

1887.

BOROUGH OF CARDIFF.

---

REPORT

ON THE

Sanitary Condition of Cardiff

FOR THE YEAR 1886,

BY

H. J. PAINE, M.D.,

MEDICAL OFFICER OF HEALTH. URBAN AND PORT SANITARY AUTHORITIES.

MEMBER OF THE EPIDEMIOLOGICAL SOCIETY, EXTRA URBAN MEMBER OF THE METROPOLITAN

ASSOCIATION OF OFFICERS OF HEALTH.

---

PRINTED BY ORDER OF THE URBAN SANITARY AUTHORITY.

---

Cardiff:

PRIOR & BAILEY, PRINTERS.

CARDIFF,

FEBRUARY, 1887.

TO THE  
Cardiff Urban Sanitary Authority.

---

GENTLEMEN,

In my report for 1885 I detailed at some length the sanitary history of Cardiff during the preceding forty years. The subject possessed an interest from the circumstance that in the earlier years the town was in a deplorable insanitary condition, due, in a great measure, to the inability of the authorities to deal with this evil, and it was only when the urgency of the case pressed itself on the attention of the legislature, that enactments were passed creating corporate bodies for the purpose of carrying out measures necessary for the protection of the public health, that sanitation could be effectively adopted.

A reference to that report will shew that between the years 1846 and 1855, three serious epidemics prevailed, each attended with an alarming mortality; the death-rate exceeding, as it had for some time, 32 per 1,000 population. In 1849 it was 51·7 and in 1854, 41·1.

In 1855, when the first sanitary operation (drainage) was made available, the mortality sensibly and progressively diminished, a result which continued in proportion as sanitary measures were carried out, this is shewn by the mean death-rate of the successive decennial periods:—

Ten years ending	1854,	32·7	per 1,000
"	"	1864,	26·7 "
"	"	1874,	23·6 "
"	"	1884,	20·0 "

The object I had in view in this history was to point out that immediately any unusual amount of mortality came under my notice, or on the outbreak of any epidemic, a careful enquiry was instituted for the purpose of ascertaining whether any local predisposing or exciting causes of diseases existed, the degree to which they might influence the prevalence of such epidemic, and the measures taken to meet the exigency, also the apparent success that followed the latter, that, as a reference, the experience of the past might afford useful information to be followed in the future.

With these preliminary remarks I now submit for your consideration my Report on the state of the public health during 1886, as indicated by the mortality and sickness coming under my observation during that year, and all matters directly or collaterally bearing on the subject.

The Cardiff Urban Sanitary District comprises an area of 8,409 acres; of these, 2,791 constitute St. Mary and St. John, Cardiff; 2,270 Canton, and 3,348 Roath. These are exclusive of that portion covered with water. It is, however, necessary that in each report upon the sanitary condition of the town made to your Board certain essentials connected with it should be recapitulated, as these from time to time exercise an undoubted influence on the health of the inhabitants. Cardiff, unlike most other towns, has no suburbs in the ordinary acceptance of the term; the whole of the houses cover a well-defined area of 1,252 acres, 2 roods, and 13 perches, distributed as follows:

	A.	R.	P.		A.	R.	P.
Canton,	308	0	23	Roath,	551	1	32
Grangetown,	69	2	20	Cardiff,	323	1	18

Each main thoroughfare has parallel and lateral streets to its extreme end. The town is built on a flat; its southern portion has a subsoil of marine clay; the northern, marl or gravel. The main trunk sewers of the central or Cardiff district follow a course from north to south as far as Herbert Street; in this street the southern portion of the drain, namely, from the Bute Dock district, converge, and together they pass through Tyndall Street to the outfall on the East Moors, in this course receiving the main trunk sewers from the Roath district, except on the eastern end of that district where a new system has been constructed. This new system passes across the Rumney Moors, terminating at the outfall before mentioned. The Canton district has a separate system of sewerage, also following a course from north to south, discharging itself at the estuary of the river Taff, on its western side. In former reports I have pointed out that the lateral sewers connected with each main trunk have very low gradients.

As the birth and death-rates of a locality are based on its estimated population, it is very important it should be as accurate as possible. The Registrar General, in his estimate, bases it on the mean annual increment of the decennial period intervening between the last and the previous census, adding this to each subsequent year. This formula is strictly applicable to the Kingdom as a whole, as, with the exception of emigration or immigration, there will be nothing to disturb the induction, but as the number of emigrants in each year varies but little, it is unnecessary to take these into consideration. When, however, this formula is applied to some individual localities it may fail. An increase of population in a large majority of localities may simply be due to the excess of births over deaths, and certainly so in agricultural districts; but there are a few towns where—besides this natural increase—disturbing causes intervene and contribute a very large addition; as where the rapid development of commercial and other industries attract new comers, and I considered Cardiff to be one of these exceptional towns. I recently reported this explanation to your Board, and by your direction this communication was transmitted to the Registrar General and the following reply was received:—

“General Registrar’s Office,  
“Somerset House, 7th Jan., 1886.

“Sir,

“With reference to recent correspondence respecting the Registrar General’s estimate of the present population of Cardiff, and the return of the inhabited houses of the Borough of Cardiff in each of the five years of 1881-5 with which you recently favoured him; I am desired to inform you, that on the hypothesis that the rate of increase of population in the Borough since 1881 has been the same as that which prevailed between 1871 and 1881, the estimate for the middle of 1886 is 100,736. On the other hand, if the population since 1881 has increased at the same rate as the inhabited houses on the rate-books of the Borough between 1881 and 1885, a somewhat doubtful hypothesis, the estimate would become 114,631; this is probably nearer the correct number. A note will therefore be added to the Registrar General’s Returns for 1886, stating that the death-rate as calculated on the usual basis is probably overstated to the extent of about one-eighth.

“I am, Sir,

“Your obedient Servant,

“W. OGLE, M.D.,

“Superintendent of Statistical Department.”

“J. L. WHEATLEY, Esq.,

“Town Clerk, Cardiff.”

With the view of determining how near the larger estimate is to the actual population, I may state that the average number of inmates to each house, based on the three census returns 1861, 1871, and 1881, are relatively 6.25 and 6.75. I therefore obtained from the Assistant Overseers of the several parishes comprised in the Cardiff District a Return of the number of houses assessed to

the poor on the 30th June last; these were as follows: Parish of St. John's, 4,208; St. Mary's, 4,153; Roath, 4,878, and Canton, 4,009. Multiplying these by 6.25 gives a total 107,800 population proper. To these add 7,000, the mean of floating population, and it gives a total of 114,800.

In November, that is nine months afterwards, I caused my annual census of houses to be made by your Inspectors, the result being as follows:—

	Inhabited,	Vacant.	Building.	Total.
Parish of St. John's	4202	140	22	4364
"    St. Mary's	4172	80	43	4279
"    Roath	5078	183	204	5465
"    Canton	4372	203	123	4698
Total...	17,824	606	392	18,806

The Registrar General in his Weekly Returns computes his birth and death rate on the hypothetical formula applicable to the Kingdom as a whole. This is necessary, as if he altered his calculation in exceptional towns it would be necessary he should take into consideration each individual town, and this would lead to great embarrassment. But to each of these weekly returns he introduces the following foot-note (alluded to in his letter). "The population of each of the 28 towns is estimated on the hypothesis that the rate of increase in the last intercensal period has been maintained since 1881. There are, however, reasons (derived from the number of inhabited houses on the rate books) to believe that by this method the populations of Leicester, Salford, and Bradford are over-estimated, and that those of Nottingham, Newcastle-upon-Tyne, and Cardiff are under-estimated. If this be the case, it would follow that the death-rates given above for Leicester, Salford, and Bradford are under-stated, and those for Nottingham, Newcastle-upon-Tyne, and Cardiff, over-stated."

In this Report I shall calculate the births and death-rates on the two estimates of population.

1st. On Registrar General's hypothetical formula applicable to the Kingdom.	} 100,736
2nd. On Registrar General's special hypo- thetical formula applicable to Cardiff.	

These two estimates cannot be placed too prominently before your notice, as, if the yearly increase of population exceeds 6,000 instead of 2,588—the mean of the previous decennial period, the apparent high death-rate will become enormously increased every year until 1891, when a new census will be taken.

Density of population is usually taken into consideration when dealing with public health. The average number of inmates to

each house varies from 6.25 to 6.75, that of ordinary towns being less than 5. This circumstance might be taken to indicate overcrowding. It is, however, not necessary it should be the case here, inasmuch as the houses occupied by the working classes (for an obvious reason being built on lease tenure, and to enable the occupier to meet his rent charge) are so constructed as to afford accommodation for two or more families; they are also loftier than in other towns. Each street has a minimum breadth of 40 feet, varying according to circumstances to 60 feet, and whenever a plan of a new house is submitted to your Board for approval, an uncovered portion of the entire area, equal to  $\frac{4}{9}$ ths, is required; hence the means of ventilation in front and behind is available, and overcrowding need not obtain. Unfortunately, in this town, there exists a class population, consisting of Irish labourers. This class numbers about 13,000, a very large proportion of them being labourers little removed from mendicancy. The number of houses tenanted by this class exceeds some 1,300; they are in groups, and form distinct centres scattered throughout the district. I may instance Stanley Street, Love Lane, and Mary Ann Street, etc., in one part of Cardiff; Pendoylan Street, Thomas Street, William Street, Ellen Street, and Tyndall Street in another; also several Courts, such as Landore Court, Carpenter's Arms Court, and Union Buildings; Shakespeare Street and Milton Street on the Northern side of Roath; John Street and Helen Street on the South side; Harvey Street and Halkett Street in Canton, and the Streets on the upper part of Grangetown. In these streets there always exists a danger of over-crowding, as an extensive practice prevails that the occupier of the house, for the purpose of deriving a profit to increase his otherwise limited means of subsistence, sublets apartments or takes in lodgers, and when such is the case the evils associated with over-crowding, such as want of cleanliness and ineffective ventilation result. Formerly, zymotic diseases spread throughout these houses. It therefore became necessary to appoint a staff of Inspectors to carry out a constant supervision over these houses, and this is persistently maintained with immense advantage. This system is thus carried out:—Each inspector is required to attend at my house early every morning, bringing with him a special report of the duties in this respect discharged by him during the previous 24 hours.

For your information I enclose one of these reports:—

MORNING REPORT of Inspector of Lodging-Houses and  
Nuisances to Officer of Health.

November 18th, 1886.

Street.	No	Name of Occupier.	Number of Families.	INMATES.			Remarks.
				Adults.	Children.	Total.	
Helen	1	A. Llewellyn	1	2	4	6	Clean
"	3	J. Cochlan	1	2	3	5	"
"	5	T. Flenning	2	4	2	6	"
"	7	J. Evans	1	2	5	7	Flags in yard broken
"	9	T. Christopher	1	2	1	3	Clean
"	11	M. Walters	2	4	2	6	"
"	13	M. Collins	1	2	3	5	"
"	15	J. Devaney	1	2	3	5	Syphon in W.C. broken
"	17	H. Afley	1	2	5	7	Clean
"	19	M. Clennan	1	2	1	3	"
"	21	W. Inson	2	4	1	5	"
"	23	E. George	2	4	2	6	"
"	25	E. Brain	2	4	4	8	"
"	27	E. White	2	4	6	10	Flags in wash house broken
"	29	T. Grant	2	4	5	9	Clean
"	31	M. Candy	2	4	3	7	"
"	33	H. Lloyd	2	4	4	8	Stench trap broken
"	35	J. Nankmore	1	2	4	6	Dirty yard
"	37	D. Sullivan	1	2	4	6	Clean
"	39	M. Williams	1	2	2	4	Water closet choked
"	41	E. James	2	4	6	10	"
"	43	W. Murphy	1	2	6	8	Clean
"	45	W. White	1	2	4	6	Syphon in W.C. broken
"	47	W. Woods	1	2	2	4	Clean
"	49	J. Cumming	1	2	5	7	Dirty W.C. pan
"	51	Mrs. Hill	2	4	5	9	Clean
"	53	H. White	1	2	7	9	"

Signed, A. E. LEYSHON,

Inspector, Roath District.

All defects and nuisances described under the heading "Remarks," are thus dealt with:—In the case of the ordinary nuisances, a notice is served upon the occupier requiring him immediately to abate them, but where structural or defective sewer arrangements are required to be carried out, a notice is served on the owner. In either case, unless these notices are complied with within a reasonable time prescribed, ulterior proceedings are instituted. The firm action taken by the Magistrates to assist your executive has eventuated with great advantage. Within the last year only two proceedings against the occupier and one against the owner have been necessary, and in these cases penalties have been inflicted.

The rapid increase of new houses that take place every year enables your officials to prevent over-crowding without hardship. The number of plans for new houses submitted to your board for approval and passed, are, in

1881	...	904	1884	...	1445
1882	...	686	1885	...	1345
1883	...	980	1886	...	1201

#### THE RAINFALL.

The rainfall during the year 1886, as observed by Mr. W. ADAMS, C.E., F.G.S., at his residence, Cambridge House, Park Place, Cardiff, is shewn by the subjoined table :

Latitude, N,	51 deg., 9 min. 10 sec.
Longitude, W.,	3 deg., 9 min. 55 sec.
Diameter of Receiver of Guage,	5 inches.
Height above sea level,	43 feet.



### RAINFALL. TABLE No. 1.

The following table shows the monthly rainfall, the greatest fall in 24 hours, with date, and the number of days on which 0·01 in. or more rain fell:—

Month.	Total Depth.	Greatest fall in 24 hours.	Date.	Days on which 0·01 inches or more fell.
	Inches.	Inches.		
January ...	5·03	0·91	30th	23
February ...	1·32	0·62	28th	11
March ...	3·97	0·68	20th	13
April ...	2·98	0·73	7th	15
May ...	6·38	1·52	31st	19
June ...	0·70	0·28	1st	7
July ...	4·85	0·71	29th	17
August ...	1·68	0·44	9th	9
September ...	4·08	0·75	4th	14
October ...	5·09	0·87	15th	21
November ...	5·39	1·03	5th	21
December ...	6·64	1·33	26th	21
	48·11			191

### TABLE No. 2.

The following is the rainfall for the year 1886, as compared with six previous years:—

Month.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
January ...	·87	·92	3·19	5·75	6·03	3·71	5·03
February ...	3·88	4·81	2·56	3·73	4·40	3·65	1·32
March ...	1·90	3·88	2·26	0·60	3·39	1·87	3·97
April ...	1·98	1·44	5·68	0·67	1·56	2·52	2·98
May ...	1·45	2·62	2·72	1·90	2·37	3·86	6·38
June ...	2·38	3·59	4·28	1·81	1·92	2·61	0·70
July ...	6·64	2·62	5·77	3·56	4·05	0·72	4·85
August ...	·77	6·94	6·75	2·09	2·21	2·74	1·68
September	3·67	2·09	3·94	6·14	1·96	6·51	4·08
October ...	4·94	3·23	8·33	4·23	1·01	5·59	5·09
November	3·67	4·98	6·26	6·38	2·12	5·47	5·39
December..	6·70	4·50	4·86	1·92	5·87	1·74	6·64
	38·85	41·62	56·60	38·78	36·89	40·99	48·11

The average rainfall of the six previous years was 42·29; that of the present year 48·11, or 5·82 above the average.

The Meteorological Observations of the year were as follows :— The month of JANUARY was wet, cold, and cloudy, with occasional snow. The winds were very variable, North winds preponderating. There were 15 days when the temperature was at or below  $32^{\circ}$ . The barometer oscillated very much; its highest reading was  $30\cdot141$  inches, on the 12th; the lowest,  $29\cdot015$  inches, on the 18th, the mean of the month being  $29\cdot623$  inches. The highest temperature registered was  $51^{\circ}\cdot1$  on the 3rd; the lowest,  $25^{\circ}\cdot2$ , on the 19th. The mean of maximum was  $41^{\circ}\cdot2$ , the mean of minimum  $32^{\circ}\cdot8$ , the mean of month,  $37^{\circ}$ . This was somewhat below the average of the previous five years. The mean reading of hygrometric dry bulb was  $36^{\circ}\cdot2$ , the wet bulb,  $35^{\circ}\cdot2$ . There were 23 days when  $0\cdot01$  inches or more of rain fell. The greatest fall in 24 hours was  $0\cdot91$  inches on the 30th. The total rainfall of the month was  $4\cdot503$  inches. The total deaths registered from all causes in the Urban Sanitary District of Cardiff during the four weeks ending 30th January were 180. The deaths from the seven chief zymotic diseases, 18. The per centage of deaths from zymotic diseases to total deaths being 10.

FEBRUARY was cold, also dull and cloudy, but with occasional sunshine. The dominant winds were East. There were 13 days when the temperature was at or below  $32^{\circ}$ . The barometer was steady; it was highest on the 9th, its reading then being  $30\cdot623$  inches; it was lowest on the 1st, its reading then being  $29\cdot264$  inches; the mean of the month,  $30\cdot077$ . The maximum temperature in the shade was  $47^{\circ}\cdot7$  on the 13th, the minimum,  $25^{\circ}\cdot6$ ; the mean of maximum,  $40^{\circ}\cdot0$ ; the mean of minimum,  $31^{\circ}\cdot2$ ; the mean of month  $35^{\circ}\cdot6$ . The mean of hygrometric dry bulb was  $34^{\circ}\cdot6$ , the mean of wet bulb,  $33^{\circ}\cdot6$ . There were eleven days on which  $0\cdot01$  inches or more rain fell. The greatest fall in 24 hours was  $0\cdot62$  inches, on the 28th. The total rainfall of the month was  $1\cdot32$  inches. The total deaths from all causes during the four weeks ending 27th February were 196, from the zymotic 16, the per centage of zymotic to total deaths,  $8\cdot1$ .

MARCH was fine during the first week, it then became somewhat dull and cloudy with occasional sunshine, but cold throughout the whole of the month, the winds being Easterly. The barometer was fairly high and steady, its highest reading,  $30\cdot330$ , on the 11th, the lowest,  $29\cdot244$ , on the 5th, the mean of the month  $29\cdot894$ . The temperature was highest on the 24th, it then being  $62^{\circ}\cdot7$ , its minimum,  $21^{\circ}\cdot7$  on the 7th; the mean of maximum  $46^{\circ}\cdot1$ , of minimum  $35^{\circ}\cdot4$ ; the mean of month,  $40^{\circ}\cdot7$ . There were 16 days when the temperature was at or below  $32^{\circ}$ . The mean of hygrometric dry bulb,  $40^{\circ}\cdot1$ , of wet bulb,  $38^{\circ}\cdot4$ . There were 13 days on which  $0\cdot01$  or more rain fell. The greatest fall in 24 hours was on

the 20th, it then being 0·68 inch; the total rainfall of the month was 3·97 inches. The total deaths from all causes during the five weeks ending April 3rd, were 264; from the zymotic, 16; the per centage of zymotic to total deaths, 6·0.

The mean of temperature for the quarter at Cardiff, as compared with Greenwich, is as under:—

Month.	Cardiff.	Greenwich.	Above.	Below.
January	37 <sup>o</sup> ·0	36 <sup>o</sup> ·1	1 <sup>o</sup> ·2	
February	35 <sup>o</sup> ·6	33 <sup>o</sup> ·7	1 <sup>o</sup> ·9	
March	40 <sup>o</sup> ·7	39 <sup>o</sup> ·6	1 <sup>o</sup> ·1	
Mean of Quarter	37 <sup>o</sup> ·7	36 <sup>o</sup> ·5	1 <sup>o</sup> ·4	

APRIL. The weather was variable, with frequent storms and with occasional bright sunshines. East and West winds alternately prevailed. The barometer still continued high and steady. Its highest reading 30·24 in. on the 14th, the lowest 29·157 in. on the 8th; the mean of month 29·864 in. The highest temperature, 70<sup>o</sup>·6, was registered on the 27th; the lowest, 32<sup>o</sup>·3, on the 11th; the mean of maximum, 56<sup>o</sup>·1; the mean of minimum, 47<sup>o</sup>·7; the mean of month, 48<sup>o</sup>·4. The mean of hygrometric dry bulb, 47<sup>o</sup>·3; of wet bulb, 44<sup>o</sup>·4. There were 15 days on which 0·01 in. or more rain fell. The greatest fall in 24 hours was 0·73 in. on the 7th. The total rainfall of the month was 2·98 in. The total deaths from all causes during the four weeks ending May 1st were 142, from the zymotic 14, the per centage of zymotic to total deaths, 9·8.

MAY was bright and fine during the first week, it then became dull, continuing so more or less during the remainder of the month. The winds were variable, East and West preponderating. The barometer was high and steady, its highest reading, 30·390 in., on the 5th; its lowest, 29·104 in., on the 13th; the mean of month, 29·882. The maximum temperature was 71<sup>o</sup>·1 on the 9th; the minimum, 32<sup>o</sup>·7, on the 1st; mean of maximum, 61<sup>o</sup>·1; mean of minimum, 45<sup>o</sup>·2; mean of month, 53<sup>o</sup>·1. The mean of hygrometric dry bulb, 53<sup>o</sup>·6; of wet bulb, 50<sup>o</sup>·0. There were 19 days on which 0·01 in. or more rain fell. The greatest fall in 24 hours was 1·52 in. The total rainfall of the month was 6·38. The total deaths from all causes during the four weeks ending May 29th, were 148; from the zymotic, 13; the per centage of zymotic to total deaths, 8·7.

JUNE was bright and sunny, also unusually dry, West winds more or less prevalent. The barometer was high and steady, its highest reading, 30·225 in., on the 30th; its lowest, 29·065 in., on the 15th; mean of month, 29·942 in. The maximum temperature was 78<sup>o</sup>·8 on the 19th and 29th; the lowest, 45<sup>o</sup>·3, on the 15th;

the mean of maximum,  $67^{\circ}3$ ; the mean of minimum,  $50^{\circ}3$ ; the mean of month,  $58^{\circ}8$ . The mean of hygrometric dry bulb,  $59^{\circ}5$ ; of wet bulb,  $54^{\circ}6$ . There were seven days on which  $0\cdot01$  in. or more rain fell. The greatest fall in 24 hours,  $0\cdot28$  in., on the 1st. The total rainfall,  $0\cdot70$  in. The total deaths from all causes during the five weeks ending July 3rd were 170; from the zymotic, 14; the per centage of zymotic to total deaths, 8·2.

Month.	Cardiff.	Greenwich.	Above.	Below.
April	$48^{\circ}4$	$46^{\circ}4$	$2^{\circ}0$	...
May	$53^{\circ}1$	$53^{\circ}3$	...	$0^{\circ}2$
June	$58^{\circ}8$	$57^{\circ}8$	$1^{\circ}0$	...
Mean of Quarter	$53^{\circ}4$	$52^{\circ}5$	$1^{\circ}0$	

JULY was a very warm month; the early part, viz., up to the 9th, was very fine, after this the weather was unsettled. West winds prevailed throughout the whole of the month. The barometer was fairly steady, its highest reading,  $30\cdot292$  in., was on the 3rd; its lowest,  $29\cdot448$  in., on the 26th; mean of month,  $29\cdot890$  in. The maximum temperature,  $82^{\circ}6$ , was registered on the 4th; the minimum,  $43^{\circ}5$ , on the 28th; the mean of maximum,  $71^{\circ}0$ ; of minimum,  $55^{\circ}0$ ; the mean of month,  $63^{\circ}0$ . The mean of hygrometric dry bulb,  $63^{\circ}5$ ; of wet bulb,  $58^{\circ}5$ . There were 17 days on which  $0\cdot01$  in. or more rain fell. The greatest fall in 24 hours was  $9\cdot71$  in. on the 29th. The total rainfall of the month being  $4\cdot85$  in. The total deaths from all causes during the four weeks ending July 31st were 176; from the zymotic, 25; the per centage of zymotic to total deaths, 19·8.

AUGUST was also a dry month and very warm, the prevailing winds being still West. The barometer oscillated frequently, but was upon the whole high, its highest reading being  $30\cdot201$  in. on the 20th; its lowest,  $29\cdot310$  in. on the 16th; mean of month,  $29\cdot931$  in. The maximum temperature,  $79^{\circ}9$ , was registered on the 30th; the minimum,  $45^{\circ}0$  on the 3rd and 19th; the mean of maximum,  $70^{\circ}9$ ; of minimum,  $54^{\circ}9$ ; the mean of month,  $62^{\circ}9$ . The mean of hygrometric dry bulb,  $62^{\circ}5$ ; of wet bulb,  $58^{\circ}9$ . There were only nine days on which  $0\cdot01$  in. or more rain fell. The greatest fall in 24 hours was  $0\cdot44$  in. on the 9th. The total rainfall of the month was  $1\cdot68$  in. The total deaths from all causes during the four weeks ending August 28th were 184; from the zymotic, 64; the per centage of zymotic to total deaths, 34·7.

SEPTEMBER also continued warm, the weather being somewhat changeable until the 12th, when it became very fine, continuing so until the 24th, after this the weather was unsettled. The winds were very variable, West winds, however, were in

excess until the 13th, then Easterly. The barometer was high and steady throughout the whole of the month, its highest reading being 30·538 in. on the 16th; its lowest, 29·738, on the 1st; mean of month, 30·105 in. The maximum temperature was 72° on the 14th; the minimum, 40°·8 on the 24th; the mean of maximum, 63°·8; of minimum, 51°·4; the mean of month, 57°·6. The mean of hygrometric dry bulb, 58°·2; of wet bulb, 55°·0. There were 14 days on which 0·01 in. or more rain fell. The greatest fall in 24 hours was 0·75 in. on the 4th. Total rainfall for month, 4·08. Total deaths from all causes during the five weeks ending October 2nd, 256; from the zymotic, 77; the per centage of zymotic to total deaths, 30·0.

Month.	Cardiff.	Greenwich.	Above	Below.
July	63°·0	63°·0	...	...
August	62°·9	62°·0	0°·9	...
September	57°·6	58°·7	...	1°·1
Mean of Quarter	61°·1	61°·2	0°·3	

✶ OCTOBER was a wet month, the preponderating winds were East. The barometer fluctuated a good deal, its highest reading 30·36 in. on the 30th; its lowest, 26·642, on the 16th; mean of month, 29·681. The highest temperature was 71°·8 on the 4th; the lowest, 37°·8, on the 22nd; the mean of maximum, 56°·2; of minimum, 48°·5; mean of month, 52°·3. The mean of hygrometric dry bulb, 52°·1; of wet bulb, 50°·6. There were 21 days on which 0·01 in. or more rain fell, the greatest fall being 0·87 in. on the 15th. The total rainfall of month, 5·09 in. The total deaths from all causes during the four weeks ending October 30th were 165; from the zymotic, 17; the per centage of zymotic to total deaths, 10·3.

NOVEMBER was a wet month, winds more or less Westerly. The weather was somewhat cold and damp. The barometer was unsteady, its highest reading, 30·712 in., on the 24th; its lowest, 29·141 in., on the 9th; mean for the month, 29·606 in. The maximum temperature was 56°·7, on the 2nd; the minimum, 34°·0 on the 8th; the mean of maximum, 48°·8; of minimum, 41°·3; the mean of month, 45°·0. The mean of hygrometric dry bulb, 45°·2; of wet bulb, 43°·8. There were 21 days on which 0·01 in. or more rain fell. The greatest rainfall in 24 hours was 1·03 in. on the 5th. The total rainfall of month, 5·39 in. The total deaths from all causes during the four weeks ending November 27th were 156; from the zymotic, 11; the per centage of zymotic to total deaths, 7·0.

DECEMBER was damp and cold, West winds again prevailed more or less throughout the whole of the month. The barometer fluctuated very much, its highest reading, 30.56 in., on the 31st; its lowest, 28.572 in., on the 8th; mean of month 29.702. The maximum temperature, 52.6, was registered on the 6th; the minimum, 22.8 on the 31st; the mean of maximum, 42.2; of minimum, 33.3; mean of month, 37.7; the temperature was at or below 32° on 11 days. The mean of hygrometric dry bulb, 37.3; of wet bulb, 36.5. There were 21 days on which 0.01 in. or more rain fell; the greatest fall in 24 hours being 1.33 in. on the 26th. The total rainfall of month, 6.64 in. The total deaths from all causes during the five weeks ending January 1st were 232; from the zymotic, 20; the per centage of zymotic to total deaths, 8.6.

Month.	Cardiff.	Greenwich.	Above.	Below.
October	52 <sup>o</sup> .3	53 <sup>o</sup> .3	...	1 <sup>o</sup> .0
November	45 <sup>o</sup> .0	44 <sup>o</sup> .0	1 <sup>o</sup> .0	...
December	37 <sup>o</sup> .7	36 <sup>o</sup> .5	1 <sup>o</sup> .2	...
Mean of Quarter	45 <sup>o</sup> .0	44 <sup>o</sup> .6		

TABLE No. 3.

The temperature of the year as compared with that of the previous five years.

Month.	1881.	1882.	1883.	1884.	1885.	Mean of 5 years.	1886.
January ...	32 <sup>o</sup> .1	42 <sup>o</sup> .1	40 <sup>o</sup> .5	44 <sup>o</sup> .5	38 <sup>o</sup> .5	39 <sup>o</sup> .5	37 <sup>o</sup> .0
February ...	39 <sup>o</sup> .6	43 <sup>o</sup> .6	42 <sup>o</sup> .2	42 <sup>o</sup> .0	44 <sup>o</sup> .1	42 <sup>o</sup> .3	35 <sup>o</sup> .6
March ...	40 <sup>o</sup> .7	46 <sup>o</sup> .3	37 <sup>o</sup> .5	45 <sup>o</sup> .7	42 <sup>o</sup> .4	42 <sup>o</sup> .5	40 <sup>o</sup> .7
April ...	47 <sup>o</sup> .7	48 <sup>o</sup> .7	48 <sup>o</sup> .1	45 <sup>o</sup> .4	46 <sup>o</sup> .3	47 <sup>o</sup> .2	48 <sup>o</sup> .4
May ...	55 <sup>o</sup> .0	52 <sup>o</sup> .5	52 <sup>o</sup> .5	52 <sup>o</sup> .7	49 <sup>o</sup> .9	52 <sup>o</sup> .5	53 <sup>o</sup> .1
June ...	57 <sup>o</sup> .4	56 <sup>o</sup> .2	57 <sup>o</sup> .4	58 <sup>o</sup> .6	59 <sup>o</sup> .2	57 <sup>o</sup> .6	58 <sup>o</sup> .8
July ...	62 <sup>o</sup> .1	60 <sup>o</sup> .1	58 <sup>o</sup> .4	59 <sup>o</sup> .8	63 <sup>o</sup> .1	60 <sup>o</sup> .7	63 <sup>o</sup> .0
August ...	58 <sup>o</sup> .7	60 <sup>o</sup> .2	60 <sup>o</sup> .0	63 <sup>o</sup> .1	59 <sup>o</sup> .1	60 <sup>o</sup> .2	62 <sup>o</sup> .9
September	56 <sup>o</sup> .0	54 <sup>o</sup> .3	56 <sup>o</sup> .9	59 <sup>o</sup> .8	51 <sup>o</sup> .3	55 <sup>o</sup> .7	57 <sup>o</sup> .6
October ...	47 <sup>o</sup> .3	50 <sup>o</sup> .3	50 <sup>o</sup> .1	49 <sup>o</sup> .4	45 <sup>o</sup> .4	48 <sup>o</sup> .5	52 <sup>o</sup> .3
November	49 <sup>o</sup> .7	44 <sup>o</sup> .1	43 <sup>o</sup> .8	43 <sup>o</sup> .8	44 <sup>o</sup> .0	45 <sup>o</sup> .1	45 <sup>o</sup> .0
December	41 <sup>o</sup> .1	40 <sup>o</sup> .3	41 <sup>o</sup> .2	41 <sup>o</sup> .7	38 <sup>o</sup> .8	40 <sup>o</sup> .6	37 <sup>o</sup> .7

TABLE NO. 4.

The following is a Monthly Summary of the Meteorological Observations recorded during the year:—

MONTH.	BAROMETER.			THERMOMETER.						HYGROMETERS.		TOTAL RAINFALL.
	Highest.	Lowest.	Mean of Month.	Maximum.	Minimum.	Mean of Max.	Mean of Mth.	Mean of Month.	No. of days at or below 32 deg.	Mean of Dry Bulb.	Mean of Wet Bulb.	Inches.
January	Date. 12. 30°141"	Date. 18. 29°015"	29°623"	Date. 3. 51°°1	Date. 19. 25°°2	41°°2	32°°8	37°°0	15	36°°5	35°°2	5°03
February	9. 30°623"	1. 29°264"	30°077"	13. 47°°7	10. 25°°6	40°°0	31°°2	35°°6	13	34°°6	33°°6	1°32
March	11. 30°331"	5. 29°244"	29°894"	24. 62°°7	7. 21°°1	46°°1	35°°4	40°°7	16	40°°1	38°°4	3°97
April	14. 30°244"	8. 29°157"	29°864"	27. 70°°6	11. 33°°2	56°°1	40°°7	48°°4	0	47°°3	44°°4	2°98
May	5. 30°390"	13. 29°104"	29°882"	9. 71°°1	1. 32°°7	61°°1	45°°2	53°°1	0	53°°0	50°°0	6°36
June	30. 30°225"	15. 29°065"	29°942"	19. 78°°8	15. 45°°3	67°°3	50°°3	58°°8	0	59°°5	54°°6	0°70
July	3. 30°292"	26. 29°448"	29°890"	4. 82°°6	28. 43°°5	71°°0	55°°0	63°°0	0	63°°5	58°°5	4°85
August	20. 30°201"	16. 29°310"	29°931"	30. 79°°9	19. 45°°0	70°°9	54°°9	62°°9	0	62°°5	58°°9	1°68
September	16. 30°538"	21. 29°738"	30°195"	14. 72°°0	24. 40°°8	63°°8	51°°4	57°°6	0	58°°2	55°°0	4°08
October	30. 30°362"	16. 28°642"	29°684"	4. 71°°8	22. 37°°8	56°°2	48°°5	52°°3	0	52°°1	50°°6	5°09
November	24. 30°712"	9. 29°141"	29°606"	2. 56°°7	8. 34°°0	48°°8	41°°3	45°°0	0	45°°2	43°°8	5°39
December	31. 30°562"	8. 28°572"	29°702"	6. 52°°6	31. 22°°8	42°°2	33°°3	37°°7	11	37°°3	36°°5	6°64

TABLE No. 5.—Illustrates the daily Direction of Winds throughout the Year.

Direction of Winds.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
N.W. ...	6	1	1	3	2	4	1	9	1	...	2	3	33
S.W. ...	1	...	3	2	3	3	4	2	7	1	...	2	28
N.E. ...	5	1	1	4	1	2	...	2	6	...	3	1	26
E.N.E. ...	1	1	1	3	1	...	...	2	2	4	3	...	18
N. ...	2	...	...	...	1	...	...	...	2	...	1	1	7
N.N.E. ...	3	2	1	1	...	...	...	2	...	1	2	...	12
S.S.W. ...	1	1	...	...	...	...	...	2	...	2	...	...	6
W.N.W. ...	5	2	1	...	1	1	...	...	...	2	...	...	12
W. ...	3	2	5	7	6	6	19	8	3	4	9	19	91
E. ...	1	13	10	8	7	12	2	1	6	5	1	1	67
S.E. ...	3	4	6	2	3	1	1	...	2	6	1	1	30
S. ...	...	1	1	...	5	1	1	2	1	3	4	1	20
W.S.W. ...	...	...	2	...	...	...	3	1	...	3	4	2	15



TABLE No. 6.

Monthly Deaths and Death-Rate for 1886.

Months.	Mean Tempera- ture.	No. of Deaths.	Death Rate.	Zymotic Deaths.	
				No. of Deaths.	Rate.
January ...	37 <sup>o</sup> .0	180	23.3	18	2.3
February ...	35 <sup>o</sup> .6	196	25.8	16	2.1
March ...	40 <sup>o</sup> .7	264	27.4	16	1.7
April ...	48 <sup>o</sup> .4	142	18.3	14	1.8
May ...	53 <sup>o</sup> .1	148	19.2	13	1.7
June ...	58 <sup>o</sup> .8	170	17.6	14	1.1
July ...	63 <sup>o</sup> .0	176	22.8	35	4.5
August ...	62 <sup>o</sup> .9	184	23.8	64	8.3
September ...	57 <sup>o</sup> .6	256	26.5	77	8.0
October ...	52 <sup>o</sup> .3	165	21.4	17	2.2
November ...	45 <sup>o</sup> .0	156	20.2	11	1.4
December ...	37 <sup>o</sup> .7	232	24.0	20	2.1
TOTAL ...		2269	22.5	315	3.1

## THE DRAINAGE.

The supplementary system of the drains at the eastern end of Roath is now completed, and will be the means of affording a much needed relief to that portion of your district; many houses have already been connected with it. This system, with additional sewers necessary to be constructed in other parts of the town, has been carried out at an expenditure exceeding £28,000 on the year.

In the autumn, great complaints were made owing to offensive exhalations from the ventilating shafts in many of the public thoroughfares. These were occasioned by the congested condition of the main sewers. The absence of storm water, and the limited storage of the reservoir at Llanishen did not afford the means of flushing them sufficiently to pass away their contents, hence this congestion. During the months of June, July, August, and September, there was such a drought that fears were entertained of a water famine, and this necessitated instructions to be issued to householders enjoining a most rigid observance of economy in their expenditure of water; hence the pan and syphon closets adopted in most houses tenanted by the working classes were

constantly found to be in a most unsatisfactory condition as to cleanliness, the syphons being blocked up and other stoppages in the soil-pipe.

To overcome the evils to be apprehended from this escape of sewer gases, various expedients have engaged the attention of your executive; amongst these the construction of furnaces, with the view of causing our street ventilating shafts to be inlets instead of outlets; this has been tried in some districts and has failed; the furnaces have been costly, and their area of operations too limited. Another expedient was the closing of these ventilating shafts and the construction of flues to be placed against the highest building in the most convenient part of each street. These have been found inoperative, as the sewer gases would simply reach a given height there encountering atmospheric pressure, escape of these gases would not be attained.

Happily, your new reservoir at Llanishen (available in November) will enable you to maintain a thorough flushing of your main trunk sewers, and the construction of automatic tanks at the heads of blind or lateral sewers will afford necessary relief to them.

During the year, examination of house sewers has been very rigidly maintained by your Sanitary Inspectors, with the following result:

Table 7. HOUSE INSPECTION.

CARDIFF DISTRICT.

Name of Street.	Number of Houses Inspected.	Defective Drains,	Choked Drains,	W. C. Pans and Syphons Defective.	Defective Stench Traps permitting an escape of sewer gas.	Scullery Sinks connected with Drains.	Inside Closets not ventilated.	Closets not supplied with Water.	Other nuisances.
Augusta Street	52	...	...	8	8	9	...	51	10
Adamsdown Sq.	25	1	...	...	2	10	...	25	...
Bedford Street	102	...	...	2	7	1	...	102	11
Cairns "	57	...	...	...	1	...	...	57	13
Charles "	45	11	...	2	13	19	22	12	4
Coburn "	103	6	2	7	32	11	...	103	22
Crwys Road	26	3	...	1	3	13	...	26	3
Edward Terrace	28	1	...	1	...	15	18	28	...
Eleanor Street	22	...	6	2	4	...	...	22	4
Friends Place	13	...	...	5	3	1	...	13	2
Leason Terrace	7	...	...	...	...	...	...	7	7
Miskin Street	82	1	...	...	5	8	3	82	3
Moira "	33	...	...	2	6	1	...	32	2
Mount Stuart Sq.	56	9	...	3	15	30	23	40	7
North Luton Place	23	...	...	2	3	11	...	23	3
Penarth Terrace	8	...	...	1	...	7	...	7	...
Richmond Road	85	1	...	...	6	27	30	85	2
South Luton Place	28	1	...	...	5	21	...	28	2
Tunnel	8	...	1	...	...	...	...	8	2
Vachell's Terrace	6	...	...	2	1	1	...	6	2
Woodville Road	127	9	4	2	43	15	45	120	13
TOTAL ...	936	43	13	40	157	200	141	877	112

## HOUSE INSPECTION—Continued.

## CANTON DISTRICT.

Name of Street.	Number of Houses Inspected.	Defective Drains.	Choked Drains.	W. C. Pans and Syphons Defective.	Defective Stench Traps permitting an escape of sewer gas.	Scullery Sinks connected with Drains.	Inside Closets not ventilated.	Closets not supplied with Water.	Other Nuisances.
Carpenters Arms Ct	7	...	...	...	...	...	...	4	1
Conway Road	89	...	...	...	1	15	...	10	2
Edmunds Buildings	10	...	...	...	...	...	...	10	...
Ethel Street	60	...	2	2	...	...	...	60	12
Evans Court	3	...	...	...	...	...	...	1	...
Gough Street	49	4	2	1	6	...	...	49	14
Havelock "	34	1	...	4	13	1	...	26	12
" " Grange	26	1	...	4	5	1	...	26	12
Lewis Court	9	...	...	...	...	...	...	9	5
Park Street	31	3	2	3	1	3	...	29	5
Penarth Road	9	...	...	...	1	8	...	9	1
" Terrace	35	3	1	7	11	...	...	35	6
Rising Sun Court	5	...	...	1	...	...	...	4	2
Rowlands Building	7	...	...	1	...	...	...	3	3
South Morgan St.	34	...	2	4	7	...	...	34	4
Temperance Terr.	4	...	...	...	...	...	...	1	1
Thomas "	6	...	...	...	2	...	..	6	1
Stephenson Street	16	...	...	...	1	...	...	16	...
TOTAL ...	434	12	9	27	48	28	...	332	81

## HOUSE INSPECTION—Continued.

## ROATH DISTRICT.

Name of Street.	Number of Houses Inspected.	Defective Drains.	Choked Drains.	W. C. Pans and Syphons Defective.	Defective Stench Traps permitting an escape of sewer Gas.	Scullery Sinks connected with drains.	Inside Closets not ventilated.	Closets not supplied with Water.	Other Nuisances.
Albany Road	30	.	1	...	...	...	...	...	11
Arabella Street	54	...	2	...	3	...	...	54	3
Croft	50	...	1	...	3	...	...	50	7
Cornet	46	...	...	...	6	...	...	46	4
Diamond	70	2	...	4	2	...	...	70	8
Emerald	58	1	2	...	2	...	...	58	7
Harold	52	...	...	2	6	...	...	52	5
James	32	...	...	...	...	30	...	32	...
Mackintosh Place	54	...	2	...	...	...	...	54	3
Metal Street	80	2	...	...	...	...	...	44	4
Oxford	45	1	3	...	...	...	...	45	2
Planet	47	...	1	...	3	...	...	47	6
Ruby	58	...	3	...	2	...	...	58	8
Snipe	16	2	...	...	...	...	...	16	...
Tin	23	2	...	2	...	...	...	23	1
Vere	18	...	...	...	2	1	...	16	3
Walkers Road	17	...	1	...	...	..	...	17	5
Woodville Rd. East	32	...	1	2	1	...	...	32	6
TOTAL ...	782	10	17	10	30	31	...	714	83

## WATER SUPPLY.

As regards the Water Supply, I have on former occasions described this as good in quality. Subjoined is the analyses of that obtained from the Llanishen Reservoir, as also that obtained from the Pumping Station at Ely :—

Description.	Llanishen Reservoir (Filtered).	Ely Pumping Works.
Total solid matter ...	22·8	31·2
Albuminoid ammonia ...	·0085	·006
Free ammonia ...	·0026	...
Nitrogen as Nitrates & Nitrites	·047	·059
Total Nitrogen found ...	·056	·064
Previous sewage or animal con- tamination ...	} ...	slight
Chlorine ...	1·15	1·50
Temporary ...	9·0	15·0
Permanent ...	9·4	11·1
Total ...	18·4	26·1

These analyses shew that it is free from pollution. It is conveyed by the main conduit direct from the filtration beds, and delivered into the service-pipes connected with each house; it, therefore, cannot be contaminated in its course and no means exist of communicating infectious diseases.

For some years it has been exceedingly deficient in quantity. This deficiency has operated during the last two or three years very prejudicially to the public health. Up to the year of 1886 the daily delivery to this and the outlying districts (Penarth, Leckwith, and Llandough,) is about 1,000,000 gallons from the Llanishen Reservoir, and 750,000 gallons from the Ely Pumping Station, making a total of 1,750,000 gallons; this affords a supply of only 14 gallons per head of population.

Dr. PARKES, one of the highest authorities in sanitary matters, states, that to ordinary towns the daily supply should be 25 gallons per head, namely, nine gallons for domestic and 16 for municipal and trades purposes, so that for the latter the present supply afforded to this district, allowing nine gallons for the former, would only give five for the latter, a quantity totally inadequate for such a town as Cardiff, where the low gradients of the sewers require an unusual amount for flushing purposes to keep them free from solid excretal deposits. I have stated in my former reports that the water obtained from the Ely Pumping Station has an excess of hardness, therefore undesirable for washing purposes, and should be utilised only until a less objectionable water could be obtained. In the autumn of the present year your new reservoir at Llanishen was completed; This has a storage capacity equal to 300,000,000

gallons, making with that of the original reservoir, 380,000,000. Allowing 50,000,000 gallons for evaporation, deposition, and other causes, there would be available storage for 330,000,000 gallons.

A large main conduit of 30 inches in diameter has been constructed. Allowing 3,000,000 gallons to be delivered daily, would give 27 gallons per head of population, exclusive of any supply to be obtained from the Ely Pumping Station.

Samples of water have been obtained from six wells and forwarded to the Borough Analyst for examination. Subjoined are his reports; columns being annexed showing the limited impurity standard also a standard of purity.

From these analyses it will be seen they are unfit for (drinking) domestic purposes. Proceedings were therefore taken before the Magistrates, and orders obtained that these should be peremptorily closed.

TABLE No. 8.

Description.	Total Solid Matter.	Albuminoid Ammonia.	Free Ammonia.	Nitrogen as Nitrates & Nitrites.	Total Nitrogen found.	Previous Sewage or Animal Contamination.	Chlorine.	Magnesia Salts.	Hardness.		
									Temporary.	Permanent.	Total.
Sample G, 125	78.40	0.008	0.005	2.302	2.312	22,800	6.95	excessive	5.80	40.20	46.00
" " 126	67.60	0.015	0.0067	1.899	1.916	18,700	9.50	rather excessive	8.25	28.81	37.04
" " 127	113.0	0.016	0.014	4.558	4.5827	45,500	10.75	moderate	13.95	25.65	39.60
" " 128	35.7	0.009	0.0027	1.6380	1.6476	16,000	3.1	moderate	7.20	14.28	21.48
" " 132	96.4	0.012	0.130	4.250	4.3670	43,200	6.40	moderate	13.3	29.6	43.4
" " 133	72.0	0.014	0.005	3.375	3.390	33,400	4.10	moderate	11.6	24.4	36.0
Limit of Impurity Standard	40.0	0.015	0.010	1.00	700	700	3.0		5.0	24.0	29.0
Standard of Purity	20.0	0.004	0.002	0.50	nil	nil	1.5		14.0	3.0	17.0



## THE FOOD SUPPLY.

A careful attention has been paid to the quality and condition of animals slaughtered at the abattoirs in the Roath and Canton cattle markets by those who have charge of these two departments (private slaughter-houses not being permitted in the Borough), and in the event of any carcass presenting an unusual or abnormal appearance, the matter is reported to your Veterinary Inspector, Mr. MOIR, M.C.V.S., whose duty it is to determine whether the appearance is due to disease, or the carcass is in any way unfit for human consumption, so that it can be dealt with accordingly. If the carcass is considered by that officer to be one of an animal suffering from a disease at the time it is slaughtered, and there is a reason to believe the owner was cognisant of this fact, or did not report the same to the manager of the market, proceedings are taken against him. During the past year it has been necessary to take these proceedings only in one instance, and in that case a penalty of £12 and costs was inflicted, or in default, one month's imprisonment. It is also the special duty of one of your Inspectors to visit the Public Market in St. Mary Street every Saturday, and take care that no meat brought into the town from the Rural Districts is unfit for human consumption.

1,155 lbs. of meat have been destroyed during the year, also 20 tons of potatoes, these being unfit for food.

## NOTIFICATION OF DISEASES.

The evils entailed on the public health by reason of non-notification of infectious diseases have been forcibly presented to my mind for many years. Since the establishment of Board Schools in this districts—many of them affording instruction to some hundreds—these evils have increased in a marked manner, from the circumstance that children from infected houses are permitted to continue their daily attendance at these schools, thus carrying with them the germs of infection, spreading broadcast such infantile epidemics as may be at that time prevalent. I have recently reported to your Board a very serious epidemic of measles that suddenly broke out in the sub-district of Grangetown; this district contains a population of 5,987. When my attention was first called to the prevalence of this epidemic I visited the locality. On the occasion of my first inspection, I ascertained that of 78 infected houses there were 27 children from them still continuing their daily studies, and that the epidemic was spreading widely throughout the district. Sanitary precautions were immediately adopted to repress this practice. A notice was served upon the

occupier of every house wherein a case of measles occurred, forbidding school attendance for a time; also an official communication made to the Superintendent of each school, notifying each infected house and the danger to be apprehended if such attendance was permitted. I also made an especial request to the heads of every school throughout the entire district, that the absence of every child from school on account of sickness should be reported to me that I might institute an enquiry as to the nature of such sickness, and, if necessary, take such action as might meet the requirements of the case. I have here to acknowledge the cordial co-operation I have received from these officials, and the success that resulted from these precautions was made manifest by the circumstance that although this epidemic of measles subsequently prevailed throughout the whole of the town, it was greatly diminished in intensity and mortality. The total number of deaths from this disease in Grangetown was 57, or a death-rate of 9.5 per 1,000 inhabitants, while the total throughout the whole town was 26, or a death-rate of 0.2 per 1,000. Satisfactory as were the results of the measures adopted to repress the virulence of the disease, I need hardly point out to you how infinitely greater this would have been if the notification had been made to the Sanitary Authorities immediately on the appearance of the first cases; as the severity of an epidemic is more or less intensified in direct ratio to the degree in which the atmosphere is charged with infective germs of the cases of sickness in a circumscribed area. Similar remarks apply to other infantile epidemics, such as Scarlatina, Whooping Cough, etc., but the advantages to be derived from the notification of infectious diseases is by no means confined to those of early life; like evils have come under my observation when making enquiry into the prevalence of zymotic diseases amongst adults—as Typhus and Typhoid Fevers, Small-pox and Diphtheria.

In 1885 I reported to your Board an outbreak of Typhus Fever in this town. This disease is most infectious, and when introduced into a town it finds a very fertile soil for development in the filth and wretchedness of the overcrowded Irish lodging-houses.

Ireland has been designated the birth-place of Typhus, and in the localities of this town occupied by this class, this possible danger of introduction has always been a source of apprehension, owing to the extensive coasting trade existing between Ireland and Cardiff, and the consequent migration into this town when Typhus prevails to a greater degree in that part of the Kingdom. For some years the careful inspection of their lodging-houses had been attended with great success, that Typhus Fever here was remembered as a thing of the

past; but in 1885, sickness was reported to me in one of the houses in Carpenter's Arms Court. When I visited it, I found the house consisted only of a basement floor and one bedroom, and no through ventilation. Lying on two beds were an adult and seven children suffering from Typhus Fever. No sanitary precautions had been taken, and the ingress and egress of friends and relatives freely permitted. It spread to other houses in the immediate neighbourhood and in other parts of the town, the source of infection being unmistakably traced to the house in Carpenter's Arms Court. So severe was its character, that out of fifty-one cases nine were fatal. Whenever fresh cases were reported, effective measures were adopted to prevent further spreading of the disease with such success that the disease was limited to eleven houses.

There are 45 of the large towns in the Kingdom where notification of infectious diseases has been adopted, and with marked success. This is effected by two systems; one compulsory, as when the occupier of the house is required to notify to the Sanitary Authority immediately any case of infectious disease occurs in his establishment; non-compliance renders him liable to a penalty. This has its advantage. The compulsory notification by the occupier brings to the knowledge of the Sanitary Authority many cases of infectious disease which may be so slight as not to require medical attendance, but may be the means of spreading infection. Compulsory powers are obtained by an Act of Parliament applicable to a particular locality, or under a Provisional Order issued by the Local Government Board, to be subsequently confirmed by the Legislature.

Voluntary notification is obtained by an arrangement to be made with the medical attendant, who receives a small fee for such information. The payment of this fee is economical, as, by it, excessive sickness may be prevented and consequent saving of life. It defines the specific nature of the disease, and the necessity of prompt and immediate action where such necessity exists. Information from such a source is very desirable, and insures the co-operation of the medical attendant, with the precautionary measures to be adopted by the Sanitary Authority. Each, therefore, has its advantages, and I am of opinion that both might be adopted as a dual system.

Closely connected with this part of my report, I have now to direct your attention to the urgent necessity that now exists for making more efficient provision for the treatment of infectious cases. The only provision for such cases at the present time is a temporary wooden building—erected by you—in close proximity to the Seamen's Hospital. It is intended to be utilized for the reception of infectious cases when these occur amongst the shipping,

as well as such in the town, when it is desirable that they should be removed to such an institution. It consists of two wards, each containing only eight beds; it is, therefore, quite inadequate, by reason of its limited accommodation. It is getting out of repair, and, within the last two or three years, I have been greatly embarrassed when the town has been threatened with impending visitations of severe epidemic diseases. This was especially the case when typhus fever (in 1885) broke out in Carpenter's Arms Court. Moreover, it does not afford the means of classification of the sick, and when small-pox is met with in the shipping—a not infrequent occurrence—they are necessarily obliged to be transferred to this institution, and are mixed with other patients not suffering from this disease; and, on more than one occasion, when patients have become convalescent after typhoid fever, they have been attacked with small-pox.

Your Health Committee have for long felt the necessity of erecting a suitable building for the reception of cases of infectious disease, but have been invariably met with the insurmountable difficulty in obtaining an eligible site. I, therefore, suggested to the Chairman of your Committee that an application should be made to Lord Bute for a piece of ground suitable for this purpose. The time appeared to me to be very opportune. The present Seamen's Hospital is a wooden war ship, obtained from the Admiralty in 1866; it is now fast falling into decay. Within the last few months upwards of £300 has been expended in repairs, and from time to time further expenditure in this direction will be needed. This ship has been an inestimable boon to sick seamen and ship owners. It has been maintained almost entirely by voluntary contributions received from vessels frequenting this port. It has been chiefly under the management of a Committee composed of gentlemen connected with the shipping interests, and so carefully and wisely have these gentlemen discharged their duties that they have realised an invested sum of nearly £5,000, due from excess of receipts over expenditure. The necessity for erecting a permanent building for the reception of sick seamen has occupied for some time the attention of these gentlemen. An application was therefore made to Sir William Thomas Lewis (the representative of Lord Bute), and, in reply, Sir William arranged for an interview with the Chairman and Vice-Chairman of your Committee, the same officials of the Seamen's Hospital, Mr. Mc Connachie, Mr. Harpur your Surveyor, and myself. At this interview, the present condition of the Hamadryad Ship was placed prominently before him, and the early necessity of its being replaced by a permanent structure; this he immediately recognized, and suggested that we should visit the ship, as also the wooden building in connection with it, and determine whether any spot in

that neighbourhood would meet our requirements, the result being that a piece of ground close to the Hamadryad was selected. It is about four acres in extent, sufficiently distanced from any houses at the present time, and none would be likely to be built there. It has a southerly aspect with the open sea in front. It only requires its level to be raised, and protected by a sea wall on the south; it is, therefore, a most eligible site. In the event of the Seamen's Hospital being erected there, it would be necessary to make separate provisions for the reception of infectious cases when such occur amongst the seamen. Under these circumstances, should Lord Bute's permission be obtained, it was proposed that an infectious hospital, capable of being used for the shipping as also for the town, should be constructed at the cost of the Local Authorities. I then submitted a block plan for such hospital, based on the pavilion principle, so that one pavilion might be erected with very little delay and soon brought into use, and if the arrangements at present existing between the Local Authorities and the Seamen's Hospital were continued, there would, for the present, be no necessity for an expensive additional staff. Afterwards, should additional pavilions become necessary, these might be added. It also contained provisions for administrative department when such were required. A communication has since been received from Sir William Thomas Lewis, stating that Lord Bute fully approved of the scheme and intimated his generous intention to erect a Seaman's Hospital at his own cost.

### THE MARRIAGES.

The total number of marriages registered from 31st December, 1885, to 31st December, 1886, as furnished by the Deputy-Superintendent Registrar, were—

• At the Established Churches	...	434
" Nonconformist Churches	...	187
" Catholic Churches	...	105
" Synagogue, &c. (Jewish)	...	2
" Registrar's Office	...	516
		<hr/>
TOTAL	...	1,244

### THE BIRTHS.

The total births registered in Cardiff during 1886 were 4,270; of these, 2,202 were males and 2,068 females, showing an excess of 106 births over those of the previous year.

The Births were distributed over the sub-districts as under :—

Quarter ending.	Cardiff.	Roath.	Canton.	Total.	Estimated	Pop. 114,631	28	Of
					population 100,736		Large Town	King- dom
					Birth-rate		per 1,000	
April 3rd	483	367	270	1120	44·4	39·0	34·7	32·3
July 3rd	504	309	242	1055	41·8	36·8	33·1	32·2
Oct. 2nd	469	298	286	1053	41·8	36·7	32·8	30·6
Jan. 1st	436	325	281	1042	41·3	36·3	32·1	29·7
<b>TOTAL</b>	<b>1892</b>	<b>1299</b>	<b>1079</b>	<b>4270</b>	<b>42·3</b>	<b>37·2</b>	<b>33·2</b>	<b>31·2</b>

It will thus be seen that that the birth-rates in Cardiff, according to the two estimates relatively, were 9·1 and 4·0 above that of the large towns, and 11·1 and 10·1 that of the Kingdom.

Its difference would have been still greater had the floating population—estimated as 7,000—been deducted, as this class comprise the average number of seamen constant in this port, whose families reside elsewhere, and, therefore, do not contribute to the population proper.

### THE DEATHS.

The total deaths registered in the Urban Sanitary District of Cardiff during the year was 2,269; of these, 1,280 were males and 989 females. There were 212 fewer deaths registered in this year than last year; these deaths were distributed throughout the sub-districts as follows :—

	Cardiff	Roath	Canton	Total
Winter Quarter ending March	365	185	90	640
Spring " " June	239	145	76	460
Summer " " September	308	168	140	616
Autumn " " December	296	134	123	553
<b>TOTAL</b>	<b>1208</b>	<b>632</b>	<b>429</b>	<b>2269</b>

The births being 4,270 and the deaths 2,269, the excess of births over deaths being 2,001, the per centage of births to deaths is 188; that of the large towns, 158.

I may now explain that in order to determine the status of public health during a given period, it is usual to ascertain the mortality of the district and the proportionate rate this bears to the estimated population, hence, the necessity to which I have alluded, that this estimate should be as close as possible to the actual population.

From time to time during the past year, public attention has been directed to, and some anxiety evinced by, the high death-rate of this district recorded in the weekly returns issued by the Registrar General. Inasmuch as a high death-rate is usually accepted to indicate an insanitary condition of a district, due to the existence of causes preventible or removable, and amenable to a Sanitary Authority. As a general principle this may be accepted as an important factor to be duly considered. It is necessary that the mortality return should extend over a sufficient length of time to be of real value; this necessity arises from the circumstance that the mortality returns are based on the time of registration and not on the date of actual death. Thus, a close registration of deaths occurring during a given week would contrast very unfavourably with the preceding and succeeding weeks, when the registration has been lax. But there are other considerations; a mortality for a prolonged or even indefinite time may be due to causes entirely outside the control of a Sanitary Authority. To enable you to accept this proposition, I insert this table:—

TABLE No. 9.

No.	Week ending.	No. of Deaths	1st. Death-rate as per Registrar General's estimate, 100,736.	2nd. Death-rate as per Reg. Gen. probable population 114,631.	Seven Chief Zymotic Diseases			
					Deaths	Death-rate 100,736,	Death-rate 114,631.	
1	January	9	40	20.7	18.1	8	4.1	3.6
2	"	16	51	26.4	23.1	2	1.0	0.9
3	"	23	48	24.9	21.7	3	1.6	1.3
4	"	30	41	21.2	18.5	5	2.6	2.2
5	February	6	48	24.9	21.7	3	1.6	1.3
6	"	13	56	29.0	25.4	1	0.5	0.4
7	"	20	43	22.3	19.5	6	3.1	2.7
8	"	27	49	25.4	22.2	6	3.1	2.7
9	March	6	52	26.9	23.5	4	2.1	1.8
10	"	13	59	30.6	26.7	4	2.1	1.8
11	"	20	59	30.6	26.7	2	1.0	0.9
12	"	27	51	26.4	23.1	4	2.1	1.8
13	April	3	43	22.3	19.5	2	1.0	0.9
14	"	10	36	18.6	16.3	4	2.1	1.8
15	"	17	30	15.5	13.5	1	0.5	0.4
16	"	24	35	18.1	15.8	3	1.6	1.3
17	May	1	41	21.2	18.5	6	3.1	2.7
18	"	8	33	17.1	14.9	4	2.1	1.8
19	"	15	34	17.6	15.4	3	1.6	1.3
20	"	22	42	21.8	19.0	3	1.6	1.3
21	"	29	39	20.2	17.6	3	1.6	1.3
22	June	5	45	23.3	20.4	3	1.6	1.3
23	"	12	24	12.4	10.8	3	1.6	1.3
24	"	19	37	19.2	16.7	2	1.0	0.9
25	"	26	24	12.4	10.8	1	0.5	0.4
26	July	3	40	20.7	18.1	2	1.0	0.9
27	"	10	43	22.3	19.5	4	2.1	1.8
28	"	17	42	21.8	19.0	6	3.1	2.7
29	"	24	39	20.2	17.6	13	6.7	5.8
30	"	31	52	26.9	23.5	12	6.2	5.4
31	August	7	34	17.6	15.4	12	6.2	5.4
32	"	14	52	26.9	23.5	23	11.9	10.4
33	"	21	49	25.4	22.2	14	7.3	6.3
34	"	28	49	25.4	22.2	15	7.8	6.8
35	September	4	45	23.3	20.4	14	7.3	6.3
36	"	11	59	30.6	26.7	19	9.8	8.6
37	"	18	51	26.4	23.1	16	8.3	7.2
38	"	25	54	28.0	24.4	14	7.3	6.3
39	October	2	47	24.3	21.3	14	7.3	6.3
40	"	9	46	23.8	20.8	3	1.6	1.3
41	"	16	37	19.2	16.7	6	3.1	2.7
42	"	23	33	17.1	14.9	2	1.0	0.9
43	"	30	49	25.4	22.2	6	3.1	2.7
44	November	6	32	16.6	14.5	...	0.0	0.0
45	"	13	47	24.3	21.3	9	4.7	4.0
46	"	20	37	19.2	16.7	1	0.5	0.4
47	"	27	40	20.7	18.1	1	0.5	0.4
48	December	4	34	17.6	15.4	2	1.0	0.9
49	"	11	36	18.6	16.3	2	1.0	0.9
50	"	18	43	22.3	19.5	2	1.0	0.9
51	"	25	51	26.4	23.1	5	2.6	2.2
52	January	1	68	35.2	30.8	9	4.7	4.0



This table gives the weekly returns of mortality for the year, detailing the deaths from all causes, as also the deaths from zymotic diseases, with the two death-rates as given on the authority of the Registrar General; namely, the one based on the hypothetical formula applicable to the general Kingdom; the other, as he states, the most probable one, that on the number of houses rated to the poor in the middle of the year, and the mean of inmates to each house as found to exist at the last census. His weekly returns are, however, based on the first or general formula, hence the high death-rate occasionally recorded for Cardiff. It is, therefore, my duty to direct your attention to such facts as may enable you to determine the degree to which these death-rates indicate an insanitary or sanitary condition of your district. I must, in the first place, refer you to columns four and five contained in this table. It will be found that in column four, the death-rates are given according to the first hypothesis of the Registrar General. In this column there are two well-defined prolonged periods when the death-rates were exceptionally high; and it was to these public attention was called without the explanation given. Certainly, in the first of these two periods, there existed no need for the distrust in the sanitary arrangements, as it clearly shows that a high death-rate may result from causes outside the authority of a Sanitary Board. In this column, during the months of January, February, and March, the death-rates from all causes were exceptionally high, but during these months the death-rates from the zymotic diseases were unusually low; thus, the mean of death-rates from these diseases of the large towns is 2·33, that of this district being 1·99; this circumstance will be alluded to again. There is also another circumstance to be alluded to as indicating there was no defect in your sanitary arrangement, namely, that the mean death-rates of your district contrast favourably with those of the Kingdom generally, as especially those of the large towns, the death-rate of the former for the year being 19·0, that of the latter 20·9, while the death-rate of Cardiff for the year, based on the lesser estimate of the Registrar General is 22·5, but if it had been based on his larger estimate (the probable one), it would only have been 19·7.

The following table shows the death-rates of Cardiff, as also those of the large towns, and that of the Kingdom for the four quarters of the year.

	March	Quarters June	Ending. Sept.	Dec.	Death- rate of Year.
Cardiff: Registrar General's Estimate, 100,736 ...	25·2	18·3	24·5	22·0	22·5
Registrar General's probable population, 114,631 ...					
Twenty-eight large town ...	24·4	18·6	20·4	20·3	20·9
Death-rate of whole Kingdom	22·6	18·2	17·2	18·1	19·0

## MORTALITY AT AGES.

The following table gives an analysis of deaths at certain periods, with per centage to total deaths:—

Under one year of age	...	...	690	30·4	} 43·0
One year and under two years	...	...	163	7·1	
Two years and under three years	...	...	53	2·3	
Three years and under four years	...	...	41	1·8	
Four years and under five years	...	...	33	1·4	
Total under five years	...	...	980		
Five years and under fifteen years...	...	...	87	3·8	
Fifteen years and under twenty-five years	...	...	157	6·9	
Twenty-five years and under thirty-five years	...	...	197	8·6	
Thirty-five years and under forty-five years	...	...	180	7·9	
Forty-five years and under fifty-five years	...	...	186	8·1	
Fifty-five years and under sixty years	...	...	106	4·6	
Sixty years and under sixty-five years	...	...	34	1·4	
Sixty-five years and under seventy-five years	...	...	233	10·2	} 15·5
Seventy-five years and under eighty-five years	...	...	88	3·1	
Eighty-five years and under ninety-five years	...	...	19	0·8	
Ninety-five years and upwards	...	...	2	0·0	

From the above return it will be seen that upwards of thirty per cent. or nearly one-third of the whole deaths occurred under one year of age.

The following returns show the rate of deaths to births in Cardiff of children under one year of age, compared with that of the entire Kingdom and large towns.

Quarter ending.	The Kingdom.	The Large Towns	Cardiff.
March	150	154	163
June	123	133	121
September	180	231	217
December	147	160	172

It will thus be seen that this mortality in Cardiff was greater than that of the Kingdom, but less than that of large towns; in all three divisions the greatest mortality was during the third or summer quarter; this was due to diarrhœa—always more or less prevalent during these three months.

After the age of one year up to five, the deaths among young children sensibly decreased, continuing low until the age of fifteen, when the death-rate rose; afterwards varying but little to the age of fifty-five; after, in each subsequent decennial period, with one exception, the per centage was low, the exception being the interval between sixty-five and seventy-five when it was 10·2—an increase due to inflammatory affection of the pulmonary organs, these being especially fatal during the first or winter quarter.

I have now to direct your attention to the specified causes of death as entered in the Register of Mortality, tabulating the whole in a form adopted by the Medical Officer of the Local Government Board, giving the ages at which they occurred, and proportionate death-rate, according to the two estimates. This form will be found in the Appendix. It will there be observed that the total deaths have been grouped into five classes, as under:—

Class I.	Zymotic Diseases	...	400
„ II.	Constitutional	...	333
„ III.	Local	...	1045
„ IV.	Developmental...	...	359
„ V.	Violent and Not Classed	...	132
			2269

Class I comprises those diseases most important to be considered in the Report of the Medical Officer of Health, as these are recognised as being due to preventible or removable causes; and the extent to which these contribute to the mortality of a district indicates its relative sanitary condition.

In this class there are certain genera selected by the Registrar General as coming under this category and are designated by him the seven chief zymotic diseases; these are small-pox, measles, scarlatina, diphtheria, whooping cough, fever, and diarrhœa.

In recent reports made to your Board I have endeavoured to clear away all difficulties that might possibly exist in recognising the origin of all infectious diseases, and the direct and collateral circumstances that favor their introduction into a locality and contribute to their activity. That infection is an entity that does not originate spontaneously, but that it is an organism possessing latent mortality, requiring only favouring circumstances to develop this, and that each entity is specific in its nature, and may be introduced into the human system either by inoculation by the air we breathe and the water we drink.

Table 10 illustrates the mortality and death-rates from these diseases in this district during the year 1886 as compared with the six preceding years.

From this table it will be seen that the mortality from zymotic diseases in 1886 contrasts most favourably with those of the preceding years.

TABLE No. 10.

The following table gives the total deaths and death-rate of the seven chief zymotic diseases for each year during the six years ending 1885, with mean of same.

Years.	1880		1881		1882		1883		1884		1885		Mean of six years.		1886		Death Rate as per Registrar General's probable estimate. 114,681
	Deaths	Death Rate.	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	
Estimated Population according to Registrar General.	83,427		86,015		88,603		91,204		93,468		97,034		89,958		100,736		
Seven Chief Zymotic Diseases.																	
Small Pox	1	0'011	2	0'023	1	0'011	1	0'010	8	0'085	2	0'020	2'5	0'027	1	0'009	0'008.
Measles	67	0'803	1	0'011	32	0'361	11	0'120	83	0'888	198	2'040	48'7	0'704	17	0'168	0'148
Scarlatina	29	0'347	20	0'232	67	0'756	42	0'460	128	1'369	26	0'267	52'0	0'572	17	0'168	0'148
Diphtheria	10	0'119	12	0'139	27	0'305	22	0'241	35	0'374	39	0'402	24'2	0'264	14	0'139	0'122
Whooping Cough	77	0'922	58	0'673	38	0'428	68	0'745	31	0'330	118	1'216	65'0	0'719	46	0'456	0'401
Fever	23	0'275	21	0'244	18	0'203	35	0'383	34	0'363	39	0'402	28'4	0'312	73	0'724	0'636
Diarrhoea	99	1'186	50	0'581	110	1'241	74	0'811	157	1'679	99	1'020	98'2	1'086	164	1'628	1'430
<b>TOTAL</b>	306	3'663	164	1'903	293	3'305	253	2'770	476	5'088	521	5'367	307'4	3'684	332	3'295	2'896

Table 11 shows the streets in which deaths from these diseases have been registered, each district being sub-divided into sections north and south.

TABLE No. 11. CARDIFF DISTRICT.

NORTH SIDE.

Streets.	S. Pox.	Measles.	Scarlatina	Diphtheria	W. Cough	Fever.	Diar-rhoea	Total
Bedford Street	...	...	1	...	...	...	2	3
Blackweir	...	...	...	...	...	...	1	1
Cairns Street	...	...	...	...	2	...	...	2
Catherine Street	...	...	...	...	...	2	...	2
Cathays Terrace	...	1	...	...	...	...	...	1
Castle Road	...	...	...	...	...	...	1	1
Coburn Street	...	...	...	...	2	2	3	7
Cranbrook Street	...	...	...	1	...	...	1	2
Crwys Road	..	...	1	...	...	3	...	4
Dumfries Place	...	...	...	...	...	1	...	1
Gordon Road	...	...	...	...	...	...	1	1
Harriet Street	...	...	...	...	...	...	4	4
Hirwain Street	...	...	...	...	...	...	1	1
Llantrissant St.	...	...	...	...	1	...	...	1
Letty Street	...	...	...	...	...	1	2	3
May Street	...	...	...	...	1	...	1	2
Minnie Street	...	...	...	...	...	1	3	4
Miskin Street	...	...	...	...	...	1	...	1
Merthyr Street	...	...	...	...	...	...	5	5
Penlline Street	...	...	...	...	...	1	1	2
Richmond Road	...	...	...	...	...	1	...	1
Richard's Street	...	...	...	...	...	2	...	2
Russell Street	...	...	...	...	...	...	1	1
Salisbury Road	...	...	2	...	...	...	...	2
The Barracks	...	...	1	...	1	...	...	2
The Parade	...	...	...	...	...	...	1	1
Thesiger Street	...	...	...	...	...	1	1	2
Treherbert Street...	...	...	...	1	...	...	1	2
Treorky Street	...	...	...	...	...	...	1	1
Union Workhouse...	...	...	...	...	...	3	4	7
Woodville Road	...	...	...	...	...	1	2	3
Carried forward ...	...	1	5	2	7	20	37	72

## CARDIFF DISTRICT.—SOUTH SIDE.

Name of Street.	S. Pox.	Meas- sles.	Scar- latina.	Diph- theria	W. Cough.	Fever	Diar- rhoea	Total
Adam Street	...	...	...	...	...	1	3	4
Adamsdown Square...	...	...	...	...	...	2	...	2
Bute Street	...	...	1	...	2	...	2	5
Bute Esplanade	...	...	...	...	...	...	1	1
Christina Street	...	1	...	...	...	...	...	1
Cowbridge Road	...	...	...	...	1	...	...	1
Canal Bank	...	...	...	...	1	...	...	1
Canal Parade	...	...	...	...	...	...	1	1
Charles Street	...	...	...	...	...	1	...	1
Davis	...	...	...	...	...	...	1	1
Edward	...	...	...	...	1	...	1	2
Evelyn	...	...	...	...	...	1	1	2
Ellen	...	...	...	...	...	...	1	1
Eldon	...	...	...	...	...	...	1	1
Frederick	...	...	...	...	...	1	...	1
Francis	...	...	...	...	...	1	...	1
Frederica	...	...	...	...	...	...	1	1
Glossop Terrace	...	...	...	...	1	...	...	1
George Street	...	...	...	...	...	2	...	2
Hospital Ship	...	...	...	...	...	1	...	1
Herbert Street	...	...	...	...	...	1	1	2
Havelock	...	...	...	...	...	...	1	1
Ivor	...	...	1	...	...	...	1	2
John	...	...	...	...	2	...	1	3
James	...	...	...	1	...	...	...	1
Little Frederick St.	...	...	...	...	...	...	1	1
Mark Street	...	...	...	1	...	...	1	2
Maria	...	...	...	...	...	1	...	1
Penarth Road	...	...	...	...	...	1	...	1
Pembroke Terrace	...	...	...	...	...	1	...	1
Stuart Street	...	...	...	...	...	...	1	1
South William St.	...	...	...	1	...	...	...	1
Sandon Street	...	...	...	...	2	...	...	2
St. Mary	...	...	...	...	...	...	2	2
Station Terrace	...	...	...	...	...	...	1	1
Scott Street	...	...	...	...	...	...	2	2
Tudor Road	...	...	...	1	...	...	1	2
Taff Street	...	...	...	...	...	1	1	2
Union	...	...	...	...	...	1	...	1
Victoria	...	...	...	...	...	1	3	4
Windsor Esplanade	1	...	...	...	...	...	...	1
Windsor Road	...	...	...	...	...	...	1	1
Wellington Terrace...	...	...	...	...	...	2	...	2
West Bute Street	...	...	...	...	1	...	...	1
TOTAL	1	1	2	4	11	19	31	69

## ROATH DISTRICT.—NORTH SIDE.

Name of Street.	S. pox.	Measles.	Scarlatina	Diphtheria	W. Cough	Fever	Diarrhœa	Total
Albany Road	...	...	...	...	...	1	...	1
Castle Road	...	1	...	...	...	1	...	2
Croft Street	...	...	...	...	...	...	1	1
Charles "	...	...	...	...	...	...	3	3
Clive "	...	...	...	...	...	...	2	2
Daniel "	...	...	...	1	...	...	...	1
Donald "	...	...	...	...	...	...	1	1
Inverness Place	...	...	1	...	...	...	...	1
Lucas Street	...	...	...	...	...	...	1	1
Mackintosh Place	...	...	...	...	...	...	2	2
Moy Road	...	...	...	...	...	...	1	1
Milton Street	...	...	...	...	...	...	4	4
Oakfield "	...	...	...	...	...	1	...	1
Shakespeare Street	...	...	...	...	...	...	1	1
Vere Street	...	...	1	...	...	...	...	1
<b>TOTAL</b>	...	<b>1</b>	<b>2</b>	<b>1</b>	...	<b>3</b>	<b>16</b>	<b>23</b>

## ROATH DISTRICT.—SOUTH SIDE.

Adeline Street	...	...	...	...	1	2	3	6
Broadway	...	1	...	...	1	...	2	4
Bertram Street	...	...	1	...	...	1	...	2
Burnaby "	...	...	...	1	...	...	...	1
Blanche "	...	...	...	...	1	...	...	1
Carlisle "	...	...	...	...	1	...	...	1
Constellation "	...	...	...	...	...	...	1	1
Comet "	...	1	...	1	...	2	...	4
Cumrae "	...	...	...	...	...	1	...	1
Cecil "	...	...	...	1	...	1	...	2
Clifton "	...	...	...	...	...	...	4	4
Copper "	...	...	...	...	...	...	1	1
Diamond "	...	...	...	1	...	...	...	1
Emerald "	...	...	...	...	...	1	...	1
Fort "	...	...	...	...	...	...	1	1
Gwendoline "	...	...	...	...	...	...	1	1
Habershon "	...	...	...	1	1	...	...	2
Helen "	...	...	...	...	...	1	...	1
Infirmary "	...	1	...	...	...	1	...	2
Iron "	...	...	...	...	1	...	...	1
<b>Carried Forward</b>	...	<b>3</b>	<b>1</b>	<b>5</b>	<b>6</b>	<b>10</b>	<b>13</b>	<b>38</b>

## ROATH DISTRICT.—SOUTH SIDE. (Continued).

Name of Street.	S. Pox.	Measles.	Scarlatina	Diphtheria	W. Cough	Fever	Diarhoea	Total
Brought forward ...		3	1	5	6	10	13	38
Janet Street ...		...	1	...	2	...	1	4
Kingarth "		...	...	...	...	1	...	1
Killcattan "		...	...	...	...	...	1	1
Maud "		...	...	1	...	1	...	2
Metal "		...	1	...	...	...	...	1
Orbit "		...	...	...	...	1	...	1
Ordell "		...	...	...	...	...	2	2
Pearl "		...	1	...	...	2	2	5
Prince Leopold St. ...		...	...	...	1	...	...	1
Pengam Crossing ...		...	...	...	...	...	1	1
Planet Street ...		...	1	...	...	...	...	1
Railway "		...	...	...	4	1	...	5
Ruby "		...	...	...	...	...	1	1
Sapphire "		...	...	...	...	1	...	1
System "		...	...	...	...	1	...	1
Silver "		...	...	...	...	...	1	1
Topaz "		...	...	...	...	1	...	1
The Flats ...		...	...	...	...	...	1	1
Theodora Street ...		...	...	...	2	...	...	2
<b>TOTAL</b> ...		<b>3</b>	<b>5</b>	<b>6</b>	<b>15</b>	<b>19</b>	<b>23</b>	<b>71</b>

## CANTON DISTRICT.—NORTH SIDE.

Clive Road ...	1	...	...	...	...	...	...	1
Conway Road ...	...	...	...	...	...	...	3	3
Daisy Street ...	...	...	...	...	...	...	1	1
Ethel "	...	...	...	...	1	...	1	2
Glynne "	...	...	...	...	...	...	2	2
Glamorgan Street ...	...	...	...	...	...	...	1	1
Halket Street ...	...	...	...	...	1	...	2	3
King's Road ...	...	...	1	...	...	...	2	3
Llandaff Road ...	1	...	...	...	...	...	...	1
Market Street ...	...	...	...	...	...	1	...	1
Mortimer Road ...	...	...	...	...	...	...	2	2
Pwll Coch Street ...	...	...	...	...	1	...	...	1
Pembroke "	1	...	...	...	...	...	...	1
Pontcanna Place ...	...	...	...	...	1	...	...	1
Romilly Road ...	...	...	...	1	...	...	...	1
Springfield Place ...	...	...	...	...	2	...	1	3
Severn Road ...	...	...	...	...	2	...	3	5
Union Street ...	...	...	...	...	1	...	1	2
<b>TOTAL</b> ...	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>9</b>	<b>1</b>	<b>19</b>	<b>34</b>





## LOWER GRANGE. (Continued).

Name of Street.	S. pox.	Meas-les.	Scar-latina	Diph-theria	W. Cough	Fever	Diar-rhoea	Total
Brought forward	...	...	...	...	...	...	8	8
Earl Street	...	1	...	...	...	...	...	1
Hewell	...	...	...	...	...	...	5	5
Homesdale	...	...	...	...	...	...	2	2
Knole	...	...	1	...	...	...	...	1
Kent	...	...	...	...	1	...	1	2
Ludlow	...	...	...	...	...	...	2	2
Mathews' Terrace	...	...	...	...	...	...	1	1
Oakley Street	...	...	...	...	...	1	...	1
Plymouth Terrace	...	...	...	...	...	...	1	1
Sea View	...	...	...	...	...	1	...	1
TOTAL	...	1	1	...	1	2	20	25

## SMALL POX.

The first of these diseases to which I have to call your attention is small-pox. The town is frequently exposed to the possibility of this disease being introduced through the shipping; and, in almost every case, when the town has been visited by small-pox during recent years it has been traced to this source. There has been only one death registered from small-pox during the year; this was in January, the history of this case being as follows:—On the 29th of the previous month, my attention was called to a case of small-pox in a house in Windsor Esplanade, Bute Docks. On visiting this house, I found it to be that of a young child aged three years. The disease was in a very severe confluent form, and in an advanced stage, death taking place on January 2nd; this child had not been vaccinated. On enquiry, I ascertained there were nine other inmates in the house, three adults and six children; amongst the latter, two were unvaccinated. I immediately requested the Public Vaccinator to visit the house, vaccinate the two children and re-vaccinate the remainder of the inmates. In four days, these two children developed varioloid eruption, and the vaccine pustules also become active; both ran concurrent, but the small-pox was in a very modified form; the others escaped the disease. On enquiry into the source of infection I ascertained that a ship had arrived in this port about the 20th December from Marseilles; while there, one of the sailors suffering from small-pox had been removed into hospital; when the ship arrived at Cardiff, the crew, being apparently in good health, were discharged, and two of them took up their residence in this house, and thus were the means of introducing this disease.

On the 15th January, my attention was called to a house in Crichton Street; I there found six cases of small-pox; one of these had the disease in a severe confluent form—this patient had not been vaccinated. The others, who had been vaccinated, had it in so mild a form that some doubt existed as to whether the disease was small-pox or chicken-pox. The source of infection was supposed to have been introduced by the parent, who is a Custom-house Officer, and he was supposed to have caught it on board an infected vessel in the Docks.

On the 8th February, another case of small-pox was reported to me. This was an adult female, the wife of a keeper of a Seamen's Boarding House, in the Bute Road. The woman was immediately removed to the infectious hospital; all the other inmates of the house, eight in number, were re-vaccinated—five of these successfully. Two left the house for sea within 48 hours of re-vaccination, therefore the result of these could not be known. An unvaccinated child, aged ten years, was successfully vaccinated. There was no extension of the disease amongst the inhabitants of this house.

On February 13th, a case of small-pox occurred in the Union Workhouse; the patient was a vagrant, who was removed into the house the day on which he arrived in Cardiff, he was at the time unwell, and in a few hours a variolous eruption appeared; he was taken to the infectious ward.

On March 2nd, another man in the body of the house also developed small-pox; he was removed to the infectious ward.

On March 17th, a man in the lock ward developed small-pox, and he was also removed; in each case the disease was in a modified form, and they soon became convalescent.

Dr. SHEEN, the Medical Officer of the Union, carried out re-vaccination of all the inmates that, in his judgment, required the operation.

On March 11th, I visited a house in Homesdale Street, Grange-town; the patient was an assistant in a Pawnbroker's establishment, I caused him to be removed into the Hamadryad Hospital. I caused the whole of the inmates, nine in number, to be re-vaccinated, eight of these successfully. There was no extension of disease in this house.

There were no further cases of small-pox among the inhabitants of the town until the last month of the year.

On December 15th, my attention was called to a case of confluent small-pox in a house in Comet Street, Roath; he was immediately removed to the Hamadryad. I could not, at the time, trace his source of infection. I subsequently learned that a fellow

lodger had previously suffered from an attack of small-pox in so mild a form that the medical attendant considered it to be chicken pox, and they both occupied the same room during his illness.

There were some cases of small-pox received into the Hamadryad during the summer months from the shipping; these will be mentioned in the report to be made to the Port Sanitary Authority.

I may here state that whenever called to a house infected with small-pox, sanitary provisions were diligently enforced, and the bedding and clothes used by the sick destroyed.

#### MEASLES.

The deaths from measles were 17, giving a death-rate, according to the lesser estimate of the Registrar General, of 0·168; the mean of the six previous years, at the same estimate, being 0·704. They were sparsely scattered throughout the district for the whole year until December, when it prevailed in an epidemic form in the Canton District, but not severely; there being ten deaths registered in December in that district.

I then caused a house-to-house inspection to be made with a view of detecting infected houses, and, when necessary, prevented children from attending school. I also caused printed instructions to be distributed to heads of families in parts of districts where the measles prevailed, enjoining them that as the weather was cold and foggy, therefore unfavourable, to prevent any children suffering from premonitory disease being exposed to such influences; the mortality from measles being due, not so much to the disease itself as to the inflammatory affections of the respiratory organs set up by these causes.

The necessity of preventing children from infected houses from attending school will be manifest that in the commencement 789 infected houses were visited. Among these, 91 cases of measles were detected in 72 houses; 49 children were attending school. After instructions were given to desist from this practice a marked improvement took place, and a rapid subsidence of the epidemic.

#### SCARLATINA.

The total deaths registered from scarlatina were 17, the death-rate being 0·168, against a mean of deaths of 52 and death-rate of 0·572 of the previous six years. This disease was also spread over the year and at no time showed a disposition to take an exceptional activity. The same measures taken as in measles to prevent extension of the disease, by preventing children from infected houses attending school, were adopted with a like success.

## DIPHTHERIA.

There were 14 deaths from diphtheria, with a death-rate of 0·139, as against a mean of 24 deaths and death-rate of 0·264 of the previous six years. It is satisfactory to find that no second case was registered in the same house.

## WHOOPING-COUGH.

The total mortality from whooping-cough was 46 and a death-rate of 0·456, the mean deaths of the previous six years being 65, and a death-rate of 0·719. It was most fatal during the months of January, February, and March; in these months there were 22 deaths, the weather at this time being very severe; after this the mortality rapidly subsided and few deaths were registered from this disease. During the summer months there was a slight reaction.

## FEVER AND DIARRHŒA.

The two following, namely, fever and diarrhœa, contributed more largely to the mortality of zymotic diseases.

The total deaths registered from fever were 73, with a death-rate of 0·724, against 28 deaths and a death-rate of 0·312, the mean of the previous six years.

The annexed table (12), shews the distribution, the temperature, the rainfall, and number of wet days in each month. It will be seen that during the latter half-year, fever prevailed in an epidemic form; previous to this, the monthly mean of mortality was less than ordinary.

Of the 73 deaths from fever, two were registered as typhus, 63 as typhoid, and eight as simple continued.

TABLE NO. 12. DEATHS FROM FEVER.

MONTHS.	DEATHS.			TEMPERATURE.							Wet Days.
	Districts.			Maximum.	Minimum.	Mean of Max.	Mean of Min.	Mean of Month.	Total Rainfall.		
	Cardiff.	Roath.	Canton.							Total.	
January	2	...	...	51 <sup>o</sup> .1	25 <sup>o</sup> .2	41 <sup>o</sup> .2	32 <sup>o</sup> .8	37 <sup>o</sup> .0	5.03	23	
February	...	...	2	47 <sup>o</sup> .7	25 <sup>o</sup> .6	40 <sup>o</sup> .0	31 <sup>o</sup> .2	35 <sup>o</sup> .6	1.32	11	
March	1	...	2	62 <sup>o</sup> .7	21 <sup>o</sup> .1	46 <sup>o</sup> .1	35 <sup>o</sup> .4	40 <sup>o</sup> .7	3.97	13	
April	...	...	...	70 <sup>o</sup> .6	33 <sup>o</sup> .2	56 <sup>o</sup> .1	40 <sup>o</sup> .7	48 <sup>o</sup> .4	2.98	15	
May	3	...	...	71 <sup>o</sup> .1	32 <sup>o</sup> .7	61 <sup>o</sup> .1	45 <sup>o</sup> .2	53 <sup>o</sup> .1	6.36	19	
June	...	...	...	78 <sup>o</sup> .8	45 <sup>o</sup> .3	67 <sup>o</sup> .3	50 <sup>o</sup> .3	58 <sup>o</sup> .8	0.70	7	
July	9	...	...	82 <sup>o</sup> .2	43 <sup>o</sup> .5	71 <sup>o</sup> .0	55 <sup>o</sup> .0	63 <sup>o</sup> .0	4.85	17	
August	11	7	1	79 <sup>o</sup> .9	45 <sup>o</sup> .0	70 <sup>o</sup> .9	54 <sup>o</sup> .9	62 <sup>o</sup> .9	1.68	9	
September	4	8	...	72 <sup>o</sup> .0	40 <sup>o</sup> .8	63 <sup>o</sup> .8	51 <sup>o</sup> .4	57 <sup>o</sup> .6	4.08	14	
October	1	5	2	71 <sup>o</sup> .8	37 <sup>o</sup> .8	56 <sup>o</sup> .2	48 <sup>o</sup> .5	52 <sup>o</sup> .3	5.09	21	
November	4	1	3	56 <sup>o</sup> .7	34 <sup>o</sup> .0	48 <sup>o</sup> .8	41 <sup>o</sup> .3	45 <sup>o</sup> .0	5.39	21	
December	4	...	2	52 <sup>o</sup> .6	22 <sup>o</sup> .8	42 <sup>o</sup> .2	33 <sup>o</sup> .3	37 <sup>o</sup> .7	6.64	21	
Total	39	22	12							73	

TABLE No. 13. FEVER-DEATHS AT AGES.

MONTHS.	YEARS.															Total			
	Under 1	1	2	3	4	5	10	15	20	25	35	45	55	60	65		75	85	95
January .....	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2
February.....	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	2
March .....	...	...	...	...	...	...	2	...	...	1	...	...	...	...	...	...	...	...	3
April .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
May .....	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	3
June .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
July.....	1	...	...	...	...	1	...	3	3	6	1	1	...	...	...	...	...	...	16
August .....	1	...	...	2	...	3	4	3	3	2	1	...	...	...	1	...	...	...	20
September .....	...	1	...	...	...	...	2	...	2	1	1	2	...	...	...	...	...	...	9
October .....	...	...	...	...	...	1	...	1	1	1	...	...	...	...	...	...	...	...	4
November .....	...	...	...	1	...	...	...	...	2	1	2	1	...	...	1	...	...	...	8
December .....	...	...	...	...	...	1	...	2	...	1	...	...	...	...	...	1	...	...	6
Total .....	2	1	...	4	...	7	9	10	11	15	6	5	...	...	2	1	...	...	73

Table 13 gives the deaths at ages. From this it will be seen that seven deaths were registered under the age of five years, 63 between the ages of five and forty-five, and three above 65.

For the purpose of determining the circumstances under which typhus and typhoid fevers might originate and spread throughout a district—to enable you to adopt or repress these—it is necessary to define the specific nature of each.

Typhus fever is essentially a most infectious disease; is so readily communicable from the sick to the healthy, that those in contact with the patient are in great danger. Dr. MURCHISON, the great authority on fever, states, that during the epidemic of typhus fever in Ireland, during the year 1847, upwards of 500 medical men in attendance on the sick, forming one-fifth of the whole, were attacked with this disease; of these 500, no less than 127 died. A like mortality obtained among the nurses and those who had charge of the wards.

Typhoid fever, unlike typhus, is not infectious, in the ordinary acceptation of the term; it is not communicable from person to person, hence it is that no instances are recorded where the disease prevailed amongst those who had charge of the sick, and in our large Metropolitan Hospitals, typhoid cases are unhesitatingly distributed throughout the ordinary sick wards and no harm has resulted.

Typhus fever is always associated with great disturbances of the brain and nervous system, and attended with excitement.

Typhoid fever is an abdominal disease; its first symptoms are localized in the intestinal tract, lesions here following in regular and progressive stages; the first being marked by hyperæmia, then ulceration of the intestinal glands, and mucous surface; finally, in severe cases, with sloughing and hemorrhage. Conjoined with these symptoms others supervene, the cerebral symptoms being analogous to those observed in typhus, namely, coma and delirium; but these are more low and muttering than those of typhus. From these remarks it may be clearly understood that during the course of the intestinal lesions, infective matter is thrown off from the surface and passes away from the patient through the excretal discharges. It is in these discharges the morbid poisons are found, and it is by them the disease spreads.

The sanitary precautions necessary to be adopted are in each case widely different.

In typhus, isolating the patient and limiting the area of force are two of the most important objects to be attained.



In typhoid, care and cleanliness observed by those in charge of the sick, and also the destruction of the germs contained in the dejecta are the most necessary.

The two deaths from typhus were:—the first, that of a young female aged ten years, daughter of a labourer residing in Thomas Street, Grangetown, registered as typhus, pneumonia. The second was that of a travelling draper, aged 18 years, who lived in a residential house in this town. He returned home from one of his rounds suffering from the premonitory symptoms of fever, and died in a few days. There was no second case in either of these houses. When I enquired into the history of these cases I did not consider the disease was of an infective character.

I have now to notice the circumstances under which typhoid fever prevailed as an epidemic during the summer quarter. Previous to this quarter—with one exception—all the cases that came under my observation were sporadic, and due to causes connected with the individual, as there was an absence of the more prominent indication that would be associated with epidemic typhoid; the exception being the death registered in Dumfries Place in the month of January. This was the case to which I have recently alluded in a report made to you, wherein I described that the fever was introduced into the house by one of the inmates who had returned from a visit. She had been staying at a friend's house in the adjoining county, and, at the time of her visit, some of the members were recovering from typhoid. At the time of her return she complained of sickness and headach, and fever rapidly developed itself; it then spread among the inmates of this house, and on examining the premises, I found that the waste-pipe of the scullery in the back kitchen communicated direct with the soil-pipe of the w.c. This waste-pipe was untrapped and permitted sewer gases to escape and enter the house. Here, evidently, the infected germs contained in the dejecta of the first patient passed into the soil-pipe, and then (through the sewer exhalations I have described) communicated the fever to the other inmates. I give this as a typical evidence that sewer exhalations required infective germs to originate fever, as a family that previously resided in this house for a long time complained of offensive smells proceeding from this scullery grid to such an extent that the deodorants were constantly obliged to be employed yet no fever resulted.

In the first week of July, one of my Inspectors reported to me that he had reason to believe that fever prevailed in the northern portion of the Cardiff sub-district, but no deaths had been registered. I therefore instituted an enquiry, and ascertained such to be the case. In this portion of the district, between the 7th and 31st of July, sixty-six cases of typhoid fever were discovered, the characteristic symptoms being well marked; out of these sixty-six cases eleven were fatal.

I have already stated that the contagia are to be found in the dejecta of the sick. There are two ways in which the contagia are introduced into the system, namely, the water we drink or the air we breathe. In this district the first does not obtain, inasmuch as the water received into the reservoir at Llanishen, after filtration, passes from the filter beds direct through the main conduits to the houses of the consumers; therefore, cannot be contaminated in its passage. It was, therefore, to the atmosphere I had to seek a solution, with the following result. In the month of June a serious drought commenced, continuing throughout July, August, and September; there was a consequent absence of storm water, and, the minimum supply of water threatening a water famine, the proper flushing of your sewers could not be employed, hence the free passage of their contents was impeded, and the sewers consequently were congested with gases; these gases found an outlet in the ventilating shafts in the centre of the streets and so poisoned the atmosphere, and frequently, on my visits of inspection into an infected district, the exhalations from these shafts were perceptible even at some distance, and it was in the course of certain main trunk sewers and lateral ones connected with them that the cases of fever were especially found.

Subjoined is a table showing the streets in which cases of sickness as also deaths from typhoid fever occurred :—

**TABLE No. 14. TYPHOID FEVER.**

Streets,	No of Cases.	Deaths	Streets.	No. of Class.	Deaths
			<i>Brought forward</i>	68	33
Richard ... ..	4	2	Oakfield ... ..	1	1
Catherine ... ..	1	1	Helen ... ..	2	1
Woodville Road ...	7	3	Maude ... ..	2	1
Mিনny ... ..	4	1	Bertram ... ..	1	1
Crwys Road ... ..	5	3	Cecil ... ..	1	1
Miskin ... ..	6	1	Comet ... ..	2	2
Coburn ... ..	10	2	Topaz ... ..	1	1
Letty ... ..	4	1	Emerald ... ..	2	1
Albany Road ... ..	1	1	System ... ..	6	1
Castle Road ... ..	4	1	Sapphire ... ..	2	1
Infirmery ... ..	1	1	Orbitt ... ..	1	1
Penline ... ..	1	1	Railway ... ..	1	1
Adamsdown Sq. ...	3	2	Adeline ... ..	4	2
Victoria ... ..	1	1	Pearl ... ..	8	2
Taff ... ..	1	1	Workhouse ... ..	3	3
Cumrea ... ..	1	1	Wells ... ..	1	1
Kingarth ... ..	2	1	Market ... ..	1	1
Charles ... ..	2	1	Edward ... ..	5	1
Frederick ... ..	1	1	Machen ... ..	1	1
Herbert ... ..	1	1	Tynant ... ..	1	1
Union ... ..	3	1	North Clive ... ..	1	1
Wellington Terrace	2	2	Oakley ... ..	1	1
Maria ... ..	1	1	Seaview ... ..	1	1
Francis ... ..	1	1	George ... ..	1	1
Eveline ... ..	1	1	Hospital Ship ... ..	1	1
<i>Carried forward</i>	68	33	<b>TOTAL ...</b>	<b>119</b>	<b>63</b>

A reference to the map will shew that along the main trunk sewer leading from the Northern end of Crwys Road to Glossop Road (colored red), the main trunk sewer (colored yellow) leading from Albany Road through Castle Road to South Grove, the main sewer (colored green) leading from Elm Street to the outfall on the Moors, that it was in the streets abutting these, as also the lateral sewers connected with them, that the intensity of the disease manifested itself, thus corroborating the opinions I have expressed.

There were 164 deaths registered from diarrhœa within the year, giving a death-rate of 1·628, as against 98 deaths and a death-rate of 1·086 the mean of the previous six years, the mortality of the year was therefore an excess.

For some years the disease has prevailed in Cardiff as an epidemic, only in that form known as infantile; and, from the circumstance that it is chiefly confined to the hot months, it is called summer, or third quarter diarrhœa. In this form and at this season it always prevails to a greater or less degree throughout the Kingdom.

In 1884, my attention was directed to the mortality from this disease by Dr. BALLARD, one of the Medical Inspectors of the Local Government Board, who has been for some time making an exhaustive enquiry into the etiology of the disease and the degree to which preventible or removable causes contribute to its prevalence.

The results of my observations tend to establish the fact that temperature, especially conjoined with dry weather and diet, are important factors to be considered when dealing with the subject.

The autumnal months of 1884 were excessively hot and dry, especially August, September, and October. The temperature of July was below the average, and the mortality was less than is usual in that month; but in August it suddenly became very hot, and on one occasion 82°·8 were registered in the shade, and the mortality became excessive, continuing more or less so through September and October; there was also a minimum amount of rainfall. There were 157 deaths from diarrhœa in the year, of which 114 took place in these months.

In 1885 the temperature of July was in excess, but it suddenly fell during the months of August, September, and October, being then considerably below the average; there was also excess of rainfall throughout these months. There were 99 deaths, of which 73 were registered in these three months as against 114 of the former year.

Table 15 shews the mortality and distribution in each month during the year 1886, as also the temperature and rainfall.

Table 16 the deaths at age.

TABLE No. 15. DEATHS FROM DIARRHOEA.

MONTHS.	DEATHS.			TEMPERATURE.							Wet Days.
	Districts.			Maximum.	Minimum.	Mean of Max.	Mean of Min.	Mean of Month.	Total Rainfall.		
	Cardiff.	Roath.	Canton.							Total.	
January	2	...	...	51 <sup>o</sup> .1	25 <sup>o</sup> .2	41 <sup>o</sup> .2	32 <sup>o</sup> .8	37 <sup>o</sup> .0	5.03	23	
February	...	1	...	47 <sup>o</sup> .7	25 <sup>o</sup> .6	40 <sup>o</sup> .0	31 <sup>o</sup> .2	35 <sup>o</sup> .6	1.32	11	
March	...	...	1	62 <sup>o</sup> .7	21 <sup>o</sup> .1	46 <sup>o</sup> .1	35 <sup>o</sup> .4	40 <sup>o</sup> .7	3.97	13	
April	2	...	3	70 <sup>o</sup> .6	33 <sup>o</sup> .2	56 <sup>o</sup> .1	40 <sup>o</sup> .7	48 <sup>o</sup> .4	2.98	15	
May	2	1	1	71 <sup>o</sup> .1	32 <sup>o</sup> .7	61 <sup>o</sup> .1	45 <sup>o</sup> .2	53 <sup>o</sup> .1	6.36	19	
June	...	2	2	78 <sup>o</sup> .8	45 <sup>o</sup> .3	67 <sup>o</sup> .3	50 <sup>o</sup> .3	58 <sup>o</sup> .8	0.70	7	
July	...	8	7	82 <sup>o</sup> .2	43 <sup>o</sup> .5	71 <sup>o</sup> .0	55 <sup>o</sup> .0	63 <sup>o</sup> .0	4.85	17	
August	19	10	19	79 <sup>o</sup> .9	45 <sup>o</sup> .0	70 <sup>o</sup> .9	54 <sup>o</sup> .9	62 <sup>o</sup> .9	1.68	9	
September	28	15	17	72 <sup>o</sup> .0	40 <sup>o</sup> .8	63 <sup>o</sup> .8	51 <sup>o</sup> .4	57 <sup>o</sup> .6	4.08	14	
October	3	3	7	71 <sup>o</sup> .8	37 <sup>o</sup> .8	56 <sup>o</sup> .2	48 <sup>o</sup> .5	52 <sup>o</sup> .3	5.09	21	
November	2	...	2	56 <sup>o</sup> .7	34 <sup>o</sup> .0	48 <sup>o</sup> .8	41 <sup>o</sup> .3	45 <sup>o</sup> .0	5.39	21	
December	2	1	1	52 <sup>o</sup> .6	22 <sup>o</sup> .8	42 <sup>o</sup> .2	33 <sup>o</sup> .3	37 <sup>o</sup> .7	6.64	21	
Total	68	36	60	164							

TABLE No. 16. DIARRHŒA—DEATHS AT AGES.

MONTHS.	MONTHS.										YEARS.										Total.		
	0	1	3	6	9	1	2	3	4	5	10	15	20	25	35	45	55	60	65	75		85	95
January	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
February	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
March	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
April	...	...	1	3	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
May	...	...	2	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	4
June	...	1	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	4
July	3	1	6	1	1	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	4
August	1	10	7	12	6	...	5	...	...	1	...	...	...	...	1	1	...	...	...	...	...	...	18
September	1	13	16	10	8	...	8	...	...	...	...	...	...	...	1	1	1	...	...	1	...	...	48
October	2	...	2	2	2	...	3	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	60
November	...	2	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13
December	...	...	...	1	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
Total	7	28	38	30	19	22	3	...	1	1	...	...	...	4	2	1	1	1	5	2	...	...	164

From these tables it will be seen that there were 122 deaths recorded under the age of one year, and 25 above one and under three, making a total of 147 deaths at the nursing period of life; the remaining 17 were above these ages. Of the 164 deaths, 126 were registered during the summer quarter.

The temperature of these months being as follows: the maximum temperature of July—in the shade—was 82°·6 on the 4th; the mean of the month being 63°·0. The maximum temperature registered in August was 79°·9, on the 30th; the mean of month, 62°·9. In September, the maximum temperature registered was 72°·0 on the 14th; the mean of month 57°·6. It was, therefore, considerably in excess during these months. There was also a minimum amount of rain, and, on more than one occasion, in consequence of the drought that obtained, fears were apprehended of a possible water famine. The temperature observations will enable you to arrive at a conclusion as to how far these exercise an influence on the mortality of diarrhœa.

I have now to speak of diet as a cause of infantile diarrhœa. In 1884-5 I made an enquiry as to the diet of children whose deaths had been registered as diarrhœa, with the following result:—

	1884.	1885.
Breast milk only ...	2	1
Breast milk and other food...	9	3
Cows' milk ...	99	72
	<hr/>	<hr/>
	110	76

I mentioned in my reports for these two years there had been a remarkable absence of the mortality of infantile diarrhœa among the Irish portion of your population. This class comprises a population of about 13,000. I need hardly say that amongst this class the essential for the development of zymotic diseases are to be found, namely: over-crowding and want of cleanliness; the immunity therefore from infantile diarrhœa was remarkable, and I attribute this immunity to the fact that cows' milk was rarely ever given, children being nursed at the breast. With a view of determining how far this opinion has been founded, I this year obtained practicable information on this subject; I therefore selected one of the centres of your Irish population, namely: Pendoylan Street, Thomas Street, North William Street, Ellen Street, Rosemary Street, Tyndall Street, and Stanley Street. The houses in these streets are occupied entirely by Irish families; they comprise a population exceeding 2,000. In these streets only one death from infantile diarrhœa occurred during the year, that being the child of a publican, aged 18 months. In these streets I found 43 infants under the age of nine months; of these, 33 were nursed at the breast, seven breast and other food, and three on cows' milk.

### CONSTITUTIONAL DISEASES.

The deaths from these diseases were 333, giving a death-rate of 3·305, as against a death-rate of 4·108, the mean death-rate of the Kingdom, extending over a period of 30 years. This death-rate is due to a lesser mortality in scrofula, tabes mesenterica, and phthisis. In scrofula the death-rate being 0·069, as against 0·141 of the Kingdom; tabes mesenterica, 0·218, against 0·290; phthisis, 2·124 against 2·491. This reduction is satisfactory in shewing that the reduction in these three diseases indicates an improved condition in the general health of the district.

### LOCAL DISEASES.

The total deaths from local diseases were 1045, with a death-rate of 10·373, the mean of the Kingdom being, for the 30 years, 8·721. When speaking of the effects of temperature influences on the public health, I have especially pointed out that such influences might cause a high death-rate outside the control of a Sanitary Authority. During the months of January, February, and March, of 1886, the severe weather operated prejudicially on the public health, and the attention of the public being called from time to time to the high death-rate in Cardiff ruling these three months. I then explained that the mortality from zymotic diseases at this time was considerably below the average, and that the high death-rate was solely due to the mortality from acute inflammatory affections of the respiratory organs, bronchitis, pleurisy, and pneumonia.

The mortality from these diseases during this quarter, had it continued through the remaining nine months, would have given a death-rate of 5·837, whereas the death-rate on the year was only 1·379.

### DEVELOPMENTAL DISEASES.

The mortality from these diseases calls for no observation, as the death-rate of the district as compared with that of the Kingdom, with a slight fractional difference, was the same.

### VIOLENT DEATHS.

The deaths from these causes have always been higher than that of the Kingdom, and gave this year a death-rate of 0·952, against 0·581, that of the Kingdom; this is especially due to the nature of its industrial occupations extensively carried on in this district (dock and railway), exposing those employed in these industries to the chances of accidents.



The following is a summary of the sanitary operations carried out during the year.

13,798 day, and 978 night visits have been made and the results duly reported to you, exclusive of 15,256 incidental house visitations made when enquiring into the possibility of existing cases of sickness.

51 houses were found to be overcrowded; in each instance notices were served upon the occupiers to reduce the number of inmates. In two instances only it was found necessary to institute legal proceedings, when the occupiers were fined 20/- with costs.

The occupiers of 450 houses were served with notices to cleanse and whitewash premises. Brushes were lent out for this purpose 1714 times.

1012 closet and surface drains in a defective condition were cleansed and repaired. 439 drains were tested, either by essential oils or the "Asphyxiator." In two instances proceedings were taken before the Magistrates when the defendants were fined respectively.

32 cesspools were emptied and disinfected; 12 have been abolished, and the house-drains connected to the main sewers.

143 houses or parts of houses have been fumigated after cases of infection.

141 bake-houses were inspected at least on two occasions during the year. 39 occupiers were served with notices to lime-wash premises.

119 cow-sheds and 77 milk-shops were inspected. Notices were served upon the occupiers to lime-wash these during the months of June and November.

The common lodging and boarding houses have been kept under constant supervision. Cleansing and lime-washing have been thoroughly enforced.

984 lbs. of beef, mutton, and veal, also upwards of 20 tons of potatoes have been destroyed. Proceedings were taken before the Magistrates in two instances; one offender was cautioned, the other fined £12, with 20/- costs.

The other nuisances dealt with were detailed in daily reports.

The following is a list of clothing and bedding disinfected at your disinfecting chambers:—

Articles,	Disinfected.	Destroyed.
Beds ... ..	27	3
Mattresses ... ..	34	3
Blankets ... ..	63	4
Quilts ... ..	24	0
Sheets ... ..	29	3
Bolsters, Slips, and Pillows	103	15
Carpets ... ..	26	1
Articles of Clothing ... ..	168	15
Other Articles ... ..	224	34
	<u>698</u>	<u>78</u>

I have now to express my satisfaction with the very efficient manner in which your Chief Inspector, Mr. GOVER, and Inspectors LEYSHON, VAUGHAN, and HELLERMAN have discharged their several duties.

I have the honour to be, Gentlemen,

Your obedient Servant,

H. J. PAINE, M.D.,

Medical Officer of Health, Cardiff Urban Sanitary Authority.



