gaseous contents. On the spot also the smell was exceedingly disagreeable, so much so that I found it desirable to keep to windward of the sewer.

The Town Council as far back as November 1893 referred to the Beach Outlet Committee the consideration as to whether the present works should be maintained or whether it was desirable that new works should be constructed.

Much discussion has, from that time onward, taken place in reference to this matter, and eventually in June 1895 the Beach Outlet Committee recommended that application should be made to the Local Government Board to sanction a loan for 6000*l.* with which to carry out works in connexion with a new sewer outfall. On August 9th 1895, a local inquiry was held by Colonel Hasted with reference to this matter, but the divergence of opinion elicited during the inquiry was so great that in November 1895 Major Tulloch was instructed to visit the locality and report on the matter. As the result of his visit he came to the conclusion that the Ness was the most suitable point for the discharge of sewage, and recommended either that the present outfall should be maintained or that another should be established just to the north of it.

In March of the present year plans were prepared for a scheme in accordance with Major Tulloch's recommendations and a tender for the work was accepted subject to the sanction of the Board. But on April 14th the Town Council rescinded a previous resolution adopting such scheme, and the Surveyor was ordered to prepare alternative plans, &c., for a new outfall at a site about 120 yards south of the present valve chamber. These plans together with a covering letter from the Town Clerk were in due course submitted to the Board for their approval with the statement that Major Tulloch's objections to somewhat similar plans, previously presented, had been obviated. To this letter the Board replied on May 15th, 1896, that they would not be prepared to sanction a loan for a scheme by which the sewage of the Borough of Lowestoft would be discharged at an outfall south of the existing one and nearer the town.

The main sewers and their various ramifications were originally ventilated by manholes and lampholes communicating with the outside air by means of gratings in the roadways on a level with the ground surface. Of these, there were originally 246 manholes and 69 lamp-holes, but recently the gratings covering a large number of these have been sealed up, in consequence of complaints of nuisance from the foul odours which periodically emanated from them.

The late Medical Officer of Health, Dr. Clark, was strongly of opinion that the system of sewer ventilation by open manholes constituted a grave danger to health, and in a lengthy report presented to the Town Council, he entertains the view that this system had causal relationship with increase of diphtheria in the town. In consequence of this report, the Town Council resolved :—

1. That every surface ventilator within 50 yards of a ventilating shaft be immediately closed.
2. That every surface ventilator that may be within 50 yards of any public or large private school entrance or exit be immediately closed.

In consequence of these resolutions no less than 183 surface ventilators have since been closed, but the erection of ventilating shafts in their place has not been carried out to a corresponding extent. Where, also, shafts have been erected against the sides of buildings, they have not, in any case, as far as my own observation goes, been continued up above the roof, and in one instance especially, I noted that the open termination of the ventilation

shaft is placed just beneath the eaves, so that it is unlikely that its intended purpose of ventilating the branch of the sewer with which it is connected can be satisfactorily accomplished.

It is consequently desirable not only that more ventilating shafts should be provided, but that they should be erected in such a fashion that they may be capable of efficient action.

The street gulleys are occasionally flushed with sea-water by means of tank carts, but otherwise no systematic flushing of the sewers is carried out.

Until quite recently in the case of much of the lower-class house property the rain-water pipes appear to have been, as a rule, connected directly with the drain leading off from the yard gulley, or from the water-closet, where such existed, without the intervention of a trap of any sort. The expectation seems to have been that the rain-pipes would act as ventilators to the drains, but as not infrequently the rain-water pipe opens at its upper extremity just beneath a bed-room window, such an arrangement is obviously not altogether unattended with disadvantage to the health of the inmates of the dwelling. I learnt, however, from the Medical Officer of Health (Dr. Thomas) that the matter has been receiving attention of late and that he has already in a large number of instances been successful in securing the disconnexion of rain-water pipes from drains, the usual plan adopted being to cause the pipe to discharge, above ground, over a specially trapped gulley in the yard.

EXCREMENT AND REFUSE DISPOSAL.

In the "new town" the houses are almost universally provided with water-closets, which discharge into the sewers of the southern branch of the main sewerage system. In the northern portion of the town the better-class houses are also provided with waterclosets, but in the North and West Wards this is rather the exception than the rule. In those districts where the houses are of low rental value, the method of excrement and refuse disposal is for the most part by means of privy-middens, the middens being often of large size, of considerable depth, uncemented, and without protection from the weather. Of these privy-middens I was informed that about 3,000 still exist in the town, though a number have been done away with or converted into water-closets during the last year or two. This has been particularly the case where, owing to the house having no means of access from the back, it was necessary, when cleaning out the midden, to carry the nightsoil through the house itself. This state of affairs persisted until recently, in the case of each of a long block of houses which I inspected, in Pakefield Street. In May 1894, the Town Council ordered "that all houses in the Borough, where nightsoil is now carried through the houses, be required to be provided with water closets." This order, however, only affected about 125 houses out of the total number possessing privy-middens, so that the nuisance and possible danger arising from this method of excrement disposal remains very much in statu quo.

Thus in Raglan Street, North Ward, I found that privies were universal, and that, in one case, a midden was so full and its contents so moist that there was soakage of its fluid contents through the privy into the yard. A somewhat similar condition was observable in the case of several others of the lower districts of the town which I visited, and is due to the fact that the occupiers of such premises often make a practice of emptying household and other slop water into the midden, especially if there be no yard gulley at hand. A considerable quantity of fish-heads and other offal also finds its way into the middens, especially into those serving houses the inhabitants of which are engaged in some branch or other of the fishing industry. Under these circumstances it is not difficult to understand that although, as a rule, all privies and privy middens are emptied once a month* by the employés of the Town Council, the smell from these receptacles in the height of summer is apt to be greatly complained of. Such surroundings tend to decrease the power of resistance to diseases in persons living among them, and if these middens should happen to become infected by the specific microbe of such

* For two months during the "season" these receptacles are emptied at intervals of a fortnight.

a disease as enteric (typhoid) fever, through the discharges of a sick person being thrown into them, grave danger to health is likely to arise. It cannot, indeed, be expected that enteric fever can be altogether banished from the town so long as the unsanitary conditions which persist at present, chiefly among which must be mentioned prevalence of the privy middens, are not effectually dealt with.

According to a statement made to me by the Medical Officer of Health a very small per-centage of the water closets in the town are fitted with efficient flushing apparatus, and the waterworks manager informed me that the Company claim under their Act the power to determine the particular form of flushing cistern which shall be employed, where such an apparatus is to be fitted. He has since added by letter that the Company supply iron cisterns of the type approved by them, to builders and others, at a cost of 1*l.* 7*s.* 6*d.* each. These are of 2-gallon capacity, but have the disadvantage that the flow from them is only established as long as the plug or chain is held, the Company refusing to allow the use of siphon flushing cisterns. This being so it is likely that the complete flush of two gallons is seldom or never obtained.

At a meeting on January 14th, 1895, the Council in dealing with the question of the conversion of certain privies into water closets determined that their order should not include the provision of a flushing apparatus, this decision, as it was stated to me, having been arrived at as a sort of protest against the claim of the Water Company. In answer to an inquiry the Town Clerk told me that this resolution was intended to apply only to the premises actually under consideration at that particular meeting. Unfortunately, however, a much wider construction has been put upon it, especially by owners of cottage property, and, in consequence, in nearly all recent cases where orders have been made for the conversion of privies into water-closets, no special means of flushing have been provided. Such closets therefore must be flushed by hand, the not uncommon result being that, as in some that I saw, they are not flushed at all, or to a most inadequate extent; not infrequently therefore closets are in a most filthy condition. In one case a woman told me that she had to fetch all her water from a stand pipe at a considerable distance from her house, and that this she could not do on every occasion that the closet was used.

It is impossible not to agree with the statement made by the Medical Officer of Health in his Annual Report for 1895, that the decision of the Council in this matter is a most regrettable one, and should be reconsidered at the earliest possible moment.

All refuse of other than excremental origin is, as a rule, removed once a week under the supervision of the Inspector of Nuisances. The work is actually carried out by men employed by a contractor, who is paid the sum of 14*l.* 7*s.* per week by the Town Council, who also provide all the necessary carts and horses. For a few weeks, during the season, collection of refuse is made daily in certain parts of the town. The material collected is carted to two depôts outside the town, where it is deposited in heaps until it can be got rid of. The Inspector of Nuisances arranges for its sale to farmers and others, and owing to the fact that much of it is made use of on lands in the immediate vicinity of the town, in some cases closely adjoining the main roads, complaint has not unnaturally arisen as to the nuisance occasionally experienced from this source.

On the occasion of my visiting the waterworks at Lound, I found that the main road along which we drove from Lowestoft was strewn on one side for some distance with scraps of paper, &c., which had been blown over into it from adjoining fields on which town refuse had been spread. On this occasion, also, we experienced a smell from this same source, which was the reverse of pleasant, although the day was by no means hot. I find that the Medical Officer of Health has stated to the Town Council that, in his opinion, this deposit of night soil on land in the neighbourhood of the town "is a source of great danger," and seeing that it must not infrequently contain a certain proportion of discharges from patients suffering from typhoid fever and other infectious diseases, the presence of a definite element of danger to health is obvious.

Probably the most satisfactory method of dealing with the town refuse of all kinds would be by cremating it in a destructor, which, if properly situated and managed, need create no nuisance. As far as I am aware, however, the recommendation of the Medical Officer of Health as to the adoption of such a method of refuse disposal has not been taken into consideration by the Town Council.

SLAUGHTER-HOUSES, DAIRIES, COWSHEDS, AND MILK SHOPS.

There are a considerable number of slaughter-houses in the town, many of which I visited in company with the Medical Officer of Health and the Inspector of Nuisances. For the most part I found them in fair condition as regards cleanliness and ventilation, but in several instances they are in immediate proximity to dwelling houses, the inhabitants of some of which make great complaint as to the nuisance from them, especially in hot weather. Without particularising in each instance the premises specially referred to, I may state that in one case I found that no water supply had been provided, while in two others the blood pit had not been emptied within the required period. Of more importance, however, is the fact that, in connexion with almost every slaughter-house visited, I found that pigs, in one case to the number of thirteen, were kept on the premises, and were fed in large measure on blood and offal from the slaughtered animals. Unfortunately no byelaws for the registration and regulation of slaughter-houses are in force in the Borough, although the Medical Officer of Health has made representations on the subject to the Town Council. In consequence of many complaints as to the keeping of pigs in slaughter-houses, it was, however, decided early in the present year to give notice that, after March 1st, butchers having pigs on their premises would be proceeded against as causing nuisance. I have since heard from the Medical Officer of Health that in all instances this notice has had the desired effect.

I inspected a number of dairies, milk shops, and cowsheds in different parts of the town. In all those visited the general sanitary conditions, as also the arrangements for the storage and distribution of the milk and the cleansing of milk cans and other trade utensils, appeared to be not unsatisfactory.

II.—DISEASE PREVALENCE.

MEASLES.

During the third and fourth quarters of the year 1895, measles was prevalent to an exceptional degree in Lowestoft. The malady presented also a type of unusual virulence, no less than 75 deaths having been registered as due to this disease up to December 31st, 1895, this number representing a death rate for the half-year of 2.94 per thousand of the total population.

Although the late Medical Officer of Health had advised the addition of measles to the schedule of diseases notifiable in the Borough, the Sanitary Committee had not, up to the time at which the epidemic commenced, considered it desirable to recommend the Town Council to adopt this course. In consequence it has not been possible to arrive at any accurate estimation of the total number of persons attacked by the disease, but the Medical Officer of Health somewhat vaguely puts it down as "several hundreds."

Previous to the appearance of the first cases of the disease in the autumn of 1895, no deaths from measles had been registered in the Borough for more than three years, from which fact one may fairly infer that, even though cases of the disease may have occurred during that period, they were at any rate comparatively few in number and of mild type. In consequence there would be likely to be, at the time at which the outbreak at present under consideration first appeared, a considerable number of susceptible children among the population who would be liable to attack on coming into contact with the disease.

As the outbreak commenced during the interval between the resignation of the late Medical Officer of Health (Dr. Clark) and the appointment of

his successor (Dr. Thomas), who came into office on September 1st, 1895, I found it difficult to obtain reliable information as to the origin of the measles, but as the result of the investigations of Dr. Thomas, it would appear that the first known case of the disease was that of a visitor, aged 29 years, who came to stay at Kirkley, who developed measles very shortly after arrival in the locality, and who eventually died of this malady on July 9th, 1895.

No other death from measles was registered for more than a month afterwards, while between the second and third there was again an interval, to early September, of about three weeks. From this time onwards, however, deaths from measles occurred almost daily, and, occasionally, two, three, or even more in one day up to the end of November. In December only three deaths from this disease were registered, and by the end of the year the malady had ceased to assert its presence.*

Although the disease had, after its first introduction, spread to a certain extent from house to house, it was not, as already stated, until the beginning of September that it obtained any serious hold on the population. This period corresponded with that at which the various schools re-opened after the summer vacation, subsequently to which time the gathering together in these establishments of numbers of children, some of whom though perhaps not known to be ill were yet in a highly infectious condition, would appear to have conduced in no small degree to the further and rapid spread of the disease. In May 1894 the Town Council had directed that the school attendance officer (Mr. Cobb) should notify to the Medical Officer of Health, on a form supplied to him for that purpose, the names of any children whom he found to be absent from school on account of measles, and that he should be paid a fee of twopence per case for such notifications. Dr. Thomas stated to me, however, in reference to this subject that, when he entered on his duties as Medical Officer of Health, he was not informed by anyone of the presence of the disease in the town and that the Inspector of Nuisances was equally unaware of its existence. The first knowledge of the true state of affairs was afforded by a list forwarded to the Medical Officer of Health early in September by Mr. Cobb, which contained the names of no less than 85 children whom he had found to be absent from school on account of measles, either because they were themselves the subject of the disease or because it had broken out in their families.

The Medical Officer of Health at once endeavoured to obtain authority for closing the various schools which these children had been severally attending, but failing to obtain such authority he at once visited all the elementary schools in the town and obtained information in each case as to the number of absentees, and instructed the school authorities to exclude for a time not only all children who had just recovered from the disease, but also all who were coming to school from houses known to have been infected. He also set to work to visit personally a large number of invaded dwellings with the result that he found that most of the children of school age who had been attacked had recovered from their illness, and that the malady was now mainly affecting infants and other children below school age. He found, moreover, as he informed me, that in many instances mothers appeared to have no proper appreciation of the danger of the malady, and not infrequently made the statement to him that "everyone must have the disease, and the sooner they had it the better," and that with this object in view, children had been purposely taken to houses, certain of the inmates of which were at the time suffering from measles.

Dr. Thomas further informed me that, in his opinion, the exceptionally severe type of the disease, together with the unusual death-rate among those attacked, was in some measure, at any rate, dependent on the high atmospheric temperature which prevailed during the autumn of 1895, together with the fact that a large proportion of those cases which terminated fatally were complicated with diarrhoea, and, later on, with diphtheria, the true nature of which was, in a number of instances, definitely determined by means of bacteriological examination.

* For table giving number weekly in 1895 of fatal cases, see Appendix.

In answer to inquiries on my part as to what action had been taken by the Town Council to check the progress of the disease, Dr. Thomas stated that disinfectants were freely distributed to the inmates of invaded households, and that care was taken to secure isolation of patients wherever that was possible. Instructions were also given as to the best methods of preventing the spread of infection, such as the avoidance of indiscriminate visiting, and the sending to school of children from houses in which a case of the disease had occurred, until the medical practitioner, if one were in attendance, had certified that there was no further risk of infection.

Whether in consequence of the precautions thus taken, or because the supply of susceptible material had become exhausted, the epidemic finally died down by the end of the year, and thus far during the present year no further deaths from measles have been registered in Lowestoft.

As a result of the experience through which the town had recently passed, the Council at a meeting held on December 10th, 1895, determined that, subject to the consent of this Board, the provisions of the Infectious Disease (Notification) Act, 1889, should apply to measles, and this resolution was approved by the Board on February 5th of the present year.

ENTERIC FEVER.

Of this disease 40 cases were notified in 1895, during which year also eight deaths were registered as from this cause. Two of the cases, according to the Medical Officer of Health, were imported into the town: one from London, a school teacher, in whose case the malady had a fatal termination; the other a cooper from Scarborough. Of the 40 cases, 18 were removed to the Sanatorium for treatment, of whom only two died.

Six of these cases occurred in December 1895, and these were followed by 10 more in January 1896, and this fact was reported to the Board by the Medical Officer of Health on February 1st of the present year, as he considered that the number of attacks was indicative of epidemic prevalence. After careful investigation, at the time of my visit to Lowestoft, I found it impossible to define any condition other than such as are always present in the locality as responsible for this particular outbreak.

Enteric fever, indeed, would appear to be endemic in Lowestoft, as may be learnt from consideration of the fact communicated to me by the Medical Officer of Health, that the death-rate from this disease per 1,000 of the population was, in 1895, almost identical with the mean enteric fever death-rate for the previous 11 years, the figures being 0.476 and 0.483 respectively.

The appended table shows, for each of several sub-divisions of Lowestoft, the actual number of cases of enteric fever during the last six years, with the enteric fever deaths in each year for the town as a whole.

ENTERIC FEVER CASES AT LOWESTOFT.

—	Estimated Population.	Notified Fever Cases.					
		1890.	1891.	1892.	1893.	1894.	1895.
North Ward - - -	7,145	16	12	6	22	11	13
South Ward - - -	5,721	4	—	2	12	2	8
East Ward - - -	5,107	5	2	3	7	5	9
West Ward - - -	7,189	38	9	6	22	12	10
Port - - -	2,000	—	—	—	4	1	—
Totals - - -	27,162	63	23	17	67	31	40
Deaths from enteric fever - - -	-	8	5	5	6	5	8

Of the 27 houses inhabited by the persons reported as attacked by enteric fever between the date of Dr. Thomas's appointment (September 1st) and the end of last year, eight only were furnished with water-closets, and only two of these eight closets were found to be provided with a satisfactory flushing apparatus. In three of the other six the arrangements for flushing were altogether inefficient, and the closets were generally in a bad state of repair; in the remaining three there existed no means of flushing the pan whatever. As the result of his inspections at the time when cases were notified, the Medical Officer of Health ascertained that 19 of the invaded houses were provided only with privy middens of the common type, "many of them," to quote his own description, "horribly foul-smelling, all of them a great deal too close to the houses, and many of them right under bedroom windows." I further learnt that the water supply of 18 of these 27 houses was derived from the Company's mains while the nine other households obtained their supply from pump-wells, the water of every one of which, on analysis, afforded evidence of sewage contamination.

Attention has previously in this report been called to the fact that at the present time there exists in the Borough about 3,000 privy middens. These middens are for the most part of large size, frequently they are erected immediately against the house wall, and a number of them in proximity to the wash-house fire place. As the contents of these privy middens are in many instances unprotected from the weather, and as the middens, which are commonly made use of for the reception of liquid as well as solid filth of various descriptions, are usually sunk partly below the surface of the ground and not cemented, it will be obvious that the surrounding soil must gradually become more and more contaminated, and thus form a suitable breeding place for, among others, the organism of enteric fever, should the dejections of patients suffering from this disease be disposed of in the midden. In those parts of the town where these privy middens exist in greatest numbers there also, I found, the inhabitants are for the most part dependent on pumps drawing from surface wells for their supply of drinking water, and I specially noticed that the distance of such a well from the privy midden was sometimes very small, a few yards only or even less having been observed to intervene between the two. Chemical examination of the water from such wells has, in every instance in which it has been carried out, shown that the water was unfit for drinking purposes, containing as it did a large proportion of organic matter. Bacteriological examination, which alone is capable of affording evidence of specific pollution with the germ of enteric fever, had not been attempted, but even if it could have been shown that such contamination had not taken place, it is not unlikely that the continued use for drinking purposes of water so obviously unfitted for human consumption would be apt to render the system of persons making use of it less able to withstand invasion by enteric fever, than under better hygienic circumstances would be the case.

Even though the well water should not fall under suspicion, grave danger to health is liable to arise from the propinquity to houses of excrement-sodden soil, emanations from which will tend to rise up within the dwellings, especially at night time, unless, indeed, as is not often the case, the houses are erected over an impermeable bed of concrete. Where the Water Company's supply is employed for drinking purposes, it is improbable that infection of enteric fever has been conveyed by it, as otherwise one would expect the incidence of the disease to have been more widespread than fortunately has been the case hitherto.

In certain parts of the town the sewers are admittedly faulty, while in the East Ward especially the fall is sometimes so slight that it is almost impossible to properly drain houses to them. Added to this, the present condition of the outfall sewers is such that they become blocked at every high tide, and for some time afterwards, so that their contents are dammed up in what is practically an elongated cesspool. This being so, the traps of house drains will be liable to be forced, and foul gases will tend to escape by gratings in the roadways, causing not only grave nuisance, but perhaps danger to the health of the community.

Speaking generally, it is difficult to deny that the unwholesome conditions which I have particularised have had a large share in the fever in Lowestoft, and consequently it is most important that immediate steps should be taken to remedy, as far as may be, the defects in the arrangements at present in force for dealing with solid and liquid refuse, particularly that of an excremental character.

Even should the present system of privy middens be done away with altogether, and the sewerage system brought into as perfect condition as possible, it will necessarily be a matter of some time before the subsoil can recover from its present contaminated condition. Until this has been accomplished, however, it is not to be expected that enteric fever will cease from time to time to assert its presence in the place.

DIPHTHERIA.

During the year 1895 the notifications of this disease numbered 46, of which no less than 30 occurred in the course of the last four months of that year, the period namely during which the present Medical Officer of Health was in office. The number of deaths during the eight-months and four-months periods was 12 and 9 respectively.

Although the numbers of both cases and deaths were unduly large they did not attain the proportions which had been reached in each of the three immediately preceding years, there having been a sudden jump from 15 cases with two deaths in 1891 to no less than 65 cases with 15 deaths in 1892.

The following table shows that in 1895 the incidence of the disease was most marked in the last quarter of the year, and in that particular division of the town called the North Ward :—

TABLE showing DISTRIBUTION QUARTER by QUARTER in LOWESTOFT of CASES of DIPHTHERIA notified in 1895.

—	North Ward.	South Ward.	East Ward.	West Ward.
Population (estimated) - -	7,145	5,721	5,107	7,189
First quarter - - -	2	1	1	1
Second „ - - -	0	0	0	1
Third „ - - -	4	0	8	1
Fourth „ - - -	23	1	1	2
	29	2	10	5

No single definite cause could be found for this sudden outbreak of diphtheria during the months of October, November and December 1895.

Nearly all the cases, however, made their appearance, as the Medical Officer of Health informed me, “in very old houses, deficient in light, air, and ventilation, and, in many cases, overcrowded,” a type of dwelling which is only too common in the older portions of the town and particularly in the North Ward.

Inquiry was made at the time as to whether school attendance had played a part in the spread of the disease. No evidence was, it is said, obtained as to prevalence of “sore throat” among children attending the various schools in the town, while of those actually attacked by diphtheria, more than half the total number were in children under school age. In a number of these cases the child had previously been suffering from an attack of measles, during convalescence from which malady diphtheria supervened.

In the annual reports of former Medical Officers of Health of the Borough, considerable stress had been laid on the possible danger to health which

might occur from inhalation of sewer gases in the neighbourhood of the various manholes and street ventilators. Much complaint, too, had been made from time to time by the inhabitants of the town as to the nuisance arising from this source, in consequence of which a number of the street gratings had been closed from time to time. Dr. Thomas therefore naturally turned his attention to this point, but was unable to satisfy himself in any instance that the disease had been contracted by means of sewer emanations.

Of the 25 invaded houses, however, no less than 17 had filthy privies, and although the remainder possessed waterclosets, these latter were in no case provided with an efficient flushing apparatus. In addition, other sanitary defects were discovered on nearly all the premises in question.

A large majority of the 25 houses were supplied with water from the Company's mains. For five only was water obtained from surface wells, three of which were found to afford water so grossly contaminated that they have since been closed by order of the Town Council.

Attention was also directed to the condition of the milk supply; but as in some households little or none was consumed, while in others it was obtained from sources which differed from one another in almost every instance, it seemed improbable that infection could have been derived from this source.

Like enteric fever, diphtheria is, unfortunately, more or less endemic in Lowestoft, and it has tended to appear especially in those parts of the town where the general sanitary conditions are of an unsatisfactory nature. Premises which are damp and dark, ill-ventilated, and overcrowded, afford, indeed, the most favourable opportunity for the continued vitality and development of the specific microbe of diphtheria.

Of the total number of diphtheria cases, one third were removed to the Sanatorium, as it was found impossible to satisfactorily isolate them in their own houses. In five instances multiple attacks in the same family were simultaneously notified. With these exceptions, no extension of the disease occurred in invaded households, efficient isolation at home or removal to the Sanatorium having been carried out in each instance under the direction of the Medical Officer of Health, who invariably visited every invaded dwelling immediately on receipt of the notification.

At the Sanatorium antitoxic serum was employed in the treatment of all the diphtheria cases admitted with the exception of one, which died before an injection could be given. Dr. Thomas is strongly of opinion that the use of this remedy was of great service in combating the virulence of the disease, only two cases having died out of nine in which injection of antitoxin was systematically carried out, notwithstanding the fact that all the cases admitted were suffering from a severe form of the malady.

III.—SANITARY ADMINISTRATION.

The Town Council have adopted byelaws relating to:—

- (a.) Nuisances, sanctioned by the Board on December 31st, 1887.
- (b.) Common lodging-houses, sanctioned by the Board on December 3rd, 1887.
- (c.) New streets and buildings, sanctioned by the Board on February 21st, 1889, and December 23rd, 1891.
- (d.) Hackney carriages, sanctioned by the Board on August 2nd, 1892.
- (e.) Horses standing for hire, sanctioned by the Board on July 4th, 1888.

They have also adopted regulations under the Dairies, Cowsheds, and Milkshops Order of 1885. They have not any byelaws for the regulation of slaughter-houses, although the Medical Officer of Health has pointed out the necessity for such being adopted.

The Infectious Disease (Notification) Act, 1889, has been adopted and came into force in 1890. The Town Council having, as already stated, applied to the Board to approve an order extending the application of this Act to measles, this addition was sanctioned by the Board on February 5th, 1896. The Infectious Disease (Prevention) Act, 1890, and the Public Health Acts Amendment Act, 1890, have also been adopted in their entirety.

The Medical Officer of Health is Dr. John Tubb Thomas, who was appointed to the post in September 1895. His salary is 100*l.*, of which half is repaid from county funds. During the short period that he has been in office he has made himself well acquainted with all the circumstances of the district under his care, and he has, on various occasions offered sound advice to the Council, who, however, do not appear to afford him all the facilities which are desirable for the efficient discharge of his duties. Thus, no office has been assigned to him, so that, in conducting his business, he has to use a corner of the Council Chamber for the purpose. Again, the Council do not provide him with any assistance in the clerical portion of his work. He appears to be a capable officer, and is not engaged in private practice.

The Inspector of Nuisances, Mr. P. Kett, has held office for a number of years. I have had on former occasions opportunity of judging of the character of his work, and I consider it in the main to be decidedly satisfactory. He receives a salary of 120*l.*, of which one half is repaid from county funds. In addition, he is paid 7*s.* a week by the Council to provide himself with some assistance in drain-testing, a part of his work which takes up a considerable proportion of his time. With this exception, he is single-handed in his work, and, in consequence, it is impossible for him to give sufficient time to all the various items of sanitary work which require attention in a town of the size of Lowestoft. Moreover, he is hampered by the multiplicity of other duties which have been imposed on him by the Town Council, although it is only fair to state that certain of them, such as the post of mace-bearer, practically entail little or no work.

It is very desirable that further assistance should be afforded to the Medical Officer of Health by an increase in number of the sanitary staff, as otherwise, owing to the difficulty of dealing promptly with all questions of sanitation that arise, there is risk of Lowestoft losing its present reputation as a health resort.

The Town Council have provided accommodation for the isolation of cases of infectious disease at the Sanatorium, in which 57 cases were treated during 1895, of which number 31 were admitted since September, when the present Medical Officer of Health came into office. The buildings consist of an administration block and two pavilions each containing two small wards, and of a small iron building which was erected in anticipation of cholera. A mortuary, disinfecting chamber, and laundry and ambulance shed are all contained in one block of buildings at the rear of the hospital buildings. A permanent staff of three nurses, two of whom are trained, and one not so, have recently been engaged. A resident caretaker, and his wife, who acts as matron and cook, live in the administration block. Here also the nurses sleep, but there is only one bedroom available for both day and night nurses, and there is no bath-room in this block. There is a resident laundress, but no ward maids have been appointed. In the laundry the only provision for the supply of the hot water necessary for washing is from a small copper.

The disinfecting chamber, supplied by Goddard and Massey, is of efficient type. There are separate chambers for infected and disinfected goods. The carts used for conveying articles from the town to the disinfecting chamber and back are arranged to be propelled by hand. They are very heavy and of a size insufficient to take a full-sized mattress.

A large horse ambulance is also kept in this shed, which is horsed when necessary from the Corporation stables.

June 1896.

S. MONCKTON COPEMAN.

RECOMMENDATIONS.

1. The Town Council should, without further delay, take steps to remedy the present unsatisfactory condition of the sewer outfall works.

2. All surface wells the water of which is found to be contaminated owing to the proximity of cesspools and privy middens, should be closed and the provision of a better water supply enforced.

3. The Town Council should at once take such steps as may be necessary to ensure that, as far as possible, the quality of the public water supply shall be above suspicion.

4. More ventilating shafts should be erected along the line of the main sewers and their branches. These shafts should be carried up to open freely above any wall or building in their immediate neighbourhood, or against which they are erected. Those at present in existence should be heightened to such an extent as may be necessary to remove all risk of danger to health, and to render them capable of efficient action.

5. Arrangements should be made for the systematic flushing of the sewers, more particularly in the summer months.

6. Where orders are made for the conversion of privies into closets, the Town Council should in each instance insist on such closet being provided with suitable flushing arrangements.

7. The Town Council should consider the question of providing a "destructor," for the cremation of town refuse of all kinds.

8. Byelaws, based on the Board's Model Code, should as speedily as possible be drawn up and put in force for the regulation of slaughter-houses and common lodging-houses.

9. The Town Council will do well to carry out such extension of the present Isolation Hospital as will allow of the simultaneous treatment in it of cases of more than two diseases, allowing also for separation of sexes.

APPENDIX.

Week ending.	Notifications.					Deaths.						
	Diphtheria.	Typhoid.	Scarlet Fever.	Erysipelas.	Puerperal Fever.	Diphtheria.	Typhoid.	Scarlet Fever.	Erysipelas.	Whooping Cough.	Diarrhoea.	Measles.
1895.												
January 5th	1	—	—	—	—	—	—	—	—	—	1	—
" 12th	1	—	3	1	—	—	—	—	—	—	1	—
" 19th	—	—	1	—	—	—	—	—	—	—	2	—
" 26th	—	—	—	1	—	—	—	—	—	—	—	—
February 2nd	—	2	—	—	—	—	1	—	—	—	1	—
" 9th	—	—	—	2	—	—	—	—	—	—	1	—
" 16th	—	—	—	—	—	—	—	—	—	—	1	—
" 23rd	—	—	—	—	1	—	—	—	—	—	—	—
March 2nd	—	—	—	—	—	—	—	—	—	—	—	—
" 9th	2	—	1	—	—	—	—	—	—	—	—	—
" 16th	—	—	—	—	—	—	—	—	—	1	—	—
" 23rd	1	—	1	—	—	—	—	—	—	—	?	—
" 30th	—	—	1	—	—	—	—	—	—	—	—	—
April 6th	—	—	5	—	—	—	—	—	—	—	—	—
" 13th	—	—	1	—	—	—	—	—	—	—	—	—
" 20th	—	2	—	—	—	—	—	—	—	—	—	—
" 27th	—	1	—	—	—	—	—	—	—	—	—	—
May 4th	—	—	—	—	—	—	1	—	—	—	—	—
" 11th	—	—	—	2	—	—	—	—	—	—	?	—
" 18th	—	—	—	—	—	—	—	—	—	—	—	—
" 25th	—	—	—	—	—	—	—	—	—	—	—	—
June 1st	—	—	—	—	—	—	—	—	—	—	—	—
" 8th	—	1	—	—	—	—	—	—	—	—	—	—
" 15th	1	—	—	—	—	—	—	—	—	—	1	—
" 22nd	—	1	—	—	—	—	—	—	—	—	—	—
" 29th	—	—	—	—	—	—	—	—	—	—	—	—
July 6th	2	2	1	—	—	—	—	—	—	—	—	—
" 13th	—	3	—	—	—	—	—	—	—	—	—	—
" 20th	—	1	—	1	—	—	—	—	—	—	2	—
" 27th	—	—	—	—	—	—	1	—	—	—	—	—
August 3rd	1	—	—	—	—	1	1	—	—	—	—	—
" 10th	—	—	1	—	—	—	—	—	—	—	1	—
" 17th	5	—	—	1	—	1	—	—	—	—	4	—
" 24th	—	—	—	—	—	—	—	—	—	—	3	1
" 31st	2	—	—	—	—	—	—	—	—	—	3	—
September 7th	—	2	—	1	—	1	1	—	—	1	1	—
" 14th	—	3	1	—	—	—	—	—	—	—	5	4
" 21st	—	1	—	—	—	—	—	—	—	—	3	—
" 28th	3	2	—	1	—	—	—	—	—	2	7	8
October 5th	1	—	—	—	—	1	—	—	—	5	4	5
" 12th	3	3	—	1	—	—	—	—	—	2	6	16
" 19th	5	1	—	—	—	4	—	—	—	1	2	8
" 26th	4	3	1	—	—	1	1	—	—	—	1	12
November 2nd	—	2	—	—	—	1	—	—	—	—	—	5
" 9th	1	3	—	—	—	1	1	—	—	1	1	4
" 16th	—	—	—	—	—	—	—	—	—	—	1	2
" 23rd	—	1	1	—	—	—	—	—	—	2	—	3
" 30th	—	—	—	1	—	—	1	—	—	—	—	4
December 7th	10	—	—	1	1	—	—	—	—	—	—	1
" 14th	1	—	—	—	—	—	—	—	—	—	—	1
" 21st	2	3	—	3	—	1	—	—	1	1	—	—
" 28th	—	3	1	—	—	—	—	—	—	—	—	1
1896.												
January 4th	—	2	1	—	—	—	—	—	—	—	—	—
" 11th	—	—	—	1	—	—	—	—	—	—	—	—
" 18th	—	1	—	—	—	—	—	—	—	—	—	1
" 25th	4	1	1	—	—	2	—	—	—	3	—	1
February 1st	2	6	1	—	—	1	1	—	—	2	—	—
" 8th	1	—	—	—	—	—	1	—	—	—	—	—
" 15th	7	2	1	—	—	1	—	—	—	2	—	—
" 22nd	2	1	2	—	—	—	—	—	—	—	—	—
" 29th	2	1	—	—	—	1	—	—	—	—	—	—

