[Report 1908] / Medical Officer of Health, Chester City & County Borough.

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CITY & COUNTY BOROUGH OF CHESTER.

ANNUAL REPORT

OF THE

Medical Officer of Health

For the Year 1908.

CHESTER:
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MDCCCCIX.

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Medical Officer of Health - - DR. A. E. THOMAS

City and County Borough of Chester

ANNUAL REPORT

OF THE

MEDICAL OFFICER OF HEALTH

FOR THE YEAR 1908

To the Mayor, Aldermen, and
Councillors of the City of Chester.

GENTLEMEN,

The prominent and outstanding facts of the Annual Report and vital statistics for the year 1908 are briefly recorded below :—

Estimated Population ...	39,515	
Birth-rate	24·8	per 1,000 inhabitants
Death-rate	16·02	" "
Infantile Mortality	120	per 1,000 births
Death-rate from Phthisis ...	1·113	per 1,000 inhabitants
Death-rate from all forms of Tuberculosis ...	1·873	" "
Respiratory death-rate excluding Phthisis ...	2·278	" "
Zymotic death-rate	1·59	" "

Other noticeable features derived from this Return are :—

The diminished birth-rate.

The lessened number of births—the lowest for over 30 years, and the first occasion during this interval on which the number has been less than 1,000.

The declining death-rate—the lowest since 1874, the first year for which records are available.

The gratifying and substantial reduction in the death-rate from Phthisis and all forms of Tuberculous disease.

The small number of deaths due to Enteric Fever and Puerperal Fever.

The diminution in the number of deaths accredited to Measles and Diphtheria.

The increased number of deaths due to Scarlet Fever and Influenza.

The very slight increase in the Infantile Mortality.

The lessened prevalence of Diphtheria.

The increased prevalence of Scarlet Fever.

Social and Economic.

In the beginning of 1908 was published a Return by the Board of Trade dealing with the working classes, their rents, housing, the retail prices of food, and the standard rates of wages for the principal industrial towns in the United Kingdom.

A short summary of the information given respecting Chester is here appended.

In the beginning of the seventeenth century Chester was still nominally the chief seaport on the north-west coast—Liverpool being one of its dependents—but even as early as 1617, in a return of ships belonging to the ports, Liverpool was found to have greater tonnage and more seafaring men. The passing of Chester as a port was due in the main to the silting up of the Dee. The railways to Crewe and Birkenhead begun in 1837, and opened in 1840, re-invigorated the City, but no prominent new industry has arisen. Indeed the chief source of employment, other than house building, appears to be in connection with the railway. This is borne out by the census returns of 1901, which gives the number of those

employed in various callings :—Domestic indoor servants (not in hotels) 1938, house building 1484, railway servants and officials 809, milliners and dressmakers 650, engineering and machine-making 635, gardeners (not domestic), nurserymen seedsmen, florists, 335. The minor industries include lead smelting, the manufacture of paints and white lead, and the production of snuff and tobacco.

The total number of occupied males over 10 years in 1901 was 11,680, the percentage of inhabitants employed in professional pursuits in 1901 was 2·7, in commercial callings 2·0. The number of married or widowed women in 1901 was 12·4 per cent. of the total population, of female domestic servants 5·1 per cent.

The population of Chester and number of houses inhabited in previous census years were as follows :—

Year.		Population.		Inhabited houses.
1811	...	17472	...	—
1841	...	23814	...	4600
1851	...	27766	...	—
1861	...	31110	...	5971
1871	...	35257	...	6731
1881	...	36794	...	—
1891	...	37105	...	—
1901	...	38309	...	7948

Wages—

Wages at Chester rule generally lower than in London—thus assessing the wage in London at 100 in each case—in Chester the index number in the building trade for skilled workmen is 89, for labourers 84. In the engineering trade the numbers are for skilled men 84, for labourers 75, In the printing trade the number is 81, and in the furnishing trade 87. Put in another way this means for example that a skilled workman in the building trade in Chester obtains 89 per cent. of the wages he would obtain for the same work in London.

Housing and Rents—

The bulk of the working class property in Chester is situated in the modern part of the town outside the old city walls.

There are streets and courts in the ancient part, dwelt in mainly by a poorer class, the courts containing a certain number of back to back houses.

The most general type of working class house in the city is that with two bedrooms, kitchen, and scullery—of which type there are large numbers.

There are also cottages with two living rooms and two bedrooms. Sometimes a scullery is added. Larger houses with three bedrooms are fairly common.

In the majority of working class dwellings, rentals range between 3 and 5 shillings per week. Houses of higher rentals are mostly to be found in the newer districts on the outskirts. The weekly rents charged are for three-roomed houses, from 3 shillings to 4 shillings and 6 pence : for four-roomed houses from 4 shillings to 5 shillings, and for five-roomed houses from 5 shillings to 6 shillings.

Assuming that in London a working man pays 100 weekly rent for his house—in Chester he would for the same class of house pay 50—that is working class rents in Chester are half the amount they are in London. The other towns classed equal to Chester in this respect are Blackburn, Warrington, Wigan and Merthyr Tydfil. The rent index numbers, for other neighbouring towns nnder similar circumstances are for Liverpool 65, Birkenhead 70, Crewe 48, Manchester 62, Stockport 51, Macclesfield 32.

At the 1901 census, 2205 people or 5·76 per cent. of the total were living in tenements considered as overcrowded. The number of these houses was 288, or 3·55 per cent. of the total. In Chester, as in the case of most old towns it is evident that antiquity and picturesqueness are being constantly brought into collision with modern ideas concerning hygiene.

Cost of Living—

Assuming the price for all commodities (groceries, meat, coal) used up in a working man's home in London to be 100, in Chester the index number is 94. For rent, meat provisions, coal, all included

the numbers are for Chester 85, Liverpool and Bootle 86, Birkenhead 88, Crewe 84, Manchester and Salford 86, Stockport 81, and Macclesfield 78, as against the 100 accredited to London.

Population—

The population estimated at the end of June, 1908, is 39515. This includes citizens in the following institutions :—

The Chester Workhouse which is in Hoole ;
The Cheshire County Asylum, Upton ;
The Middlesbrough Asylum, Yorks ;
The Nottingham Asylum ;
The Prestwich Asylum ; and
The Royal Albert Asylum, Lancaster.

Births—

During 1908, the number of births registered in the district was 981, equivalent to a birth-rate of 24·8 per 1·000 inhabitants. This rate is ·9 less than the rate for 1907, and 2·3 less than the average rate for the years 1898-1907.

The corresponding rates for the country at large are annexed.

Birth-rates 1908—

England and Wales	26·5
76 Great Towns	27·0
142 Smaller Towns (including Chester)	26·0
Chester	24·8
Rural Districts	26·2

The statistics for previous years are given below :—

Year.	Births.	Birth-rate.
1874 ...	1203 ...	33·5
1875 ...	1209 ...	33·4
1876 ...	1242 ...	34·2
1877 ...	1255 ...	34·3
1878 ...	1258 ...	34·2
1879 ...	1238 ...	33·5
1880 ...	1261 ...	33·9

Year.		Births.		Birth-rate.
1881	...	1232	...	32·9
1882	...	1182	...	31·6
1883	...	1158	...	30·9
1884	...	1141	...	30·5
1885	...	1158	...	30·8
1886	...	1151	...	30·6
1887	...	1097	...	29·2
1888	...	1074	...	28·6
1889	...	1096	...	29·1
1890	...	1098	...	29·2
1891	...	1074	...	28·5
1892	...	1128	...	29·95
1893	...	1159	...	30·71
1894	...	1105	...	29·1
1895	...	1142	...	30·0
1896	...	1170	...	30·6
1897	...	1081	...	28·2
1898	...	1103	...	28·6
1899	...	1049	...	27·2
1900	...	1092	...	28·2
1901	...	1037	...	26·7
1902	...	1054	...	27·0
1903	...	1064	...	27·2
1904	...	1044	...	26·7
1905	...	1066	...	26·8
1906	...	1063	...	27·0
1907	...	1015	...	25·7
1908	...	981	...	24·8

The birth-rate for Chester for 1908 is lower than it has ever been since the records were first published—this is the first occasion on which the births have been less than a thousand. In 1874 when the population was a little over 36,000 the births were roughly 250 more than in 1908 when the population is nearly 40,000.

In comparison with the rest of the country, Chester is also behind-hand—its birth-rate is less than the birth-rate for England and Wales generally, less than the rates for the 76 great towns, for the 142 smaller towns, and for the essentially rural districts.

Doubtless one of the factors to be correlated with the dimin-

ishing birth-rate is the large and increasing numbers of residents at 60 years and upwards who find comfort, rest and seclusion in our venerable old-time cathedral city.

This diminishing birth-rate will eventually have some compensating features. With smaller families greater attention will be paid to the individual children so that the infantile mortality may be expected in some degree to fall automatically with a falling birth-rate. With smaller families too, the physical development of the present children should show much improvement over that of the last generation owing to the greater care bestowed upon them.

The number of illegitimate births was 35.

Notification of Births Act, 1907—

This Act was not adopted in the City. A circular letter was sent to every medical man and midwife practising in Chester informing them of the non-adoption and inviting them to acquaint the Medical Officer of Health with any births, or any circumstances connected with such births which required public health supervision or investigation, and any influences which might from a sanitary standpoint re-act adversely upon the progress of the infant concerned and were such as to permit of remedy.

Still-Births—

Notice was received from midwives of 54 Still-Births, delivered when no medical man was present.

Of these 43 formed the subject of special investigation.

Eighteen were full-time children, eight born at eight months, thirteen at seven months, and four at six months.

The parents were nearly all in humble circumstances.

In only eight cases had a doctor been engaged beforehand, though twenty-six had bespoken the services of a midwife.

Fourteen of the cases were subsequently attended by the nurses from the Benevolent Institution, Grosvenor Road.

Nine gave the history of an accidental fall a few days previously, two attributed the cause to fright, and two to severe physical exertion in coal carrying, and laundry washing.

In fourteen cases the child was the first born.

In the remaining twenty-nine families there were nine who had lost no children, six who had lost one, three who had lost two, five who had lost three, one where four had died, two where five had died, one where six had died, one where there had been nine deaths, and one where there had been twelve deaths, including three miscarriages.

In five families both parents were alcoholic, in four the father alone showed signs of indulgence.

Four of the mothers spoke of having taken drugs for the purpose of inducing miscarriage.

The other causes ascertained were syphilis, lead poisoning (painters), and Brights disease.

The bodies were buried in the cemetery.

The facts elecited justify the presumption that before long when the pernicious effects on pregnancy of accidents, excessive strain, lead, alcohol, syphilis, and pelvic deformities are more generally recognised among housewives, that the number of still-births should be much diminished.

Midwives' Act, 1902—

Twenty-three midwives registered at the Public Health Office as practising in the City in 1908, of whom nine were in residence at the Benevolent Lying-In Institution, Grosvenor Street.

It was found necessary to suspend one midwife and one pupil from work for a fortnight on account of Scarlet Fever breaking out in the house of a patient, and another midwife and pupil for a like period on account of Puerperal Fever in a lying-in woman.

The clothes and other details were disinfected in each case.

The Central Midwives' Board in June issued a leaflet setting

forth in popular language the early signs and symptoms of cancer of the womb, and urging that when such signs were present medical advice should be sought early.

This circular was, at the request of the Board, issued to midwives and nurses in the City who might presumably be brought into contact with such cases, and might benefit them accordingly.

Twenty records of sending for medical help were received at Forest House for the following reasons :—

Premature birth 3 ; premature birth of twins 1 ; feeble vitality of child 2 ; debility of mother after confinement 1 ; puerperal fever 1 ; high temperature of mother after delivery 3 ; ante-partum hæmorrhage 1 ; uterine inertia 3 ; face, knee, foot, breech presentation, 1 each ; prolapse of funis 1.

Notices of 54 still-births were received.

There was one death from puerperal fever.

Inquests—

Forty-five Inquests were held in 1908—35 on adults and children over 5 years, and 10 on children under 5 years.

The following verdicts were given :—

ADULTS AND CHILDREN OVER FIVE YEARS—

Heart Disease	4
Drowning	5
Accidents—Burns	6
Crushes and Falls	6
Run over by Motor Car	1
Run over by Train	2
Blood Poisoning, following small accidental injuries	2
Death from a Blow—misadventure ...	1
Cerebral Hæmorrhage	3
Peritonitis	1
Senile Decay	1

Rupture of Bowels	1
Suicide	1
Natural—exact cause unknown	1

CHILDREN UNDER FIVE YEARS—

Convulsions	3
Accidental Drowning	3
Overlain by parents in bed	1
Pneumonia and Bronchitis	2
Accidental Burn...	1

Non-Residents—

Forty-four non-residents died in the City, chiefly residents from the surrounding country, and in the Chester General Infirmary. The names of the places are inserted here that it may be realised what a large area this excellent institution serves :—Hoole 7 ; Connah's Quay 3 ; Hawarden, Frodsham, Mold, Shotton, Rossett, 2 each ; Bagillt, Barrow, Buckley, Bangor, Boughton Heath, Chorlton, Denbigh, Flint, Fulham (London), Helsby, Holywell, Kelsall, Llangollen, Manchester, Northwich, Ruabon, Sandycroft, Stafford, Tarvin, Tarporley, Tipperary, Whitchurch, Wrexham, Wybunbury, 1 each.

Deaths—

The number of inhabitants who died in 1908 was 633. Of these 70 died outside the City, chiefly in the Workhouse, and in a few cases in Liverpool hospitals.

The death-rate for 1908 is 16·02 per 1,000 inhabitants.

This is the lowest death-rate yet achieved since the rates were recorded in 1874.

The corresponding rates for the rest of the country are given below.

Death-Rates, 1908—

England and Wales	14·7 per 1,000 inhabitants
76 great towns...	14·9 ,, ,,

142 smaller towns (including Chester)	...	...	... 14·0 per 1,000 inhabitants
Chester	...	...	... 16·02 ,, ,,
Rural Districts...	...	...	... 14·7 ,, ,,

The death-rate for Chester, although exhibiting a gratifying improvement, is still higher than the rate for England and Wales generally, higher than the rates for the 76 great towns, and 142 smaller towns, and exceeds the rate for the essentially rural districts.

It has already been pointed out that one very potent factor in the production of this result consists in the very large proportion of old people who live in the City, attracted alike by its artistic sense of repose, and the assiduous care taken in preserving its old-time characteristics.

The number of deaths with their corresponding rates for previous years are appended :—

Year.	Population.	Deaths.	Death-rate.
1874 ...	35905 ...	908 ...	25·25
1875 ...	36121 ...	868 ...	24·05
1876 ...	36337 ...	909 ...	25·03
1877 ...	36553 ...	830 ...	22·72
1878 ...	36769 ...	783 ...	21·3
1879 ...	36985 ...	923 ...	24·95
1880 ...	37202 ...	787 ...	21·17
1881 ...	37418 ...	705 ...	18·85
1882 ...	37443 ...	755 ...	20·17
1883 ...	37468 ...	708 ...	18·90
1884 ...	37493 ...	781 ...	20·83
1885 ...	37518 ...	811 ...	21·63
1886 ...	37543 ...	731 ...	19·47
1887 ...	37568 ...	707 ...	18·83
1888 ...	37593 ...	748 ...	19·90
1889 ...	37618 ...	764 ...	20·30
1890 ...	37643 ...	820 ...	21·78
1891 ...	37668 ...	787 ...	20·8
1892 ...	37784 ...	791 ...	20·9

Year.	Population.	Deaths.	Death-rate.
1893 ...	37901 ...	812 ...	21·4
1894 ...	38017 ...	617 ...	16·229
1895 ...	38134 ...	810 ...	21·25
1896 ...	38251 ...	780 ...	20·4
1897 ...	38367 ...	735 ...	19·2
1898 ...	38484 ...	819 ...	21·3
1899 ...	38600 ...	767 ...	19·84
1900 ...	38717 ...	727 ...	18·8
1901 ...	38834 ...	754 ...	19·43
1902 ...	38951 ...	644 ...	16·53
1903 ...	39075 ...	658 ...	16·84
1904 ...	39199 ...	635 ...	16·228
1905 ...	39250 ...	706 ...	17·9
1906 ...	39325 ...	707 ...	17·9
1907 ...	39420 ...	650 ...	16·5
1908 ...	39515 ...	633 ...	16·02

There was a diminution this year as compared with last year in the number of deaths from Measles, Hooping Cough, Diphtheria, Diarrhœa, and Enteritis, all forms of Tuberculosis, Cancer, Heart Disease, and Marasmus; whereas there was an increase in the deaths due to Scarlet Fever, Influenza, Alcoholism, Accidents, Premature Births, Convulsions, Bright's Disease, and Old Age.

As the death-rate diminishes it may be confidently asserted that the actual number of deaths from the diseases of old age—that is from Cancer, Pneumonia, and Bright's Disease—will show an automatic increase.

The corrected death-rate for 1908, which makes allowances for differences in the age and sex distribution between Chester and other towns, is 16·56 per thousand.

In comparing Chester with other towns the corrected death-rates alone should be referred to in all cases.

Uncertified Deaths—

Uncertified deaths are those in which no medical man was in

attendance before death, so that no certificate of death is given as in the ordinary course of events.

In these cases information is given to the Coroner, who decides on the facts elicited by his officer whether an inquest is necessary or whether the circumstances are sufficiently suspicious or indicative of foul play to render fuller investigation advisable.

If the Coroner is satisfied that the death was a natural one, he certifies to that effect, and an order for burial is issued.

Two uncertified deaths occurred in Chester in 1908. The Coroner was informed and was satisfied in each case that the death was natural.

Zymotic Diseases —

The deaths from the seven principal epidemic or zymotic diseases in 1908 numbered 63, as against 82 deaths in 1907. This gives a zymotic death-rate of 1·59 per 1000. The corresponding rates for 1905, 1906, 1907, were 2·70, 2·72, and 2·08 respectively, so that this year there has been a very marked diminution.

The seven principal zymotic diseases are Small-pox, Measles Scarlet Fever, Diphtheria, Hooping Cough, Fever (Typhoid and Typhus), and Diarrhæa.

The zymotic death-rate does not indicate the increased or lessened prevalence of these diseases, but only to some extent their virulence or power of causing death.

The rate is one of the popular but unsafe standards for comparing the health of the inhabitants of towns, one town with another.

The zymotic death-rates for England and Wales were—

Year 1908.	Zymotic death-rate.
England and Wales	1·29
76 great towns	1·59
142 smaller towns (including Chester) ...	1·26
Chester	1·59
Rural Districts	0·99

It will be seen that the rate in Chester is equal to the rate in the big towns, but greater than the rates in England and Wales for the whole country, and greater than the rates for the smaller towns and the rural districts.

Small-pox—

There were no cases of Small-pox during the year. Two persons arrived in the district who had been in contact with persons suffering from Small-pox, and were kept under daily supervision until all fear of infection was past.

Scarlet Fever—

There were notified during the year 167 cases. Of these, after removal to hospital, 3 were found to have Diphtheria as well as Scarlet Fever, while 3 had Chicken-pox as well as Scarlet Fever. Of 4 sent into hospital for purposes of isolation, one was found to have German Measles, and the other three no obvious disease.

So that there were 163 cases with 6 deaths, eqivalent to a case mortality of 3·68 per cent, or, in other words, roughly about 1 in every 30 patients died from the disease.

This year the number of cases and the number of deaths both show an increase.

There has been a wave of increased prevalence of the disease not merely in Chester but also in most towns. The last few years seem to mark the trough of the wave of incidence, and it would now appear that we are now moving towards a fresh crest.

The rates and numbers for Chester in preceding years are annexed:—

Year.	No. of Cases Notified.	Deaths.	Case Mortality per cent.	Death-rate per 1000 Living.
1900 ...	71 ...	1 ...	1·4 ...	·026
1901 ...	119 ...	2 ...	1·7 ...	·051
1902 ...	83 ...	2 ...	2·4 ...	·051
1903 ...	75 ...	3 ...	4·0 ...	·076
1904 ...	64 ...	7 ...	10·9 ...	·178
1905 ...	111 ...	3 ...	2·7 ...	·076
1906 ...	102 ...	0 ...	0·0 ...	·000
1907 ...	80 ...	1 ...	1·2 ...	·025
1908 ...	163 ...	6 ...	3·68 ...	·151

The present epidemic has been characterised by the mild virulence of the cases. It is not unusual to find that a child may have had an attack of undoubted Scarlet Fever and not have missed a single day's attendance at school, or, on the other hand, have been absent for an afternoon only, or for one or two days, and then have returned to school with the information that it has had "Mumps."

Some have had the mildest of sore throats only. In other cases the parents are quite ignorant or even guilty of gross carelessness; for example, one father, when he saw the Scarlet Fever rash on his child, said "It's only the water rash—go to bed for a short time." Later the child got up and mixed with other children.

Any swelling at or around the lower jaw in Chester seems to be regarded as mumps; the enlarged glands of the neck which accompany scarlet fever are therefore accredited, mistakenly accredited by the parents to "mumps," and in a day or two the child is allowed to mix freely with others, the scarlet fever rash having meantime been completely missed.

Mumps, as far as the Public Health Department is concerned, is not a common disease in Chester, whereas just now scarlet fever is common.

Every case of alleged mumps should, therefore, be regarded with suspicion as a possible case of scarlet fever.

Another factor which has conduced to the prolongation of the epidemic is the bad housing.

Owing to the pressure on the Isolation Hospital it has been found impossible to admit all the cases in which this course was advisable, so that many cases had to be treated at home.

Under the circumstances it has been found impossible to isolate effectively the patient at home when the house contains only one or two bedrooms and there is a family say of two, four, or even six children, and the mother has to cook for the household and attend the sick one.

Houses with one or two bedrooms at most are most undesirable and in epidemic times a distinct menace to the welfare of the citizens.

Every house for family occupation should contain at least three bedrooms ; of the others there are already sufficient.

The following schools were closed during the year in order to prevent the spread of scarlet fever.

St. Mary's Junior	...	8th June to 6th July.
Trinity Girls'	...	17th December to January 11th, 1909.

Diphtheria—

In 1908, there were notified 104 cases of Diphtheria, of these, after further observation 8 were found to be suffering from Scarlet Fever as well as Diphtheria, whereas 8 admitted to the Isolation Hospital for isolation and observation were found not to have Diphtheria and were classified as follows:—Tonsillitis 5, Scarlet Fever 2, Syphilis 1.

So that there were 96 cases of true Diphtheria exhibiting the classical signs.

In addition to these there were kept under observation 20 carrier cases—patients exhibiting no signs whatever, but feeling and appearing quite well, but known to be harbouring the Diphtheria bacillus in the throat and capable of giving Diphtheria to others.

Most of the carrier cases were found in a school, and there is every reason to believe that in all probability the diffusion of the bacillus had been effected through the school by means of the brass instruments which the students were in the habit of playing.

Brass instruments were in like manner the cause of a grave epidemic in a school near London a few years back.

For school purposes if orchestral or band music is to be taught as a school subject, it is best that stringed instruments be

used, or if brass and reed instruments are essential, then each player should have his own instrument and sterilize the metal mouth piece as occasion requires.

Among the 96 cases there were 7 deaths equal to a case mortality of 7·29 per cent. which is the lowest for 5 years.

The rates for recent years are appended.

Year.	Notified.	Deaths.	Case Mortality per cent.	Death-rate per 1000 living.
1900 ...	45 ...	5 ...	11·1 ...	·129
1901 ...	59 ...	8 ...	13·5 ...	·206
1902 ...	41	3 ...	7·3 ...	·077
1903 ...	29 ...	2 ...	6·9 ...	·051
1904 ...	58 ...	9 ...	15·5 ...	·230
1905 ...	50 ...	5 ...	10·0 ...	·127
1906 ...	152 ...	20 ...	13·1 ...	·508
1907 ...	201 ...	18 ...	8·9 ...	·456
1908 ...	96 ...	7 ...	7·29 ...	·177

Enteric Fever.

During 1908, there were notified 23 cases of Enteric Fever, of which 15 were removed to the Isolation Hospital. Three of these cases on subsequent investigation were considered not to be Enteric Fever, and were diagnosed as Phthisis, Tubercular Meningitis, and Nephritis. Thus there were 20 undoubted cases with two deaths.

In five instances there was reason to believe that the infection had arisen from carrier cases in the same house ; in one case the parent had suffered from Enteric Fever about ten years previously. For it is now an established fact that cases of Enteric Fever may be infectious, and remain infectious for many years ; there are cases on record where the typhoid germ has been recovered from the stools of the patient 30 years after the original attack. In three cases the disease was probably contracted out of Chester.

In one case the presumable source was water-cress hawked in the streets.

In the other 11 cases no definite source was ascertained.

The rates for recent years are here appended:—

Year.	Enteric Cases. Notified.	Deaths.	Enteric Death-rate per 1,000 Population.
1900 ...	68 ..	5 ...	·129
1901 ...	36 ...	6 ...	·154
1902 ...	20 ...	3 ...	·077
1903 ...	28 ...	5 ...	·128
1904 ...	17 ...	1 ...	·025
1905 ...	18 ...	2 ...	·050
1906 ...	11 ...	0 ...	·000
1907 ...	9 ...	1 ...	·025
1908 ...	20 ...	2 ...	·050

Infectious Disease.

The present would appear to be an opportune moment for describing how infectious diseases are dealt with in the City.

When a case has been notified it is removed as speedily as possible to the Isolation Hospital.

The removals are effected by Mr. Wilding, 54 and 56, Linenhall Street.

For this purpose the Corporation keep two ambulances, one of which is of the stretcher type with rubber tyres, and is reserved for Enteric cases or others dangerously ill, and whom it is essential to keep lying down during removal.

In a few instances, and only when adequate isolation can be secured, the patient is allowed to be nursed at home.

In times of epidemic, when the hospital accommodation proves to be insufficient, then, of course, owing to lack of beds, cases are allowed to stay at home, which would not otherwise be permitted.

As soon as the case is removed, an Inspector calls at the house and disinfects the bedroom and rooms occupied by the patient,

Special attention is directed to the bed linen, the pillow slips. sheets, towels, and handkerchiefs, and feeding utensils.

These are soaked for 24 hours in a strong solution of disinfectant, or boiled for a considerable time in water containing washing soda.

The object of the washing soda is to loosen any mucus which may have become attached to linen or utensils.

Disinfectants and carbolic soap are supplied gratis at the Public Health Office.

The house is well scrubbed and cleansed.

Meantime a sanitary survey of the premises is made and the details entered on the following card:—

INFECTIOUS DISEASE. *Date*.....*19*.....

No.....Disease.....Vaccination.....
Name.....Age and Sex.....Dr.....
Address.....Notn. Received.....
Hospital Removal.....Disinfection Date.....
Day School.....
Sunday School.....
Work.....
Last Attendance
Class in School.....
Work of others in House.....
.....
Work carried on in House.....
No. of others in House.....

Age and Sex, and whether had this Disease or not.

1st Family.	2nd Family.

Overcrowding.....Degree of Isolation Sufficient Yes, No.
Library Books.....
Onset—Dates—Hdche.....Vomg.....S. Thrt. .....
Diarr.....Rash.....Pain.....

Milk supply.....

Cows .....

House—Cleanliness .....

Ventilation .....

Light (Rooms, Staircase).....

Dryness.....

Drainage .....

.....

Trapping of drains—use test.....

Privy or W.C. (state which)—Condn.....

..... Distance .....

Ashpit—Condition .....Distance .....

Pavement .....

Animals kept—Condition.....Distance .....

Washing done at.....

Backway to House, Yes, No. Rent.....

PROBABLE SOURCE.—Ask as to visits to or by friends; place of work, school, Sunday School, school children sitting by or walking home with patient; if necessary visit school to get names of presumable contacts absent or lately absent with colds, influenza, sore throats, bilious attacks, or other ill-defined causes; visits to tea meetings, social gatherings, entertainments; cases connected with any of foregoing; previous cases of sore throat, headache, vomiting, peeling, diarrhœa, rash, rhinorrhœa, otorrhœa, or other illness in house or close by; food—milk, fish, fried fish, shellfish, oysters, mussels, cockles, pork, pork pie, tripe, strawberries, ice cream, water-cress; other cases of Typhoid in household in previous years; water supply, any special circumstances during previous weeks; drain nuisance, tailoring, washing, disease amongst domestic animals, disinfection after removal of previous case; Sunday clothes, week-day clothes; contact with case recently discharged from Isolation Hospital, or otherwise convalescent:—

Date of Inspection.....

Signature.....

Notice is sent later to the owner or occupier of any defect, with a request to remedy the same.

If this is not done within a reasonable time, a further statutory notice is sent which may be followed by police court proceedings unless its demands are complied with.

After admission to hospital the patient is washed and warded, and seen at the earliest moment by the Medical Officer.

A note is made of the patient's condition on the bed card once a week in ordinary uncomplicated cases, once a day or oftener in severe cases.

When the patient is ready for discharge he is examined very minutely, and a detailed record of his condition entered on the history sheet, with the time at which he may be expected to attend school.

This date is sent on the day of his discharge to the Education Office.

A few days after his discharge, the patient is visited by the Lady Health Visitor in order to see whether he keeps well, and whether there has been any return of the signs bespeaking further possible infection.

These latter visits have been of very great service in preventing the so-called "return cases."

In times of epidemic the following measures are taken in addition to the above:—

1. When a case has been removed to hospital, the rest of the household is still kept under supervision by periodic visitation, in order to ascertain the existence of fresh cases as soon as possible, and to ensure their early removal. Instruction is given in methods of prevention.

2. Whenever there is reason to suspect a small localised outbreak all the houses in the impugned district are visited, and enquiries made as to recent cases of badly-defined illness, or missed cases.

3. Cases nursed at home are visited periodically, to ensure that isolation is kept up. These children and their "contacts" are seen by the Medical Officer before readmission to school.

4. The milk supply is closely watched.

5. The names of children absent from school with causes unexplained are sent to the Public Health Office. These children are either visited at home or requested to call at the Public Health Office for examinatiom.

6. Special classes, or even a whole school are examined in school, and suspicious cases excluded and either referred to their own doctor or, if poor, examined by the Medical Officer of Health.

7. Any child present in school with a rash or other suspicious sign is sent to the Health Office at once, accompanied by a Teacher, in order to have an opinion on the case.

8. Bacteriological investigations may be made in appropriate cases.

9. School closure is applied in suitable circumstances.

The notifiable diseases are Small-pox, Cholera, Diphtheria and Membranous Croup, Scarlet Fever, Typhus Fever, Enteric or Typhoid Fever, Continued Fever, Relapsing Fever, Puerperal Fever, and Plague.

Measles and Chicken-pox are not notifiable.

In Chester Phthisis and other Tuberculous diseases associated with discharges are voluntarily notifiable.

Zymotic Enteritis is notifiable in children under one year of age in the months of July, August, and September.

The following notices are given when a patient is admitted and discharged from the Isolation Hospital.

NOTICE ON ADMISSION OF PATIENTS.

Enquiries as to the progress of patients may be made at Forest House, Love Street, or at the Nurses' Home, Isolation Hospital, from 10 to 12 a.m., and 5 to 6 p.m. daily; on Sundays and Bank Holidays at Forest House, from 2 to 2-30 p.m., and 6 to 6-30 p.m.

Letters may be sent to patients as often as desired, and should be addressed to him or her direct, at the Hospital.

Oranges, Apples, Honey, Flowers, Plants, Toys, Books, and Unused Newspapers may be sent in by relations and friends; they cannot, however, be taken out again. The toys should be strong, having no glass or celluloid parts in their construction, free from paint, and preferably of the sort known as unbreakable. Painted toys like Noah's Arks, from which the paint is easily washed off or sucked off, are quite unsuitable and must not be sent. Toys used by the patient at home should be burnt after his removal. They should on no account be given to other children.

Grapes, Bananas, Sweets, Cakes, and Eggs are not allowed to be sent in.

All Parcels for patients must be properly wrapped up and addressed, and are to be left at the Nurses' Home; they are not to be taken to the wards by relatives.

Visits.—As long as the patient is progressing favourably visits are not allowed. If, however, there is any decided change for the worse, or if the patient becomes dangerously ill, immediate notice is sent to the parents by special messenger, telephone, telegram, or letter, according to the urgency of the case; and parents are then allowed two visits each daily, of 15 minutes duration. It is, therefore, important that *notice of any change of address* should at once be sent to the Matron.

Visitors will be required to wear wrappers, which will be provided at the Hospital, to cover the dress whilst in the ward, and to wash their hands and face before leaving the Hospital. They are warned against visiting the wards when in ill-health, whilst exhausted, or with an empty stomach. They should avoid touching the patients, or exposing themselves to the patient's breath, handling the bed clothes,

or sitting on or near the bed. *Parents are specially requested not to send children with messages or on errands to the Hospital, and to leave them at home when making visits themselves.*

Clothes should be sent to the Hospital, so that the patient may get up, in about three weeks from the time of admission. They should be clearly marked with tape and marking ink.

Boots and Shoes should be *rubbed so as to be supple with oil, and carefully examined for nails* that may hurt *before* being sent to the Hospital.

Notice of Discharge is sent to parents beforehand, by letter from the hospital, and will state the clothes required to be sent for the patient's use in going home.

The Hair of Children will be cut on admission only if it is considered necessary in the interests of their health or cleanliness.

After Patient's Removal an Inspector will call to supervise the disinfection of the premises. The blankets, pillow-slips and sheets last used by the patient should be sent with him to the Hospital for steam disinfection, or soaked for 24 hours in a disinfectant to be obtained gratis at Forest House. The knife, fork, spoon, cup, plate, saucer, and drinking-glass, should be boiled in boiling water containing washing soda for 15 minutes. The handkerchiefs and towels should either be soaked in the disinfectant supplied as above or boiled for 15 minutes.

NOTICE TO FRIENDS OF PATIENTS DISCHARGED FOR HOME.

Every patient, before discharge, is most carefully examined, and every precaution taken to see that, before leaving Hospital, he is free from infection. It sometimes happens, however, that in all Fever Hospitals patients who, prior to their departure, show no signs of infection, develop this power within a few weeks of reaching home.

To guard against this risk you are advised, for the next four weeks, or *longer, to keep specially and exclusively for patients use a knife, fork, spoon, cup, plate, saucer, drinking-glass, towel, and handkerchief*; and the first seven should, at the end of each day, be placed in a saucepan

of water containing washing-soda, and boiled for ten minutes. Toys should not be used during the interval.

Patients should sleep alone, if possible in a separate room, *and should not play with others.* Kissing should be forbidden for the four weeks, and until any signs given below, which may develop, shall have ceased.:—

Scarlet Fever.—No one can say, with certainty, how long Scarlet Fever may linger in the system ; it sometimes happens that persons continue to be infectious several weeks after they appear to be quite well in themselves; therefore, the above directions should be carefully followed. It is most important that any recently discharged patient who has a sore throat, a sore nose, sore ears, *a "running" from the nose or ears, however slight in degree,* or who has a "breaking-out" or peeling of the skin, should, at once be put to bed, strictly isolated, and placed under the care of a Doctor, who should be told of the recent illness.

Diphtheria.—If in the course of the next few weeks after discharge, any alteration of voice, defect in the sight, difficulty in swallowing, shortness of breath, weakness in the limbs, or "running" or soreness of the *nose* or ears should be observed in one who has recently had Diphtheria, the patient should be put to bed, isolated, and a Doctor consulted without delay.

Typhoid.—An Inspector will call to advise as to the precautions necessary after recovery from this disease.

Clothes left behind by the patient should be sent for on Saturday ; a week later than the Saturday following the date of discharge. The Hospital Authorities will not hold themselves responsible unless these are claimed *within one month* of the date of departure.

Parents are specially requested *not* to send *children* to the Hospital for these clothes or on other errands; the parents should either go themselves or send adults.

School.—The earliest date at which patient should resume Day School or Sunday School is.....

Name .....

Address .....

Date .....

Measles—

There were 12 deaths due to measles of which 10 occurred in children under 5 years of age. Five of the deaths were in children under 2 years.

The parents were all in poor circumstances.

Four of the deaths took place in the Courts.

Measles is still one of the deadliest diseases to young children—much more fatal to them than Scarlet Fever, Diphtheria, Typhoid, Small-pox or Erysipelas.

The deaths from Measles are in some small measure the result of carelessness, neglect or poverty—but the large number of deaths are due to ignorance—colossal unmitigated ignorance.

The disease is the Murrain of Britain—a death from measles is a blight upon wholesome maternity. When the christening has been passed the average British mother looks forward with anticipation to the advent of the Measles—regarding it as a friendly landmark, little knowing the treacherous shoal it may prove to be.

Hooping Cough—

There were 11 deaths due to Hooping Cough, all in children 3 years and under.

Five of the deaths were in children under 1 year.

Four of the deaths were in the Courts.

The parents were all in poor circumstances.

The observations already made in connection with Measles apply with equal force to Hooping Cough.

The immediate cause of death in both cases is Pneumonia, caused by the parents prematurely exposing the children to the weather during convalescence from Measles and Hooping Cough.

The most dangerous period in both diseases is just when the children have got over the acute attack and are about to get up again.

For the purposes of comparison the deaths of children under 5 years from various diseases are tabulated below :—

Year.	Measles.	Hooping Cough.	Small-pox.	Scarlet Fever.	Diphtheria.	Typhoid.
1900-1906	82	84	1	11	31	1
1907	15	17	0	1	9	0
1908	10	11	0	5	4	0
1900-1908	107	112	1	17	44	1

It will be seen from this table that Measles and Hooping Cough each cause nearly twice as many deaths amongst children under 5 years as Small-pox, Scarlet Fever, Diphtheria, and Typhoid Fever, all taken together.

Perhaps this illustration—derived from the actual numbers in Chester for the last 9 years may once more force the matter upon public attention, and once more drive home the lesson that for children under 5 years, Measles and Hooping Cough are by far the most deadly diseases.

And the pity of it is that these deaths are preventible and should be prevented by the exercise of a little intelligence, a little care and forethought.

Alcoholism—

Sixteen deaths were attributed to this cause in 1908, twice as many as in 1907, 5 more than in 1906.

Nine of the cases were males, 7 females.

The average age at death for males was 47, for females 51 years.

One case only was connected with the trade, 12 were in a comfortable condition of life.

Nine of the deaths were accredited to Cirrhosis of the Liver, which is well recognised as one of the diseases induced by alcoholic excess.

Other causes of death were Peripheral Neuritis (alcoholic paralysis), Syncope, and Alcoholic Delirium.

One of the persons died in prison, another in a charitable institution, and one in poor circumstances.

It was noted in a previous report that Alcoholism is rarely named in death certificates save in the cases of the homeless, the friendless, or paupers from a workouse infirmary.

The friends of the deceased don't like the word—insurance companies watch for it.

Deaths from Alcohol are masked under the headings Cirrhosis of the Liver, Peripheral Neuritis, Syncope, and in the young Adult Pneumonia—anything but Alcohol.

Cancer—

There were 39 deaths ascribed to Cancer in 1908. Of these two-thirds were females.

In more than half the cases the digestive system was affected, in less than one-third the reproductive system.

Cancer of the Reproductive System was limited to females, and Cancer of the Digestive Organs was almost twice as common among women as among men.

Of reproductive organs the womb and breast were involved with about equal frequency. Of digestive organs the stomach was most commonly concerned, and next to the stomach, in order, the liver and intestines.

In one case the tongue was affected, and in one the ear.

One-sixth of the deaths were under 40 years of age, while two deaths took place at ages less than 30.

During the year the existence of a **Cancer House** in Chester has come under notice. Two recent deaths from Cancer have occurred in the house in question.

PHTHISIS NOTIFICATIONS.

The notifications of Phthisis received in 1908 were 27 in number—5 more than in 1907, 3 less than in 1906. Of the 27 cases 14 were males and 13 females.

The measures adopted on receipt of notification were the same as in previous years. Premises were disinfected, and sanitary defects were noted and remedied. Patients were advised and aided towards the improvement of their own condition and the protection of their households from the disease.

Late Notification—

The later stages of Phthisis are the most infectious; apart, therefore, from the question of the patient's recovery, it is necessary for the sake of other residents in the house that, during these stages, precautions against the spread of infection should be taken with special care.

In one of the 27 cases, however, there was no opportunity to advise such precautions, for notification was not received till after death; of the remaining 26 cases 8 died within the year, and in 4 of the 8 notification preceded death by less than three months—in one case by a week, in one case by a month, and in two cases by two months. In the other 4 cases death took place from three to nine months after notification.

The degree of danger to other members of households during the later stages varies according to circumstances. While 5 of these 9 cases had separate bedrooms, which is matter for satisfaction, 4 had not. The 4 houses in which patients had not separate sleeping rooms contained 18 persons, who were thus exposed to undoubted risk.

Cases under private medical care, whether notified late or early, and even if not notified at all, are of course instructed by

their own medical attendant to observe the proper precautions; many, however, are without such valuable supervision, and as a general rule it will be correct to say that the usefulness of notification of Phthisis as a preventive measure is much impaired when it takes place in the closing weeks or months of illness—indeed it may prove then of little or no value.

Age—

Of the 27 patients two were between 1 and 5 years of age, three between 5 and 15, five between 15 and 25, and seventeen between 25 and 65. The wage earning period of life furnished more than half the cases.

Duration of Illness—

The most frequent duration of illness prior to notification was one year : 8 of the 27 cases were reported as of one year's duration, 4 illnesses had lasted less than a year, 3 for 2 years, 5 for 3 years and 2 for 4 years. Three patients had been ill between 5 and 8 years, and one for 15 years. In the remaining case the length of illness was uncertain.

Change of Address—

Eleven of the 27 cases had lived in more than one house betwen onset of illness and notification. Ten of the 11 had one change of address, and one, in the course of a three years' illness, had resided in five different houses.

Phthisis in a breadwinner means retrenchment, and retrenchment a change to a cheaper house. Each change of address implies a fresh possible focus of infection for the next tenant.

Occupation and Incapacity—

Of the 14 males, 5 were labourers, while 2 had in-door work. Two others were workers in metal, and one was a plasterer. Of the 13 females all who worked were employed in-doors ; 6 were housewives, 2 domestic servants, and 1 a machinist.

All the males had been compelled to cease work for various periods, 5 of them for a year or more. Three of the females still carried out their household duties ; two had been incapacitated for a year or more.

Isolation—

In only 8 out of the 26 houses was the patient isolated with any degree of completeness.

In these 8 cases the patient had a separate bedroom.

In the other 18 cases the absence of the provision was due to ignorance, and not to want of accommodation.

The occupants did not know, or appeared not to know, that Phthisis was a communicable disease, and therefore were neglecting the obvious precautions.

The visits of the Sanitary Inspector have proved of great value in instructing the people and helping to safeguard the interests of the other inmates.

The average number of persons per house was 5, so that in each house at least four other persons were exposed to the possibility of contracting Phthisis.

Houses—

The houses in which patients lived were carefully inspected.

Eight were on the back-to-back principle.

Such houses are the chosen haunts of consumption.

Families in houses of this type, even if comfortably off, furnish more cases of Phthisis than poorer families in thorough-ventilated houses.

In 4 houses the ground floor was damp, and in 1 the ground flooring was defective.

Four houses were dirty, and in 6 the lighting of rooms was inadequate.

Damp, dirt, and darkness are the allies of Phthisis.

The germ can live on sodden wall-paper; dirt harbours it, and darkness helps it to survive.

It quickly dies in dry, clean, well-lit rooms.

Other sanitary defects in addition to the above were found and remedied.

Family Infection—

In 8 cases other members of the family had suffered, or were suffering from Tubercular Disease. Two of the cases were parents, 2 were husbands, and 4 were brothers or sisters.

A family history of Consumption on the side of father or mother, or both, was elicited in 6 examples.

Habits of Life—

Of 12 males eighteen years old and over, 4 were total abstainers, 7 were moderate drinkers, and one drank to excess. Of 8 females eighteen years old and over, 5 were total abstainers, and 3 were moderate drinkers. All persons under 18 were described as total abstainers.

Insurance—

Ten of the sick persons had insured their lives. Four were insured by the Prudential Assurance Co., 2 as Oddfellows, and the remainder as railway servants or members of Friendly Societies. None of the ten was insured less than 6 months before notification. One had been insured for 1 year, one for 2, and one for 5. Three had been insured for 20 years, and two for 30. In two cases the date of insurance was uncertain.

Value of Voluntary Notification—

Voluntary notification of Phthisis in Chester would appear to have been weighed in the balance and found wanting. As in previous years, so also in 1908, the number of cases disclosed by

notification falls far short of the cases existing in the City. And of the notifications received, some arrive at so late a stage of the patient's illness that the disease has already had the chance of spreading to others, and preventive measures are well-nigh futile.

Supplemented, however, by the Tuberculosis Regulations, to which reference is made elsewhere, it is probable that voluntary notification may yet be made to serve a useful purpose.

Revisits—

All the known cases of Phthisis notified prior to 1908 in the City were revisited during the year.

Two had been reported to the Public Health Office 5 years previously and had now moved out of the district but were still living.

Six had been under supervision 4 years, nine for 3 years, thirteen for 2 years, fourteen for 1 year, and one for less than a year.

In nearly half the cases the patients had left, leaving no address and were now completely lost.

In many of the others removal from house to house had been frequent—in one instance the patient had lived in 6 houses in about 2 years—this means that these 6 houses had all become centres for the fresh dissemination of the disease.

In only a quarter of the cases were the public health precautions found to be carefully observed.

One patient was at sea in the capacity of a ship's steward.

Deaths from Phthisis and Tuberculous Diseases—

Both for Consumption and Tuberculous Disease as a whole the returns for 1908 show lower death-rates than those of the previous year. In 1908 the death-rate from all Tuberculous Diseases was 1·873 per 1·000, as compared with 2·132 per 1·000 in 1907.

The Phthisis death-rate in 1908 was 1·113 per 1000, not only lower than 1907, but *the lowest yet recorded in Chester.*

All who have the interests of the City at heart will view this result with pleasure. But Chester must not rest on its laurels. The figure just quoted is lower than the corresponding figure for England and Wales last year, 1·140 per 1·000, but further and continuous effort will be required if this position is to be maintained. There is some fluctuation in the Chester Phthisis rate from year to year, and the rate next year may possibly be greater than this. Be that as it may, the rate for 1908 is gratifying in itself, and may be taken as a sign that the efforts which have been made in the past to control the prevalence of consumption are beginning in some measure to tell.

Type of Disease—

Of the 74 deaths from Tubercular disease, more than half were due to Phthisis.

Thirty deaths were attributed to other forms, especially to Tubercular Peritonitis and Tubercular Meningitis. Three persons died of Spinal Caries.

Phthisis among diseases has a position of sinister eminence. It is justly dreaded not merely on account of the number of lives it takes, but because of the *age* at which it takes them.

Age—

Three quarters of the deaths from Phthisis, 33 out of 44, occurred in the age period 25 and under 65. And most of the 33 were *men in the prime of life.*

Thus Phthisis selects its victims. Like the Minotaur of the fable it chooses as a sacrifice the flower of the nation. It carries off those whose services the community can least afford to lose.

Men in the prime of life have mastered their profession. They have spent much labour in acquiring their skill or knowledge : when they fall a prey to Phthisis their labour is all spent in vain.

Sooner or later they become unfit to follow their work. Their savings are exhausted ; they sink to penury ; and their closing scene may be enacted in the wards of a workhouse infirmary. Deprived of the bread-winner, the wife and children are compelled to seek parish relief.

A sustained and concerted effort must be made to avert such tragedies as these. Working class dwellings must be improved, back to back houses must be abolished, for bad housing favours Phthisis. People must learn the value of fresh air and wholesome living, and if cases occur in their homes must carefully second the efforts of Medical Men and Sanitary Officers to prevent the spread of the disease.

The 30 deaths from other Tubercular Diseases have a different age distribution. With one exception all died at ages less than 25, and most in the first few months or years of life. Tubercular Peritonitis and Tubercular Meningitis are diseases of infancy and childhood.

There are various means by which children may contract Tuberculosis. The kiss of a parent suffering from Phthisis may transmit the infection to a child. Phthisical parents should never kiss their children.

And it is most undesirable that any young child should ever be kissed on the mouth. Children are much more liable to intection than older persons : and by indiscriminate kissing they run the risk not only of Tuberculosis but also of other diseases.

Tubercle may also be conveyed to children in cow's milk. Breast feeding, for this reason among many others, is best. The careful supervision of milk supplies by sanitary authorities tends to reduce the risk of milk-borne Tuberculosis.

PHTHISIS DEATHS.

Duration of Illness.

Fifty per cent. of the cases had lasted two years or longer. The longest duration recorded was thirteen years. Another case had lasted eleven years. Three had six years' duration, and three had five.

It is one of the special features of Phthisis that it often follows a lingering course. The patients themselves grow weak and ill yet many are consoled till the very last by the hope of improvement and recovery. But their friends and household associates are not merely the pitying witnesses of their slow decline; they run the risk, practically from the time when the disease is well declared, of becoming infected themselves. The longer the course of the disease, the more numerous are the opportunities of infection. Husbands, wives, children, and fellow workmen may all be exposed to danger.

But if the patient will take due precautions, if he will sleep in a room by himself, if sunlight and fresh air are given free access to all parts of his house and work-place, the phthisical patient will not only benefit himself and improve his chances of recovery; he may feel assured that the risk of communicating the disease to others is being much reduced.

Occupation.

Of the occupied males almost 50 per cent. had indoor or sedentary work. Several were clerks, one was a compositor, and one was a shop assistant.

An exclusively indoor life lowers the bodily forces, and so predisposes to disease. Persons who follow a sedentary occupation are specially liable to infection.

The most scrupulous cleanliness, the most careful attention to ventilation should prevail in all offices and workrooms.

But dry dusting and dry sweeping should never be permitted. These methods raise and disperse the dust, they do not remove it; and dust, as is well known, may contain the germ of consumption. Dust should be collected from furniture and fittings on a damp duster, and the floor should be dealt with by damp sweeping. Wet tea leaves, wet saw dust, or wet pieces of newspaper should always be placed on the floor before the brush is called into play.

One of the occupied males was a stone mason. This is a dusty trade. The sharp stone dust is apt to enter the lung, and frequently leads to consumption. In some places stone masons wear

respirators. This is a wise precaution. But even in the absence of respirators stone masons, by wetting the stones which they cut, may prevent the sharp dust from flying, and may do much to protect themselves from this special disease of their craft.

Of the occupied females several were housewives, but most were employed in paid indoor work. Two were domestic servants: one had been employed in a cotton warehouse, and the remainder were engaged in the making of clothing and headgear.

When a housewife suffers from Phthisis all the members of the family are in danger. She prepares the meals; she cleanses the feeding utensils; and in this way the food of the household may become infected.

The risk to the children of a house by the employment of a consumptive domestic servant is very great. The occupied females who were engaged in warehouses and workrooms are further examples of the dangers of indoor work.

Home Isolation.

One patient lived alone, and died in a house of two rooms; 13 patients died in houses of three rooms—in only six of these houses did the patient have a separate bedroom.

It is doubtful whether, at the present day, any useful purpose is served by building houses with one or at most two bedrooms.

If the inmates are attacked with Phthisis or infectious disease, and are nursed at home, it is more than probable that some of the other inmates will become infected.

It may be urged that these houses with one or two bedrooms are meant for old couples.

Be it so—sooner or later the old people either adopt children, or have grandchildren to live with them, and when the house is invaded by infection grave difficulties of isolation immediately arise.

These considerations are not merely theoretical: they illustrate difficulties which occur in actual practice; so much so that I hold strongly that, save under special circumstances, the building of houses with less than three bedrooms should be quite discouraged in Chester.

A Retrospect.

For the last half-century or more the Phthisis death rate of England and Wales has been declining. In 1850 the rate was 2·62 per 1,000 living. During the ten years 1861-1870 the average rate per annum was 2·54 per 1,000.

The following ten years, 1871-1880, had an average rate of 2·19, and this decline continued throughout succeeding years. In 1881-1890 there was a further fall of the average rate to 1·77 per 1,000 per annum, and in 1891-1900 a still further decrease to 1·39. The ten-year period beginning in 1901 promises an even lower figure.

The accompanying table shows the Phthisis death-rates for England and Wales and Chester respectively from 1874 to the present time, with the exception in the case of Chester of the year 1877, for which no data have been found.

	Phthisis Death-rate.	
Year.	England and Wales.	Chester.
1874 ...	2·080 ...	2·767
1875 ...	2·200 ...	2·370
1876 ...	2·110 ...	2·330
1877 ...	2·070 ...	—
1878 ...	2·110 ...	2·152
1879 ...	2·020 ...	2·655
1880 ...	1·860 ...	2·204
1881 ...	1·820 ...	1·657
1882 ...	1·850 ...	2.058
1883 ...	1·880 ...	1·978
1884 ...	1·820 ...	1·978
1885 ...	1·770 ...	1·653
1886 ...	1·730 ...	2·240
1887 ...	1·610 ...	2·186
1888 ...	1·560 ...	2·026

Year.	Phthisis Death-rate. England and Wales.	Chester.
1889 ...	1·570 ...	2·074
1890 ...	1·680 ...	1·569
1891 ...	1·590 ...	1·675
1892 ...	1·460 ...	1·644
1893 ...	1·460 ...	1·556
1894 ...	1·380 ...	1·631
1895 ...	1·390 ...	1·784
1896 ...	1·300 ...	1·518
1897 ...	1·340 ...	1·618
1898 ...	1·310 ...	1·770
1899 ...	1·330 ...	1·787
1900 ...	1·330 ...	1·421
1901 ...	1·260 ...	1·391
1902 ...	1·230 ...	1·311
1903 ...	1·200 ...	1·461
1904 ...	1·230 ...	1·250
1905 ...	1·140 ...	1·783
1906 ...	1·150 ...	1·525
1907 ...	1·140 ...	1·548
1908 ...	— ...	1·113

The following points may be briefly noted:—

From 1874 to 1879 inclusive, the Phthisis death-rate of England and Wales was more than 2 per 1,000. Since 1880 there has been a steady decrease to the rates of 1905, 1906 and 1907, which were less than 1·2.

The earliest Chester rate was nearer 3 than 2 per 1,000. Since 1890 the annual rate, with four exceptions, has been less than 1·7

Both for England and Wales and for Chester the Phthisis death-rate has declined, and with slight interruptions the diminution has been a progressive one.

During the first ten years of the table, 1874-1883, the average annual Phthisis death-rate for England and Wales was 1·920 per 1,000; for Chester, 2·255. During the closing ten years, 1898-1907, the rate for England and Wales was 1·232; for Chester, 1·523.

The difference between the average rates of the opening and closing decades for England and Wales is ·688 per 1,000; for Chester, ·732. The reduction of the Chester rate is the greater of the two.

That is to say that the decline of the Phthisis death-rate in Chester has taken place at a more rapid pace than in England and Wales as a whole.

With an average rate, for the closing decade, of 1·523, the actual number of deaths from Phthisis in Chester during the 10 years, 1898-1907, was 594. Had the average rate of the opening ten years, 2·255, persisted in the closing ten years, the number of deaths in the ten years would have been 879.

This reduction in the death-rate means that there were saved in Chester from death by Consumption alone in the course of ten years 285 lives.

At the beginning of the period covered by the table the Chester rate was the higher. In 1908 it is lower than any recorded for England and Wales up to 1907.

A New Measure—

The year 1908 witnessed a fresh and important departure in the administrative control of Tubercular disease.

By the Public Health (Tuberculosis) Regulations, 1908, issued by the Local Government Board, the duty is laid upon Medical Officers of Poor Law Institutions and District Medical Officers, of notifying to the Medical Officer of Health all cases of Pulmonary Tuberculosis among parochial patients. Superintending Officers of Poor Law Institutions and Relieving Officers are also concerned, and the Medical Officer of Health is to be kept informed by them of patients' movements and changes of address.

Phthisis is liable to affect that unsettled class which oscillates between parish relief and transient independence. By their manners and customs, their nomadic habits, and the housing conditions under which they elect or are forced to live, they foster

and propagate the infection and carry it from place to place. And it happens frequently enough that respectable workmen, weakened by phthisis and ceasing to earn wages, sink with their families to indigence and come within the cognizance of the Poor Law. Poverty and Phthisis go hand in hand : and whether the persons concerned are undeserving or unfortunate, the necessity for their supervision is undoubted.

Many such phthisical persons resort to common lodging houses in the course of their random migrations from town to town. Many indeed frequent them, to the peril of all concerned. Heedless or ignorant of the precautions required to prevent the dissemination of their disease, they spit on the floor of the common rooms and sleeping-rooms, they wipe their mouths and faces, if at all, with the common towels. While they are guests in these hotels of the nomad, they are beyond the knowledge of the Poor Law ; but fortunately not beyond the reach of another instrument which will come into action in Chester. By means of the new Bye-laws for common lodging houses in the City it will be possible to bring these scatterers of infection under closer observation than at any time up to the present.

Cared for on the one hand by the Poor Law officials in the casual or sick wards of workhouses, supervised on the other in common lodging houses by the sanitary department of the City, they will have far fewer opportunities of handing on their affliction to others.

The Tuberculosis Regulations will be strengthened and re-inforced by the common lodging house Bye-laws.

Conference to consider the Provision of a Sanatorium—

On April 24th, 1908, a conference was held at Chester, at which representatives of Birkenhead, Crewe, Stockport, and Chester were present to consider the joint provision of a sanatorium for consumptives.

Oakwood Hall, Romiley, near Stockport, had recently been offered by a generous donor to the County of Cheshire for this purpose, and though reported upon as most suitable by both the

County Medical Officer and the County Architect, had been declined, so it is alleged, through the influence of one County magnate, since deceased, who held property in the vicinity.

The conference had good reason to believe that the generous offer was still open for the joint Boroughs provided they took action soon.

Estimates were drawn up, based upon the County Architect's figures, and providing for the accommodation of 40 beds. This worked out at £220 per bed. The expenditure per bed was estimated as 32s. 4d. per week.

The expenses given above were outside expenses—some were first charges and would not necessarily recur annually in full—they would in a year or two become much lessened.

The annual expenditure for Chester was estimated at £431 if the other three Boroughs joined in, and the number of beds allotted five.

If in addition, Macclesfield, Hyde and Stalybridge participated, then Chester got four beds for an annual expenditure of £327.

There was considerable discussion and the Stockport representatives kindly undertook to ascertain more definite information as to the terms on which the donor would be prepared to offer the Hall to the four Boroughs.

The Representatives of each of the Boroughs promised to lay before their respective Committees the deliberations of the Conference, and particularly the following questions:—

(1) Is a Consumptive Sanatorium in Cheshire desirable;

(2) If so, is it desirable that the four boroughs concerned should join in the establishment of one either at Oakwood Hall or elsewhere.

The Town Clerk of Chester was appointed Secretary of the Conference, and was empowered to convene a further meeting at an appropriate time.

Conference with the Chester Guardians.

A joint Conference was held in September between Representatives of the Public Health Committee and the Chester Guardians to consider the best means of alleviating and dealing with cases of Phthisis.

The Guardians stated that they had certain wards in their Workhouse Infirmary in which they were desirous of accommodating cases of Phthisis; that they had difficulty in procuring patients to occupy them, and they desired the co-operation of the Public Health Committee in an endeavour to get patients to undergo treatment.

No difficulty in relation to the stigma of poverty attaching to residence in a Workhouse would arise, as the Guardians would allow patients liberty to wear their own clothes, to go and come as and when they desired, on the understanding they were not to come into the City; further, they would make arrangements for the admission of patients without the necessity for an interview with the Board.

The Guardians did not propose to confine the class of patients to the destitute, and while they would be prepared to undertake some responsibility for the support of the family of any patient who was a wage-earner—each case being considered on its merits—they would look to patients to contribute the whole or a proportion of the expenses of their maintenance in cases where they could afford it.

The wards were inspected by the Committee and found to be very clean and well-appointed.

The action of the Guardians is kind and well-timed, and the Public Health officials have instructions to advise suitable cases to take advantage of their excellent provision, attended as it is by every consideration for the sensitive feelings and susceptibilities of poor patients.

Infantile Mortality.

During the past year there occurred in Chester 118 deaths of infants under one year of age. This is equivalent to an Infantile Mortality rate of 120 per 1,000 births.

These are the corresponding figures for recent years:—

Year.	Infantile Mortality per 1000 births Chester.	England and Wales.	76 Great Towns.	141 Smaller Towns.	Rural Districts.
1900	157	154	—	—	—
1901	189	151	—	—	—
1902	119	133	—	—	—
1903	131	132	—	—	—
1904	135	145	—	—	—
1905	136	128	140	132	113
1906	160	133	145	138	116
1907	111	118	127	122	106
1908	120	121	128	124	110

The rate for 1908 is thus in excess of that for 1907, which was the lowest for many years, but it is well below the average of recent years, and lower than in any individual year since 1900, with two exceptions.

The rate is lower than the rate for the whole of England and Wales, lower than the rates for the great towns and the smaller towns,

Infantile Mortality affects the total death-rate of populations. In Chester in 1908 the deaths of infants have raised the total death-rate by 2·9 per 1,000 living.

But the infantile death-rate does not necessarily rise and fall with the total death-rate.

The total death-rate can never be abolished so long as man is mortal; but it ought to be possible under favourable conditions, if not to abolish the infantile death-rate, at least to reduce it very considerably.

Infantile Deaths are largely preventible.

The principal causes of Infantile Mortality in 1908 were as follows. The figures for 1906 and 1907 are given also :—

	1906.	1907.	1908.
Diarrhœal Diseases	49	21	19
Premature Birth	26	17	27
Atrophy, Debility, Marasmus...	20	21	15
Pneumonia	14	9	10
Bronchitis	11	13	14
Hooping Cough	8	8	5
Other Infectious Diseases ...	2	0	2
Convulsions	8	6	11
Tubercular Diseases	5	9	5
Suffocation, Overlaying ...	0	0	1

PREVENTIBLE INFANT DEATHS.

Among preventible causes of Infantile Mortality are

Diarrhœal Diseases—

Many of these may be prevented by seeing that the food of infants is clean, and by keeping clean every object which is likely to be put in their mouths.

Thus the milk given to hand-fed infants should be clean to start with. It should be received in a clean jug, stored in a clean place, and prepared for the infant's use in a clean manner. The bottle should be clean. A long tube bottle should never be used, for it cannot be kept clean. The hands of infants, which they are apt to be put to their mouths, should be frequently sponged or washed at any time of the day ; not merely in the morning and evening. They should not have dummy teats to suck ; these appliances, by falling on the floor, or touching the child's clothing, take up the germs of disease, the germs are sucked off and swallowed, and so the child becomes infected.

It is matter for satisfaction that deaths of infants from Diarrhœal Diseases in Chester were fewer in 1908 than in 1907, and were less by 30 than in 1906.

Deaths resulting from **Premature Births** in 1908 were 27 in number, 10 more than in 1907, and one more than in 1906.

Among causes of Premature Birth are Alcoholism, Abortifacients, Lead Poisoning, Syphilis, Factory Work, Injury, Malnutrition, and Emotional Disturbance. In varying degree these are preventible causes, though not in every case easily prevented.

Atrophy, Debility, and Marasmus—

Accounted for 15 deaths in 1908, a lower number than in 1906 or 1907. Of deaths in this group some were probably the consequence of congenital weakness, others of faults in diet. They are in some measure preventible.

Deaths from **Pneumonia** and **Bronchitis** together show little variation in the three years ending with 1908. The figures are 25, 22, and 24 deaths. Most adults, in following their work or occupation are necessarily exposed to the weather, and cannot escape the risk of a chill, but infants, if well clad, well housed, and carefully tended, need run no such risk. In fact, Pneumonia and Bronchitis are preventible diseases of infancy, even in children suffering from measles or hooping cough they may often be averted by timely attention.

It is not suggested that healthy infants should be kept indoors; on the contrary, they should always be taken out on suitable days; but there is no doubt that many infants fall ill of Pneumonia or Bronchitis by being carried through the streets in the cold and wet or at night, or by accompanying their mothers in inclement weather on holiday excursions or to places of entertainment. If mothers, when called upon to choose between their own amusement and the welfare of their children, invariably took the proper course and stayed at home, deaths of infants from Pneumonia and Bronchitis would diminish.

A low standard of air purity within the house favours the occurrence of respiratory disease. It is therefore of the highest importance that efficient ventilation should prevail in houses where there are young children, and especially in rooms where they sleep. But this can never be effected in back-to-back houses, or narrow courts and entries. Matters are worse if windows are

small and open with difficulty, and the evil is if possible greater still in the presence of dirt and overcrowding.

So long as such housing conditions continue in our midst, the children will continue to suffer.

Hooping Cough, other Infectious Diseases, and **Tuberculosis** are all essentially preventible. In 1908 they resulted in 12 deaths of infants.

Overlaying, of which there was one example in 1908, is an obviously preventible cause of death. Infants should never sleep in the same bed with their parents or older persons. Every infant should have its own cradle. There is no need for the cradle to be an ornate or elaborate structure. A box or a clothes basket can readily be made suitable. No doubt overlaying is sometimes the result of simple weariness on the part of the mother after a hard day's work. In other cases, and especially at the end of the week, it may be due to the use of alcohol. Such cases are anticipated by the the Children's Act, 1908, section 13 of which provides punishment on conviction where it is proved that the death of an infant under three years of age was caused by suffocation whilst the infant was in bed with some other person over 16 years of age, and that that other person was at the time of going to bed under the influence of drink. The intention of this provision is excellent. It is greatly to be hoped that it will lead to a reduction in the number of deaths from overlaying.

It is, therefore, well within the fact to say that many infantile deaths are preventible. In Chester the following measures among others are directed against the conditions which lead to infant mortality:—

Notification of Zymotic Enteritis (Summer Diarrhœa), followed by home visits and advice.

House to house visitation, with a view to the improvement of living conditions in houses, and the abatement of nuisances in their surroundings.

Careful and continual supervision of the Courts of the City.

Action under the Housing of the Working Classes Act, 1890.

Supervision of Midwives under the Midwives Act, 1902.

Volun tary notification of consumption, followed by disinfection, and directions for preventing the spread of the disease in families.

Attentive supervision of the milk supply of the City with special reference to the presence in milk of dirt, tubercle bacilli and other germs of disease.

The supervision of weakly infants by the Lady Health Visitor, who enjoins medical attendance upon the parents, and instructs them in methods of cleanly food preparation for the child, and otherwise helps them in any difficulties that present themselves.

Age Incidence of Infant Deaths.—Further insight into the causes of infantile mortality is gained by looking to the periods at which the deaths occur. Information on this point will be found in Table V. which gives deaths from stated causes in weeks and months under one year of age.

Two of the specified groups may be left out of account.

These are Atrophy, Debility, and Marasmus on the one hand, and Convulsions on the other. These groups include diseases which have nothing in common but the production of emaciation or convulsions. By omitting these the total number of 118 deaths for discussion is reduced to 92.

Of these 92 deaths, 43, or 46 per cent., took place in the *first three months* of life. Thus the first three months are specially fatal, and the diseases which make them so are of a different order from those of succeeding periods in the first year.

The diseases of the later months are nearly related to those of after years. Measles and Hooping Cough, for example, appear in the later months only, and most of the deaths from Diarrhœa, Tuberculosis, Bronchitis, and Pneumonia occur after the close of the third month. These diseases depend on environment: they are the result of influences which affect the child's body from without.

But the principal causes of death in the *first three months* are of a different class from the diseases of later childhood. They are scarcely diseases at all in the ordinary sense of the word. Premature Birth and Congenital Defects in Table V. are seen to affect the first three months exclusively. They are responsible together for 31 of the 43 deaths in that period. Infants who die from them are such as have no staying power. They do not as a rule succumb to unfavourable surroundings, though in certain cases these play some part. Their race is over before it is well begun, because they lack those vital forces which make separate existence possible.

The diseases of the *later months* are those which are most amenable to the sanitary measures which are now in force throughout the country. The Fevers, Diarrhœal diseases, Tuberculosis Pneumonia and Bronchitis may be dealt with, and are dealt with, by such sanitary measures. And many causes of death in the first three months which affect the child before its birth are open to remedy, some by factory legislation, some by charitable agencies, some by social advance or popular enlightment.

But even when all available good influences are brought to bear, Infantile Deaths which result from the transmission of defective hereditary characters are likely to prove very difficult to deal with and to prevent.

Deaths of Illegitimate Infants—

Among Illegitimate Infants the death-rate continues high. The illegitimate births in the year were 35 : the deaths were 8. The rate is 228 per 1000 births, as contrasted with 120 for the City as a whole, and 116 for Legitimate Infants.

Illegitimate Infants, for reasons which are only too obvious, most frequently begin their lives under a very heavy handicap of those adverse influences which lead among other results to premature birth. They suffer too from insufficiency of maternal care, either by neglect or by force of circumstances. They run risks of chill through want of attention, and they are specially exposed to the dangers of hand-feeding with unsuitable substitutes for breast milk.

Of the 8 deaths of Illegitimate Infants 4 were ascribed to premature birth. One child died of Bronchitis and one of Diarrhœa. The two remaining deaths was attributed to Marasmus.

ZYMOTIC ENTERITIS.

The year 1908 was the second of three during which the provisions of the Infectious Disease Notification Act, 1889, were extended within the City of Chester to Zymotic Enteritis, occurring in infants under one year of age during the months of July, August, or September.

Twenty-one notifications were received during the year, as contrasted with 33 in 1907.

Zymotic Enteritis in infants is due to disease germs, and food is the principal means by which these germs effect an entrance into the body. It is therefore essential, especially during the season when the disease is most apt to prevail, that methods of feeding should be such as to protect the food of infants from contamination.

Method of Feeding—

Of the infants notified only one was exclusively breast-fed, while less than one-third of the total number were wholly or partially breast-fed up to the date of onset. The remaining cases were almost equally divided between infants who had been breast-fed but had begun hand-feeding, and infants who had been hand-fed throughout their lives.

No deaths occurred among the breast-fed infants: whether wholly or partially breast-fed, all recovered.

Of the hand-fed infants on the other hand four died, and 3 of the 4 had been weaned at birth.

Of all the methods of infant feeding, breast feeding is best and safest. Breast milk is safeguarded almost completely against contamination by the germs which cause Zymotic Enteritis. It is the infant's natural and most wholesome food. Moreover, it is the

infant's birthright. No mother is justified in deciding to feed her infant by hand, instead of at the breast, unless she has been definitely advised by a medical man to take this step.

Doubtless the movements of a nursing mother are somewhat restricted : she cannot be out of her house at all hours : her visits to her friends must be curtailed or given up. But these are trivial considerations in comparison with the welfare of her child. Her child should always be first in her thoughts and should receive her undivided attention.

Back to the land is a watchword of the present generation—*back to the breast* is equally urgent and insistent.

Partial Breast Feeding—

The partially breast-fed infants, all escaped alive.

Their nourishment was breast milk supplemented by barley water, rusks or morsels of the parental fare.

Barley water is probably harmless, and rusks under suitable circumstances are useful enough : but it is folly to give infants scraps from a mixed adult dietary. They cannot digest such food and they suffer accordingly.

The two infants submitted to this ordeal suffered from Zymotic Enteritis. Their lives were saved, and this happy result may be traced, in part at least, to the fact that breast milk was the principal component of their diet.

It is almost incredible, in an enlightened country, that infants should be subjected to a diet of casual scraps. For an infant such scraps are not food, they are a test of endurance.

The reprehensible practice of giving alcohol wantonly to young children is dealt with by the Children Act, 1908. It is a pity that scrap feeding cannot be suppressed on similar lines.

Hand-feeding.

The hand-fed infants were fed with cow's milk and barley water, cow's milk and patent barley, cow's milk and water, cow's milk and boiled bread, or condensed milk.

The three first named mixtures of milk and other substances, if the ingredients are in correct proportion, have all their advocates.

Whether boiled bread is correct as an addition to cow's milk depends on the age of the child. For young infants, at least, it is quite unsuited. One of the infants fed with boiled bread was two months old when seized with Zymotic Enteritis. The result was fatal.

One infant was fed wholly on condensed milk. This child also died.

Hand-feeding is sometimes justified ; more frequently it is not. It is true that some infants cannot be breast-fed ; the mother's milk may fail.

Others, again, cannot be exclusively breast-fed. The mother may have to go out to work, and this may entail her absence from home for many hours each day.

But others who might be breast-fed if the mothers were willing, on various pretexts are not so fed.

If a mother for any reason—and that reason should always be cogent and irresistible—cannot suckle her child, it is her duty to ensure that the food which she substitutes for breast milk approaches it both in composition and in cleanliness. If the food is defective in either particular, the hand-fed infant runs the risk of serious, and, it may be, fatal illness.

Long-tube Bottles.

The disadvantages of the long-tube bottle have been constantly urged, yet more than half of the hand-fed infants had bottles of this undesirable type.

Cleanliness of Bottles.

A dirty bottle is an obvious fault. Here the record is better. More than half the bottles were found to be clean. Close attention is required to reach and maintain this result.

Flies.

Of the hand-fed cases one half were in houses with many flies, one half in houses where flies were scarce. Where flies were numerous the deaths were relatively thrice as many as in houses where flies were few.

Refuse Removal.

A house with its ashpit close at hand, other things being equal, will contain more flies than one whose ashpit is more remote. In most of the cases the ashpit was not more than six yards from the house ; in one case the distance was greater. One house had no ashpit.

Three deaths took place in houses with ashpits not more than 6 yards distant, and one in the house without an ashpit.

Flies breed in ashpits and places where organic matter decays, and in many places a flight of a few yards brings them to rooms where food is cooked and exposed to the air.

Especially they frequent untidy houses where bread crumbs and particles of sugar are found lying on tables, shelves, and floor. It has been proved by experiment that they carry infective germs and excremental matter on their feet from place to place. Milk should never be left uncovered in their presence for they readily contaminate it. Even if they are drowned in the process, the ill that they do survives them.

Apart from the question of flies, milk can hardly be stored with safety in houses where the parents are careless. A housewife who is dirty in person or in household management is not likely to keep clean vessels. Milk should be stored in a cool place ; but in small overcrowded houses cool places are difficult to find.

It is an unfortunate fact, with regard to milk storage in houses, that where the need for precaution is greatest, the probability of its exercise is least.

Houses, Persons, Milk Vessels.

Of the hand-fed infants one-half lived in dirty houses, while the houses of the other half were clean.

Half had parents or attendants whose personal cleanliness was at fault, while the parents or attendants of the rest had a clean appearance.

The standard for milk vessels was found to be somewhat higher than that for the house or person. Three-fourths of the hand-fed had milk which was stored in a clean vessel.

It is perhaps some slight satisfaction that the milk vessels in general were cleaner than the people or their houses. But this in itself is not enough : milk vessels should be entirely above suspicion : and clean milk vessels in a dirty house or in dirty hands are not likely to remain clean long.

Another factor affecting hand-fed infants is the date of weaning. Weaning during the warm months is to be deprecated.

Of the hand-fed infants only two were weaned during the hot months of the year, the remainder were weaned between December and May.

In the present series of cases therefore the effects of ill-timed weaning are happily not apparent.

Other Details—

Inquiry was also made as to Dummy Teats, Insurance of Infants, occupation of father, work done by mother, and family records for deaths of children.

Of the infants who died most had dummy teats. The dangers of dummy teats are now well known. Had it been intended to devise a means for introducing disease germs into the mouths of infants, nothing more suitable could have been invented.

Of the infants notified, more than one half were insured ; one infant had been insured but the policy had been allowed to lapse.

The proportion of deaths among the insured infants was slightly higher. One-third of the fathers were described as labourers; others had irregular or ill-paid employment, while some followed definite trades. Poverty, household squalor, and unclean milk are closely associated.

The mothers, who, after marriage were occupied with house-work only, lost more infants by death than those who went out to work, contrary to expectation.

All the first-born children recovered. The deaths from Zymotic Enteritis were all among the infants, who belonged to families whose number had already been reduced by Diarrhœal Disease, or to families in which there had been deaths from other causes.

The wages of labouring men, or of men in irregular employment do not increase by lapse of time, while the number of their children does. The money which keeps a man, his wife and one child in comfort in the early period of married life, may not suffice as the family grows in number. The household becomes cramped for room; the mother is overworked; the standard of cleanliness falls, and the circumstances are established which favour Zymotic Enteritis, and also other diseases.

Measures adopted—

Many methods of sanitary reform re-act beneficially on Zymotic Enteritis; but in 1908 a definite step was taken in Chester towards dealing with the disease directly. A Lady Sanitary Inspector was appointed. She has visited the houses from which notifications were received; she has urged upon mothers or persons in charge of infants the importance of following closely the directions of the medical man in attendance; and she has given instructions in the cleansing of bottles, the storage of milk, and other necessary details. She has kept cases under observation, and has noticed defects of housing.

By these means light has been let in on dark places; and a knowledge of the methods of protecting infant life has begun to

spread in quarters where such knowledge had hitherto been conspicuous by its absence.

Canal Boats Acts 1877 and 1884.

At the end of 1908 there were on the register 520 canal boats, an increase of 7 boats on the number for 1907.

The number of boats inspected during the year was 225, of which 22 were found to infringe the Acts and Regulations in respect of the following:—

Absence of Certificate	1
Certificate not identifying Owner with the Boat ...	1
Overcrowding	2
Accommodation dirty	2
Painting	12
Dilapidations	15
No proper water vessel	2

Notices were served and the subjects of the complaints remedied.

Each Sanitary Inspector, including the Lady Health Visitor, is in Chester also an Inspector under the Canal Boats Acts.

The duty of the Lady Health Visitor in this connection is to deal with cases of Puerperal Fever, cases of child-birth, and infectious disease occurring in the boats.

The total number for which the cabins were registered is 1,092; the total number occupying was 663, made up as follows—male adults 393, female adults 120, children of school age 77, children under school age 73.

Compared with 1907 the numbers for the present year show a diminution on the grand total of 299.

The male adults, female adults, and children of school age are much less in number this year; the children under school age show an increase of 15.

There were five deaths on canal boats in 1908—two in adults and three in children under five. The causes of death were, in the children—Diphtheria, Premature Birth, and Convulsions; in the adults, Pneumonia, and Rupture of the Bowels.

There were no deaths from Phthisis, and no notifications of the disease; perhaps the open-air life led by boatmen may account for this.

One case of infectious disease occurred in a child who died of Diphtheria.

The presence of infectious disease on canal boats has further bearing for Chester.

There is a tendency amongst boatmen to make the Chester Isolation Hospital the dumping ground for their cases of infectious disease.

This is due to the high reputation the hospital has achieved amongst them for its successful results, and the ease and convenience with which admission is obtained. In other places, it may be, there are no hospitals, and, if hospitals, no staff to serve them

But it has other and disastrous consequences for the sick children; a child taken ill with, say diphtheria, near Shrewsbury, is kept on the boat until Chester is reached, then medical aid is obtained gratuitously from the Infirmary, and for the first time the child comes under appropriate treatment, but too late to save its life. Such cases have occurred in actual practice.

There were 7 Births in Canal Boats during the year.

Factory and Workshop Act, 1901.

There were on the register at the end of the year 165 workshops. This number included the following:—Dressmakers and Milliners 49, Tailors 31, Cabinet Makers and Joiners 9, Bootmakers 7, Carriage Builders, Rope and Brush Makers, Bookbinders, Smiths, Drapers and Outfitters, 3 each; Corset Makers 2; Tarpaulin

Maker, Curio Dealer, Fitting and Repairing Shops, Marine Store Dealer, Plumber, Pianoforte Repairer, House Furnisher, Basket Maker, Printer, Harness Maker, and Tin Smith, 1 each.

In all 51 defects were found, 48 of which were nuisances remediable under the Public Health Acts, and 3 under the Factory and Workshop Act. They were as follows :—

Workplaces dirty	21
Workplaces badly ventilated	2
Overcrowding	2
Sanitary Accommodation insufficient or unsuitable, or used by both sexes in common	15
Breach of Sanitary Requirements for Bakehouses...	2
Other Contraventions	9

Notices were served and remedies provided—there were still a few outstanding at the end of the year.

In one shop the owner failed to affix in a prominent place the abstract of the Factory and Workshop Act. This omission was notified to H.M. Inspector of Factories—Mr. John Jackson, 51, South John Street, Liverpool.

Eight notices of infringements were received from Mr. Jackson, and the reports of the action taken by the Public Health Department subsequently forwarded to him.

Special enquiry was made into the provision of sanitary conveniences for females in factories.

They have to be sufficient in number, one for every 25 females employed ; have bolts or fastenings on the inside of the door, have substantial partitions between each seat, have approaches well screened, be conspicuously labelled "For Females" or "For Women only."

In addition to these special details, they have of course also to be efficient, clean, and well-kept.

Three factories were visited by H.M. Inspector and the Medical Officer of Health ; the infringements pointed out to the owners and notified to them later by letter, and subsequently remedied.

Miss R. E. Squire, Senior Lady Inspector of Factories and Workshops, has been appointed by the Home Office to take charge of the Lady Inspector's Branch in the North-Western Division, which includes Cheshire.

Her official address is 72 Bridge Street, Manchester, to which place complaints and enquiries referring to the employment of females in workshops and factories should be directed.

The Shop Hours Act, 1892.

The Seats for Shop Assistants Act, 1899.

Under the first no young person shall be employed in or about a shop for a longer period than 74 hours, including meal times, in any one week.

And in every shop in which a young person is employed a notice shall be kept exhibited by the employer in a conspicuous place referring to the provisions of this Act, and stating the number of hours in the week during which a young person may lawfully be employed in that shop.

This Act does not apply to a shop where the only persons employed are members of the same family, dwelling in the building of which the shop forms part, or to which the shop is attached, or to members of the employer's family so dwelling, or to any person employed as a domestic servant.

Under the second Act, in all rooms of a shop or other premises where goods are actually retailed to the public, and where female assistants are employed for the retailing of goods to the public, the employer carrying on business in such premises shall provide Seats behind the counter or in such other position as may be suitable for the purpose, and such Seats shall be in proportion of not less than one seat to every three female assistants employed in each room.

In connection with these two Acts, 128 visits were paid to shops in the City.

In 34 instances the card specified above was not exhibited as required in a conspicuous place.

Attention was drawn to the infringements, and cards were supplied from the Public Health Office.

In one house the walls and ceilings of the shop were dirty. This was remedied.

In every case the requirements of the Seats for Shop Assistants Act were satisfactorily complied with.

Homework and Outworkers.

Those who employ outworkers are by law compelled

1. To keep a register of outworkers, to be open to inspection by any duly authorised inspector.
2. To send a list of outworkers, their names, addresses, and the nature of their work, to the Local Authority twice each year, on February 1st and August 1st.

In default there is a penalty not exceeding forty shillings.

In Chester two employers send in a list twice a year; thirteen send in a list once a year.

The reason of this latter apparent evasion of the law is probably to be found in the very fitful and very casual character of the employment sent out.

The two who send in lists twice yearly regularly employ outworkers; the others, it would appear, only send out occasional odd jobs.

The names of 24 outworkers were obtained—8 males and 16 females. Their employments were—

Boot repairing, 4 males and 1 female.
Fancy sewing and embroidery, 3 females.
Costume repairing, 3 females.
Slipper making, 3 females.
Tailoring, 1 male, 1 female

Shirt making, 2 females.

Lace working, pinafore making, vest making, sewing and repairing, football case stitching, one female each ; upholstering, one male employed.

In four instances the outworkers sub-let part of the work.

The workrooms were inspected and also the rest of the premises, special attention being given to the lighting, ventilation, cleanliness, structure, and overcrowding.

The workrooms were found to be dirty in 4 cases, damp in 1, and dark in 1 case.

The wages varied considerably—One earned 1s. per week, 10 earned 5s. per week and under, 4 earned between 5s. and 10s. weekly, 6 earned between 10s. and £1 a week, three earned 24s., 26s., and 32s. per week respectively.

One woman, doing boot sewing and repairing, estimated her earnings at 10s. per annum, owing to the small amount of work she received.

Nine asserted that they were being paid at the standard rate of wages recognised in Chester, or by the current local log. In 15 cases it was admitted that no standard existed—"Prices are arranged with the firm;" "The firm have their own prices for piecework;" I am quite satisfied with the pay the firm give me."

The price for slipper stitching—uniting the sole to the upper —was 9d. or 9½d. the dozen slippers.

For shirt making, including the provision of buttons and the sewing of buttonholes, the price was 8d per shirt.

The proposed legislative establishment of local "Wages Boards" might, perhaps conduce to more uniform and generous treatment than now confessedly exists in different parts of the country.

Some had other private sources of income ; thus, 9 were in business on their own account and took in "private work,"

3 had a small private income, 7 were assisted by relatives and friends, 1 let apartments, 2 were said to be entirely dependent on their earnings.

The health of the workers was investigated—1 was totally deaf, one had rheumatism, 3 others were ailing, the rest were reported to be healthy.

The sanitary condition of the rest of the house other than the workroom was on the whole satisfactory in nearly every case. In one instance the rooms were dirty, in another the drainage was defective. Notices was served and remedies obtained.

All the wages were stated to be paid in coin—there was no evasion of the Truck Acts.

Bakehouses—

At the end of the year there were on the register 44 bakehouses, 3 of which employed mechanical power.

Four of the bakehouses are underground, and all have the Council's certificate.

All the bakehouses were inspected. In all 120 visits were made and 8 nuisances found, which were remedied when notice had been served on the owners.

Dirty walls and floors	6
Stable ventilating into bakehouse	1
Defective water-closet leaking on to floor	1

The names and addresses of the bakehouses are as follows :—

Occupier.	Address.
Atkin, Charles	68, 70, and 72, Foregate Street
Messrs. Baker & Sons ...	42, Bridge Street
Bannister, E	63, Foregate Street
Blake, Edgar	7, Watergate Row
Bolland, R. & Sons, Ltd. ...	34, Eastgate Row
Carver, Edward	143, Foregate Street
Cocoa House, Ltd.	48, Foregate Street
Co-operative Society	Kynaston Street

Occupier.	Address.
Cottle, J.	20, Bridge Street Row
Davies, Francis	44, Crane Street
Davies, Walter	Rear of 149, Foregate Street
Durish, Antonio	58, Foregate Street
Dutton, Caleb	Rear of 10, Church Street
Dutton, Frederick	34, Frodsham Street
Evans, Walter...	58, Christleton Road
Fieldstead, Stephen	96, Foregate Street
Green, Edwin...	71, Brook Street
Griffith, Messrs.	9, Lower Bridge Street
Hall, Frederick	13, Christleton Road
Harris, Alfred	70, St. Anne Street
Hawarden, James	38, Newgate Street
Jackson, John	73, Watergate Street
Jeffries, T.	42, Catherine Street
Jones, C. J.	33, Boughton
Kendrick, J.	15 and 17, Northgate Row
Kendrick, J.	29, Foregate Street
Lee, Miss M.	13, Handbridge
Martin, Henry & Co.... ...	98, Foregate Street
Millington, James	65, Brook Street
Pitt, S.	100 and 102, Northgate Street
Postles, Thomas	111, Garden Lane
Price, John	7, Railway Terrace, Hoole Lane
Quinn, Frederick George ...	159, Foregate Street
Urmston, Mary, & Son ...	63, Northgate Street
Walker, George	83, Garden Lane
Wedgewood, S.	81, Boughton
White Stephen	83, Tarvin Road
Williams, S.	57, Egerton Street
Williamson, John	30, Brook Street
Williamson, Thomas & Co. ...	14, Cuppin Street

The following are underground bakehouses :—

Clemence, S. & A.	46 and 44, Northgate Street
Denson, W. & Son	6, Northgate Street
Smith, Alexander	1, Grosvenor Park Road
Urmston, E.	78, Watergate Street

Dairies, Cowsheds, and Milkshops.

The registration of dairymen, cow-keepers, milk vendors, and milk purveyors is proceeding slowly, and has not yet been completed.

Some of the purveyors, and more especially those from outside the City would appear to resist registration.

Notices have been issued to all known cow-keepers and dealers, that whether residing in the City or not, if they sell milk in the City, they must according to law, be registered by the Chester Council.

Forms of application for registration are supplied gratis at the Public Health Office, Forest House.

In addition, traders may obtain certificates witnessing such registration on payment of a fee of one shilling, but these certificates are only granted to those cow-keepers, milk vendors, or dairy keepers whose premises, utensils, and conditions of business, were at the time of inspection, satisfactory and efficient from a public health standpoint.

The possession and display of such a certificate therefore is some guarantee of a high standard of sanitary efficiency at the time when the premises and conditions of business were examined.

By the end of December, 1908, there were registered 27 cow-keepers resident in Chester. Nearly all these are also milk vendors and dairymen.

Their names are given below.

Occupier.	Situation of Premises.
Baker, Samuel	2, Brown's Lane, Handbridge
Davies, Mary Ellen	Near Hope Street, Saltney
Dodd, Joseph	At the rear of St. Mark's Terrace, Saltney
Edwards, G. T.	Queen's Park Farm
Edwards, Thomas	At the rear of 79, Overleigh Road, Handbridge
Johnson, William	Ashes Farm, Wrexham Road
Jones, Richard	Bottoms Lane, Queen's Park

Occupier.	Situation of Premises.
Lawrence, John	3, Glynne Street, Saltney
Lee, Samuel	54, St. Anne Street
Meredith, John	Land, Wood Street, Saltney
Powell, George	River Lane
Powell, Joseph	19, Eaton Road
Powell, Thomas	Old Wrexham Road
Randles, James	20, Greenway Street
Robinson, Richard	2a, Pyecroft Street, Handbridge
Robson, Christopher	33, Mount Pleasant, Saltney
Sconce, Daniel	4, Watergate Square
Shore, Sidney Hubert Victor	Land adjoining G.W.R. Co's. Wharf, Saltney
Speed, Joseph	Beech House, Bumper's Lane
Speed, Joseph	3, Sealand Road
Speed, Martha...	Wrexham Road
Strange, James	Pinfold Farm, Eaton Road
Tennyson, Alfred	Carnarvon Tavern, Crane Street
Thomas, Misses	Lache Hall Farm, Lache Lane
Walley, Charles John... ...	Walley's Farm, Bumper's Lane
Williams, Brothers	Saltney Side Farm
Williams, John	11, Castle Street

In addition, there were 76 persons registered milk sellers and dairy keepers resident in the City, and milk purveyors from outside the district, but selling their milk, and in some cases, dairy produce in Chester.

A full list of these will be given next year.

One small unregistered cow-shed was discovered close to one of the main streets, containing a milch cow and three calves, not the cow's own progeny.

The calves were said to be kept here until large enough to be sold, or otherwise disposed of.

On two occasions cases of diphtheria were found to be nursed at home in farms outside the district, and supplying the City with milk.

The farms were visited, and every precaution taken to see that the milk supply was kept free from the possibility of infection.

One case of typhoid occured in a milk shop in the City ; the case was removed to the Isolation Hospital ; the premises and utensils thoroughly cleansed, disinfected, and kept under close supervision for some considerable time. The business was for a short period transferred to another house while the cleansing and disinfection were proceeding.

Common Lodging Houses.

One Common Lodging House, 2, Commercial Hall, was removed from the Register in 1908—so that there now remain 10 registered Common Lodging Houses.

A closing order was obtained in respect to No. 2, Hawarden Castle Entry. It had previously been certified by the Medical Officer of Health as unfit for human habitation and dangerous to the health of its occupants and was voluntarily closed by its owner.

There were 4 prosecutions for keeping unregistered houses—the defendants were fined amounts varying from 10/- to 20/- and costs.

One Common Lodging House took fire, but this was extinguished before serious damage was done.

It would appear that there is no power at present to make bye-laws for the prevention of fires in these houses.

Three applications were received for the registration of fresh houses but were all refused. The premises were either unsatisfactory, insanitary, or dirty, or the occupiers deemed unsuitable for this class of work.

For example, in one such house inspected late in the afternoon the walls and floors were dirty and unswept, the bedding was ample but dirty, the bedroom utensils had not been emptied and smelt very offensively, there was insufficient light and ventilation, insufficient privacy for married couples, the floors were dilapidated,

the rooms were overcrowded. The washing accommodation was very primitive—there was one towel, very dirty, for 14 occupants.

The ten houses were the subject of 37 inspections. The following contraventions were found :—

Dirty bedding	2
Dirty walls, floors and ceilings	6
Fouled and defective water closets ...	4
Drains choked	4

Notices were served on the owners and the nuisances remedied.

Public Houses.

These have come under special notice during 1908. Their sanitary accommodation and general condition was the subject of investigation. As a result notices were served on the owners of 16 licensed premises in connection with the following defects :—

No flush to urinals	8
Insufficient number of water closets ...	3
Dilapidated yard pavement	3
Stables in disrepair	3
Insufficient urinal accommodation	2
Drainage defects	2
Dirty walls and ceilings	1
Dilapidated cellar floors	1
Deep and offensive ashpit	1
Water closet insufficiently ventilated ...	1

The repairs were carried out under the supervision of the Sanitary Inspectors.

New Bye-Laws.

The bye-laws for the employment of children in the City were sanctioned by the Home Secretary on July 22nd, 1908. The following clauses are extracted for their public health significance :—

2. A child under the age of 11 years shall not be employed.

8. A child shall not be employed in the turning over, carrying away, or sorting of refuse collected in any rubbish heap, nor in gathering or seeking for rags or any other

article whatsoever from any dust receptacle, refuse heap, or other collection of refuse.

9. A child shall not be employed in, or in connection with the sale or delivery of intoxicating liquors, except on premises where such liquors are exclusively handled, dealt with, and sold in sealed vessels.

10. A child under the age of 12 years shall not be employed as a lather hand, or in any similar occupation in any barber's or hairdresser's shop.

11. A child shall not be employed as a billiard marker, score marker, or attendant on the games played in any billiard or bagatelle saloon or room.

14. A child employed in any industrial work at home on any day shall not be employed on the same day in any other occupation.

23. A licence to engage in street trading shall not be refused by the Council to any person between the ages of 11 years and 16 years applying for it, and not prohibited by Bye-law 17 except on the ground that the applicant is by reason of physical or mental deficiency unfit to trade in the streets, or that he has not his parent's or guardian's consent to his being so engaged.

30. No licence-holder shall trade in the streets unless he is wearing good shoes and stockings, and is otherwise decently and sufficiently clad.

PROTECTION OF FOOD SUPPLIES.

The samples submitted to the Public Analyst during the year numbered 100, distributed as follows :—

Milk	31
Butter	15
Margarine	4
Lard	4
Bread	5
Beer and Stout	5
Self-raising Flour...	4

Tea, Pepper, Ice-cream, each 3...	9
Coffee, Yeast, Vinegar, Golden Syrup, Ground Rice, Arrowroot, Mixed Spice, Sweets, each 2... ...	16
Cocoa, Currants, Mustard, Cheese, Currant Cake, Ginger-beer, Soda-water, each 1	7
	100

Of the 100 samples 15 were adulterated, and of these 10 were milk, 2 butter, 1 cheese, 1 vinegar, and 1 ginger-ale.

Milk—

Of the 31 samples examined, 30 were whole milk and 1 was skimmed milk.

Among the 30 whole milk samples, the average record for fat was 3·59 per cent.; 6 were above 4 per cent. The highest figure was 4·95 per cent.; 2 were below the regulation standard of 3 per cent. For solids not fat the average figure was 8·82 per cent. Eleven samples had 9 per cent. or over, 4 had less than the regulation quantity of 8·5 per cent., and of these 1 had less than 8 per cent.

The sample of skimmed milk did not attain the regulation requirement of 9·5 per cent. of milk solids.

None of the milk samples contained preservatives.

Of the 10 faulty milk samples 9 were whole milk, and 1 was a sample of skimmed milk. Five of the 10 were adversely reported upon on account of the presence of dirt, and 3 on account of added water or the removal of cream. Two were defective in both respects.

In the 5 samples condemned for the presence of dirt, cow dung was found in each case. In 2 samples it was present to the extent of 1·4 grains per gallon; the vendor in both cases was cautioned. In the 3 remaining samples the amount was 2·4, 4·2, and 9 grains per gallon respectively, and the vendor in each case was prosecuted.

Of the three samples condemned for the addition of water or removal of cream,, 1 had 1·9 per cent of added water, and 1 was deprived of 6·2 per cent. of cream. The vendor in both cases was cautioned.

The remaining sample of this group had 6·7 per cent. of added water, and was also deprived of 12·7 per cent. of cream; in this case prosecution followed.

Of the two samples condemned both for dirt and for quantitative deficiencies, 1 was a whole milk sample. It had 8·5 per cent. of added water, and contained ·7 grains per gallon of a sediment which consisted of sand and vegetable matter. The vendor was prosecuted. The other sample was skimmed milk· It had 8 per cent. of added water, and shewed 1·4 grains per gallon of a deposit consisting of sand, earthy material, hair, and husk of wheat. In this case also proceedings were taken.

With reference to the presence of cow dung in milk it is necessary to bear in mind that the quantity of that impurity discovered by the analyst is less than the amount present at first.

Careful experiment has shewn that only $\frac{1}{8}$th part by weight of cow dung originally introduced into milk can be recovered in the final result. The remaining $\frac{7}{8}$th has been dissolved out into the fluid, and cannot be separated from it by filtering or allowing to settle.

The moral is obvious. No amount of straining *after* milking will remove all the obnoxious polluting material—only $\frac{1}{8}$th part is so removed.

The filth should be prevented from entering rather than that it should be attempted to remove one part of it afterwards, leaving seven times as much behind in the "strained" milk.

It may be well here to refer to the time of taking samples. Milksellers have objected to samples being taken towards the end of a round, and, unfortunately, some magistrates, probably without full knowledge of the circumstances, have endorsed these

objections from the bench. From a public health standpoint this is much to be deplored.

1. If a time, a closed time at the end of a round, that is, between 10 and 11 in the morning, were adopted during which samples of milk should not be taken, then this would at once become the time when fraud and adulteration would be practised.

2. Some milksellers start selling in the country, and may finish their round in Chester, so that by the time they arrive in the City they naturally are at the end of their round. If the milksellers' suggestion were adopted it would mean that these country vendors would never be sampled save by arrangement beforehand, which, of course, is absurd, as all samples, to be of any value for the detection of adulteration, must be surprise samples.

3. Complaints of the quality of the milk supplied are not infrequently received at the Public Health Office from citizens who have bought. Most of these complaints have reference to one time only—Sunday morning between 10 and 11, the others refer chiefly to the Sunday afternoon supply; the rest, very few in number, to the other days of the week. On the receipt of a complaint, a sample is sooner or later taken under exactly the same circumstances, the same time, and the same place as that mentioned in the letter.

4. The end of a round is the time when a milkseller begins to find out that he wants more milk. In some towns it is usual for fraudulent dealers to carry water, in a can emptied of its milk, and placed there ostensibly for cleansing purposes. Nothing is easier than it is for such a dealer to empty this water into the milk shortly before its delivery. Many such cases are on record, and are most difficult to detect.

5. The Sanitary Inspector is in the position of any other buyer. What is good enough for the milkseller to sell, whether at the end or beginning of a round, must be

by Act of Parliament good enough to be analysed. If the milkseller thinks that near the end of his round his milk is too poor for analysis, or, in other words, that it is below the standard, fixed low purposely by the Legislature, he should either inform his customers that he has none for sale, or sell it as skimmed milk and label it as such. In law there is no excuse for a low standard quality of milk. There is a well-known case on record, carried to the highest courts, in which a vendor selling milk admittedly taken fresh from the cow, but below the standard of quality, was convicted, and the conviction upheld on appeal.

6. The Central Authority would never allow the action of the inspector to be fettered in any way in the matter of taking samples under the Sale of Food and Drugs Acts.

BACTERIOLOGICAL EXAMINATION OF MILK.

Tubercle.

Eighteen samples were examined, and 2 derived from different cow-keepers were found to contain the tubercle bacillus.

The cowsheds were visited, the cows examined by a veterinary inspector, and isolation samples taken from cows presenting suspicious signs of tuberculosis.

These latter samples were, however, found free from tubercle, illustrating once more the difficulty in tracing the source of any infected milk. In all probability the milks originally tested were mixed milks, derived from one or more milk vendors and mixed in the open street during the progress of the round.

Bacillus Coli.

This germ inhabits the intestines of man and animals—its presence, therefore, bespeaks pollution by excrement.

In 4 samples the bacillus was absent in one cubic centimetre (about 17 drops). These are, therefore, extremely clean milks, and

stand the bacteriological test, which is the severest test of all. No evidence was obtained in these milks of the presence of any excremental matter.

This is the standard of bacteriological cleanliness now adopted for milk, that the Bacillus Coli should not be present in one cubic centimetre.

In 6 samples Bacillus Coli was present in one cubic centimetre, but absent from one-tenth of a cubic centimetre.

In 2 samples the bacillus was present in 1/10th cubic centimetre, but absent in 1/100th cubic centimetre.

In 6 samples the bacillus was present in 1/100th cubic centimetre, but absent in 1/1000th cubic centimetre.

These 8 last samples are, from a bacteriological standpoint, very filthy specimens.

Bacillus Enteritidis.

This bacillus was not found present in any of the samples when 10 cubic centimetres (about three teaspoonfuls) of each were tested.

Leucocytes.

These are the white corpuscles of the blood.

They were absent in 4 samples, and present in great excess in 2 samples.

In all probability the cows from which these two last samples were taken had some disease of the udder—an inflammation.

Streptococci.

One cubic centimetre of each sample was examined.

They were present in 2 samples, absent in the other sixteen.

Some farmers, some of the writers in the local press, and self-styled experts, seem to regard it as an intolerable hardship, an absurd proposal, that cow-keepers and milksellers should be even asked to supply clean milk.

These gentlemen are, of course, entitled to their opinion, and if they prefer foul polluted milk, milk contaminated with manure, hairs, sand, blood, or matter from an abscess, they are doubtless strictly within their right in demanding it and seeing that they get it.

But for the citizens of Chester the Public Health Committee has determined that the milk supply shall be clean at all costs, and, what is more to the point, the citizens are in process of getting this clean supply.

The picture drawn above is not an exaggerated one, for example, milk containing blood was sold in Chester streets quite recently, but there is no need to enlarge upon this unsavoury topic and kindred others.

If the ordinary purchaser, when nearing the bottom of the milk jug, would cant it to one side, and draw the attention of the milk vendor to the sediment present, it would not be long before improvement were effected.

At the present day there is absolutely no excuse for filthy milk ; clean milk may be obtained by observing the simple rules of cleanliness—rules which may be learnt from almost any manual on cow-keeping, or dairy farming, or from the literature issued by the Board of Agriculture, rules which are endorsed by veterinary and medical authorities.

The attitude of some cow-keepers is, however, that of almost complete apathy, of others ridicule, which may even be aggressive.

Nothing is commoner in police court cases, for example, than to have the suggestion ridiculed that cows' udders should be just moistened during milking, or that the hairs of the flanks, round the udders, and hind quarters should be cut short and kept short.

And yet these very conditions are recommended and illustrated with prints in books on dairy farming written by experts—dairy experts.

One of the worst faults in Chester milk rounds is the use of the long dipper. In this method of serving, towards the end of the round, the arm is thrust in up to the armpit through the large open can of milk while the owner is, it may be, smoking at the time.

In this method, when the top of the can is removed, the milk is exposed to pollution by street dust. Milk vendors have been timed near the principal streets, and it was found that the lid of the can was removed and the milk exposed to the street dust for from one-third to one-half the time taken in the progress through the streets.

If this average held throughout, it would mean that while on the round the morning's milk alone was exposed to unrestricted contamination by street dust and street sweepings for about one hour to one hour and a half daily.

Definite improvement has occurred in the City, and in at least 3 cow-keepers' establishments great cleanliness is observed; the dairies, the milksellers' shops, are nearly all kept very clean.

It would be well if the milksellers visited one of the model dairies elsewhere each year, and went prepared not to scoff but to learn.

Butter.

Of the fifteen samples sold as butter two were found to consist entirely of margarine. One of these contained 83 per cent. of foreign fat, and the other 82 per cent. Prosecutions were instituted in both cases.

The remaining thirteen samples were genuine butter, none had more than 16 per cent. of water, the limit permitted by the Sale of Butter Regulations, 1902. The highest percentage of water was 15·5 : the lowest 11·3.

One of the genuine samples contained Boric Acid.

The quantity was 23·8 grains per lb., that is to say, less than the permissible limit of 35 grains per lb.

Margarine.

The 4 samples of margarine were all genuine: one was delivered to the purchaser in a plain wrapper, and a letter of caution was sent to the vendor. When margarine is sold by retail, the wrapper containing it must have printed upon it in capital block letter, not less than half-an-inch long, the word MARGARINE, distinctly legible. No other printed matter is allowed on the wrapper.

Lard.

Of the 4 samples 3 were genuine. One was regarded as doubtful on account of the presence of a trace of cotton seed oil. But the trace was so slight as to admit the possibility that it might have been derived from the food stuff of the animal concerned.

Bread.

The 5 samples of bread were genuine. All were of wheat flour only, and free from alum.

Beer and Stout.

The 5 samples were all genuine, and free from arsenic. The 3 samples of beer contained 9·7, 16·2, and 36·8 grains of common table salt per gallon respectively, and the 2 samples of stout contained 37·8 and 46·9 grains of salt per gallon.

Self-Raising Flour.

The 4 samples were genuine. None contained alum, arsenic or lead. In 3 cases the baking powder, or substance for raising the flour, was a mixture of sodium bicarbonate with acid phosphate of calcium. The quantity of this powder in the samples concerned was 2, 2·47 and 3 per cent. respectively. In the remaining sample the baking powder was composed of sodium bicarbonate and cream of tartar.

Tea.

The three samples were genuine. They consisted of pure tea.

Pepper.

Three samples : all genuine. Microscopic examination showed pepper only.

Ice Cream.

The 3 samples were reported genuine. They were free from preservatives and poisonous metals. One was composed of sugar and milk with ground rice, one of sugar and milk with flour, and one chiefly cream and egg. One of the samples was described as clean, and one as fairly clean. The remaining specimen contained a little sand and dust, but the quantity was too small for estimation.

Coffee.

The samples of coffee, 2 in number, were both genuine.

Yeast.

Two samples of yeast were taken : both were genuine.

Malt Vinegar.

Of the 2 samples of malt vinegar 1 was genuine. The other was deficient in acetic acid to the extent of 10·5 per cent.

Golden Syrup.

Two samples were taken : both genuine.

Ground Rice.

Two samples : both were genuine and consisted of rice only.

Arrowroot.

The 2 samples of arrowroot were both genuine.

Mixed Spice.

The samples, 2 in number, were genuine. One was composed of cinnamon bark, and nutmeg, the other of cinnamon bark, nutmeg, and ginger.

Sweets.

Both samples were genuine, and free from poisonous metals. One contained ·58 per cent. of tartaric acid.

Cocoa.

One sample, genuine, consisting of cocoa only.

Currants.

One sample, genuine.

Mustard.

One sample, genuine. Miscroscopic examination showed mustard only.

Cheese.

The sample taken contained 21 per cent. of foreign fat. The cheese was a margarine cheese, and the vendor was prosecuted.

Currant Bread.

A genuine sample, free from alum and poisonous metals.

Ginger Ale.

This sample contained 1/40th of a grain of copper per gallon. It was free from lead.

Soda Water.

The sample was free from lead, but contained 1/100 grain of copper per gallon.

PROSECUTIONS.

The number of prosecutions was 9: 6 for milk, 2 for butter, and 1 for cheese.

Milk.

Of the 6 prosecutions 1 was for adulteration, 3 for pollution, and 2 for both. In the last group one sample was skimmed milk.

The details are as follows :—

1. *Adulterated.* Containing 6·7 per cent of added water, and deprived of 12·7 per cent. of cream. Dismissed on payment of costs, £2 2s. 6d.

2. *Polluted.* Containing 2·8 grains of cow dung per gallon. Dismissed on payment of costs, £1 2s.

3. *Polluted.* Containing 9 grains of cow dung per gallon. Fined £1, and costs £1 8s.

4. *Polluted.* Containing 4·2 grains of cow dung per gallon. Dismissed on payment of costs, £1 7s. 6d.

5. *Adulterated and Polluted.* Containing 8·2 per cent. of added water, and ·7 grain of sand and vegetable debris per gallon. Warranty set up as defence. Dismissed under Section 25 of Sale of Food and Drugs Act, 1875.

6. *Adulterated and Polluted. Skimmed Milk.* Containing 8 per cent. of added water, and 1·4 grains per gallon of a sediment consisting chiefly of sand, earthy matter, hair, and husk of wheat. Dismissed on payment of costs, £1 2s. 6d.

Butter.

Two prosecutions.

1. Containing 83 per cent. of foreign fat, and consisting entirely of margarine. Prosecution for selling margarine not in a package marked as provided : Fined 5/- and costs, £1 4s. 0d. Prosecution for selling margarine as butter not proceeded with.

2. Containing 82 per cent. of foreign fat, and consisting entirely of margarine. Prosecution for selling margarine not in a package marked as margarine as provided : Fined 10/- and costs, £1 6s. 0d. Prosecution for selling butter which upon analysis turned out to be margarine not proceeded with. Prosecution for obstructing officer in the course of his duties dismissed on payment of costs, 3/6.

Cheese.

One prosecution.

The cheese was a margarine cheese, and contained 21 per cent. of foreign fat. Fined £2, and costs £1 11s. 6d.

In addition, certain vendors were cautioned, 1 for milk containing added water, 1 for milk deprived of cream, and 2 for polluted milk. Another vendor received a letter of caution for delivering margarine to a purchaser in a plain wrapper.

In comparing the figures for 1908 with those of 1907, the following points may be noted :—

Both in 1907 and in 1908 100 samples were analysed.

In both years also 15 samples were found to be adulterated.

The number of milk samples taken in 1907 was 43, in 1908 the number was 31.

Among 43 milk samples analysed in 1907, 12, or 27 per cent., led to prosecution. Of 31 samples taken in 1908, 6, or 19 per cent., were the occasion of proceedings.

While 1908 differs little from 1907 in respect to the number of milk samples condemned for pollution, the degree of pollution was less in the 1908 samples than in those of 1907, with the single exception of the sample above reported, which contained 9 grains of dirt per gallon.

In both years all milk samples were free from preservatives.

In each year one butter sample contained boric acid, but in neither case did the quantity transgress the limit permitted.

In both years two samples of coffee were examined. In 1907 both the samples were adulterated, in 1908 both were genuine.

In 1907 the 4 samples of cheese were genuine. In 1908 the only sample analysed was found to be a margarine cheese.

In both years all the samples of beer and stout were reported free from arsenic.

SLAUGHTER HOUSES AND MEAT INSPECTION.

There are 12 slaughter houses in the City, of which 3 are available for public slaughter. All were inspected during the year —375 visits in all.

In addition the Public Market was the subject of 27 special visits, the Smithfield 6, butchers' shops 45, the Soup Kitchen 4, the knacker's yard 23, and the candle factory 7 visits.

Altogether 22 carcases, or portions of a carcase, were voluntarily surrendered by the owners, who usually in these cases send for the Meat Inspector, and 17 carcases or portions were seized under the Public Health Act, Section 116, carried before a Justice, condemned, and subsequently destroyed.

The total amount of meat dealt with during the year amounted to a little over 4½ tons

Twenty-five of the carcases were seized or surrendered for the presence of tubercle, 3 were infested with the fluke (Distoma Hepaticum), in 4 the organs were cystic, 2 of the beasts had died a natural death, 3 had various inflammatory affections, while 1 had black-leg or quarter evil.

Generally speaking, the butchers and owners of slaughter houses have helped the Health Department considerably in sending early notice of any bad meat, and have given willing co-operation.

The scheme of insurance which holds in Chester, and which pays part compensation for the loss of any beast found after slaughter to be unsound or unfit for human food, has been of great service in this connection.

But even apart from this, which, after all, is a mercenary consideration, the citizens are to be much congratulated that the Chester butchers as a body have taken such a high, public-spirited view of their business, and have been prepared even sometimes at a great loss to safeguard the public welfare, and to resolutely refuse to expose bad or unsound meat.

The number of slink meat-sellers in Chester, known or suspected, is very small. Nearly all the butchers sell good meat—the best—perfectly sound and wholesome.

PROSECUTIONS.

1. For depositing in a slaughter-house for the purpose of preparation for sale, and intended for the food of man, the carcase of an ox affected with black-leg. Fined £5 and £4 6s. costs.
2. For depositing for the purpose of preparation for sale, and intended for the food of man, the carcase of a pig affected with generalised tuberculosis. Fined £5 and £1 6s. costs.

In the case of one dealer, whose cow, affected with tuberculosis and an inflamed udder, was seized, a letter of caution was sent by the Town Clerk. In this last case the circumstances, after consideration, were thought not to be sufficient to justify prosecution.

Mr. Eginton, the Chief Sanitary Inspector, is also Meat Inspector, and gives a large amount of time to this work, and makes routine and surprise visits to the slaughter-houses, the butchers' shops, the Public Market, and the Smithfield.

The Council received an application for a licence for a proposed Knacker's Yard, to be erected at Sealand. The application was refused.

MUNICIPAL LABORATORY.

During the year the following specimens were examined at the Public Health Laboratory and reported on :—

616 swabs from the throat and nose in suspected cases of diphtheria, and from patients from the Isolation Hospital before discharge for home. Cultures were generally made on blood-serum or on serum agar.

39 examples of throat and nose secretion were examined, immediately, without culture, for the diphtheria bacillus which was found present in 8 cases.

24 samples of sputum from suspected cases of phthisis.

2 phials of urine, for the presence of tubercle.

8 specimens of blood, for the diagnosis of typhoid fever, by the Widal Re-action.

19 samples of hair and "scurf" from the heads of school children, for the presence of the organism of ringworm.

2 specimens of air for bacteriological examination.

The chemical analysis of 11 samples of town's water.

The bacteriological examination of 192 waters.

One portion of meat, for the presence of the bacillus of black-leg or quarter evil.

Two pieces of meat for the presence of tubercle.

12 specimens of milk, for Bacillus Coli, Bacillus Enteritidis, and Moulds.

Chester Water Supply.

The City of Chester is supplied with water on the constant system by a private company—the Chester Waterworks Company. The supply is almost entirely from the river Dee except as to a small amount derived from a well.

The Intake of the Company is situated in "the Long Reach" of the River Dee, about one mile and a half above the Dee Weir, on the Meadows side about 150 yards above the confluence of the Huntingdon Brook with the Dee and on the opposite side to this confluence.

At the Intake the water first of all passes through a screen of very fine copper wire gauze, which is kept clean of vegetable growths and moulds by being well brushed as the necessity arises and whose woodwork is painted over every year.

From the copper screen the water is passed through copper wire strainers, half-an-inch mesh, to keep out rough debris and thence into a well on the South side of the Dee and built into the river bank.

This well is said to have a concrete bottom and for the rest is bricked.

In section it is semi-circular—the diameter of the circle constituting its river frontage.

This frontage stretches vertically up about 3 feet above the river surface at ordinary times, but at a high tide which overtops the weir, the surface of the water may reach to within 6 or 8 inches of the summit.

The frontage of the well which is apposed to the river flow is made of three shutters sliding vertically between cast-iron columns—these shutters are the gauze strainers referred to earlier. On both sides of the well and along the river bank a wall 60 feet long extends above and below. This wall acts as a buttress supporting and fixing the compound copper wire screen—in section, a trapezium with two parallel sides.

This screen is placed vertically—its upper edge is roughly about 4 feet above the surface of the water at normal times—its lower edge lies on the river bottom.

From this well the water is sent in 2 foot cast-iron pipes a distance of nearly one mile through the Meadows into a receiver.

This receiver is a closed one and is built in brick on the Meadows, is said to be concreted and water-tight, and its surface lies about 2 feet below the surface of the ground.

From the receiver on the west side of the river, the water is conveyed in a 24-inch flexible steel and copper pipe on the bed of the river to the opposite side of the river at Barrel Well.

Here there are two wells—No. 1 and No. 2, and the flexible pipe just mentioned has connections which enable the Engineer to send its contents into either No. 1 alone or into No. 1 and No. 2 together.

No. 1 well is to all intents and purposes merely a receiver whence the water is pumped on to the Upper Works—it is a cast iron cylinder sunk into the rock with a concreted bottom.

No. 2 is, however, a well whose walls are of cast iron, sunk from the surface into the rock and is asserted to contain fresh

spring water—its bottom is not concreted. This is the well referred to in the earlier part of the description.

No. 2 well is also connected with No. 1 in such a way that the Engineer is able to send its contents in any proportion desirable into No. 1 to mix with the water derived in it from the river.

The mixed waters then in No. 1 are sent on to a subsidence tank on the Upper Works—this is an open Reservoir 200 yards distant from the river.

From here the water is passed on to the sand filter beds.

These filter beds are said to have been much improved since Dr. Bruce Low's Report in 1895.

At the present time, from below up, they consist of

Perforated bricks	4½	inches
Gravel	6	,,
Shingle	2	,,

acting as a foundation for

Coarse Sea Sand	8	,,

Next, as we ascend

Rock Graded Sand...	10	,,

(this is made by actually crushing a friable variety of local red sandstone, and is graded in 5 layers, 2 inches each, the finer being the more superficial).

Fine Sea Sand	18	inches
Rock Graded Sand (2 grades)	5	,,
Coarse Sea Sand (roughing filter)... ...	15	,,

These filters are cleaned whenever bacteriological examination shews this to be necessary ; this is done by removing the top to the depth of one inch or so, washing and aerating it and then replacing it.

Another method is to lay a heavy rope over the filter bed, its ends being held by workmen on opposite sides of the bed, standing not on the sand but on the adjacent walls.

The workmen, as they move simultaneously from one end of the filter to the other, trail the rope over the surface of the sand, removing inequalities, disturbing its surface, and aerating it.

By this means the sand is not fouled by the workmen's boots or their careless habits. This method has now been discarded.

There are 6 filters, one of which has been added since the date of Dr. Bruce Lowe's Report. This is much deeper than the others, keeping its contents very cool and palatable, and, from its depth said to be less prone to become the site of gross vegetable growth, and consequent difficulties of filtration.

From the filters the water is delivered into a covered pure water tank, from which it is pumped to the top of a water tower 100 feet high (193 feet above ordnance datum), and thence the water is distributed to the City by gravitation.

The pumping engines are engaged roughly 12 to 14 hours daily ; their speed is purposely slow in order to permit of efficient filtration.

When the Tide surmounts the Weir, pumping is stated by the Company to be stopped from both wells until the tide recedes ; the duration of this cessation varies with the tide, and may amount to 6 hours or even more.

The daily consumption is now about 2 million gallons.

The storage capacity ts :—

Unfiltered Water in Reservoir ... $2\frac{1}{4}$ million gallons

Pure Water Supply in Covered Tanks $\frac{3}{4}$,, ,,

The area of the Filter Beds is 70,313 square feet, and is thus 20,000 square feet more than in 1895.

Two automatic regulators are placed on each filter to regulate and equalize the speed of filtration from each into the pure water tank.

The Storage Reservoir is stated to be always cleaned out after a fresh water flood.

Since 1895 the following improvements have been introduced :—

1. The construction and use of one new filter.
2. The use of automatic synchronising regulators on the filters.
3. The sinking of No. 2 Well and the admixture of its water with that derived from the River
4. The Renewal of two Pumping Engines, one each at both the Upper and Lower Works.

When the filters are first brought into use after cleaning the water is run off into a waste culvert until it is deemed to be sufficiently good to put into the pure water tank. The test employed is that of Nesslerising 100 cubic centimetres of the water.

Although the area of Filter Beds is in all 70,313 square feet, yet it is stated by the Company that throughout the year there are generally about 12,000 square feet of this amount out of work almost daily for the purpose of cleaning.

During 1908, the amount of water supplied was 781 million gallons to a population of roughly 55,000, or 14,200 gallons per head of the population.

The rate of filtration was 1·364 gallons per square foot of filtering area per hour, or 2·616 inches per square foot per hour.

The tower for gravity distribution is capable of holding 268,000 gallons.

The Bye-Laws of the Waterworks Company were approved by the Local Government Board on June 22nd, 1908.

The following Clauses, which have a Public Health bearings have been extracted :—

12. A person shall not for conveying, delivering, or receiving water of the Company use any pipe which shall be laid or fixed through, in or into any sewer, drain, ashpit, or manure hole, or through, in, or into any

place where, in the event of the pipe being or becoming unsound the water conveyed through such pipe would be liable to become fouled or to escape without observation.

15. A person shall not cause or suffer any pipe which is used or intended to be used for conveying, delivering, or receiving water of the Company not being a flushing or supply pipe leading from a proper surface or feed system to be connected with the apparatus of any water closet or with any urinal.

22. A person shall not fix, fit, or use any tap or other apparatus for flushing a trough closet with water of the Company, unless such water is supplied by measure.

WATER ANALYSES.

During the year 192 samples of water were bacteriologically examined by the Medical Officer of Health.

These were fortnightly samples taken from the raw river water near the intake, from each of the sand filters at the Waterworks, from the pure water reservoir and from a tap in the town. The tap was not sterilised previous to taking the sample.

GELATIN COUNT—

Raw River Water.

The number of colonies developing at the room temperature on a gelatin peptone medium ranged from 840 in the summer months to over 11,000 in the winter months.

The average for May, June, and July, was 1,100 colonies; the average for December, January and February, 8,110 colonies.

Filter Beds.

These had counts ranging from 1 to 152. Altogether 126 samples were taken. The counts in 98 were below 10, in 117 below 20. There were only 3 counts above 100.

Pure Water Reservoir.

The counts were as follows:—47, 19, 28, 17, 6, 5, 8, 2, 18, 9, 9, 19, 3, 7, 5, 2, 3, 5, 7, 5, 2, 13.

Consumers' Tap.

The actual counts were:—33, 31, 27, 25, 14, 12, 12, 32, 5, 14, 9, 14, 19, 27, 8, 12, 15, 13, 92, 23, 14, 15. The taps were not previously sterilised.

For waters subjected to sand filtration, Koch adopted the following standard :—The gelatin count per cubic centimetre at 20° C. in 96 hours must be less than 100.

The lowness of the numbers in the counts given above show that the Chester water supply is generally of exceptionally good quality.

It is found, however, that, while a small gelatin count may indicate high purity, it does not necessarily follow that a high gelatin count is associated with objectionable pollution. It is the quality, not the quantity of organisms present, which tells of possible danger.

For this purpose, the bacillus coli, which is an inhabitant of the intestine, is used as an index of excremental pollution.

B. Coli.

The raw river waters contained B. Coli in numbers ranging from 2 to 37 per cubic centimetre, on only 4 out of 22 occasions did the numbers exceed 10. On only one occasion did the water from the filter beds contain B. Coli—1 per cubic centimetre.

The water from the consumers' tap, however, contained 1 Bacillus Coli on 4 occasions.

The water taken on January 6th, 1908, contained 1 B. Coli in one of the filters and one in the town's water per cubic centimetre.

This illustrates one of the risks run by river waters submitted to filtration only.

The nine o'clock morning and evening temperatures had been very low on January 2, 3, 4, 5, but on the 6th a thaw set in, and the samples taken on that day contained B. Coli in one of the filters and in the town's water.

Factors which may impair the efficiency of the working of the filter beds are—in winter, frost followed by thaw ; in summer, excessive foliage or excessive grass on the premises of the filtering plant, excessive growth of algae in the filter contents, young eels, sticklebacks, and the larvæ of gnats.

Further risks which may be incurred at all seasons are due to—

1. Cracks in the adjoining ground leading to concealed faults in the filter sides, and forming an avenue for the access of ground pollution.
2. The cleansing of too many filters at one and the same time leading to the overwork of the rest.
3. Carelessness in allowing the contents of filters after cleansing to pass into the pure water tank before chemical and bacteriological tests have shown that this may be safely effected.

   This is sometimes done by inexperienced managers of waterworks. The cleansing of the filter beds is accelerated and their contents are passed quickly into the public service.

   Every filter bed takes a little time after cleansing before it is able to filter efficiently. The development of this state is acccompanied, and in great measure due to the growth on the sand of surface jelly, which acts partly in a mechanical manner, partly biologically.
4. The access of flood water to the fllter beds.
5. Too quick a rate of filtration. This, it is generally considered, should not exceed 4 inches vertical displacement per hour.
6. The employment of workmen on the beds or the works who have ever had typhoid fever, even many years previously.

Many of the above risks may be minimised, if not abolished, by the provision of sedimentation reservoirs for use prior to filtration.

It is of interest, therefore, to note that in the local Press—August 15, 1908, the Chairman of the Company stated "they had had plans before them with the object of the construction of very largely increased storage which would have the effect of tiding them over any difficulty in the matter of an impure river, or floods, or anything else that might happen."

This is distinctly a move in the right direction.

Further, frequent bacteriological examinations are necessary—the raw river water, the water from each one of the filters, from the pure water tank, from the consumers' tap, and possibly from the reservoir also, should all be bacteriologically examined as a routine at least twice a week.

Other examinations should be made in addition whenever special circumstances call for them—*e.g.*, when a thaw has set in after severe frost—circumstances which may bespeak possible failure of the sand filters.

Frequent analyses make for safety, intelligent supervision of the plant, the river, and river banks for freedom from pollution.

Chemical Analyses—

The monthly Chemical analyses of the water for 1908 are given below :—

Date.	Source.	Total Hardness Degrees.	Free Ammonia per Million.	Albuminoid Ammonia per Million.	Chlorine Grains per Gallon.	Quality.
Jan. 16	White Horse Yard ...	8·1	Trace	0·078	1·9	Good
Feb. 1	30, Earls Villas ...	5·8	Trace	0·07	1·4	Good
Mar. 12	Forest House	6·2	Trace	0·064	1·2	Good
April 9	Prince's Court... ...	6·2	Trace	0·078	1·5	Good
May 5	Gee's Court	8·3	Trace	0·088	1·5	Good
June 1	Commercial Court ...	8·3	Trace	0·078	1·5	Good
July 2	Davies' Court	9·4	Trace	0·07	2·5	Good
Sept. 10	Hawarden Castle Entry	6·2	None	0·075	1·7	Good
Oct. 6	Parkes' Court	8·5	Trace	0·07	1·7	Good
Nov. 2	Evan's Court	9·8	Trace	0·07	1·9	Good
Dec. 5	Shepherd's Court ...	6·9	Trace	0·084	1·7	Good

Courts and Old Property.

A new list of Courts and old property was made in 1908 for the fortnightly meetings of the Public Health Committee.

This list contains 130 Courts and groups of buildings which, owing to the conditions of life prevailing in them, the conditions of housing, the people resident in them, or other reasons are considered by the Public Health Committee to call for special supervision and regulation.

Each one is therefore visited at least once a fortnight by one of the Sanitary Inspectors.

In 110 instances these courts have single owners, the other 20 have more than one owner, 14 have two owners, 1 has three owners, 2 have four owners, 2 have five owners, and 1 has six owners.

Valentine's Court, Northgate Street is owned by the Chester Corporation, Farrall's Court, Northgate Street, by the Dean and Chapter, while the Duke of Westminster owns Belgrave Court and Grosvenor Court, both in New Crane Street, and Connah's Court in Handbridge.

Grosvenor Court contains alms houses.

The new list contains 796 houses, of which 62 were empty at the end of the year—some of these were permanently closed, others, 18 in number, were unfit for letting.

During the last 30 years, 50 Courts containing 352 houses have been abolished.

Courts Abolished.

Name of Court.	Situation.	No. of Houses.
Denson's Court	Northgate Street Row	5
Higginson's Court	Northgate Street Row	5
Roberts' Court	Northgate Street Row	4
Williams' Court	Northgate Street Row	3
Ball Court	Upper Northgate Street	4
Egerton Court	Upper Northgate Street	7
Yoxall Court	Goss Street	7
Lamb Court	Crook Street	12
Long Edge	St. Martin's Fields	9

Name of Court.	Situation.	No. of Houses.
Peacock's Court	Linenhall Street	2
Wilkinson's Court	Linenhall Street	6
Hamilton Court	Watergate Street Row	6
Brittain's Court	Watergate Street Row	18
Neild's Court	Castle Street	4
Edwards' Court	Foregate Street	21
Cross Gun Court	Foregate Street	25
Royal Oak Yard	Foregate Street	14
Crown Court	Foregate Street	15
Richmond Court	The Mount	2
Baker's Court	Steam Mill Street	7
Downes' Court	Union Street	10
Deacon's Court	Union Street	17
Eaton Court	Love Street	8
Grosvenor Court	Love Street	3
Eaton Court	Bridge Street Row	2
Roberts' Court	Lower Bridge Street	7
White Bear Court	Lower Bridge Street	6
Pipe Court	St. Olave Street	4
Roberts' Court	St. Olave Street	5
Wilkinson's Court	St. Olave Street	4
Moss Court	Duke Street	4
Nicholas Court	Nicholas Street	5
Edgar Court	Handbridge	4
Bannister's Court	Handbridge	12
Brooke's Court	Handbridge	14
Whooley's Court	Handbridge	14
Edward's Court Brown's Court	Handbridge Handbridge	15
Blower's Court	Cuppin Street	2
Faulkner's Court	Frodsham Street	2
Princess Court	Castle Street	2
Cooke's Court	Watergate Row	3
Waterloo Court	Handbridge	1
Drury's Court	The Newgate	6
Jones' Court	St. John Street	2
Royle's Court	St. John Street	2
Woods' Court	Handbridge	6
Ball's Court (part of)	Foregate Street	8
Carter's Court	Union Street	6
White Alley	George Street	2

The last seven on this list containing 32 houses were done away with in 1908.

During the same interval the following courts have been pulled down, one of them in part only, and new houses erected on the sites :—

Name of Court.	Situation.	No. of Houses.
Brittain's Entry	Watergate Row	5
White Horse Yard	Foregate Street	6
Cross Gun Court	Foregate Street	30
Puppet Show Entry	Watergate Row	6
Copperas Court	Greenway Street	7
Edgar Court	Handbridge	2
Brown's Court Edward's Court	Handbridge	13

The following Courts have been improved at an estimated cost of £6,500 :—

Name of Court.	Situation.
Valentine's Court	Northgate Street
Davies' Court	King Street
Stone Court	Trinity Street
Davies' Court	Steam Mill Street
Banner's Court	Princess Street
Jonas' Court	Princess Street
Boden's Court	New Crane Street
Horton's Court	The Kaleyards
Jones' Court	Greenway Street
Harrison's Court including Bishop Lloyd's Palace	Watergate Street Row
Coleclough's Court	Watergate Street Row
Rathbone Place	Watergate Street Row
Ball Court	Foregate Street
Lower Yard Herbert's Court White Lion Yard	Crook Street
Connah's Court	Handbridge
Dutton's Court	The Headlands
Allen's Court	The Headlands
Puppet Show Entry	Watergate Street Row
Unity Place	Lower Bridge Street
Deva Place	Lower Bridge Street

Name of Court.	Situation.
Broad Entry	Handbridge
Jones' Court	Handbridge
Parry's Entry	Foregate Street
Union Court	Cuppin Street
Martin's Court	Watergate Row
Lewis' Court	Back Thomas Street
White Horse Yard	Foregate Street

Although these Courts have been improved, it does not necessarily follow that the improvement is in every case final and of a high sanitary order, or that further improvement is not called for. It is hoped in a future Report to deal with this question at much fuller length.

A report has been made on the housing conditions of White Lion Yard and Herbert's Court, and negotiations are now proceeding between the Council and the owner.

In addition there are 18 Courts where action may be possible in respect of housing at an early date. A closing order was obtained for the common lodging house in Hawarden Castle Entry on August 5th, 1908.

HOUSE INSPECTION AND DRAIN TESTING.

The Council in June, 1908, authorised the Sanitary Inspectors to inspect and test the drains of a house at the request of a householder for a minimum fee of five shillings, to cover the cost of the materials used.

Ten houses were examined and reported upon for fees varying from five to fifteen shillings and defects of construction found in all save one. These were subsequently remedied.

CHESTER SEWAGE DISPOSAL WORKS.

These are situated at Sealand, on the right bank of the Dee, at a distance of about one mile from Chester Cross.

The first sewage works are said to have been built in 1874, and consisted of—

2 Low level rectangular tanks.

2 High level rectangular tanks.

And a number of mud lagoons for drying the sludge drawn off from the tanks.

The sewage was treated with lime, passed into the low level tanks where sedimentation took place, and thence into the river.

When the tide prevented this passage, the sewage after passing through the low level tanks was pumped into the high level tanks, and from there escaped into the Dee.

The old engine plant consisted of—

2 Lancashire steam boilers.

2 Horizontal condensing steam engines driving 4 centrifugal pumps. (Total H.P. = 100).

1 Liming engine and lime mixer.

Experiments were made from time to time with small filters containing diverse materials, and also with various chemicals.

1890. About 1890 a filter 4 feet deep was built at the river end of the high level tanks. It was small and very frequently clogged up.

1898. In 1898 a new scheme was adopted to deal with 1,500,000 gallons daily. The dry weather flow was estimated to be 1,399,890 gallons, this number being apparently based on the population to be served at 30 gallons per head. The scheme was approved by the Local Government Board, and the new works were completed in 1905.

1905. The new works consisted of—

1. One new pump well.
2. Three suction gas producers with engines and pumps.
3. One distributing tower.
4. Two automatic revolving screens (dismantled in 1906).
5. Two large upward flow circular tanks, containing a layer of clinkers 21 inches thick extending downward from the water surface.

The capacity of each was 140,000 gallons.

They were practically sedimentation tanks and in some degree septic and anærobic.

The clinkers were removed in 1907, making the tanks now open settling chambers.

6. Ten small secondary upward flow circular tanks containing a layer of clinkers 3 feet 6 inches thick extending downwards from the water surface.

The capacity of each was 70,000 gallons.

The sludge from all the tanks may be removed at any time, without disturbing the working of the filters, by means of a perforated radial arm, revolving in a circular direction just above the tank base, and attached to a central shaft descending vertically along the axis line of the tank.

7. Ten primary high level percolating filters fed intermittently by Candy Whittaker Revolving Sprinklers. The depth of each filter was 3 feet 8 inches, and the area 220 square yards.

These filters held graded clinkers.

8. Ten secondary low level filters, similar to 7. The middle two feet held polarite and clinker; the surface and bottom contained graded clinker.

These low level filters were connected to the old high level tanks on the old works whence there is an outlet by open culvert to the Dee.

The new works cost roughly £70,000, and were started in March, 1905. The tanks were worked as septic tanks. Some of the inhabitants of the neighbourhood complained of the offensive smell, and in view of these complaints septic treatment was abandoned.

Later it was judged advisable to work only a few of the tanks, but, after six months working, the lower 10 filters ponded, and the new works were shut down to clean the filters, and simultaneously the revolving screens were dismantled.

In March, 1906, the dry weather flow of sewage was determined. Gaugings over 12 consecutive days shewed the average daily flow to be 2,117,000 gallons.

The new works were re-started in April, 1906.

The rate of treatment was 1 million gallons per 24 hours ; the rest of the sewage was treated with lime and sent through the old works.

The filtered effluent gave very good analytical results, but the tanks did not arrest sufficient solid matter, but allowed it to be discharged on to the filters. The 10 lower filters consequently ponded up, and the works were again stopped in November, 1906.

The filters were restarted later, and experiments have since been conducted on the new works with chemicals—Lime and Copperas—before settlement and filtration since May, 1907.

A control was obtained by passing part of the sewage of the new works untreated through the filters.

It was found that very good results were obtained by using 3½ grains of Lime and Copperas per gallon.

Later, it appeared that the advantage of chemical precipitation on the new works was not sufficient to justify its continuance, and it was stopped.

Experiments were still continued, and promised well.

The following are fair average analyses (1907). The figures represent parts per 100,000 :—

	Crude Sewage.	Effluent from Tanks.	Effluent Single Filtration.
Suspended Solids...	30·51	9·2	2·26
Chlorine	9·09	8·31	7·95
Free and Saline Nitrogen	3·36	2·95	0·07
Albuminoid Nitrogen	·630	·372	0·074
Oxygen absorbed (4 hrs. at 80°F.) ...	7·30	3·61	0·91
Nitric Nitrogen	...	...	1·96

In the above no chemical treatment was used; the two following analyses refer to chemical treatment (1907).

	Tank Effluent.	Single Filtration Effluent.
Suspended Solids	5·91	3·23
Chlorine	8·46	7·98
Free and Saline Nitrogen ...	2·88	·459
Albuminoid Nitrogen	·279	·083
Oxygen Absorbed...	2·76	·93
Nitric Nitrogen		1·68

The crude sewage figures refer to average hourly samples taken daily from 9 a.m. to 8 p.m.

The figures for tank and filter effluents are also those of hourly samples taken daily from 9 a.m. to 8 p.m., but do not, although taken simultaneously with the crude sewage, correspond in point of time with the crude sewage.

For example, the filter effluent at any given time corresponds to raw sewage, which had entered the works many hours previously.

At this period a fixed quantity of sewage was passing on to the tanks and filters.

The sludge from the old works is scooped by manual labour into troughs, and conducted into lagoons containing ashes, and fresh grass is placed on its surface.

The sludge from the tanks is run through the radial arms into a long trench, one of which was employed in this way daily for eight months, and was very successful.

1908.

The present daily dry weather flow is about 2¼ million gallons.

The method of treatment is as follows :—

The cutfall sewer enters the works below the ground level by an invert 5 feet below ordnance datum.

The sewage passes directly into two low level rectangular tanks below the level of the adjoining ground, having a combined capacity of 75,000 gallons.

The sewage is stated to be 45 minutes in passing through these tanks.

From here it passes by gravity into a pump well, whence it is pumped to a distributing tower to the height of 32 feet, and is then conveyed by a rising main to the measuring chamber on the new works.

On the new works are the two large circular tanks 18 feet deep, already described, and the smaller tanks 16½ feet deep.

The sewage passes through these tanks, which are practically sedimentation chambers, and is said to take 9 hours in so doing.

The tanks have flat floors, and are worked in parallel.

The sludge deposited by sedimentation is removed daily by radial slotted pipes attached to vertical axial shafts, one in each tank. These radial arms are situated just above the tank floors, and may be made to revolve in a horizontal plane.

After passing through the tanks the sewage passes into a single channel or large aqueduct which feeds 10 filters—high-level filters 5 on each side of the channel.

The effluent from each set of 5 high-level filters is discharged into a secondary channel or small aqueduct, whence it passes through a second set of filters, the low-level filters, of which there are five on each side.

So that altogether there are 10 high-level and 10 low-level filters, one large aqueduct, and two small aqueducts.

The filters are circular, and have Candy Whittaker revolving sprinklers.

The high-level filters contain clinkers.

In 1908 the clinker and polarite were removed from some of the low-level filters and replaced by broken granite.

The filters at present are unable to treat the whole of the sedimentation tank effluent on the new works. The excess passes away by an overflow pipe placed near the commencement of the large aqueduct.

The final filter effluent later joins the overflow tank effluent just mentioned, and this mixed effluent passes through the two high-level rectangular tanks on the old works (capacity 200,000 gallons), and thence by open water course and a short "race" to the Dee.

The amount of sewage treated in the circular tanks on the new works is 2¼ million gallons, of which 1¼ million gallons receive further treatment on the filters.

The remaining one million gallons are removed by the aqueduct overflow in the manner mentioned above.

The 10 high-level filters treat 750,000 gallons daily, that is at the rate of 340 gallons per square yard, and 280 gallons per cube yard daily.

It is expected that when the 10 low-level filters have been renewed they will treat 500,000 gallons daily.

The sludge is disposed of in two ways.

1. It is pumped into lagoons, allowed to become dry, and then given to farmers, who cart it away.
2. It it pumped into a long trench, near the recently "made bank," and allowed to percolate into the sandy soil.

Pumping Plant—

The gas pumping plant consists of 3 centrifugal pumps (8, 10, and 12 inches) driven by gas engines and producer plants.

In addition there is a steam plant, now only used as a stand by.

Experimental Treatment.

From July, 1907 until May, 1908, the tanks and filters were divided into two equal sections—to one of which was applied Chester sewage previously treated with chemical precipitants—while to the other section was conveyed sewage merely settled and not chemically treated. Thus :—

a. 375,000 gallons sewage daily were mixed with lime and copperas and allowed to deposit for 13 hours in 3 tanks and were then sprinkled over 5 filters.

b. 375,000 gallons sewage were treated daily by sedimentation alone for 13 hours in 3 tanks and then sprinkled over 5 filters.

The tanks and filters used in these experiments were of similar size and construction.

From July, 1907 to May, 1908, the results in parts per 100,000 were as follows :—

	Crude Sewage	Settled Sewage.	Settled Sewage Filtrate	Chemically Precipitated Sewage.	Chemically Precipitated Sewage Filtrate.
Suspended Solids	19·9	9·66	5·12	5·84	3·74
Chlorine ...	—	8·6	8·1	8·7	8·1
Free and Saline N.	—	2·86	0·19	2·82	0·34
Albuminoid N. ...	—	0·372	0·123	0·252	0·091
Do. Settled	—	—	0·052	—	0·044
Oxygen absorbed 4 hours 80°F.	4·86	3·59	1·41	2·46	0·97
Do. Settled	—	—	0·73	—	0·58
Nitric N. ...	—	—	1·81	—	1·75

The Crude Sewage figures represent an average of the day sewage taken hourly from 9 a.m. to 8 p.m., and of the night flow from 9 p.m. to 8 a.m.

Difficulties were encountered in connection with the adjustment of the proper amounts of lime and copperas to be added—and occasionally there appeared to be too much lime in the tank effluent.

The sludge from the chemical treatment was about twice as much as that obtained by sedimentation only, it was more glutinous, and removed with greater difficulty from the tanks.

In June, 1908, chemical treatment was discontinued, and until the end of the year tank sedimentation and simple filtration substituted.

In this month all the sewage was pumped on to the new works, passed through the circular sedimentation tanks, and partly on to the filters, the excess being removed by the large aqueduct overflow.

The results obtained (June, 1908, to May, 1909) are as follows:—

Part per 100,000.	Crude Sewage.	Tanks Effluent.	Filter Effluent.	Final Effluent.
Suspended Solids	23·23	10·75	5·84	6·65
Chlorine	7·7	7·8	7·9	7·9
Free and Saline N.	2·87	2·67	0 65	—
Albuminoid N.	0·576	0·371	0·140	—
Do. Settled	—	—	0·063	—
Oxygen absorbed 4 hrs. 80° F.	6·05	3·70	1·61	2·14
Do. Settled	3·70°	3·18°	0·74	—
Nitrate N.	...	...	1·38	0·20
Dissolved Oxygen disappearing from solution of filtered filter affluents in	24 hours.	48 hours.	5 days.	
	·154	·271	·785	

* Two months' average.

At this time the sewage passing on to the filters was constant, to the tanks, variable.

These results refer to the averages for 24 hours.

The dissolved oxygen figures show that the final effluent is well within the standard proposed by the Royal Commission.

Much of the information embodied in the above Report has been supplied by the kindness and courtesy of Mr. Scouller, B.Sc., Superintendent of the Chester Sewage Works.

Chester Isolation Hospital.

During the year 303 cases were admitted to the Isolation Hospital, Sealand, as compared with 323 for the previous year. They were distributed as follows:—

Local Authorities.	Scarlet Fever.	Diphtheria.	Typhoid Fever.	Totals.
Chester City	141	82	12	235
Chester Rural D.C.	11	9	0	20
Hoole	4	16	2	22
Tarvin, Tarporley, and Malpas ...	11	13	0	24
Hawarden R.D.C. (private patients)	0	2	0	2
Totals	167	122	14	303

Seventeen cases were treated in hospital by their own doctors, the rest, 286, by the Medical Officer of Health.

Revision of Diagnosis.

In some cases the patients after admission and a few days' observation were found to have other diseases in addition to the ones for which they were notified, and in a few other cases the diagnoses were revised.

Scarlet Fever.

Thus 6 cases notified as Scarlet Fever were found to have on admission Diphtheria (3 cases) and Chicken Pox (3 cases).

Four suspicious cases of Scarlet Fever removed for isolation and observation were found to have German Measles (1 case) and no obvious disease (3 cases).

Diphtheria.

Eight cases of Diphtheria were found after admision to have Scarlet Fever as well.

One case of Diphtheria suffered also from Measles.

In 8 cases the diagnosis was revised and instead of Diphtheria the following substituted:—Tonsillitis 5 cases, Scarlet Fever 2 cases, Syphilis 1 case.

Typhoid Fever.

Three cases notified as Typhoid Fever and removed for isolation and observation were found later to be cases of Phthisis, Tuberculous Meningitis and Nephritis.

MORTALITY.

Scarlet Fever.

165 cases. 6 deaths. Mortality 3·63 per cent.

Diphtheria.

114 cases. 10 deaths. Mortality 8·77 per cent.

Typhoid Fever.

14 cases. 2 deaths. Mortality 14 28 per cent.

Two deaths were due to Phthisis, and to Tuberculous Meningitis.

Illness amongst the Staff.

Eight of the staff were warded for the following diseases and affections :—

Diphtheria 1, Measles 1, Dyspepsia 1, Herpes and Impetigo Contagiosa 1, Abscess of Breast 1, Tonsillitis 2, and Haemorrhoids 1. All recovered.

In addition others were treated but not warded for Anaemia, Neuralgia, and other minor ailments.

The admission of mixed cases, of cases suffering from one infectious disease and incubating another still continues to give rise to great, very great difficulties of accommodation and administration.

Some provision to meet this difficulty is necessary and the Public Health Committee have been carefully going into the matter.

Changes in the Staff—

Dr. J. R. Currie, of Glasgow, was appointed Assistant Medical Officer of Health.

Miss A. Townend, of Kettering, was appointed Lady Sanitary Inspector and Health Visitor.

Both these appointments were rendered necessary by the very large amount of work entailed in the Medical Inspection of School Children, which began in September, 1908.

In bringing this review of the year's work to a close, I wish to thank the Council and the Public Health Committee for their willing help, their encouragement and support, and the officials of the Health Department and of the other Departments for their kindly assistance and co-operation.

I am, Gentlemen,

Your obedient servant,

A. E. THOMAS.

CITY AND COUNTY

TABLE I.—Vital Statistics of Whole

Year.	Population estimated to Middle of each Year.	Births.		Total Deaths Registered in the District.				otal Deaths in Public Institutions in the District.
				Under 1 Year of Age.		At all Ages.		
		Number.	Rate.*	Number.	Rate per 1,000 Births registered.	Number.	Rate.*	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1898	38484	1103	28·6	189	171	784	20 4	119
1899	38600	1049	27·2	172	164	732	19·0	87
1900	38717	1092	28·2	157	143	684	17·7	50
1901	38834	1037	26·7	189	182	729	18·8	58
1902	38951	1054	27·0	119	113	618	15·9	89
1903	39075	1064	27·2	131	123	630	16·1	95
1904	39129	1044	26·7	135	129	596	15·2	86
1905	39250	1066	26·8	136	127	682	17·3	108
1906	39325	1063	27·0	160	150	690	17·5	112
1907	39420	1015	25·7	113	111	629	15 8	109
Averages for years 1898-1907.	38978	1058	27·1	150	141	677	17·3	91
1908	39515	981	24·8	118	120	616	15·5	105

* Rates in Columns 4, 8, and 13 calculated per 1,000 of estimated population.

NOTE.—The deaths to be included in Column 7 of this Table are the whole of those registered during the year as having actually occured within the district or division. The deaths to be included in Column 12 are the number in Column 7, corrected by the subtraction of the number in Column 10 and the addition of the number in Column 11.

By the term "Non-residents" is meant persons brought into the district on account of sickness or infirmity, and dying in public institutions there; and by the term "Residents" is meant persons who have been taken out of the district on account of sickness or infirmity, and have died in public institutions elsewhere.

BOROUGH OF CHESTER.

District during 1908 and previous years.

Deaths of Non-residents registered in Public Institutions in the District. (10)	Deaths of Residents registered in Public Institutions beyond the District. (11)	Nett Deaths at all ages belonging to the District. Number. (12)	Rate.* (13)	I. Institutions within the District receiving sick and infirm persons from outside the District.	II. Institutions outside the District receiving sick and infirm persons from the District.	III. Other Institutions, the deaths in which have been distributed among the several localities in the District.
41	76	819	21·3	Chester General Infirmary	Chester Workhouse, Hoole	H.M. Prison, Knutsford
31	66	767	19·9	Chester Isolation Hospital	Cheshire County Asylum, Upton	Mill Road Infirmary, Liverpool.
28	71	727	18·8		Middlesbrough Asylum, Yorks.	
27	52	754	19·4		Parkside Asylum Macclesfield	
36	62	644	16·5		Nottingham Asylum	
41	69	658	16·8		Rainhill Asylum	
39	78	635	16·2		Prestwich Asylum	
44	68	706	17·9		Royal Albert Asylum, Lancaster.	
37	54	707	17·9			
41	62	650	16·5			
36	65	706	18·1			
53	70	633	16·02			

The "Public Institutions" to be taken into account for the purposes of these Tables are those into which persons are habitually received on account of sickness or infirmity, such as hospitals, workhouses, and lunatic asylums.

Area of District in acres (exclusive of area covered by water).....2,862.

Total population at all ages.....38,309
Number of inhabited houses 7,948
Average number of persons per house..... 4·8
} At Census of 1901.

CITY & COUNTY BOROUGH OF CHESTER.

TABLE II.—Vital Statistics of Separate Localities in 1908 and previous years.

Year.	Castle Sub-District.				Cathedral Sub-District.			
	Population estimated to middle of each year. (a)	Births registered. (b)	Deaths at all Ages. (c)	Deaths under 1 year. (d)	Population estimated to middle of each year. (a)	Births registered. (b)	Deaths at all ages. (c)	Deaths under 1 year. (d)
1901 ...	20392	588	390	118	18442	449	364	71
1902 ...	20456	593	359	71	18495	461	285	48
1903 ...	20520	572	365	65	18548	472	293	66
1904 ...	20584	584	323	72	18601	450	312	63
1905 ...	20621	597	390	79	18629	469	316	60
1906 ...	20666	583	404	92	18659	480	303	68
1907 ...	20716	564	347	64	18704	451	303	49
Averages of Years 1901 to 1907	20565	583	368	80	18582	461	310	60
1908 ...	20766	525	324	66	18749	456	309	52

Notes.—*(b)* Deaths of residents occurring in public institutions beyond the district are included in sub-columns *(c)* of this Table, and those of non-residents registered in public institutions in the district excluded.

(c) Deaths of residents occurring in public institutions, whether within or without the district, are allotted to the respective localities according to the addresses of the deceased.

CITY AND COUNTY BOROUGH OF CHESTER.

TABLE III.—Cases of Infectious Disease notified during the Year 1908.

Notifiable Disease.	Cases Notified in Whole District.							Total Cases notified in each Locality.		No. of Cases Removed to Hospital from each Locality.		
	At all Ages.	At Ages—Years.						Castle District.	Cathedral District.	Castle District.	Cathedral District.	Total cases removed to Hospital.
		Under 1.	1 to 5.	5 to 15.	15 to 25.	25 to 65.	65 and upwards.					
Small-pox	...	...	...	...	...	...	...	...	...	...	H	...
Cholera	...	...	...	...	...	...	...	...	...	...	...	...
Diphtheria (including Membranous Croup)	104	...	23	62	11	8	...	57	47	40	41	81
Erysipelas	23	...	2	1	3	16	1	10	13	2	...	2
Scarlet Fever	167	...	47	109	8	3	...	92	75	77	66	143
Typhus Fever...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric Fever	23	...	...	10	5	8	...	8	15	5	10	15
Relapsing Fever	...	...	...	...	...	...	...	...	...	...	...	...
Continued Fever	...	...	...	...	...	...	...	...	...	...	...	...
Puerperal Fever	2	...	...	...	...	2	...	1	1	...	1	1
Plague...	...	...	...	...	...	...	...	...	...	...	...	...
Totals	319	...	72	182	27	37	1	168	151	124	118	242

Table IV.—Causes of, and ages at, Death during Year 1908.

CAUSES OF DEATH.	Deaths at the subjoined Ages of "Residents" whether occurring in or beyond the District.							Deaths in or belonging to localities (at all ages).		Total Deaths whether of "Residents" or "Non-Residents" in Public Institutions in the District.
	All ages.	Under 1 year.	1 and under 5.	5 and under 15.	15 and under 25.	25 and under 65.	65 and upwards.	Castle District.	Cathedral District.	
Small-pox	...	...	...	...	...	...	...	...	...	...
Measles	12	2	8	2	...	...	...	6	6	...
Scarlet Fever	6	...	5	1	...	...	...	3	3	5
Hooping-cough	11	5	6	...	...	...	...	7	4	...
Diphtheria (including Membranou Croup	7	...	4	3	...	...	...	3	4	10
Croup...	...	...	...	...	...	...	...	...	...	...
Fever { Typhus	...	...	...	...	...	...	...	...	...	...
Fever { Enteric	2	...	...	...	...	2	...	...	2	4
Fever { Other continued	...	...	...	...	...	...	...	...	...	...
Epidemic Influenza...	14	...	2	...	...	9	3	10	4	1
Cholera	...	...	...	...	...	...	...	...	...	...
Plague...	...	...	...	...	...	...	...	...	...	...
Diarrhœa (see notes at foot) ...	19	19	...	...	...	...	...	10	9	...
Enteritis („ „) ...	6	...	2	...	...	3	1	2	4	...
Puerperal Fever („) ...	1	...	...	...	...	1	...	...	1	1
Erysipelas	...	...	..	...	...	...	...	...	...	...
Phthisis (Pulmonary Tuberculosis)	44	...	1	1	8	34	...	28	16	3
Other Tuberculous Diseases ...	30	5	13	7	3	2	...	17	13	10
Cancer—Malignant Disease. (See notes at foot)	39	1	...	...	...	23	15	16	23	8

Bronchitis	55	14	4	1	1	14	21	31	24	4
Pneumonia	33	10	10	1	...	9	3	24	9	2
Pleurisy	...	...	...	...	...	...	...	...	...	...
Other Diseases of Respiratory Organs	2	...	1	...	...	1	...	1	1	...
Alcoholism } Cirrhosis of Liver }	16	...	...	...	...	14	2	6	10	2
Venereal Diseases	4	1	...	...	...	3	...	2	2	1
Premature Birth	27	27	...	...	...	...	...	15	12	...
Diseases and Accidents of Parturition	4	...	...	...	1	3	...	3	1	...
Heart Diseases	67	1	1	2	3	32	28	26	41	3
Accidents	18	1	4	4	1	6	2	11	7	16
Suicides	...	...	...	...	...	...	...	...	...	...
Marasmus and Inanition	17	15	2	...	...	...	...	8	9	1
Convulsions	13	11	2	...	...	...	...	7	6	...
Bright's Disease and Cerebral Hæmorrhage	70	...	...	...	...	41	29	37	33	7
Old Age	60	...	...	...	...	...	60	26	34	1
All other causes	56	6	3	1	4	24	18	26	30	26
All causes	633	118	68	23	21	221	182	325	308	105

NOTE.—Under the heading of 'Diarrhœa" are to be included deaths certified as from diarrhœa, alone or in combination with some other cause of ill-defined nature ; and also deaths certified as from

Epidemic enteritis ;
Zymotic enteritis ;
Epidemic diarrhœa. Summer diarrhœa ;
Dysentery and dysenteric diarrhœa ;
Choleraic diarrhœa, cholera, cholera nostras.

Under the heading of "Enteritis" are to be included those certified as from Gastro-enteritis, Muco-enteritis, and Gastric catarrh, unless from information obtained by enquiry from the certifying practitioner or otherwise, the Medical Officer of Health should have reason for including such deaths, especially those of infants, under the specific term "Diarrhœa."

Deaths from diarrhœa secondary to some other well-defined disease should be included under the latter.

Under the headings of "Cancer" and "Puerperal Fever" should be included all registered deaths from causes comprised within these general terms.

City and County Borough of Chester.

Table V.—Infantile Mortality during the Year 1908.

CAUSE OF DEATH.		Under 1 Week.	1-2 Weeks.	2-3 Weeks.	3-4 Weeks.	Total under 1 Month.	1-2 Months.	2-3 Months.	3-4 Months.	4-5 Months.	5-6 Months.	6-7 Months.	7-8 Months.	8-9 Months.	9-10 Months.	10-11 Months.	11-12 Months.	Total Deaths under One Year.
All Causes	Certified	18	12	8	5	43	6	8	17	7	8	8	1	2	7	4	7	118
	Uncertified	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Infectious Diseases	Small-pox	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Chicken-pox	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Measles	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	2
	Scarlet Fever	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Diphtheria: Croup	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Whooping Cough	..	..	..	..	..	..	..	..	..	1	..	..	..	2	1	1	5
Diarrhœal Diseases	Diarrhœa, all forms	..	1	..	2	3	..	2	7	2	2	1	..	..	2	..	..	19
	Enteritis *(not Tuberculous)*	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Gastritis, Gastrointesinal Catarrh	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wasting Diseases	Premature Birth	13	7	5	..	25	2	..	..	..	..	..	..	..	..	..	..	27
	Congenital Defects	2	1	..	..	3	..	1	..	..	..	..	..	..	..	..	..	4
	Injury at Birth	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Want of Breast Milk	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Atrophy, Debility, Marasmus	..	2	1	..	3	2	3	2	1	..	2	..	..	1	1	..	15
Tuberculous Diseases	Tuberculous Meningitis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Tuberculous Peritonitis: Tabes Mesenterica	..	..	..	..	..	..	..	1	..	1	1	..	..	..	..	1	4
	Other Tuberculous Diseases	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1
	Erysipelas	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Syphilis	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1
	Rickets	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Meningitis *(not Tuberculous)*	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Convulsions	3	..	1	..	4	..	2	3	..	..	1	..	..	..	..	1	11
	Bronchitis	..	..	..	2	2	1	..	2	2	1	1	..	2	1	1	1	14
	Laryngitis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Pneumonia	..	..	..	1	1	..	..	1	1	1	2	1	..	..	..	3	10
	Suffocation, overlaying	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1
	Other Causes	..	..	1	..	1	..	..	..	1	2	..	..	..	..	..	..	4
		18	12	8	5	43	6	8	17	7	8	8	1	2	7	4	7	118

Births in the year—Legitimate, 946; illigitimate, 35.
Deaths in the year of legitimate infants—110; of illigitimate infants—8.

Population: Estimated to middle of 1908—39,515.
Deaths from all Causes at all Ages—633.

FACTORIES, WORKSHOPS, LAUNDRIES, WORKPLACES and HOMEWORK.

1.—INSPECTION.

Including Inspections made by Sanitary Inspectors or Inspectors of Nuisances.

Premises.	Number of		
	Inspections.	Written Notices.	Prosecutions.
Factories ... ... (Including Factory Laundries).	25	3	0
Workshops ... ... (Including Workshop Laundries).	294	7	0
Workplaces ... ... (Other than Outworkers' Premises, included in Part 3 of this Report).	0	0	0
Total	319	10	0

2.—DEFECTS FOUND.

Particulars.	Number of Defects.			Number of Prosecutions.
	Found.	Remedied.	Referred to H.M. Inspector.	
Nuisances under the Public Health Acts:—				
Want of cleanliness	21	20	0	0
Want of ventilation	2	1	0	0
Overcrowding	2	2	0	0
Want of drainage of floors	0	0	0	0
Other Nuisances...	8	7	0	0
Sanitary accommodation — insufficient	7	4	0	0
Sanitary accommodation — unsuitable or defective	7	5	0	0
Sanitary accommodation — not separate for sexes...	1	1	0	0
Offences under the Factory & Workshop Act	3	1	1	0
Total	51	41	1	0

3.—OTHER MATTERS.

Class.	Number.
Matters notified to H.M. Inspectors of Factories:—	
Failure to affix Abstract of the Factory and Workshop Act (s. 133) ...	1
Action taken in matters referred by H.M. Inspector as remediable under the Public Health Acts, but not under the Factory and Workshops Act (s. 5.) — Notified by H.M. Inspector ...	8
Action taken in matters referred by H.M. Inspector as remediable under the Public Health Acts, but not under the Factory and Workshops Act (s. 5.) — Reports (of action taken) sent to H.M. Inspector	8
Other	0
Underground Bakehouses (s. 101):—	
Certificates granted during the year	0
In use at the end of the year	4
Homework:—	
List of Outworkers (s. 107):—	
Lists received from Employers	17
Lists of Addresses of Outworkers received from other Councils ...	2
Number of Inspections of Outworkers' Premises	36
Outwork in unwholesome premises (s. 108). — Instances	0
Outwork in unwholesome premises (s. 108). — Notices served ...	0
Workshops on the Register (s. 131) at the end of the year	165