

**Report to the General Board of Health on a preliminary inquiry into the sewerage, drainage, and supply of water, and the sanitary condition of the inhabitants of the township of Nantwich, in the county of Chester / by William Lee, Superintending Inspector.**

**Contributors**

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# PUBLIC HEALTH ACT

(11 & 12 Vict., cap. 63).

14378

## REPORT

TO THE

## GENERAL BOARD OF HEALTH

ON A

### PRELIMINARY INQUIRY

INTO THE SEWERAGE, DRAINAGE, AND SUPPLY OF  
WATER, AND THE SANITARY CONDITION  
OF THE INHABITANTS,

OF THE TOWNSHIP OF

## NANTWICH,

IN THE COUNTY OF CHESTER.

By WILLIAM LEE, Esq., C

SUPERINTENDING INSPECTOR.



LONDON:

PRINTED BY WILLIAM CLOWES & SONS, STAMFORD STREET

FOR HER MAJESTY'S STATIONERY OFFICE.

1850.

## NOTIFICATION.

THE General Board of Health hereby give notice, in terms of section 9th of the Public Health Act, that on or before the 29th day of June next, written statements may be forwarded to the Board with respect to any matter contained in or omitted from the accompanying Report on the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Inhabitants of the Township of NANTWICH, or with respect to any amendment to be proposed therein.

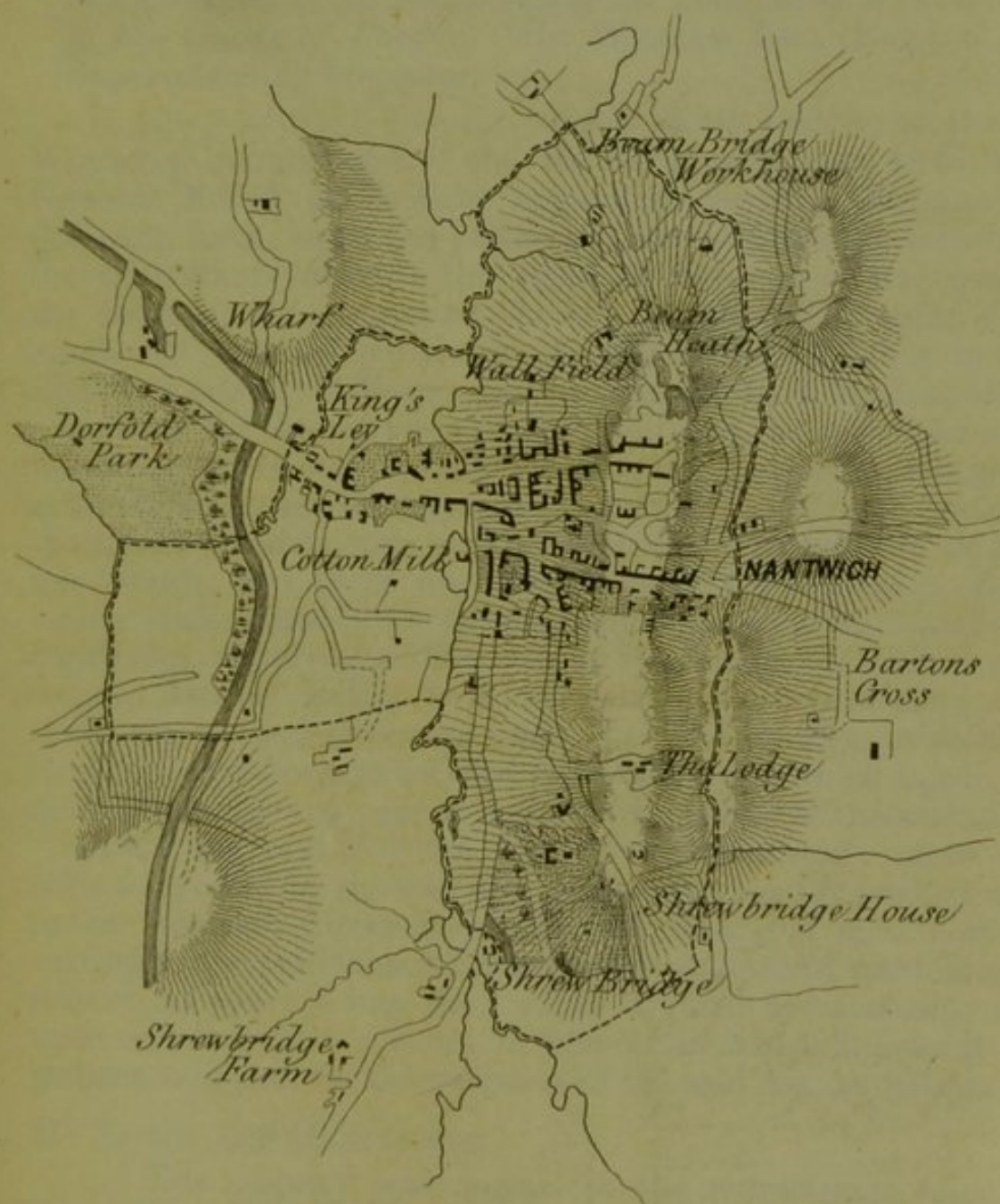
By order of the Board,  
HENRY AUSTIN, *Secretary.*

*Gwydyr House, Whitehall,  
May 21, 1850.*

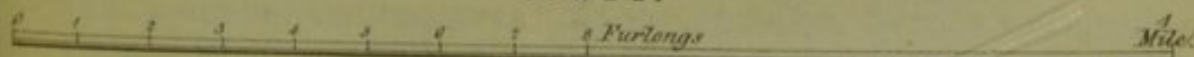
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**NANTWICH.**



SCALE.



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THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION  
PUBLISHED WEEKLY  
CHICAGO, ILL., U.S.A.  
1917

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ORIGINAL ARTICLES

## PUBLIC HEALTH ACT (11 & 12 Vict., cap. 63.)

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*Report to the General Board of Health on a Preliminary Inquiry into the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Inhabitants of the Township of NANTWICH, in the County of Chester. By WILLIAM LEE, Esq., C.E., Superintending Inspector.*

*Gwydyr House, February 15, 1850.*

WHEREAS, in pursuance of the Public Health Act, 1848, the General Board of Health, appointed for the purposes of that Act, have, upon the petition of not less than one-tenth of the inhabitants rated to the relief of the poor of and within the township of Nantwich, in the county of Chester (the number of the said petitioners greatly exceeding thirty in the whole) directed William Lee, a Superintending Inspector, appointed for the purposes of the said Act, to visit the said township, and to make public inquiry, and to examine witnesses as to the sewerage, drainage, and supply of water, the state of the burial-grounds, the number and sanitary condition of the inhabitants, and as to any local Acts of Parliament in force within such township for paving, lighting, cleansing, watching, regulating, supplying with water, or improving the said township, or having relation to the purposes of the said Act; also as to the natural drainage areas, and the existing parochial, local, or other boundaries, and the boundaries which might be most advantageously adopted for the purposes of the said Act.

Now, I the said William Lee, having previously given the notices directed by the said Act, proceeded upon the said inquiry in the manner directed by the said Act, and do report in writing to the said General Board upon the several matters with respect to which I was directed to inquire as aforesaid, and upon certain other matters, in respect of which I deem it expedient to report for the purposes of the said Act, as follows:—

MY LORDS AND GENTLEMEN,

THE inquiry was opened in the magistrates room at the police offices in Nantwich, at 10 o'clock on the morning of Wednesday, the 10th day of October last past, and was continued by adjournment on the 11th, 12th, and 13th of the same month, until I had made an inspection of the whole of the township, and had heard all persons who chose to give information touching the inquiry. *Robert Harding*, deputy town-crier, proved that he had affixed notices of the inquiry upon the doors of places of worship, and all other places where public notices were usually affixed, except the Unitarian and Baptist

chapels; and *John Hammersley*, letter-carrier, proved that he had affixed the notices upon the two latter places.

*J. Broadhurst, Esq.*, solicitor, Clerk to the Board of Guardians, put in the list which he had prepared, in accordance with the 9th regulation of the Board, showing that epidemic, endemic, and contagious diseases had of late been frequent in the following localities:—Wych-house Bank and Gas-alley, First, Second, and Middle Wood-streets, Welsh-row, Pillory-street, Queen-street, Love-lane, Barker-street, Mill-street, Hospital-street, Church-lane, Beam-street, and Wall-lane.

In most of these places, typhus fever in 1847, and cholera in 1849, had been exceedingly malignant and fatal. I carefully examined them during my inspection of the town, and beg the particular attention of the Board to the description which it will be my duty to give in a subsequent part of this Report, of the lamentable condition in which I found the inhabitants of these pestilential localities.

There were rumours of intended opposition to the inquiry, but none appeared; and I am happy to say that I was cordially assisted by all classes of society with whom I came in contact. I am under particular obligations to the following gentlemen, who accompanied me during the inspection, and furnished much of the evidence upon which this Report is founded: The Rev. A. F. Chater, Rector; Rev. John Simson, Independent Minister; *J. Broadhurst, Esq.*, solicitor, Superintendent Registrar; Thomas Williamson, Esq., Medical Officer of the Union; Mr. Thomas Johnson, Assistant Overseer, and late Inspector of Nuisances; George Latham, Esq., architect; Mr. Joseph Pickering, Relieving Officer and Inspector of Nuisances; Mr. James Howard, gentleman; Mr. Gilbert Ramsey, gentleman; Mr. William Fowles, auctioneer; Mr. William Massey, jeweller; Mr. Thomas Wright Townley, salt manufacturer; Mr. Thomas Cawley, ironmonger; Mr. William Johnson, tailor; Mr. Thomas Nixon, tanner; and Mr. Thomas Downes, tanner.

DESCRIPTION OF THE TOWN.—Nantwich is a market-town in the hundred of Nantwich, county of Chester; 20 miles south-east by east of Chester. The town is intersected by the Birmingham and Liverpool Junction Canal, and is four miles west of the Grand Junction Railway. The parish of Nantwich includes the townships of Nantwich, Alvaston, Leighton, Willaston, and Woolstanwood, containing altogether 3,490 acres. The township of Nantwich, to which the present inquiry is confined, contains 780 acres. Besides the church, which is a very fine structure, there are places of worship belonging to the Independents, Baptists, Wesleyan Methodists, Presbyterians, and Society of Friends. The town contains 17 day-schools, including a free grammar-school, erected in the reign of

Queen Elizabeth, and a bluecap-school; both of them are endowed. It is a remarkable feature in Nantwich, that at each of the public entrances of the town, are situated almshouses for poor men and women. There are other public charities amounting to about 300*l.* per annum.

Nantwich is the centre of a Poor Law Union, comprehending 86 parishes and townships, and embracing an area of 177 square miles, with a population of 33,811 at the census of 1841.

The town is pleasantly situated on the banks of the river Weaver, over which there is a beautiful stone bridge of one arch, connecting the two parts of the town. There are some good houses and shops, but the streets are very irregular, and a great number of the houses ancient erections.

The staple trade of the town is the manufacture of shoes. There is no large manufactory, the operatives universally work at their homes, making up the masters' material at certain prices for labour only. About one-third of the adult male population are shoemakers. One-sixth of the adult females are employed binding shoes. A first-rate workman can earn 20*s.* weekly, and his wife 2*s.* 6*d.* to 3*s.*; an inferior hand only about 6*s.*, and his wife not more than 1*s.* 6*d.* The binders are most generally young women. The next trade is the cotton factory, employing about 150 hands, and there is also a skin-glove factory with about 30 hands.

The town was formerly noted for its extensive manufacture of salt. In the time of Henry VIII., there were 300 salt works, but in consequence of superior springs having been found in other places nearer to the port of Liverpool, the trade at Nantwich has declined. A large quantity of salt, however, is still made here for home consumption.

In 1458, and again in 1583, the town of Nantwich was nearly consumed by fire. In June, 1604, the plague broke out and raged until March, 1605. It has since been frequently visited by epidemic scourges, and the details of this Report will show that, for want of public arrangements, the inhabitants are *now* entirely at the mercy of both fire and pestilence.

The town is governed by constables. Courts leet and courts baron are held annually by the lord of the manor.

A local Act of Parliament was obtained about 1796, to enable the trustees of the River Weaver to make the same navigable up to the town of Nantwich. The time given was not limited; but nothing was ever done in Nantwich by the trustees under the Act. There is also an Act of Parliament for the inclosure of Beam Heath, in the township of Alvaston. The heath was inclosed for the benefit of the town of Nantwich. But with reference to the mode of applying the Public Health Act to Nantwich, it may be said, that there is no local Act of Parliament in force within the township of Nantwich, for

paving, lighting, cleansing, watching, regulating, supplying with water, or improving the same, or having relation to the purposes of the Public Health Act, but that the Act may be applied by Order in Council.

There is no published map or plan of the town. A survey was made in 1794, and a map has been made within the last three years for the Tithe Commutation, but the old plan was taken as the basis, and it was adapted to the present condition of the town.

CONTOUR, GEOLOGY, METEOROLOGY, &c.—The River Weaver runs from the south to the north, with a circuitous course. The land upon which the town is built on both banks rises gently, but with sufficient fall for perfect drainage of the houses and other buildings, and the site of the town. Nantwich is situated upon the new red sand-stone system. The fertile soil is generally about half a yard thick. The subsoil on the south side of the town is brown marl without gypsum. On the west, the subsoil is generally marl, about three yards thick. On the north and east sides it is sand and marl, from three to four yards thick, with a little of the gravel of the drift on the east. There is good brick clay in the township. Drain tiles and earthenware pipes are made, but the latter are only suitable for agricultural purposes. The hard blue bricks are brought from the potteries. Below some of the marl pits is a red poisonous sand called rammel; water becomes much discoloured, and trees die if their roots get into it. It has something of the character of gypseous marl, and is about 15 yards thick. The next is a bed of gravel from a foot to 14 inches thick, and then a quick-sand about half a yard. In some places there is another bed of marl about 10 yards thick. This brings us to the brine-springs, for which the place was formerly so celebrated. The springs generally follow the course of the river, and brine has been found at 30 yards deep, on the eastern side, near the police-office. The general dip of the strata is to the south-west, with many faults.

There is no stone within nine miles of Nantwich. At Peckforton there is a soft red sand-stone, similar to that of which the parish church is built. The next nearest is a hard, rough, red-and-white stone, near Mapley Heath, in the county of Stafford.

Coal of good quality is obtained from Staffordshire, and costs 10*s.* per ton. An inferior coal, from North Wales, can be had at 8*s.*, delivered.

No rain-gauge has been kept in the vicinity, but I obtained from Mr. William Smith the monthly averages of the thermometer and barometer, with the days on which rain had fallen during the last three years. The prevalent wind is said to be from the N.N.W.

The following is Mr. Smith's table:—

| MONTHS.   | From 1st October, 1846, to 1st October, 1847.                                                   |                                                  |                                                                                                                  | From 1st October, 1847, to 1st October, 1848.                                                   |                                                  |                                                                                                                  | From 1st October, 1848, to 1st October, 1849.                                                   |                                                  |                                                                                                                  |
|-----------|-------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|           | The Average Degree of Heat at 8 o'clock, A.M. Thermometer inside the Hall Window, North Aspect. | The Average Degree below Fair at 8 o'clock, A.M. | The Average Days on which we have had Rain or Snow (more or less), with Floods in the River (larger or smaller). | The Average Degree of Heat at 8 o'clock, A.M. Thermometer inside the Hall Window, North Aspect. | The Average Degree below Fair at 8 o'clock, A.M. | The Average Days on which we have had Rain or Snow (more or less), with Floods in the River (larger or smaller). | The Average Degree of Heat at 8 o'clock, A.M. Thermometer inside the Hall Window, North Aspect. | The Average Degree below Fair at 8 o'clock, A.M. | The Average Days on which we have had Rain or Snow (more or less), with Floods in the River (larger or smaller). |
| October   | 53½                                                                                             | 11½                                              | 21*                                                                                                              | 54                                                                                              | 3½                                               | 17*                                                                                                              | 51½                                                                                             | 6½                                               | 20*                                                                                                              |
| November  | 45                                                                                              | 3½                                               | 9                                                                                                                | 48½                                                                                             | 2½                                               | 15*                                                                                                              | 44½                                                                                             | 4                                                | 12*                                                                                                              |
| December  | 34                                                                                              | 4½                                               | 4                                                                                                                | 44½                                                                                             | 7                                                | 12*                                                                                                              | 33                                                                                              | 4                                                | 16*                                                                                                              |
| January.  | 38                                                                                              | 5                                                | 6                                                                                                                | 37½                                                                                             | 6½                                               | 10                                                                                                               | 40½                                                                                             | 5½                                               | 11*                                                                                                              |
| February  | 34½                                                                                             | 3                                                | 12*                                                                                                              | 43½                                                                                             | 13                                               | 18*                                                                                                              | 43                                                                                              | ..                                               | 9                                                                                                                |
| March .   | 43½                                                                                             | ½                                                | 7                                                                                                                | 45½                                                                                             | 10½                                              | 17*                                                                                                              | 42                                                                                              | ..                                               | 10                                                                                                               |
| April .   | 46½                                                                                             | 5½                                               | 12                                                                                                               | 48                                                                                              | 5½                                               | 18*                                                                                                              | 46                                                                                              | 7½                                               | 18                                                                                                               |
| May .     | 57½                                                                                             | 4                                                | 17*                                                                                                              | 60½                                                                                             | ..                                               | 10                                                                                                               | 54½                                                                                             | 2½                                               | 13                                                                                                               |
| June .    | 60                                                                                              | 2½                                               | 15                                                                                                               | 61½                                                                                             | 6                                                | 21                                                                                                               | 58½                                                                                             | 1½                                               | 9                                                                                                                |
| July . .  | 67                                                                                              | ..                                               | 6                                                                                                                | 63                                                                                              | 2½                                               | 20                                                                                                               | 63                                                                                              | 2½                                               | 12                                                                                                               |
| August .  | 63                                                                                              | ½                                                | 15                                                                                                               | 60½                                                                                             | 5½                                               | 27*                                                                                                              | 63                                                                                              | 2                                                | 14                                                                                                               |
| September | 56                                                                                              | 2½                                               | 18*                                                                                                              | 58                                                                                              | 3                                                | 12*                                                                                                              | 59                                                                                              | 2                                                | 12                                                                                                               |
| Totals    | 598½                                                                                            | 43½                                              | 142                                                                                                              | 625                                                                                             | 65½                                              | 197                                                                                                              | 598½                                                                                            | 38                                               | 156                                                                                                              |

\* Those marked thus, caused the River Weaver to be more or less flooded.

From the above, I should judge that the rain-fall is considerable, probably upwards of 40 inches average per annum. It appears that the Weaver is subject to floods, and on inquiry I ascertained, that the water rises rapidly after storms, and sometimes gets into the houses in Wood-street and Wych House Bank, on its margin. This occurs only once in a few years, and the water subsides in four or five days. At such times it floods all the meadows above and below the town. There is no dam or obstruction across the river, except the one belonging to Messrs. Bower & Co., near the bridge.

POPULATION AND RATE OF INCREASE; NUMBER AND CLASSIFICATION OF HOUSES.—At the census of 1831 the number of inhabitants was 4,886. In 1841 it had increased to 5,849, being at the rate of nearly 18 per cent. in the 10 years. The number is supposed to have increased since that time in about the same ratio, or about  $1\frac{3}{4}$  per cent. per annum.

The number of houses in 1831 was 952. In 1841 it had increased to 1,045, equal to 8.91 per cent in the 10 years. The number of inhabitants per house in 1831 was 5.13; and in 1841 the number was 5.6. The house accommodation has not kept pace with the population; and I shall have to show, hereinafter, that in some parts of the town the cottages are occupied by a greater number of people than is consistent with health or morality.

I am indebted for the following classification of the rateable value of houses, to Mr. Broadhurst, the Superintendent Registrar. A discrepancy will be observed between the total in this return and the number given for 1841. I believe Mr. Broadhurst has confined his return to the town and its immediate suburbs, and as he has taken the trouble to extract from his registers some important information as to the number of deaths within the same limits, I have preferred retaining his figures, in order that the whole may be consistent.

| Value to the Poor-rate. |    | Number of Houses. | Value to the Poor-rate. |     | Number of Houses. |
|-------------------------|----|-------------------|-------------------------|-----|-------------------|
| Under . . . .           | £3 | 71                | Brought forward         |     | 985               |
| £3 and under            | 4  | 184               | £25 and under           | £30 | 17                |
| 4    ,,                 | 5  | 292               | 30    ,,                | 40  | 21                |
| 5    ,,                 | 6  | 134               | 40    ,,                | 50  | 8                 |
| 6    ,,                 | 7  | 66                | 50    ,,                | 60  | 3                 |
| 7    ,,                 | 8  | 24                | 60    ,,                | 70  | ..                |
| 8    ,,                 | 9  | 41                | 70    ,,                | 80  | ..                |
| 9    ,,                 | 10 | 12                | 80    ,,                | 90  | ..                |
| 10   ,,                 | 15 | 88                | 90    ,,                | 100 | ..                |
| 15   ,,                 | 20 | 49                | 100 and upwards         | .   | ..                |
| 20   ,,                 | 25 | 24                |                         |     |                   |
| Carried forward .       |    | 985               | Total . . .             |     | 1,034             |

**DISEASE AND MORTALITY.**—The connexion between defective ventilation, bad water, and want of drainage, as causes, and disease and death as the direct effects, is so striking in my notes of inspection at Nantwich, that I am induced to state in this part of my Report, some facts which are ordinarily treated of when describing the *causes* of excessive mortality. The details are almost incredible.

At *Wych House Bank*, on the borders of the river, there were 20 deaths from cholera within a short period upon this small spot of ground. The late Mr. John Baker was lessee of some of the cottages, and fell a victim. In one of his houses five persons died. There are five tenements without privies.

The ordure is put into tubs, and some of the people have to carry it through their houses once a week or fortnight. Ann Birtles occupies one of the houses, and says:—

“My husband died of cholera, and I was ill. I carry the tub through the house weekly, and make a hole in the yard, and cover it up.”

John Malkin, another tenant, says:—

“We get water for food 150 yards off. We carry the night-soil tub through the house, and empty it into the river. We also take water for washing and cleaning out of the river. There are no pumps in the neighbourhood.”

Late Walker's property is the next, and has a privy from which the soil after forming a large pool, runs over the surface and into the river. I was informed, that just when the second and more fatal outbreak of cholera commenced, a man, residing on this pestilential spot, boiled a horse that had died of disease, and fed pigs with the flesh. Some of the houses had no windows to the bed-rooms, and many of them are very dilapidated. In Martin Welsh's house were two cases of cholera, in one of which, the mistress of the house, the disease was so malignant that there were no premonitory symptoms. She was seen at night nursing a child that had cholera, but quite well herself, and in the morning she was found dead upon the floor.

Gas-alley is a passage four feet four inches wide leading from the above to Welsh-row. I spoke to one of the occupants of the houses, William Sharratt, who said,—

“I have lived here seven years, and pay for house and chamber 1s. 6½d. per week rent; I am a shoemaker, and earn 8s. or 9s. per week; I have a wife and six children; we all had fever two years since, and at the next door all in the house had it, and the man and his wife died. My wife has lately had the bowel complaint; but we have escaped the cholera. One died of it next door and two others in the alley. There were many cases in the five houses. We have no back doors, nor any privies. We get water about 120 yards off. There are no drains, but this stagnant channel close to the doors. One of the houses is a rag and bone establishment.”

In *Second Wood-street* the general condition of the neighbourhood, the drainage, and the construction of houses are all as bad as possible. The street is about 30 feet from the river, and the fall good. Mr. Williamson, surgeon, said there had been cholera in most of the houses, and that two years since there was much typhus fever. One house had nine cases; there is one foul privy within four yards, and another against the wall of the house.

*Edwards' property*, bad privies, confined yard and surface drainage standing in pools, four deaths from cholera, two of them in one house.

*Wall-lane*. There is a pool, about 30 feet diameter, receiving the drainage of about one-fourth of the town. The sediment is thrown out for manure, heaped on the sides, and then carted away. This pool is not more than 50 feet from a row of houses, in which there were many cases of cholera, and two deaths.

*Beam-street*, Mr. James Walthall Hammond's property, a drain passes under the floor of one of the houses, with an open grating close in front and another at the back. The tenant, George Peers, died of cholera, and the house is now empty. There is a foul stagnant ditch behind the houses, and no under-drain in the street.

*Mill Stone-lane*, Barker and Brothers tan-yard. I was informed that carcasses are macerated here after skinning, and that the stench is dreadful. There are ten very well built new cottages, near the tan-yard, and in one of them there had been three deaths of cholera, and several other cases in the row, not fatal.

*Pratchett's-row* is a *cul de sac*, with foul privies, and no drainage. There is a pump, but the inhabitants cannot drink the water. They fetch it a quarter of a mile; four houses have no privies. There were several cases of cholera here.

Behind the south side of *Hospital-street*, at Pall Mall, is a very offensive open stagnant ditch containing night-soil. A person living in a cottage within nine feet of it had cholera twice. The back premises of the Vine public house come to this ditch, and the wife and daughter of the occupier both died of cholera.

Behind *Pillory-street* is a similar ditch, and the cholera cases were very numerous. Mr. Williamson says, "at least a dozen persons died of it in this short street."

*Queen-street* is an opening out of *Pillory-street*; it contains only nine houses, but there was cholera in nearly every one of them. There are two privies, and one of them used by four families, is entered by the same door as a house. Persons died in the houses adjoining it on each side. Mr. Williamson said there had been much typhus in these houses for several years. The privy soil runs over the surface.

*Mill-street*.—There were about 20 deaths from cholera, and

very many cases not fatal. In one house the father and mother died, and left nine little children. In the lower part of the street the inhabitants principally drink the river water after it has received the drainage of a large part of the town.

*Church-lane.*—There is no drainage, in a court I found a large accumulation of solid matter and privy soil, covered only with boards. The houses have no back doors, and nearly every one had cholera. John Tomkinson has a drain passing under the house floor within nine inches. He asked me to examine his house, and I found the stench in the living-room quite dreadful. Both he and his wife have had cholera.

*Hospital-street.*—Mr. John Wilson, clogger, lives with a street grate in front of his door, and the prevalent wind blows the emanations into his and the adjoining houses. There were two deaths of cholera in his house, and next door four cases and two deaths. On the opposite side of the street, Mr. William Cooper's (baker) house, is in the direction of the wind from the adjacent horrible privies in Queen-street, and he lost his wife from cholera.

Such are a few of the details of my inspection, abridged as much as possible, but showing clearly that death is the inevitable consequence of breathing an atmosphere charged with the gases produced by the decomposition of town refuse.

Typhus fever ravaged the town of Nantwich in 1847, and in 1849 there were about 180 deaths, and nearly 1,000 cases of cholera, out of a population of about 6,000. The deaths from this disease alone were 30 to 1,000 of the inhabitants in the short space of 14 weeks, or about double the annual mortality of some healthy districts in the country. The following is some of the evidence given on this part of the subject. Thomas Williamson, Esq., says,—

“ I am medical officer of the district of the Nantwich Union, which includes the town of Nantwich. I have been in practice here upwards of 19 years, and parochial medical officer 17 years. I have of course become very intimately acquainted with the sanitary condition of the inhabitants, and especially of the poor. The town was visited with cholera in 1832. At that time it was confined, with few exceptions, to Wych House Bank, and to the Wood-streets. Those were also the localities most severely afflicted with it during the recent visitation. The town was then in much the same state as to drainage and water supply, as it is at present. In the spring of 1834 great numbers were attacked in all parts of the town with influenza. The mortality was greatly increased by it, especially among the old people. That disease would not in any case perhaps be generated by defective sanitary arrangements; but its intensity, and consequently its fatal effects were undoubtedly aggravated. In 1840, typhus fever of a very malignant character appeared in the union workhouse, and in the town. There were 56 cases at one time in the workhouse. The mortality was considerably increased. Typhus fever so depresses the vital powers, that the persons attacked continue long very weakly, and reach a state of

convalescence very slowly; some never recover their wonted health. That protracted state of physical depression must be a great pecuniary loss to the patients. I have no doubt that typhus fever is originated by the want of proper sanitary arrangements.

"During the two following years, scarlet fever prevailed, chiefly amongst the young and infant population. All classes were more or less affected. Scarlet fever, like influenza, would be aggravated by the want of sanitary regulations.

"We were then tolerably free from epidemic disease until the autumn of 1846, when typhus fever again prevailed, and continued for at least nine months. It commenced in the Wood-streets, and extended to Wych House Bank, Hospital-street, Gas-alley, and other parts of the town. The persons first attacked were principally Irish in low lodging houses. The English inhabitants of the same locality did not suffer much, with some exceptions, until the spring of 1847. It is a remarkable circumstance that the Irish were chiefly attacked with typhus in 1846, and that they escaped comparatively the cholera of the present year; *but the localities where both diseases were most malignant are the same.* The English were attacked with the fever about March and April, 1847, and the numbers increased until September. I attended, as medical officer of the Union, 196 cases, besides others in my private practice, within about nine months. It was confined principally to lodging-houses, and cottages of the worst description. In one house (Gaffin's, a sweep) I attended nine cases of typhus, all ill at the same time. A great number of persons were, by that fever, left chargeable to the parish.

"Cholera appeared in June last, and since that time I have attended upwards of 700 cases of cholera and choleraic diarrhœa, independent of those attended by other medical men. Nearly all the inhabitants of the town were more or less affected by the peculiar atmospheric cause of cholera, but it appeared in its severe forms almost entirely in the localities already enumerated, and among the lower classes. In the premonitory stage I gave blue pill and opium, avoiding stimulants. I continued that treatment, or calomel and opium, through the whole of the disease. The proportion of fatal cases, in developed cholera, has been about 45 per cent. The number of deaths reported is about 170, but this does not include the whole of the cases. Some few among the higher classes, occurring in private practice, were not reported.

"The house-to-house visitation was adopted on the 14th July, and was continued with great success until the decline of the disease. The third day after the visitors commenced, I visited and prescribed for upwards of 50 cases of diarrhœa. In many of those cases the parties would not in all probability have applied for medical assistance, and the diarrhœa would undoubtedly have run on to cholera. In the week before the visiting commenced, there were 37 deaths; afterwards, the diarrhœa cases increased, but the lapsed cholera declined.

"I am satisfied that, by proper drainage, thorough ventilation, an abundant supply of good water, a general cleansing of the houses, courts, and the whole surface of the town, the abolition of the present defective privies, and the substitution of a superior apparatus instead thereof, *the lives of a great portion of those who have perished by the epidemics which I have named, might have been saved.*

"There are many sick clubs and secret orders in the town. I am

connected with some of them as medical officer. There are five dividend clubs. They suffered much in a pecuniary manner from cholera, because for every funeral they had to contribute 2s. each member, according to rule. The sick-fund, which is kept distinct from the funeral-fund, was not much affected, because the disease was only of short duration. There is a female sick-club in the town, which had, a few years ago 500*l.* in the savings'-bank; that fund is now reduced to 300*l.* There can be no doubt that sick societies have a very great interest in the sanitary improvement of the town. If these epidemics were reduced by sanitary works, the contributions of the members might either be reduced, or the payments to the sick increased; or, at any rate, the annual dividends would be larger.

"The members of these clubs are most of them rate-payers. They have, therefore, an additional interest in sanitary improvements, because, if the health of the town were raised, the poor-rates would be reduced in amount; and that not only in the cost of sickness, but for medical attendance, and the great permanent charges on the rates for widowhood and orphanage, resulting from excessive deaths."

The above evidence is very important, but not more so in some respects than the following, from the Rev. A. F. Chater, the rector. He says:—

"I have resided here nearly four years. My pastoral duties have brought me much into contact with the people, and I am well acquainted with the sanitary condition of the town. Within the last four months I have been almost incessantly engaged in attending upon the sick. The cholera broke out in Nantwich in June, and is only now subsiding. Within that time I believe there have been 1,000 cases, out of a population of 6,000, and yet there were some parts of the town comparatively free from it. The disease was most malignant in the neighbourhood of the river, where many of the inhabitants obtain water. In other places, as was the case near my own house, I have no doubt that the want of drainage and the accumulations of decomposing refuse, were the immediately exciting causes.

"The whole condition of the town, as to drainage, water, and the means of cleanliness and health, is very bad; and my impression is, that where the greatest deficiency in these physical advantages exists, there, generally, the greatest demoralization abounds. It cannot be otherwise, where there is a common privy for six to twelve houses, and not more than two sleeping-rooms for a man, his wife, and sons, and daughters, perhaps grown up. When I speak of the demoralization from such causes, I believe that the same evils would exist among the higher classes, if they were subjected to the same deprivation of social comfort. I am sorry to say, that the religious condition of the people has a close relation to their physical and social state. The ministers of the Church of England are to look to the temporal welfare of their people, as well as to their spiritual interests, and thus it became an imperative duty that I should endeavour to improve their sanitary condition. I have, therefore, taken an active part in promoting the present inquiry, and hope to see the Public Health Act carried out fully. I believe it will be a blessing both to rich and poor."

From returns which have been made by Mr. Broadhurst, I

find that the value of life in the town of Nantwich is much less than in the Union to which it gives a name. I refrain from giving these vital statistics here only lest this part of my report should occupy too much space in proving what is already manifest from the evidence; namely, that there is an awful amount of preventible disease and mortality in the town of Nantwich.

**LAND DRAINAGE.**—Mr. James Howard informed me, that the agricultural land, generally speaking, is well drained. Thorough drainage is found to be a great improvement. Horse-shoe tiles are used, and pipes are coming into use. The depth at which the drains are laid varies from 18 to 36 inches, and the width apart, 24 feet on stiff lands, and a greater distance on light soils. The tiles cost 25s. per thousand, exclusive of leading; the soles one-fourth of that price. The leading of both together comes to about 3s. per 1,000.

Liquid manure has not been extensively used in Nantwich. Some land at about two miles from the town is irrigated by means of a pump and gutters. It is a most excellent piece of land, and very fertile. Manure in a liquid form has been hitherto so little appreciated, that when the machine for emptying cesspools was in operation during the cholera, the soil could scarcely be got quit of. Mr. Johnson, the Inspector of Nuisances, says, he gave it away to the person who belonged to the horse, and paid him for the leading in addition.

**DRAINAGE OF THE TOWN.**—The great bulk of the complaints made at the opening of the inquiry, had reference to the want of drainage in the town.

Mr. J. Broadhurst complained of a foul and offensive open ditch which passes along the outskirts of the greater portion of the town, and near his house, at the top of Hospital-street.

Mr. Thos. Johnson, assistant-overseer, complained of an open ditch or cesspool, commencing behind Mr. George Barker's property, and going along Pall Mall, and across Pillory-street, finally emptying itself in the river.

Mr. George Latham, architect, said there were several other offensive ditches in the neighbourhoods of Hospital-street, Pillory-street, Love-lane, Barker-street, the Church-yard, Mug-market, Pepper-street, and Wall-lane. The whole town seems to be intersected with these filthy receptacles of night-soil and all other abominations, which remain entirely stagnant, in the midst of the population. I had abundant opportunity of ascertaining the accuracy of the complaints during the inspection, and shall therefore avoid, as much as possible, further allusion to them.

In the *First Wood-street*, Thomas Dunning, occupying one of the houses, complained of a cesspool from the privies. He says:—

"The cesspool is only covered with a board. It goes with an overflow to a drain, which passes under my house. There is no trap to the grate close to the kitchen. The yard is frequently flooded, and is below the level of the ground at the back. In the next yard there is a similar drain under the house, and after a shower of rain, it runs into their stair-hole, and through my kitchen passage. I emptied it a week ago, and it is now full again. It fills with an hour's rain."

It appears that such drains as exist are under the control of the surveyors of highways. Some of them have been long made. There is no record how, or by whom. The remainder have been formed out of the highway rates.

Messrs. Thomas Cooper and John Heath, surveyors of highways, gave joint evidence, and said:—

"The public drains and sewers are under our care, and we have cleansed some of them. We do not know the length of them. There are no plans of any public or private drains in the town. A great many of the streets have no drains whatever. We cleaned out one that crosses Beam-street. It was quite full, and the man died in the house under which it passed. During the cholera we also cleaned out two that were full in Wood-street, and persons died in the houses close to both places. We cleaned another out at Wych House Bank, and persons died of cholera close by that also. We took part of one out in Snow-hill, a few weeks since, and put in larger pipes. The old ones were full when cholera occurred, and there were three cases and one death there. We consider that the existing drains are quite inadequate, and that something better is absolutely necessary. We do not know of any other remedy but that given by the Public Health Act."

I need not add anything as to the lamentable state of Nantwich, as to drainage. The position of the surveyors of highways is a most painful one, with their present very limited authority—an authority which legally extends only to the reparation and drainage of the surface of the public highways. They find themselves in charge of these ditches and drains, which exert so baneful an influence on the lives of the inhabitants, but they have no power to remove the evil, and may, therefore, well be anxious for the application of an efficient remedy.

**PRESENT SUPPLY OF WATER.**—At the opening of the inquiry the rector stated, that for 900 houses there were only five public pumps. Many of the people have no other source of supply but the river, polluted with refuse of all kinds.

*Welch-row* contains a constant stream of water, about 11 inches wide and 3 inches deep, which flows from the higher suburban land, and as the street is on its natural course, it runs in the side channel, and at the upper part of the town is tolerably pure. It is used for domestic purposes by the inhabitants adjacent, and there was no cholera above the point where it first receives house and privy drainage. Except the river, this is the only running stream in the town.

At the bottom of Mill-street I saw, during the inspection, many persons fetching river water, some of which I examined, and found it quite unfit for food. A little girl among them had got a large canful, and said, that her father, Joseph Moore, was a small shopkeeper, and lived in Pepper-street, a distance of about 250 yards. The water was for drinking and tea.

Mr. Thomas Johnson, assistant-overseer, and late Inspector of Nuisances, gave testimony of great importance, because it shows the extravagant cost of the present modes by which water is obtained. He says:—

“I have lived in Nantwich all my life, and was much engaged, officially, during the prevalence of cholera this year. With the exception of Mill-street, where all the inhabitants drunk river water, the cases of cholera have been in the immediate vicinity of foul stinking accumulations of animal and vegetable matter. The privies are very bad; there is no system of drainage in the town, nor any public water supply, except five public pumps, from only one of which is the water fit to drink, and that has been put down since the cholera commenced.

“There are two wells and a spout, from which the inhabitants obtain water for food, but the two wells are out of the township. One would be 500, and the other 600 yards from the centre of the town. With the exception of those two wells the water is very deficient in quantity and defective in quality. There may be 20 private wells, and about 100 private pumps and wells in the town. These are generally outside the houses, in the court-yards, and are confined to the more wealthy inhabitants. I know of no cottage in the town with an exclusive pump and well. There may be some few rows of cottages that have a common pump and well. The average number of houses to each of such would be about five, but by far the greater number are without any such provision. The spring water is very hard, and it varies much in different parts of the town. All these, where they exist, are outside the houses. The cost of a well, to obtain water, would vary from 6*l.* to 30*l.* That would partly arise from the faults in the strata. The average cost would not be less than 10*l.* The annual repair of pump 3*s.* 6*d.*, and its duration 20 years. There are lead cisterns for rain water in some of the better class of houses. They cost about 8*l.* for 400 gallons. Annual repairs, cleansing, and dilapidation, 2*s.* 6*d.*

Most of the poor have old treacle casks for holding rain water. They cost 6*s.*, and will last six years. The people use cans chiefly for carrying water; they will hold about three gallons, and cost from 2*s.* 6*d.* to 3*s.* They are not generally painted, and will last, with care, about two years without repairs. The poor have seldom more than one can. The water in the tubs is rarely covered, and becomes very foul. Those who have the advantage of a common hard water pump, have to carry an average distance of eight yards. Those who have to depend on the public pumps, wells, spout, and river, have to carry water 200 yards on the average. The persons so dependent form the greatest portion of the poor population, and also many of the more wealthy inhabitants. For food, the people generally economise water, on account of the difficulty of obtaining it. They do not fetch more

than nine gallons per day for a family. Water is carried to some extent, for hire, at the price of  $\frac{1}{2}d.$  per canfull."

Mr. Howard stated, that he had about 12 gallons per day carried for 6*d.* per week. He is one of the most opulent inhabitants.

I shall be able to draw out, from this evidence of Mr. Johnson, the cost of the present wretched substitutes for a proper water supply. This can be done in several forms, according to the circumstances, and will be important, when compared with the cost at which a constant supply of good water can be given in every house. The first statement is for the best supply that can possibly be obtained under the present arrangements, and it must be remembered, that those who are in a worse condition suffer an amount of deprivation which must at least be valued at the difference in cost:—

|                                                                                        | <i>s.</i> | <i>d.</i> |
|----------------------------------------------------------------------------------------|-----------|-----------|
| Annual interest on cost of pump and well . . . . .                                     | 10        | 0         |
| Ditto repairs of ditto . . . . .                                                       | 3         | 6         |
| Ditto depreciation of pump, say 5 per cent. on 90 <i>s.</i> . . . .                    | 4         | 6         |
| Ditto interest on cost of lead cistern . . . . .                                       | 8         | 0         |
| Ditto cleansing of ditto . . . . .                                                     | 2         | 6         |
| Pumping and carrying water into the house, at only }<br>1 <i>d.</i> per week . . . . . | 4         | 4         |
|                                                                                        | <hr/>     | <hr/>     |
|                                                                                        | £1        | 12 10     |

Equal to  $7\frac{1}{2}d.$  per house per week.

The next statement is for those who have a well and pump, common to five houses; and for soft water, a tub:—

|                                                                                   | <i>s.</i> | <i>d.</i> |
|-----------------------------------------------------------------------------------|-----------|-----------|
| Annual interest and depreciation of can . . . . .                                 | 1         | 6         |
| Ditto interest and depreciation of water tub . . . . .                            | 1         | 4         |
| One-fifth expense of well and pump, as above. . . . .                             | 3         | 7         |
| Pumping and carrying water into the house, at 1 <i>d.</i> }<br>per week . . . . . | 4         | 4         |
|                                                                                   | <hr/>     | <hr/>     |
|                                                                                   | 10        | 9         |

Equal to  $2\frac{1}{2}d.$  per week per house.

The third statement is a very low estimate for the condition of the great bulk of the poor people in Nantwich; namely, that of a soft water tub and can; the ordinary supply being fetched from the public pumps, the river, or wells:—

|                                                                                      | <i>s.</i> | <i>d.</i> |
|--------------------------------------------------------------------------------------|-----------|-----------|
| Annual interest and depreciation of water tub . . . . .                              | 1         | 4         |
| Ditto interest and depreciation of can . . . . .                                     | 1         | 6         |
| Fetching, pumping, and carrying water, only $2\frac{1}{2}d.$ }<br>per week . . . . . | 10        | 10        |
|                                                                                      | <hr/>     | <hr/>     |
|                                                                                      | 13        | 8         |

Equal to  $3\frac{1}{4}d.$  per house per week.

INSURANCE, FIRES, AND MEANS OF EXTINGUISHING THEM.—  
On this point Mr. Broadhurst says in his evidence :—

“The house property here is generally insured. I am not connected with any office. The insurance ranges from 1*s.* 6*d.* to 4*s.* 6*d.* per cent., according to risk. We have four fire engines; three of them are of very little use, but one is in a good condition. The engines are supplied with water from the river and pumps. If a fire were to occur in the upper part of the town, there would be great want of water, unless it were near the pools on the Barony. The town was twice nearly burnt down. There were once pipes and fire plugs in the principal streets. The water was raised by a wheel from the river, but it was the property of a private individual, and he cut off the communication. The water has to be carried by buckets to the engine. There are 36 public buckets. Mr. Charles Laxton, special high-constable for the hundred of Nantwich, has charge of the principal engine, and there are six men who are liable to be called out whenever there is a fire. There have been about a dozen fires in the last 20 years. The engines are only brought out for exercise about once a-year.”

VENTILATION OF HOUSES AND COURTS, AND CONSTRUCTION OF HOUSES AND THEIR APPURTENANCES. CONDITION OF LODGING HOUSES.—*Welsh-row* is a tolerably wide and commodious street; but generally the houses of the town are built irregularly and most of the principal streets are narrow, as is the case in many old towns. Many of the courts are very much confined: the buildings either surrounding them, or the whole is nothing more than a narrow passage. I have not visited any town where so large a proportion of the cottage houses are without any means of ventilation. In a great number none of the windows will open, and there are bedrooms without any windows. In the older parts of the town most of the houses are half-timbered and very much dilapidated. I saw numerous buildings in Nantwich from 1 foot to 2 feet 6 inches out of perpendicular.

I proceed to quote a few of the facts which came under my observation while inspecting the town.

In *Welsh-row* there is a court of newly-erected houses belonging to the Primitive Methodist Trustees, and adjoining the chapel. Richard Lord is the tenant of one, and says,—

“There are nine houses, and the rents are 4*l.* 15*s.* and rates. The privies and ashpits are at the back, and have to be emptied through the houses in wheelbarrows. There is no drainage whatever from the back: all the houses are in a similar condition. They have been built eight or nine years.”

Back of *Second Wood-street*, Mr. James Willett and others' property has very offensive privies, with cesspools full of nightsoil, and a stagnant channel in a most loathsome condition. There is no drainage.

*Middle Wood-street*.—There are three houses without privies. The nightsoil is thrown to a heap near the doors. In the same

street, Edwards' property has very bad privies, with a confined court-yard, and the drainage standing in pools. Mr. Williamson said there were two deaths of cholera in the house adjoining, and a death in each of two other houses using the same privies.

In *Castle-street* there are some dilapidated cottages with bad privies, and there were five deaths from cholera in a row of ten houses.

In *High-street* there are three front shops without any privies or back premises. They abut on the church-yard. On this point the rector says, in his evidence,—

“There are many houses in Nantwich without any doors or windows at the back; others that have the sleeping rooms in the roof, with windows that will not open. They are often in confined courts, such as *Gas-alley* and *Queen-street*, altogether inaccessible to pure air. Some have only one sleeping-room, and others a second small room without any window or fire-place. Many of the cottages are much dilapidated and out of perpendicular, and yet they are too frequently occupied by large numbers of people, especially the Irish houses. Generally there are no drains from the houses, unless some poor unfortunate man has one passing under his floor.”

Mr. Broadhurst, solicitor, gives evidence to a similar effect, in which, after detailing the constructive defects of the habitations of the poor, the want of drainage and other evils, he says,—

“There are no cellar dwellings in the town; each family occupies a separate cottage, but no cottages have cellars:”

and concludes,—

“I am of opinion that the application of the Public Health Act would be highly beneficial to the town of Nantwich. As Clerk to the Union, I can say that we have endeavoured to carry out the Nuisances Removal and Diseases Prevention Act of 1848, but in several instances it has been of no avail. The Public Health Act is necessary in consequence of the deficiency of the Nuisances Act and the General Highway Act, neither of which gives power to cut, make, deepen, or widen any public drain, or to construct any sanitary works whatever. The principal public drains in the town of Nantwich are of old duration, and pass under and through private property, which cannot be interfered with but through the aid of the Public Health Act, which I should call a ‘Blessing Act.’”

The public lodging-houses in the town are numerous, and a great grievance. It has been shown that they were the means of propagating the epidemic typhus fever of 1846-7; and it can scarcely be otherwise when people are herded together in such a manner as I found them in Nantwich. One or two instances will be sufficient to show that all notions of health, decency, and morals are banished from such places, and that the provisions of the Act are necessary for their regulation.

At a house in *Pillory-street*, kept by Thomas Welsh, there

were eight beds and substitutes for beds in one room, occupied by sixteen persons, seven males and nine females, with an average of only  $95\frac{1}{2}$  cubic feet of breathing space for each.

At another, kept by Michael Cummins, in *Love-lane*, there were seven men in three beds, in a small room affording only  $131\frac{1}{2}$  cubic feet of air for each person.

In the *Second Wood-street* is a small lodging-house, kept by John Donoghue, more crowded, in proportion to its size, than I think any place I had previously visited. The stench in all the rooms was horrible; almost enough to stifle any one coming in from the cool fresh night air. Down stairs, in the living room, was a man, his wife, and two children, and two savage dogs, whose ordure and urine was spread on the floor. In a very small room up-stairs there were four persons, with only 90 cubic feet of air each; and in another room, a little larger, eight persons, with only 68 cubic feet each.

I also examined the house of Gaffin's, the sweep, where there were nine cases of typhus fever in 1846, and found in one small room a man and woman who had both had cholera. Up a crazy ladder, in a small loft two boys; in a third dirty room, 12 feet square, three beds containing three men, three women, and two children, with 148 cubic feet of breathing space each. The only respectable clean lodging-house in Nantwich is in *Welsh-row*, and is kept by Catherine Davis, widow, who will take in only clean and decent-looking people. She pays 12*l.* rent, and complains that she cannot live because she refuses rogues and vagabonds, though her charge is not more for lodgings than those of the filthy places already described. Her six rooms are spacious, and she has ten clean beds; but on the same night when the other houses were so crowded she had only five lodgers, all men. This fact indicates to some extent the utterly degraded condition of the persons who frequent the lodging-houses of our towns.

CONDITION OF THE ROADS, SURFACE CLEANSING, AND PUBLIC NUISANCES.—There are very few footways in the streets in Nantwich. In the centre of the town the narrow streets are paved with boulders or pebbles, which extend from building to building across the street, and make a very uneven surface to walk upon.

It appears from the abstract of accounts that the expenditure of the year ending March, 1848, was 185*l.*, and I was informed that is about the average. Messrs. Cooper and Heath, the Surveyors of Highways, gave the following evidence as to their duties,—

“The length of the public highways in Nantwich is about five miles. There are two turnpike-roads in the township. We have no office in which to transact our business. The public meetings for highway purposes are held in the vestry. We have a great deal of labour, because

we have no paid collector of rates. The amount levied has been rather less than 6*d.* in the pound per annum, but not less than that would be sufficient to keep the roads in repair. A rate of that amount makes rather less than 200*l.* The roads would therefore cost nearly 40*l.* per mile. Paving boulders cost 6*s.* per ton delivered, or about 1*s.* per yard; sand 3*d.* and labour 3*d.*, making altogether 1*s.* 6*d.* per yard. The materials for macadamized roads also come from Wales, and cost 4*s.* 6*d.* per ton delivered and 2*s.* breaking. The township has no flagged footways and only a short length of kerbstones.

"We have paid nearly 30*l.* for cleansing the streets. More has been done than usual on account of the cholera; but we have not done too much, and therefore those who expended less did too little. Until last summer the streets were never watered. During the cholera we hired a water-barrel and watered the streets. The Guardians requested us to water and sweep the streets under the Nuisances Removal Act.

"At the Hospital-street end we have laid down a little gas concrete. We did it with our own men, and find it to make a good hard road. The cinders and tar mixed up ready for use costs, including carting, 2*s.* 6*d.* per load. One load will do for about eight square yards from one and a half to two inches thick. It was beaten down with a maul, not rolled; we have not done any more of it. During the prevalence of cholera, we acted with the Sanitary Committee of the Guardians, and assisted them as much as we could with our limited powers; but we were satisfied that neither the powers of the Committee, nor our own were sufficient to cope with the existing evils."

STATE OF THE BURIAL-GROUNDS.—About the time when the cholera broke out, there was no burial-ground available but the parish churchyard, and it was in so crowded a condition, that according to the rector, the open graves were frequently most painful and offensive to the sight and smell. A field at a distance of about three quarters of a mile from the centre of the town to the north-east, was immediately obtained as a parish burial-ground, and publicity being given, the service at the first interment was performed by the rector in the presence of a large assembly, with much form and solemnity. The churchyard was then covered with quick lime and closed against future interments. I cannot but remark that the energy and decision which characterised the whole of the proceedings, and the general concurrence and satisfaction on the part of the inhabitants justifies the conclusion that the improvements which it is the object of the Public Health Act to effect, will be carried out with equal vigour and good-will. If so, its provisions will be of incalculable advantage to the town, and in the words of one of the witnesses, be really "a Blessing Act."

There is a small burial-ground in the town belonging to the Society of Friends. It is not crowded, because they seldom inter more than one body in a grave.

The Independent denomination have a small plot of ground attached to their chapel in Monks-lane. There is only room for 52 graves, unless they take up the brick pavement in front of

the chapel doors. At the time of my visit only two interments had taken place; one four months previously, and the other only a few weeks. The trustees had also just purchased a plot of 600 square yards of land adjoining the chapel with the view of using it for a burial-ground. It is a singular circumstance that this ground is only 12 yards from the churchyard, and that it should have been bought for such a purpose just at the time when the churchyard was being voluntarily closed, and when public opinion was making such rapid progress against further intramural interments. It is not my duty to impute any motive; but it would seem that according to the 83rd section of the Public Health Act, the interments which have already taken place there, and the appropriation of any additional land as a burial-ground, are illegal, and the trustees or other persons in authority, liable to a penalty of 50*l.* for every offence.

In Church-lane there is a small burial-ground, also belonging to the Independents. There is room only for about 50 graves, and it already contains 24 bodies.

WATCHING, LIGHTING, AND GAS.—Mr. James Howard supplied me with all necessary information on this subject, and from his evidence it appears that the town is in a very unprotected state during the hours of darkness, and is likely to be even worse. He says,—

“The General Watching and Lighting Act is not now in operation here; it was in force for seven years until about 1842. The lamps were erected by the inspectors under that Act, but the ratepayers then determined not to elect Inspectors again. There is a watchman, who collects small sums from such private individuals as choose to give. The county of Chester Constabulary Act is in operation in Nantwich, and the special High Constable of the hundred of Nantwich resides in the town and has one man.

“There are 42 public lamps in the town, but only eight are lighted, and five of them will be extinguished in another month, unless funds be provided to pay for them; they are at present paid for by private subscription. The charge is 45*s.* for lighting from darkness until dawn, and from 4th September to the 1st April, with the exception of five nights at each full moon. The lights are batwings that burn five or six feet per hour, and the lighting and extinguishing costs the company about 11*s.* per lamp. The public lighting of the town is very defective, and if the Local Board of Health could contract with the company for lighting the town properly, it would be a great improvement. I am one of the principal proprietors of the gas works. We have no local Act of parliament, nor is the concern registered or enrolled under the General Joint Stock Company's Act. We are merely a private trading company. The capital consists of 240 shares of 10*l.* each, all paid up; the shares are at par, but there is very little traffic; the dividend averages 5½ per cent.; the consumption is now generally by meter, and the price 8*s.* per thousand, with the exception of Messrs. Bower and Company's mill, which is lighted at a lower rate on account of the large consumption.

We use three retorts in winter, but in summer we cannot find work for one. I do not think there are 12 private houses in Nantwich lighted with gas. I believe we could supply at 25 per cent. less if we could double the consumption. We do not ask permission before breaking up the streets, but we have no authority or right to lay pipes. We lay all the services up to the buildings, and sell the meters to the consumers. We have no station meter, but I think the annual make is about 1,000,000 cubic feet. We use about 250 tons of coal per annum from North Wales. It is brought thence by canal 30 miles, and costs 13s. 10d. per ton. We consume part of the coke, and only sell about 30 tons per annum at 15s. per ton; we cannot sell all of it. Lime is brought nine miles and costs 19s. per ton. We give the spent lime away to any one who will take it, and have some difficulty in disposing of it even in that manner. We destroy the ammonia water as well as we can, and give nine-tenths of the tar away. We should be very glad to get a penny a gallon for it. We have no person connected with the works who is at all scientifically acquainted with the manufacture of gas. I think the concern capable of improvement, and think that if the proprietors had secured to them an equitable dividend in perpetuity they would be glad to transfer the works to the public."

## REMEDIES.

**PUBLIC HEALTH ACT BENEFICIAL.**—Having shown the present condition of the township of Nantwich with respect to the several matters into which I was directed to inquire, it becomes my duty, according to the instructions of the Board, to point out such remedies as may remove the existing evils, and prevent the dreadful waste of life and health which appears to have been long going on in Nantwich. Those remedies are to be found in the provisions of the Public Health Act, and therefore I think it ought to be applied without delay to the whole of the township.

I now proceed to show in detail how such of these provisions as are of the nature of public works may be carried into effect.

**IMPROVED WATER-SUPPLY.**—It is now clearly proved, that water is the cheapest and only effectual agent for the removal of those decomposing animal and vegetable substances, which exist in so great abundance in every part of the town of Nantwich. It is the gases generated by these accumulations of unremoved filth, that poison the air which the inhabitants are compelled to breathe, and produce or aggravate the malignity of all the epidemic diseases with which the town has been so long scourged. A proper water supply is, therefore, indispensably necessary to the health of the town. The Public Health Act requires that the supply shall be "proper;" and to comply with this it must be *pure, abundant, at hand, and cheap.*

*Pure water* is free from mineral or organic matter in solution or suspension as far as practicable. *Abundance* requires that it may be used for all needful and convenient purposes, without limit as to quantity. *To be at hand* there must be a tap in every house, with the water constantly on at such a pressure

that, if necessary, it could be conveyed to the highest story in the house. *Cheapness* requires that it shall be furnished at the lowest possible cost, and the Public Health Act declares that the price shall not exceed the sum of 2*d.* per week. It must now be considered settled, from the opinions of all scientific and professional men who have paid attention to the subject, and from the reports of Her Majesty's Commissioners, that a supply equal to 25 gallons per day must be given for each individual of the population, for food, cleansing of the person, washing of linen, house cleansing, and other domestic purposes; for keeping in clean and healthy action a system of economical town drainage; for watering the public ways; for washing and cleansing by the hose and jet-pipe the surface of all the streets and courts of the town; for stables, inns, and manufacturing purposes; for extinguishing fires immediately by fire-plugs and the jet-pipe, without the necessity for engines; and for all other purposes to which a water supply may be made conducive in the preservation of life and property.

In providing a water supply for a town, it is always desirable, if possible, to select a source at a higher altitude than the houses, and this I was anxious to do at Nantwich. I examined all the high lands within several miles, and found two sources from whence the supply could be taken. In describing them both, I shall depart from the mode I usually adopt, because each has its peculiar advantages, and as one scheme would involve negotiations with a public company, I think it better that the local Board of Health should be prepared and strengthened by an alternative mode of supply. There are only about three areas of sufficient size, and within a convenient distance of the town. One of them I found unsuitable, on account of woods and arable land. The second is the district drained by the Cheer Brook, about two miles south-east of the town, and at the fork of several brooks about half a mile east of Butt Green, in Wybunbury Willaston Township, parish of Wybunbury. The water here would be very pure, and so abundant that nine-tenths of the water might be allowed for years to run away if the storm water should be at all turbid, and thus the expense of mechanical filtration would be avoided. It would be necessary only to construct a store reservoir, with sluices to shut out the storm water, and from thence to convey the water by a pipe to the town, where it would be distributed by street mains and by a service-pipe to every house and water closet, or improved privy.

The other source of supply, available to the inhabitants of Nantwich, is a large reservoir about three miles north-west of the town, adjoining the Ellesmere and Chester Canal, now the property of the Shropshire Union Railway and Canal Company. This reservoir has not been constructed many years, but I am informed that in consequence of the great falling off

in the traffic on the canal it is now of little use. The reservoir covers 15 acres of land, and at the time of my visit there were 8 or 9 acres of water. The level is 40 feet above the aqueduct at Welsh-row, according to the lock gauges, and it would be, therefore, sufficiently high for a store reservoir. I think it probable, however, that it is filled chiefly with storm-water; and, therefore, notwithstanding its large size, filtration would probably be necessary. The saving would be in the construction of a store reservoir, but there would be about a mile of additional main-pipe, as compared with the supply from Cheer Brook.

Taking the population at 6,000, and providing for a present consumption of 25 gallons per day, the year's supply would be 54,600,000 gallons, equal to 8,761,200 cubic feet. The annual fall of rain determines the area of ground necessary at a higher altitude than the reservoir, in order to yield the necessary quantity of water. In this instance, I should assume 40 inches, and suppose one half would be absorbed and evaporated, leaving 20 inches depth upon the whole surface available for the town use. This would only require about 120 acres of collecting ground, and as either locality has a very much larger area, it is certain that abundance of water can be easily obtained. In the collection of land drainage-water for town supply, care must be taken that the supply shall not fail during a season of drought for want of storeage room; and I should, therefore, provide a reservoir capable of containing 140 days' supply. This would extend beyond the longest period of dry weather known in this country. With more specific information as to the rainfall, I might have been able to adopt a smaller capacity, but should consider it unsafe with the slender data at my disposal. At an average depth of 12 feet, the store reservoir would require to be rather more than 6 acres in extent.

In the following estimate of the cost of a proper water supply, I have supposed it to be taken from the Cheer Brook, but I have no sections or plans to guide me in any way; and, therefore, if the altitude should be found insufficient, the canal reservoir would be better as a source of supply than resorting to artificial power to raise the water. If the canal reservoir were, however, to be adopted, I should not make a difference in the estimate, because the construction of filter-beds, and the subsequent cleaning and attention they would require, would be equal, fully, to the expense of a store reservoir. I am compelled to add, that without proper plans and sections the estimate can only be taken as the nearest approximation possible under the circumstances. With such reservation, I have no doubt the works could be constructed for the following—

## ESTIMATE FOR WATER SUPPLY.

|                                                                  | £.     | s. | d. |
|------------------------------------------------------------------|--------|----|----|
| Land for reservoir . . . . .                                     | 400    | 0  | 0  |
| Cost of reservoir . . . . .                                      | 1,000  | 0  | 0  |
| Conveying, and street-mains . . . . .                            | 2,929  | 13 | 4  |
| Services and taps to houses and privies,<br>or closets . . . . . | 1,000  | 0  | 0  |
| Total . . . . .                                                  | £5,329 | 13 | 4  |

Now, by a wise and equitable arrangement of the Public Health Act, the inhabitants of Nantwich would not need to raise the money for this and the other public works at once by rates, but the money can be borrowed on security of the rates, and repaid by equal annual instalments of principal and interest, in a period not exceeding 30 years. By this provision, the burden would not be at all felt by mortgagees in possession, or persons with limited incomes arising from house property, or by persons having only a life estate in buildings. The improvements would be additions to the property, increasing its permanent value; and the distribution of charges would prevent the present holders from paying for advantages which might be chiefly enjoyed by their successors.

To apply this principle to the estimates before me, I find that the instalment of principal and interest to repay the sum of 5,329*l.* 13*s.* 4*d.*, in 30 years, would amount to 315*l.* 8*s.* 7½*d.*; and it must be remembered that then the water would be supplied almost gratuitously, because the works would be the property of the town. Nantwich contains now 1,034 houses, and the annual instalment might be raised in the following manner:—

## ANNUAL INCOME FOR WATER.

|                                                                                                         | £.   | s. | d. |
|---------------------------------------------------------------------------------------------------------|------|----|----|
| 547 houses rated under 5 <i>l.</i> , to be charged<br>1 <i>d.</i> per week . . . . .                    | 118  | 10 | 4  |
| 277 houses rated at from 5 <i>l.</i> to 10 <i>l.</i> , to be<br>charged 1½ <i>d.</i> per week . . . . . | 90   | 0  | 6  |
| 210 houses rated above 10 <i>l.</i> , to be charged<br>2 <i>d.</i> per week . . . . .                   | 91   | 0  | 0  |
| Stables, inns, &c., say only . . . . .                                                                  | 25   | 0  | 0  |
|                                                                                                         | £324 | 10 | 10 |
| Annual Instalment . . . . .                                                                             | 315  | 8  | 7½ |
| Surplus . . . . .                                                                                       | £ 9  | 2  | 2½ |

Let these charges of 1*d.*, 1½*d.*, and 2*d.* per week for a constant supply of good water in every house, be compared with the 7½*d.*, 3½*d.*, and 2½*d.* per week which the present want of system costs for a small quantity of impure water, generally

carried a great distance, and I have no doubt that all the inhabitants will joyfully concur in the construction of public works, as a mere question of pecuniary economy, irrespective of the great improvement to be effected in the health of the town.

IMPROVED DRAINAGE OF THE TOWN.—With such a supply of water poured in at every inlet of drainage, without restraint as to quantity, there need be no stagnant ditches, drains choked up, nor any decomposing animal or vegetable refuse in the vicinity of the houses. If an efficient system of drainage be constructed, the refuse of the town can be removed before decomposition has liberated the gases which now destroy the people. As to the expense, too, a constant supply of water renders unnecessary, and worse than useless, the large drains constructed of masonry. A 12-inch earthenware pipe of good construction, and well laid, would convey the drainage of all the houses, including the water used within, and that falling on the roofs during rain. I should, therefore, drain the whole town by means of such earthenware pipes, commencing in the upper part of the streets, with pipes of about 6 inches diameter, and increasing in size towards the river, until the whole of that on the east side was collected into one pipe of 12 inches diameter, and that on the west into a pipe of about 9 inches. These two conveying pipes might then run parallel with the river for about half-a-mile down, where the refuse could be discharged, until its value was properly appreciated by the farmers. All pollution of the river and the atmosphere of the town would thus be avoided. From the street-drains should proceed similar pipes of 3 or 4 inches diameter to every cellar, sinkstone, court, fall-pipe from the roof, and water-closet or improved privy. Every opening being securely trapped to prevent stench. With a similar reserve to that explained in treating of the water supply, consequent upon the non-existence of any plans or sections, I have prepared an estimate of the cost of draining the town as follows:—

ESTIMATE FOR DRAINAGE.

|                                                                                                                                        | £.      | s. | d. |
|----------------------------------------------------------------------------------------------------------------------------------------|---------|----|----|
| Earthenware street-drains and laying, including the reinstatement of pavement, and also conveying pipe on each side of the river . . . | 3,373   | 6  | 8  |
| Laying house and court-drains, traps, and one-fourth soil-pan apparatus to each house, 1,000 houses . . . . .                          | 1,750   | 0  | 0  |
|                                                                                                                                        | <hr/>   |    |    |
|                                                                                                                                        | £ 5,123 | 6  | 8  |

On the same principle as I have already laid down, that of borrowing the money on security of the rates and distributing the repayment over 30 years, the annual instalment of principal and interest would amount to the sum of 303*l.* 3*s.* 4*d.*, which I should provide for by an equal charge upon the houses

and buildings to that already given, making the sum of 324*l.* 10*s.* 10*d.*, and leaving an annual surplus of 21*l.* 7*s.* 6*d.*

Thus it appears that the water supply, and an efficient system of drainage together, will cost less than water does now.

**SEWAGE DISTRIBUTION.**—The agricultural land of the township appears, according to the evidence, to be tolerably well drained, and therefore the sewage manure of the town might be applied to it with great advantage. Liquid manures do not seem to have been used in any systematic manner in the neighbourhood. The only instance brought before my notice was that of a piece of land irrigated by means of a pump and open gutters, but even there the land is said to be very fertile, and there can be no doubt that its fertility would be still further increased if the liquid manure were laid evenly on with the hose and jet-pipe. The value of town refuse as a fertilizer has long been well understood on the continent, and is now becoming highly appreciated in some parts of this country. Its intrinsic value has been estimated by chemists at 20*s.* for each individual of the population. Farmers have proved that it can produce 100 tons of green food upon an acre of land, and scientific men have stated that with the application of engineering skill it will yield a revenue in any town sufficient to pay all the local rates. It may probably require some time before the farmers in the neighbourhood will fully appreciate its importance to the land, and therefore I have provided for its discharge into the river below the town, but there can be little doubt that as chemical knowledge, with reference to agriculture advances, and becomes more widely diffused, the town of Nantwich will derive a considerable revenue from the sale of its sewage manure.

**IMPROVED PAVING.**—The great distance from whence road materials, and stone has to be obtained, is a disadvantage, but not an insuperable one. The streets of Nantwich generally, and the courts almost universally, are capable of great improvement, without going out of the township for materials. I have already stated that the pavement is boulders, and that the principal streets are without footpaths. It would be easy to make kerbs of clay, like large bricks, and if hard-burnt, they would have a very handsome appearance. I should then lay down footpaths of gas concrete, which would be smooth, durable, impervious to moisture, and economical. The portion laid down by the surveyors, and alluded to in their evidence, is an improvement, but it would have been much better by the admixture of a small quantity of lime, and by heavy rolling after laying down, instead of being beaten with a maul. Such kerbs as I have described might be made and put down for 6*d.* per yard run, and the concrete completed at 10*d.* per square yard. In any street admitting therefore of a footpath 6 feet wide, the total cost would be 1*s.* 1*d.* per square yard,

while the inconvenient boulder pavement now used costs, according to the evidence, 1s. 6d. per square yard. Good foot-paths may therefore be made in the streets at an actual saving of expense. If it be said that in many places the boulders are already laid down, and the pavement in good condition, the reply is, that according to the evidence, the stones, without labour, are worth 1s. per square yard for paving the carriage-ways, and the new footways, including the kerbs, will only cost, under the circumstances above stated, 1s. 1d., or 1d. per yard additional for all the extra cleanliness and comfort they would afford. All the court-yards in the town should be paved with similar concrete, and for them the kerbs would be unnecessary. I never, as far as I recollect, saw a clean cottage in a filthy, unpaved court-yard, and scarcely ever a dirty house in a clean, well-paved court; it must needs be so, especially where there is a family of children. Good pavement acquires additional importance when we consider how desirable it is to prevent the admission of dust and mud, and other inorganic solids into earthenware-pipe drains.

If we suppose that the large quantity of 20 square yards of such pavement would be required, on the average, for each cottage placed in a court-yard (which I am sorry to say would not be the case), and estimate the cost at 1s. per yard, including excavating and preparing the ground, the annual instalment for repayment would not amount to one farthing per house per week.

**IMPROVED CLEANSING.**—Having obtained an abundant supply of water with plugs or hydrants at short distances in the streets, an efficient system of drainage, and smooth impervious pavement, the whole surface of the streets and courts of the town could be watered, washed, and made perfectly clean at short intervals of time, by means of flexible hose and jets of water, at a cost of less than one halfpenny per week per house.

**BURIAL-GROUNDS.**—I have already stated that the church-yard is closed, and that a new parish burial-ground has been provided. Such an example is, I think, a sufficient indication of the public opinion in Nantwich upon the subject; and after the evils of town interments have been so clearly proved, these little confined places ought not to remain open for further burials, but the grounds both of the Society of Friends and the Independents should be also closed, so that it may be truly said, no further interments of the dead can take place within the town of Nantwich.

**PLACES OF PUBLIC RECREATION.**—The Barony is a large plot of uninclosed land on the north-east of the town, at a distance of not more than half a mile. It is now worse than useless, because the inhabitants have from time to time made large holes and pits, by getting clay to make bricks, and some of these pits are full of stagnant water. One of the drains

of the town empties into a series of them, which happen to be connected together, and the stench is complained of as intolerable. The Marquis of Cholmondeley, as lord of the manor, has some power over this common, and I believe the inhabitants have also some rights. John Tollemache, Esq., M.P., is the principal proprietor of the fee. The area, as near as I could judge, is about 25 acres, and it occurred to me during the inspection that this would be an admirable place for public walks and amusements; and that if properly laid out it would be highly ornamental to the town. I mentioned the matter, therefore, to the rector, and was gratified to hear that the same thought had occurred to him, and that he had corresponded with Mr. Tollemache on the subject. As, however, that correspondence was private, I requested the rector to address him, with reference to such an arrangement, under the provisions of the Public Health Act, and shortly after leaving Nantwich received a note, of which the following is a copy:—

“ *Nantwich Rectory, October 19, 1849.*”

“ DEAR SIR,

“ YOU may remember my showing you a letter from Mr. Tollemache to me about the Barony. He will not let me put that letter into your hands, because it was a confidential communication from the Marquis of Cholmondeley. What he has written on the other side you are at perfect liberty to use in any way you think proper.

“ I am, dear Sir,

“ Yours faithfully,

“ *William Lee, Esq.*”

“ A. F. CHATER.”

The following is a copy of the communication referred to from Mr. Tollemache:—

“ Lord Cholmondeley does not see that the interests of the Cholmondeley property can in any way be injured by his acceding to the proposed enclosure of the Barony. He has merely a life interest in the property, therefore considers his consent would be of little avail after his death. Some Act of Parliament, however, may give powers in such cases to persons similarly circumstanced. Should this be the case he will readily give his assent to the measure if the proprietors are disposed to give theirs.

“ Mr. Tollemache will readily give his assent to the proposed measure.”

A public road without fences runs lengthwise through the centre of this waste land, and if it could be inclosed for the benefit of the town, that portion to the east of the road would make as fine a ground as could well be conceived for cricket, football, and other athletic games; while that to the east of the road might be planted and laid out as public walks. The pits and holes which now disfigure it, and form receptacles for offensive refuse, would, if drained, softened down, and covered with grass, add beauty to the grounds, and give all the varied picturesque effect of a greatly extended area.

## SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS.

I. That the sanitary condition of the township of Nantwich is most deplorable; that as far as can be ascertained, every indigenous epidemic, and every foreign disease that has visited this country epidemically, has, at one time or other, ravaged the town, and has always assumed a very malignant form; that in 1846-47 the town was fearfully scourged with typhus fever; and in 1849 cholera and choleraic diarrhoea attacked upwards of one-sixth of the inhabitants, and within four months destroyed a proportion equal to thirty to a thousand of the population.

II. That the situation of the town, and the general contour of the district is favourable to health.

III. That with the exception of the recent closing of the church-yard, there exist no arrangements whatever having reference to the public health.

IV. That the town is intersected and surrounded with filthy open stagnant ditches; that there is no system of drainage nor any water supply; that many of the houses are dilapidated, and so constructed as not to admit of ventilation; that the privies are filthy and indecent; and that the paving and cleansing of the town is very defective.

V. That the occupations of the greater number of poor inhabitants are sedentary, but not otherwise unhealthy.

VI. That the health of the population would be greatly improved by—

1. A supply of good water, with a tap in every house, constantly on under pressure.

2. An efficient system of drainage of the site of the town, including the courts, houses, and other buildings, and the substitution of water-closets or soil-pan apparatus, with proper drains, for the present privies.

3. Improved paving of courts, alleys, and streets.

4. Improved systematic watering and cleansing of the courts and streets.

VII. That the above objects may probably be accomplished at the following rates per week for each cottage house:—

1. A constant supply of water, with a tap in the house, *at one penny.*

2. A system of complete drainage, with soil-pan apparatus, in lieu of the present privy, *at one penny.*

3. Clean, durable, and impervious paving of courts, *at one farthing.*

4. Public cleansing of the whole surface of the town with hose and jets of water, *at one halfpenny.*

VIII. That the weekly payments for the whole of these

objects together will be less than the present average cost of water alone.

IX. That the sewage manure may be applied to the agricultural land with great advantage, and so as to produce a considerable revenue to the town.

X. That the low lodging-houses exercise a very baneful influence upon the health of the inhabitants, especially during the prevalence of any epidemic disease.

XI. That several small burial-grounds still remain open in the town, and ought to be closed without delay.

XII. That the condition of the town would be greatly improved by the establishment of public walks and places of recreation for the inhabitants, and that the waste land called the Barony is an admirable site for such purpose.

WHEREUPON I RECOMMEND:—

1. That the Public Health Act, 1848, except the sections numbered 50 and 96 in the copies of that Act printed by Her Majesty's printers, be applied to the township of Nantwich, in the county of Chester.

2. That the Local Board of Health to be elected under the Public Health Act shall consist of nine persons, and that the entire number shall be elected for the whole of the said district.

3. That the first election of the said Local Board of Health shall take place on the 29th day of September, in the year of our Lord 1850.

4. That one-third of the number of the said Local Board shall go out of office on the 25th day of March in each year, subsequently to that in which the said first election takes place.

5. That every person shall, at the time of his election as a member of the said Local Board, and so long as he shall continue in office by virtue of such election, be resident as in the said Public Health Act, 1848, is required, and shall be seized and possessed of real or personal estate, or both, to the value or amount of not less than 1000*l.*, or shall be so resident, and rated to the relief of the poor of the said township, upon an annual value of not less than 20*l.*

I have the honour to be,

My Lords and Gentlemen,

Your very obedient Servant,

WILLIAM LEE,

*Superintending Inspector.*

*To the General Board of Health,*

*&c.*

*&c.*

*&c.*