

[Report 1867] / Sanitary Inspector, Merthyr Tydfil Local Board.

Contributors

Merthyr Tydfil (Wales). Local Board.

Publication/Creation

1867

Persistent URL

<https://wellcomecollection.org/works/s7uafsfq>

License and attribution

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

**wellcome
collection**

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

SECOND ANNUAL REPORT
ON THE
SANITARY CONDITION
OF
MERTHYR-TYDFIL,

BEING FOR THE YEAR 1866,
WITH APPENDIX,

PREPARED FOR THE LOCAL BOARD OF HEALTH BY THEIR
MEDICAL OFFICER,

THOMAS JONES DYKE,

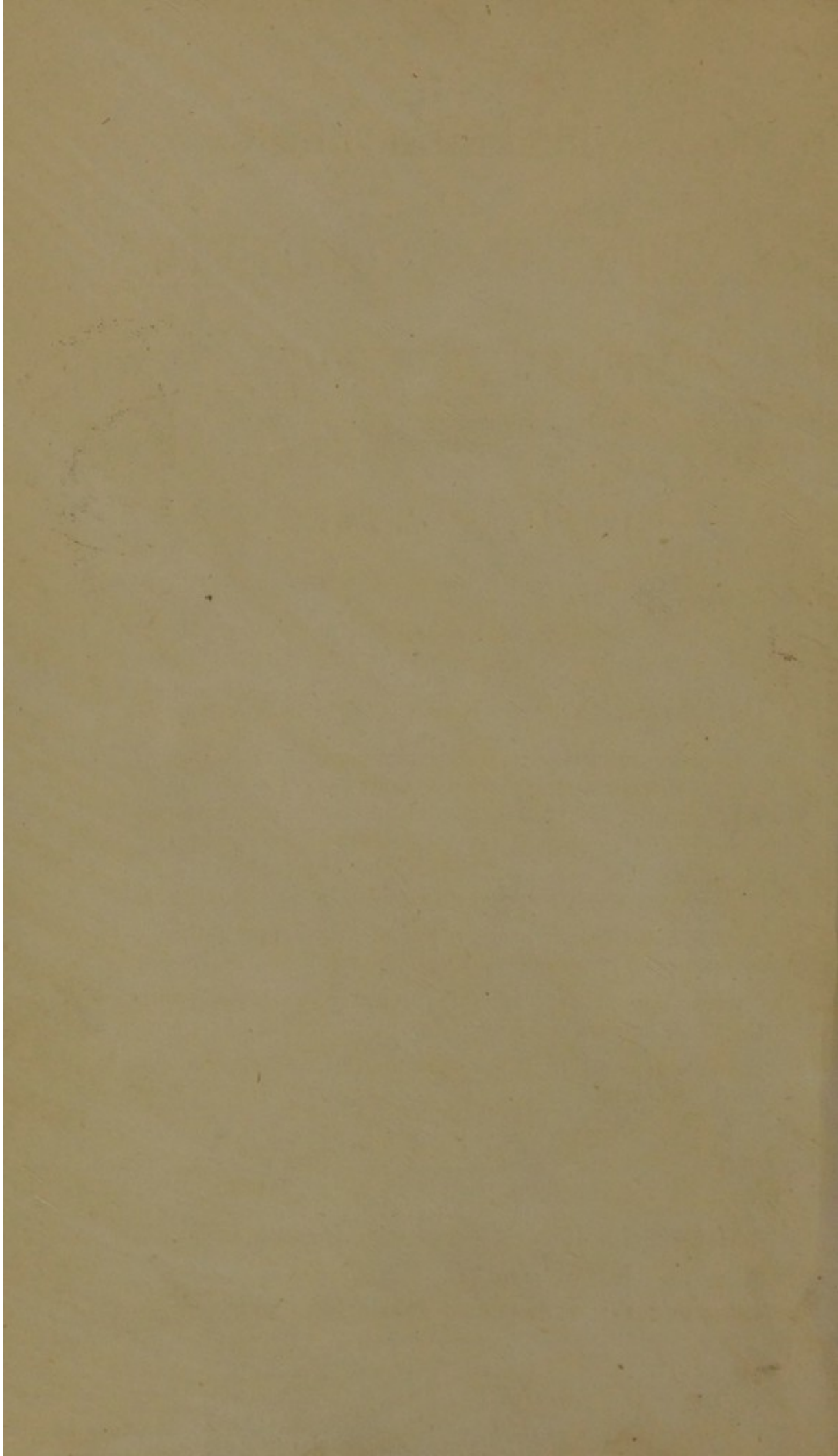
FELLOW OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND ;
MEMBER OF THE BRITISH MEDICAL ASSOCIATION ;
HONORARY MEMBER OF THE METROPOLITAN ASSOCIATION OF OFFICERS
OF HEALTH, ETC., ETC.

PRINTED FOR THE LOCAL BOARD OF HEALTH AND PUBLISHED BY
M. W. WHITE AND SONS,

PRINTERS BY STEAM POWER, ETC., HIGH-STREET, MERTHYR-TYDFIL.

1867.

[Price 6d.]



SECOND ANNUAL REPORT
ON THE
SANITARY CONDITION
OF
MERTHYR-TYDFIL,

BEING FOR THE YEAR 1866,
WITH APPENDIX,

PREPARED FOR THE LOCAL BOARD OF HEALTH BY THEIR
MEDICAL OFFICER,

THOMAS JONES DYKE,

FELLOW OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND ;
MEMBER OF THE BRITISH MEDICAL ASSOCIATION ;
HONORARY MEMBER OF THE METROPOLITAN ASSOCIATION OF OFFICERS
OF HEALTH, ETC., ETC.

~~~~~  
"Every life in the community is surrounded by dangers, which it is  
the business of science to study, and of art to avert."—*Dr. Farr.*

"An honest love of truth supplies the motive for the enquiry."—  
*Dr. H. Wentworth Acland.*

"Admirable tonique, la Vérité—pour qui sait la supporter, et la  
dire !"—*Chasles.*

~~~~~  
PRINTED FOR THE LOCAL BOARD OF HEALTH AND PUBLISHED BY
M. W. WHITE AND SONS,
PRINTERS BY STEAM POWER, ETC., HIGH-STREET, MERTHYR-TYDFIL.

SECOND ANNUAL REPORT

SANITARY CONDITION

MILITARY

FOR THE YEAR 1860

WITH APPENDIX

RELATIVE TO THE HEALTH OF THE ARMY

MEDICAL OFFICER

THOMAS JONAS DYKER

THE NATIONAL ARCHIVES
COLLECTION OF THE
GENERAL LAND OFFICE
AND THE
ADMIRALTY

THE NATIONAL ARCHIVES
COLLECTION OF THE
GENERAL LAND OFFICE
AND THE
ADMIRALTY

THE NATIONAL ARCHIVES
COLLECTION OF THE
GENERAL LAND OFFICE
AND THE
ADMIRALTY

SECOND REPORT ON THE SANITARY CONDITION
OF MERTHYR-TYDFIL.

1866.

CONTENTS.

CHAPTER I.—*Numbers and Occupations of the Inhabitants—
Rainfall—Market Value of Iron—Wages, &c.*

SECTION	PAGE,
1 Introduction	1
2 Population of Merthyr	2
<i>Table 1.</i> —Population of Merthyr and Vaynor, 1847 to 1866.	3
3 Sanitary Inspection of Residences of the People ..	4
4 Occupations of the People	5
<i>Table 2.</i> —Estimated number of People employed in Mines and Iron- works.	7
5 Distribution of the Inhabitants in Six Divisions of the Parish	8
<i>Table 3.</i> —Estimated number in each Division.	<i>ibid.</i>
6 Paupers in 1866.....	9
<i>Table 4.</i> —Number of Paupers, and Vagrants relieved in 1851—1866...	<i>ibid.</i>
7 The Weather, Rainfall, and Temperature	10

SECTION		PAGE.
	<i>Table 5.—Monthly Rainfall, Temperature, &c.</i>	12
8	Price of Iron—Food—Wages—in 1866.	13

CHAPTER II.—*Sanitary Topography of Merthyr-Tydfil.*

SECTION		
1	General Description of Parish	14
2	Description of Division of Tydfil's Well	17
3	" " Penydarran	18
4	" " Dowlais.....	19
5	" " Merthyr... ..	20
6	" " Gellydeg	21
7	" " Troedyrhiw	<i>ibid.</i>
8	Summary of Inspection of Houses, &c.	22
	<i>Table 6.—Streets, Houses, Population—Ventilation—Conveniences—Water Supply, in each Division</i>	25
9	Common Lodging Houses	26
10	Houses Let in Lodgings, under Sanitary Act, 1866. .	<i>ibid.</i>
	<i>Table 7.—Number of Houses let in Lodgings...</i>	27

CHAPTER III.—*Marriages, Births, Vaccinations, and Deaths in 1866.*

SECTION		
1	Marriages	28
2	Births—Legitimate and Illegitimate	<i>ibid.</i>
3	Vaccinations	29
4	Deaths.....	<i>ibid.</i>
5	Deaths in each Division	30
	<i>Table 8.—Deaths in each Division in each Quarter.</i>	31
6	Burials	33
	<i>Table 9.—Interments at various Burial places.</i>	<i>ibid.</i>

CHAPTER IV.—*Causes of Death.*

	<i>Table 10.—Deaths from all Causes in each class and order of Diseases.</i>
--	--

SECTION		PAGE.
1	Rate of Deaths from all causes in 1866, as compared with 1852	34
2	Rate of Deaths from special causes in 1866, as compared with 1852	<i>ibid.</i>
3	Mortality in each of the six Divisions of Merthyr from particular Diseases	36
4	Mortality from Epidemic Contagious Diseases...	37
	<i>Table 11.</i> —Deaths in each Divisions from Contagious Diseases.	38
	<i>Table 12.</i> —Deaths per 1000 in each Division from Contagious Diseases. ...	39
5	Mortality from Tubercular Diseases.....	40
	<i>Table 13.</i> —Deaths in each Division from Tubercular Diseases, and Proportional Rate per 1000.	
6	Mortality from Diseases of the Lungs	42
	<i>Table 14.</i> —Deaths in each Division from Diseases of the Lungs,	43
7	Mortality from Accidents	45
	<i>Table 15.</i> —Deaths in each Division from Accidents.	<i>ibid.</i>
8	Mortality from Diseases of the Brain, of Nutrition, Childbirth, &c., and "Sudden Deaths"	47
9	Mortality in Union Workhouse	48
	<i>Table 16.</i> —Diseases, Ages, &c., of Deaths in Union Workhouse.	<i>ibid.</i>
10	Mortality of Illegitimate Children	50
11	„ from Epidemic Cholera	51
	A.—Origin of Last Epidemic	<i>ibid.</i>
	B.—Dates of first outbreak in South Wales	52
	C.—Outbreak in Merthyr	<i>ibid.</i>
	<i>Table 17.</i> —Dates, Residences, &c., of first cases.	
	D.—Sanitary Measures before Outbreak ..	55
	E.— „ „ during Epidemic ..	58

SECTION		PAGE.
11	F.—Extent of Epidemic—Number of Persons attacked.....	60
	<i>Table 18.</i> —Number of Cases in each week under treatment.	61
	G.—Deaths from Cholera and Diarrhœa in particular localities	62
	<i>Table 19.</i> —Comparative rate of Mortality in three last Epidemics	63
	<i>Table 20.</i> —Deaths in each Division	64
	J.—Influence of Age, Sex, &c.	67
	K.—Occupations of the Deceased.....	<i>ibid.</i>
	<i>Table 21.</i> —Occupations of Deceased	68
	L.—Ages at Death of Persons who Died of Cholera, &c	69
	<i>Table 22.</i> —Ages at Death, &c	70
	M.—Influence of Water	<i>ibid.</i>
	N.—Influence of Dwellings	72
	O.—Conveyance of Disease by Persons ..	73
	P.—Conveyance of Disease by Excretions of Sick	74
	Q.—Proportion of Deaths to Persons attacked	75
 CHAPTER V.— <i>Ages at Death.</i>		
SECTION		
1	Ages of Deceased at Seven periods of life.....	76
	<i>Table 23.</i> —Ages at Death—Population at different ages, &c.	<i>ibid.</i>
2	Mortality of Children and of Aged Persons, in 1848—53, and in 1866	78
3	Mortality of Children and of Aged Persons in each Division of Parish	79
	<i>Table 24.</i> —Rate of Deaths of Children in each Division.	81
4	Duration of Life in 1852 and in 1866.....	<i>ibid.</i>

SECTION		PAGE.
4	<i>Table 25.</i> —Average Age at Death in 1866.	82
	<i>Table 26.</i> —Number of Deaths at various ages—one day to one hundred years.....	83
CHAPTER VI.— <i>Sanitary Progress in 1866.</i>		
SECTION		
1	Water Supply	85
2	Sanitary Improvements	87
3	Sewage Distribution	<i>ibid.</i>
	Conclusion.....	89

APPENDIX.

No. 1.	—Details of Sanitary Inspection in 1866.	i.
„ 2.	— <i>Table 27.</i> —Deaths in each Class and order of Diseases.	xiii.
„ 3.	—Replies of Medical Officers to Sanitary enquiries.....	xvii.
„ 4.	—Abstract of Dr. Buchanan's Report on Merthyr	xxii.
„ 5.	—Extract from Report of Medical Officer to Privy Council.....	xxvii.

ERRATA.

Page 11	line 19	read	"accustomed."
" 16	" 34	"	"beneficent."
" 29	" 16	"	"1876."
" 86	" 17	"	"analyses."

SECOND ANNUAL REPORT ON THE
SANITARY CONDITION OF MERTHYR-TYDFIL,
FOR THE YEAR 1866.

CHAPTER I.

*Number and Occupations of the Inhabitants—Rainfall—Market
Value of Iron—Wages, &c.*

MERTHYR, 1st November, 1867.

TO THE CHAIRMAN AND MEMBERS OF THE
LOCAL BOARD OF HEALTH.

SECTION 1.—*Introduction.*

IN the various Quarterly Reports, and the single Annual Report that I have presented to you, I have been obliged to *estimate* the Population of the Parish. The conclusions founded upon such estimate have not necessarily been of so reliable a character as they would have been, had they been based upon the exact enumeration of a census.

In the report for the year 1865, I stated that I had had much difficulty in collating the different enumerations of the Population, 1st—of the *Union*; 2nd—of the *Parliamentary Borough*; and 3rd—of the *Registration District* of Merthyr-Tydfil; and thence forming a probable estimate of the Population of the *Parish*.

I regret to say that notwithstanding the care I took, I was led into over-estimating the number of inhabitants in the Parish in 1865 by nearly 1000. I must plead my inexperience in extenuation of the fault.

I have been privately favoured with information upon which a more correct estimate may be formed. Dr. George Buchanan having, by the direction of the Lords of the Privy Council, visited Merthyr in the autumn of 1866, and made himself acquainted with the general features of the Town and District; and having subsequently in preparing his Report to the Privy Council, inspected the official Returns of Births and Deaths in the office of the Registrar General, he constructed, and has sent me a copy of the Table, No. 1, from which it will be seen that the Population of the Registration District of Merthyr-Tydfil (that is the Parishes of Merthyr-Tydfil and Vaynor,) in the year 1865, is set down at 56,150. Deducting therefrom the probable Population of Vaynor Parish—3044—would leave to Merthyr 53,106, instead of 54,000, as estimated by me.

SECTION 2.—*Population of Merthyr.*

The Population of the Parish of Merthyr in 1866, starting from the 1st of January with 53,106, would be as follows:—

There were born in the course of the year 2124 children; in the same period 1376* deaths occurred; the difference, 748, is the natural increase of the people. This number added to 53,106, would give 53,854 as the Population of the District of this Local Board at the *end* of 1866.

It is usual in enquiries such as I have to report to you, to take as a basis for the calculations, the number of the people at that which it would be in the *middle* of the year; this basis is found by adding half of the *natural* increase of the population ($748 \div 2 = 374$) to the estimated population on the 1st of January: $374 + 53,106$ gives 53,480, as the probable number of people in the District on the 1st of July, 1866.

* Twenty-three Persons died in the Union Workhouse. These deaths will be deducted in some of the subsequent Tables, inasmuch as those persons were removed during their sickness from *other parishes* to the Workhouse.

TABLE I.

Population, Deaths from all Causes, and Death Rate per 1000 in the Registration District of Merthyr-Tydfil in 20 years, ending 1866.

The Statistics from 1847 to 1865, supplied by Dr. Geo. Buchanan.

Years.	Population.	Deaths.	Death Rate	Means of 5 years	Epidemics Prevalent.
'847	45016	1504	33.5	36.0	<i>Cholera.</i>
1848	46131	1144	25.0		
1849	47176	3003	63.8		
1850	48150	1278	26.6		
1851	49045	1521	31.1		
1852	49856	1490	30.0	31.2	Typhus, Small-pox, Measles.
1853	50579	1525	30.4		
1854	51209	1992	38.9		
1855	51741	1606	31.1		
1856	52175	1355	25.9		
1857	52507	1397	26.3	28.7	Typhus, Small-pox.
1858	52733	1887	35.7		
1859	52855	1574	29.8		
1860	52869	1398	26.4		
1861	52778	1345	25.4		
1862	53600	1331	24.8	26.5	None. Measles.
1863	54400	1387	25.5		
1864	55100	1410	25.5		
1865	56150	1738	30.9		
1866	56950	1451	25.5		

Mean Rate of Mortality—first 5 years ... 36.0
 " " last 5 years ... 26.5

Diminution in Death Rate per 1000 9.5

NOTE.—The mean number of the population for the last period of five years was $55\frac{1}{4}$ thousands; the mean death rate for that period was less by $9\frac{1}{2}$ per 1000 than in the first five years:— $55\frac{1}{4}$ multiplied by $9\frac{1}{2}$ gives 525, this would be the saving on each year; multiply by 5, and you have 2625, as the economy of human Life in the last five years as compared with the rate of Death in the first five years.

SECTION 3.—*Sanitary Inspection of Residences of the People.*

In August, 1866, I represented to you the great need there was of a regular inspection of the *habitations* of the people, having regard to their fitness or otherwise in a sanitary point of view. After consideration you directed that four intelligent persons should be employed to make the inspection. The persons selected, Messrs. Edwards, Beddoe, Howells, and Bevan undertook the work, and did it most satisfactorily.

The enquiry was directed to the following heads:—In every street, the number of each house, the names of owner and of occupier, the number of occupier's family, and of persons lodging in the house, were carefully noted down. The means by which each house was ventilated were recorded:—whether by back doors opening into yards or courts, or by windows whose upper sashes could be freely opened. The water supply, whence derived; the privy accommodation, if any, and the state thereof; the back yards, whether clean or not; the existence of manure heaps or other nuisances on the premises, or in the neighbourhood:—all these are separately recorded under their respective headings.

The results of the investigations are given in ten books; the Tables in the appendix, which I have compiled from them, pourtray the actual condition of the Habitations of the People of Merthyr.

Following out the totals in each column, it will be observed that in the streets recently built, all the requirements of a healthy residence have been supplied by the owners; on the contrary a great deficiency of those buildings and openings necessary for the health of the occupiers, will be noticed in the older houses and cottages in the parish.

These it has been, and will be your desire to have improved. When the Main Drainage now in progress shall have been completed, you will be able to require the building of Conveniences; and as in a great number of cases, these can be placed on the un-

occupied ground at the backs of the houses, the doors made for communications will afford the means wanted for thorough ventilation.

The provisions of the Sanitary Act of 1866, with regard to Houses let in Lodgings, or occupied by members of more than one family, will I believe be of great value; as I think it will be advantageous to cottage proprietors to convert two-roomed back to back Cottages, (which cannot be licensed under the regulations which you have made,) into four-roomed well-ventilated Houses, to whose occupiers your license to take in lodgers may be safely granted.

Gradually these improvements will be effected under your directions; gradually the sources of disease will thereby be removed; and in a few years you will, I feel assured, be able to point to the low average mortality of the people as the happy result of your labours.

SECTION 4.—*Occupations of the Population.*

I fully purposed working out from the Census Tables the numbers of the people of either sex engaged in the several occupations, (as given in those Tables,) resident in the Parish of Merthyr; with the intent to show, 1st—The numbers of the persons engaged in each occupation, and of their families; 2nd—The numbers of those who died, their ages at death, and the causes of death.

I have worked out the latter part of this labour, and in four Tables should have been able to give numeral information as to occupation, age, and cause of death. But I lack a basis on which to found my calculation as to the first part of the work:—the number of the “household,” and how it is made up. It would be easy to work out the number of males and females in the various occupations, included under the eighteen great divisions as given at pages 112 to 118 in part 2 of the Census Tables, division 11, but at present I am utterly foiled in my attempt to apportion the numbers *who are dependant upon the persons so engaged.*

To make my object understood, I would say that it was my desire to demonstrate the proportional rate of mortality of the males, of the females, and of the children of those whose occupation was, for example, that of "Coal miner." To show how many children of colliers died under five; how many, say, of infantine consumption; how many colliers above 20 years died of "phthisis;" how many from "accident;" and so on for other diseases: and working out similar proportional rates for other "occupations" for the like diseases, to be able to lay before you and the public, Tables wherein you might see for yourselves, among what class, at what age, and from what disease the rate of mortality was highest or lowest. In following out the plans set before me in the admirable Report on Edinburgh, by Dr. Littlejohn, and in those on the District of St. Giles', London, by Dr. George Buchanan; I have in the succeeding pages worked out the *proportional rates of mortality in six Divisions* of the Parish; and thereby have shown that the *duration of Life is less* in some than in others; but these deductions will only prove that the sanitary state of the *House or its appurtenances*—(Street, Garden, Cesspool, &c.)—is better in one neighbourhood than another. I wish to carry the enquiry further; I want to know and to show, whether the collier, his wife, or his child, is or is not more prone to any one or other disease, than his next door neighbour the iron-worker, or the tradesman he deals with, or the iron-master he works for.

I believe I should be able to show this, if I could overcome the difficulty which at present foils me. In the Census Tables the number of the persons of different occupations is fully and plainly set out, but under order 4, page 112 of the Table alluded to, I read: "Son, Grandson, Brother, Nephew, Scholar;" and of these the numbers living in 1861, in the *Borough* of Merthyr are given at, under 20, 13,320, above 20, 52. So again with regard to females; under the same order, page 116, "Wives, Widows, Children, Scholars" are given at, under 20, 16,519, above 20, 16,182. It is impossible for me at present to apportion the proper number of *each* of these individuals to *each* "occupation." If I could,

I should be able to form that which is, I think, the right unit to work on—namely, the “household.”

It will be apparent that in a sanitary enquiry it is important to know of what the “household” is made up. The disease may be peculiar to the occupation, and the fatality from it would be brought out by a knowledge of the age, sex, &c., of the worker; but the diseases afflicting the other members of the “household,” would bear a relation to their means and mode of living, and to the healthiness of the dwelling-place; these are matters into which a Medical Officer of Health should enquire.

At present then I will only lay before you a corrected Table of the number of persons, males and females, engaged in the staple works of this District; but I will hope ere I again report to you, to be furnished with some acknowledged rule, by which I may attach to each “occupation” the due number of family dependant thereon, forming the household.

TABLE II.

Estimated number of People employed in Iron and Coal Mines, and in Ironworks, in 1866, in Merthyr.

Total estimated Population of Parish, on 1st July...53,480.

OCCUPATION.	MALES.			FEMALES.			TOTALS.
	Under 20 yrs.	20 years and upwards.	Total Males.	Under 20 yrs.	20 years and upwards.	Total Females	
Coal Miners	2090	4525	6615	107	113	220	6835
Iron-stone Miners ...	380	1516	1896	...	...	...	1896
Iron Makers	916	3201	4117	211	177	388	4505
Craftsmen, Quarry- men & Labourers }	244	1545	1789	94	82	176	1965
	3630	10787	14417	412	372	784	15201

SECTION 5.—*Distribution of Population in Six Divisions of Parish.*

For the purposes of this enquiry into the sanitary state of the Town, I have, in the Tables and Sections which follow, divided the whole Parish into six Sub-districts, or Divisions. These will be more fully described in the chapter on the Sanitary Topography of the Parish. I think it however best to place here my estimate of the Population in each of these Divisions; and in order to found bases on which to calculate the proportional rate of mortality in each of these Divisions, I have further estimated the populations of each at different ages. The materials for forming these estimates I have obtained from the Census Tables.

TABLE III.

Estimated Population in each of the Six Divisions of the Parish, on 1st July, 1866.

DIVISION.	Elevation above Sea Level.	Age under 5 years	Age 5 and under 10.	Total under 10 years	Above 10 years	TOTAL.
	Feet					
1 Dowlais	825 to 1187	2398	1824	4222	11198	15420
2 Penydarran	702 to 825	656	494	1150	3030	4180
3 Tydfil's Well ...	560 to 671	1087	823	1910	5050	6960
Total Upper Merthyr		4141	3141	7282	19278	26560
4 Merthyr	540 to 1280	2089	1700	3789	10591	14380
5 Gellydeg	560 to 1100	932	708	1640	4320	5970
6 Troedyrhiw	454 to 800	994	745	1739	4631	6370
Total Lower Merthyr		4015	3153	7168	19552	26720
7 Workhouse Pa- rishioners ... }		18	9	27	53	80
Non-Parishioners		27	13	40	80	120
Inhabitants of whole Parish		8210	6316	14517	38963	53480

SECTION 6.—*Number of Paupers in 1866.*

The Half-yearly Abstracts published by the Board of Guardians, present in their admirably arranged Tables, data on which to found conclusions as to the increase or diminution of the number of the poor and thriftless, who, temporarily or permanently, are dependent upon the well to do and careful, for their means of living.

TABLE IV.

Number of Paupers Relieved.

YEARS.	Total Relieved.	Mean Number ^o	Vagrants.
1851—March	5607	5527	1598
„ September .	5447		
1862—March	3385	3450	1877
„ September .	3518		
1866—March	2962	3378	2238
„ September .	3794		

In the above it will be seen that the mean number of persons who received relief in 1851 was 5527. It is to be borne in mind that this was the second year after the great cholera epidemic of 1849; that many of the widows and children of those who died in that year were “on the Parish,” and that the relief was wholly “out door.” The relation which the above number of Paupers would bear to the population of the parish at that time was one in *eight and a half*.

^o As a large number of the poor were in receipt of relief during the whole year, and their names would therefore appear in *each* half-yearly list, it is thought that by adding the sums of each half-year together and dividing by 2, the mean number obtained will fairly represent the number who received parish relief.

In 1866—a cholera year—the number relieved was 3378, a number less than that in 1851 by 2149. The proportion to population was *one pauper to 15½ well-to-do*.

Sickness and its consequence—death, are the great causes of pauperism; with a diminution of the *causes* of sickness the results, disease and inability to labour temporarily or permanently, should also lessen. The above figures show that a considerably less number of persons were incapacitated from labouring in 1866 than in 1851—that this improvement was owing to a *diminution of the number afflicted with disease*, by the *removal of the causes of disease*, will, I trust, be plainly shown in the following pages.

It is requisite that I should here call your attention to the largely increased number of “Vagrants,” as shown by the figures under that head. In 1851, 1598 Trampers were relieved—in 1866, 2238. The relief given is a night’s lodging at a “Registered Common Lodging House.” These houses are under the supervision of your Inspector, Mr. Wrenn, who has frequently reported to you the exceedingly imperfect state of their sanitary arrangements.

SECTION 7.—*The Weather, Temperature, Rainfall, &c., in 1866.*

1st Quarter.—The mean Temperature in the month of January was 44°. Rain fell on 24 days to a depth of 9·51 inches. On six days the temperature was below freezing point. In February there was rain on 21 days to a depth of 7·01 inches, while the mean temperature was 42·3°. Snow fell on four days. In March it rained to a depth of 3·80 inches on 12 days. The mercury in the Thermometer was below freezing point on 13 nights; the lowest range—24°, was in the night of the 14th. The mean temperature of the month was 42·0°.

The total Rainfall of the Quarter was 20·32 inches.

2nd Quarter.—The east wind prevailed on 12 days in the month of April, causing clear skies and cold weather. Rain fell on 15

days, but only marked 2·85 inches. The mean temperature of the month being 52°.

May was characterized by dry east winds on 17 days ; it rained (1·03 inches) on eight days ; the mean temperature was 56°. In June also the rainfall (4·34 inches) was below the average ; the mean temperature was 66°. On the 26th and 27th respectively the thermometer in the sun marked 110° and 118°.

The total Rainfall of the Quarter was 8·22 inches, and the mean temperature 58·5°. The absence of the usual amount of rain in May and June occasioned a diminution in the crop of hay.

3rd Quarter.—July was an exceedingly fine month. On 21 days there were cloudless skies ; it rained on 10 days (2·64 inches), the mean temperature being 66°. August was throughout a showery month, rain fell on 22 days to the depth of 3·82 inches. The mean temperature was 62°. The wind throughout the month was from the west, and on the 21st, after a succession of warm days and nights, and slight rain, a blue mist was observed in the valley. It was noticed on 15 days out of 44, from the 21st of August to the 4th of October. This mist I have been accustomed to observe in this valley, whenever warm days supervened upon slight showers of rain. I remark it here as this was the period during which the fourth epidemic of cholera prevailed in Merthyr. September was a month of almost continuous rainy days ; rain to the depth of 11·4 inches fell on 28 days. Westerly winds blew on 28 days. The mean temperature of the month was 57°.

The total Rainfall of the Quarter was 17·86 inches. The mean temperature being 61·9°.

4th Quarter.—October was a month of clear fine weather. It rained slightly (1·3 inches) on 14 days. The mean temperature being 55·7°. In November fine weather prevailed on 15 days ; the rainfall, 2·78 inches, was below the usual average for this month ; the mean heat was 47°. In December the amount of rain in 20 days was 6·21 inches ; the temperature of the month 45°. On the last day of the year the thermometer marked 32°.

The total Rainfall in the Quarter was 11·99 inches, and the mean temperature 49·3°.

During the year it rained on 204 days, to a depth of $58\frac{1}{3}$ inches. The Rainfall in 1865 was $50\frac{1}{3}$ inches.

TABLE V.

Rainfall and Temperature in Merthyr-Tydfil.
1866.

Rain Guage (Casella's), Diameter of Funnel, 6 inches ; 2 feet above Ground, 550 feet above Sea.

Month.	Days.	Days of Rain.	Rainfall in		Mean Temperature.	
			Month.	Quarter	of Month	of Quarter.
January	31	24	Inches 9·51	Inches 20,32	44·0	42·8
February	28	21	7·01			
March	31	12	3·80			
April	30	15	2·85	8,22	52·53	58·5
May	31	8	1·03			
June.....	30	15	4·34			
July	31	10	2·64			
August	31	22	3·82	17,86	62·7	61·9
September	30	28	11·40			
October	31	14	3·00			
November	30	15	2·78	11,99	47·0	49·3
December	31	20	6·21			
	365	204		58,39		

SECTION 8.—*Market Value of the Staple Product of the District, Iron, average Wages, and average Prices of Provisions.*

The price of Iron Bars, free on board at Cardiff, was in 1862, £6 2s. 6d. ; in 1865, £7 10s. ; and in 1866, £6 4s. 6d.

The wages of *skilled adult* workmen in 1862 averaged 24s. 2d. per week; in 1865 29s. 2d. ; and in 1866 about the same amount. In the early part of the year a reduction of wages took place, this affected the labourers and young persons, but the amount earned weekly by the skilled adult working man was not notably diminished.

The prices of provisions were higher in 1866 than in 1865. Flour in 1865 was 32s. 2d. the sack, in 1866 40s. 4d. Potatoes 4s. 7d. in 1865, 3s. 9d. in 1866 the hundred-weight. Beef and mutton increased in price per pound from 6½d. to 7½d. Bacon also ranged 1d. a pound more. A short hay crop, and the prevalence of the Cattle plague doubtless occasioned this excess.

The rents of four-roomed Cottages, with water supply, increased from an average of 8s. 6d. to 9s. 6d.

Reviewing the health of the people in relation to the money value of their labour, and the amount of food obtainable by a proper expenditure of their earnings, it may be observed that, though many might have to endure some curtailment, yet that each industrious and careful working man could earn sufficient to keep himself and family in comfort.

CHAPTER II.

Sanitary Topography of Merthyr-Tydfil.

THE Parish of Merthyr-Tydfil, situate in the north-eastern part of the County of Glamorgan, is seven miles in length from south to north. At its lower end it is narrowed to a width of half a mile, and gradually expanding becomes at its upper part five miles wide. It contains an area of twenty-seven square miles.

The river Taff, which is formed by the confluence of the great and lesser Taff rivers at the northern boundary of the parish, runs in a deep valley through the centre, in its course to the sea at Cardiff. The Hills rise on each side to a height, at the southern extremity, of 600 feet, gradually increasing to 1200 feet above the sea level.

The lower narrow part of the parish is, as yet, wholly devoted to agriculture, while over almost the whole of the wider upper portion level tunnels have been driven, or deep shafts sunk, into the different strata of coal and ironstone. Furnaces for smelting the iron ore, mills for rolling the metal into rails and bars, are spread over a large portion of the surface. A still wider part is covered by tips of mine shale from the underground workings, and of refuse cinder from the Iron Works.

Placed on the northern edge of the Coal-bearing Limestone Basin, where the veins of coal and of ironstone crop out at sharp angles, the place has grown from an obscure village clustered about the Church, to a wide-spread Town. Each great Iron-work as it sprang up gathered around itself the residences of the men employed. We can thus divide the Parish into the Division of Merthyr;—the Old Village much enlarged and still the residence of the chief purveyors of food and of clothing; the Division of Gellydeg, in which principally reside the workmen employed in the Cyfarthfa Iron Works; and the Division of Troedyrhiw, where

the iron and coal workers employed by the Plymouth Iron Company and many Cyfarthfa colliers live.

These divisions form the southern Registration *District* of Merthyr Lower; it covers an area of some twenty square miles.

Crossing the Morlais brook to the north of Merthyr, we enter the northern Registration *District* of Merthyr Upper. The area would be about seven square miles.

We have first the Division of Tydfil's Well, occupied for the most part by the iron workers of Cyfarthfa, but besides to these, it gives homes to very many of the poorest of our people. Next Penydarran, on the north-east of Tydfil's Well and north of Merthyr, is placed on a sunny hillside which slopes rapidly down to the Morlais brook; this division is tenanted chiefly by miners and colliers employed in the Dowlais Iron Works. Lastly Dowlais, a town in itself, still more to the north and east, separated from Penydarran by the deep ravine of the Morlais, and formerly also isolated from Merthyr by a deep gorge in which the Dulais ran, spreads itself widely over the steep bank whose fall is from the north-east to south-west.

Bearing in mind the elevation of the different places named, the amount of Rainfall, and the recent formation of the Town, it would seem that a place thus situated would be clean and healthy.

Unfortunately it has not proved to be so; a high average rate of death, gradually increasing with an increasing population, (an addition which, in my report for 1865, I demonstrated arose from the influx of healthy country people from other districts of the land, and not from the growth of the population itself,) until in this Welsh upland valley, freely exposed to the genial influences of sun and of rain, the rate of mortality of the people rivalled that which obtained in the close cellar dwellings of Liverpool, and the crowded dens of Manchester. The average age at death in 1852, in Liverpool was 17 years; in Manchester 18; in the same year in Merthyr it was $17\frac{1}{2}$ years. Well might your first Officer of Health, the late Dr. William Kay, ask, "What has Merthyr in common with

Liverpool, that it should thus be closely linked with the most unhealthy town in the Kingdom?"

Primarily the sicknesses which thus rendered the span of human life so brief, were occasioned by the faulty construction of the houses, and by the absence of those conveniences and those requirements which should be supplied, when large masses of men are drawn together to particular neighbourhoods.

The houses are built of a porous sandstone, on foundations of unmortared stone, with floors of paving stone laid on the soil after the removal only of the sod; the lower floors are always damp and cold, hence arise many forms of sickness. If occupied soon after they are built, a form of Typhoid Fever affects the inmates, while the coldness and dampness of the stone floors occasion many illnesses, more especially to children and females, who are constantly subject to these depressing influences.

In a large number of instances, there were no back doors or windows, hence the absence of that thorough ventilation which is needed to carry off the impurities exhaled by the inhabitants. Conveniences were rarely attached to the residences—the ash-heap received the excretions, which putrified in front of the house. Water was only to be had at a few springs—it was very impure, ranging from 15 to 24 degrees of hardness, much of which was due to the presence of magnesia.

Happily since the formation of this Board of Health matters have changed.

Houses were required to be built in such a way, that full currents of air could pass through them; the proper drainage of the subsoil was provided for, the foundations were required to be made damp-proof, a supply of water of the purest kind and in unlimited quantity has been afforded; while the sewerage and drainage now in progress will effect a most desirable improvement, by abstracting the superfluous water from the subsoil, in which houses have been built.

The beneficent results of these improvements it will be my happy duty to set out in these pages.

A.—DISTRICT OF UPPER MERTHYR.

The District of Upper Merthyr is formed of the north-eastern portion of the parish, which as I have said, covers an area of about seven square miles.

The surface on which Houses have been erected in Dowlais, Penydarran, and Tydfil's Well, lies on the rock named Conglomerate, or Pudding Stone. To the north the Carboniferous Limestone crops out, forming the lofty elevations of Morlais Castle and Twynaugwynion. It is bounded on the west by the Taff river; on the south by the Morlais brook; on the north by the lesser Taff; and on the east is joined on the high ridge (1200 feet) by the confines of the parish of Gellygaer.

The population is about 26,700.

SECTION 2.—*Division of Tydfil's Well.*

The Division of Tydfil's Well lies on the east bank of the Taff river. A large number of the streets are laid out very irregularly on the flats, some ten feet above the river bed—which is here 560 feet above the sea. The dwellings are small, many in a most dilapidated condition, huddled together, occupied by people of the poorest and dirtiest class, and, as will be seen in the following sections, they are the most unhealthy.

Above these flats the land rises sharply from 30 to 100 feet. The streets and houses in Brecon road (600 feet) and Grawen terrace (671 feet) are well arranged and well built. The subsoil is here formed of pebbles and boulders of the underlying conglomerate stone; it is very permeable to water, and the drainage is therefore rapidly effected. This portion is very healthy.

The streets in this division number 46; the numbered houses, 1151. 570 houses had back doors, 581 were without thorough ventilation. 832 residences had conveniences—in all cases with cesspools; 166 of these were full to overflowing. 319 houses need the erection of these conveniences. 1138 houses were supplied with water from the water works; 10 were without water; while three had the supply from wells. The water in these wells is pol-

luted with sewage; at one of the houses at which it was used, it had long been noticed that it was very offensive to smell and taste when it had been kept a day; nevertheless it was used daily during the cholera epidemic. The householder, his wife, and his only child were attacked by the disease—he died.

SECTION 3.—*Division of Penydarren.*

Penydarren Division lies on the side of the sloping ground on the road to Dowlais, east of Tydfil's Well. Conglomerate is here also the basis. Broad bands of clay run across the upper surface of the rock, the intervening portions being covered with pebbles and boulders. Springs of water well up at many points on the surface, causing the whole subsoil to be damp.

It practically consists of two long parallel streets. The western extremity at Penydarren office 702 feet, the upper at Gellyfaelog bridge 825 feet, above the sea. The streets run from south-west to north-east. The ground in the upper line of street is some 30 feet above the lower line.

There are 16 named streets or rows of houses, having 812 inhabited cottages. 470 only have back doors, thus 342 have no thorough ventilation. The number of houses having conveniences is the same as that of the houses with back doors; thus 342 conveniences will be needed here. 151 of the 470 cesspools were reported to be full. It is to be noticed in this division that the privies are placed at the upper end of the gardens, that the flow of the subsoil water is towards the brook below, and that the houses are at a lower level than the base of the cesspools. I attended the workmen of the Dowlais Iron Company residing in this division for ten years. I had frequent occasion to remark upon the severity of the symptoms which accompanied epidemic diseases, and I was able to connect those unfavourable forms of disease with the poisonous emanations from the sewage water draining towards and under the houses.

774 houses had the water tap in the house or near, 31 had no water, while seven derived their supply from a spring of very questionable purity.

SECTION 4.—*Division of Dowlais.*

The Division of Dowlais commences at Gellyfaelog bridge (825 feet), and the streets spread as parts of a wide extended fan over the rounded hillside, which slopes gently on the north-west to the Morlais brook, and more abruptly on the south-east to the Dulais brook. The highest points to which the connected streets ascend are 1127 feet at Ivor town, and 1187 at the Turnpike gate at Top of Dowlais.

The underlying rocks are the Pennant and Conglomerate; here also broad bands of adhesive clay cross the hillside; while disintegrated iron-mine rock, and pebbles of the conglomerate form the subsoil.

The streets have been laid out with commendable regularity, but unfortunately no drains were made to carry off the water of the subsoil. Necessarily the foundations of the houses are very damp.

In the 67 streets of Dowlais there are 2915 houses. 1930 houses had back entrances, in 2679 the windows have been so made that the upper sashes can be opened. The conveniences numbered 1295—there will be required to be made for the decent accommodation of the inhabitants 1620 privies. The cesspools of 105 were full.

The water supply had been laid on to 2662 houses; no well water was used; but 251 houses had no water supply. Pengarnddu is nearly a mile from, and is above, the reservoir at Dowlais. Some residences in the town have escaped being supplied.

The elevated situation of Dowlais, the dampness and therefore coldness of the subsoil, the large amount of rainfall,—these have conduced to render it a place particularly unhealthy. In the main sewers and lateral drains now being formed, a means is supplied which will greatly improve the sanitary condition of the people; for while the sewers will carry off both sewage and surface water, the cuttings in which they are placed will permanently act as drains for the water of the subsoil. An early result will, I think, be a diminution in the number of cases of sickness.

B.—DISTRICT OF LOWER MERTHYR.

The District of Lower Merthyr, includes that portion of the Parish south and west of the district above described. It covers an area of 20 square miles; the population in August being about 26,780. For the purposes of this enquiry I have formed it into the divisions of Merthyr, Gellydeg, and Troedyrhiw.

SECTION 5.—*Division of Merthyr.*

The Division of Merthyr is south of the Morlais brook, east of the Taff river, and north of Nantybwech.

The base of the Parish Church is 540 feet above the sea, and 20 above the river bed; the division extends upwards for two miles along the hill-side to the east, and to the highest point of the ridge of mountain at Twynywaun, 1280 feet above the sea.

The older and larger number of the houses have been built in the somewhat level fields along the river bank; more recent habitations have been erected in Thomas Town and Twynyrodyn, at an elevation of from 150 to 250 feet above the foundation of the Parish Church. While many isolated rows of houses are to be seen spread here and there on the hill-side.

Merthyr lies immediately on the northern edge of the Coal Basin. Veins of coal and ironstone crop out along the hill-side. Sandstone rocks of varying thickness separate the coal measures. Clay beds are frequent.

The streets of Merthyr number 103; the houses 2797. The number of double houses, those which have no back-let, is very great, 1378; thus only 1419 have thorough ventilation. The number of conveniences is 1653; thus 1144 water-closets will be needed in this division. In 228 instances overflowing cesspools are recorded.

Water has been supplied to 2525 houses. In 171 instances there was no water supply; while in 101 residences the hard water obtained from wells sunk in a soil contaminated with sewage, is most unwisely used.

SECTION 6.—*Division of Gellydeg.*

The Division of Gellydeg is west of the Taff river, north of the Vale of Neath railway, and south of the Ffrwd brook; and extends upwards to the ridge of the mountain chain (1100 feet), joining the eastern boundary of the parish of Aberdare.

George Town, Ynysfach, and Rhydycar are on an average 30 feet above the river bed, while Gellydeg, Clwydyfagwr, and Penrheolgerrig are placed two, three, and four hundred feet above the Taff.

The northern third of this Division lies on the Conglomerate rock; the southern two-thirds on the Coal formation.

There are 43 streets or rows of houses in the Division. 1085 houses were inspected. 591 had back entrances, leaving 494 without thorough ventilation. The houses have been more recently built than many in the town, as is shown by the fact that 993 have the means of thoroughly ventilating the bedrooms. The conveniences number 610; 475 closets will have to be made. 70 cesspools reported to be full.

868 houses were supplied with water; 185 had no proper supply, but many of these were beyond the range of the water-works system. In 32 houses pump water was used.

SECTION 7.—*Division of Troedyrhiw.*

Troedyrhiw Division is the largest in extent, but least populous. It extends from Nantybwh, the southern boundary of Merthyr, and from the Vale of Neath Railway, the southern boundary of Gellydeg, to the lowest point of the parish at Goytre Coed—its eastern and western boundaries being the elevated ridges where it joins the parishes of Gellygaer and Aberdare.

The parts populated lie near the river bank: Abercanaid on the west bank, with 346 houses, and Pentrebach and Duffryn on the east, with 248 houses are the more northerly; while Pontyrhun on the west and Troedyrhiw on the east, with 188 and 338 houses respectively, are grouped near the bridge which there crosses the river.

It is placed wholly on the Coal formation, the strata of which are reached by deep pits.

Pontyrhun is 454 feet above the sea. The valley is here very narrow, and the hills rise to at least 400 feet above the bridge.

The Division contains 49 streets or rows, consisting of 1120 numbered houses. The lower part of the division being principally agricultural was not examined by your visitors. 816 of the houses have back doors; 304 therefore are without thorough ventilation. 867 have conveniences; the cesspools in 73 instances are reported as full. 253 closets would appear to be required.

1023 houses have water supplied to them; 50 have none; while 47 derive it from wells.

SECTION 8.—*Summary of Inspection of Houses, &c.*

The total number of streets or rows of houses, in the portions of the parish inspected by the visitors appointed in August, 1866, was 324: the houses examined numbered 9880.

The number of inhabited houses assessed to the Poores' Rate in October, 1866, was 10,753. 164 were represented as vacant. I would here call attention to what I know to be a fact. Very many four-roomed houses rated to the relief of the Poor as *single* tenements have been, by closing the doorway between the front and back lower rooms, converted into *two dwellings* occupied by *two separate families*. In the examination made under your direction, each of these houses would figure as a distinct tenement; whereas in the Poor rate assessment they would continue to be rated as one. Doubtless the conversion of a single thoroughly ventilated tenement into a double house without ventilation, is a violation of the regulations of this Board, and is further a matter which calls for enquiry and correction.

Bearing in mind that a considerable deduction must be made from the number of houses *visited*, to bring them in correspondence with the number of houses *assessed*, also that many houses were made tenantable, and were tenanted in 1866, that had been long vacant, and remembering also that beyond and outside of the dis-

tricts examined by your visitors, there are many farm-houses, farm labourers cottages, isolated dwellings, and rows of houses occupied by workmen employed in certain small collieries, I think I may justly put down the number of houses that were *not* examined in August, 1866, at 1600. The population of these houses I estimate at 7932 persons. The number of occupants of the Union Workhouse in the same month was 200; these sums added to the population as numbered, 45,348 would give 53,480 as the probable number of the people in the parish of Merthyr-Tydfil in July, 1866.

Of the 9880 houses examined, 5796 are reported as having back doors, while 4084 are not thus thoroughly ventilated. 7293 had bedroom windows whose upper sashes could be opened; thus 2587 houses were without the proper means of ventilating the up-stairs rooms.

Here, as in many other instances, I must ask you to recur to the advice given you in 1854 by your skilled temporary Officer of Health, the late Dr. William Kay; he says:—

“The most striking features of vicious construction are in the instances of houses built *back to back*, or *under and over*, or of single or several habitations erected with high ground in their rear, frequently abutting against the walls, or rising to a level with their roofs. Others again, to the extent of whole rows without back-lets or communications of any kind externally. The most unwholesome dampness, and an extremely impure atmosphere, both acting most injuriously on the health of the unfortunate inmates, are the inevitable consequences of such ill advised erections. Comparatively few of the windows allow of being *opened at the top*, and from their generally small size admit a very inadequate portion of light.”

“In all cases where it is practicable, and there are few where it is not, the existing impediments to a current of air through such premises, be they walls, boarding or what not, should be removed, and openings as large as local arrangements permit, be thus effected in front and rear.”*

* See Report on Condition of Merthyr, &c., pages 59 and 67 (1854).

Proceeding with a reference to the abstracts of the labours of your visitors, you will observe that 5727 houses had privies with cesspools attached, of these latter 793 were reported as being *full to overflowing*. 4153 houses have to be provided with conveniences.

The evil influences of such masses of putrifying filth, as these cesspools contain, are too well known to require comment. Happily ere long the completion of the system of sewers and tubular drains will afford the means of removing these pernicious sources of disease.

Water was supplied from the public water works to 8990 tenements ; 698 had not any assured supply. I am aware that in many cases the supply has been subsequently laid on, in other instances the residences are beyond the reach of the mains. 190 houses are reported as deriving their water from wells and springs.

In concluding this portion of my report, I may be allowed to say of the Returns I have now summarized, that the details they give of the condition of each house examined will remain of value, until each particular residence shall have been put into a perfectly sanitary state. The laws passed give to you ample powers to effect the improvements, and we may rest assured that those powers will be judiciously used.

TABLE VI.

Abstract of Returns of District Inspectors, showing Houses, Population, &c., &c., in Merthyr-Tydfil Parish in August, 1866.

DIVISIONS.	STREETS.	HOUSES. No.	INHABITANTS		VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.			
			Family.	Lodgers.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.	
<i>Upper Merthyr :</i>												
1 Dowlais.....	67	2915	12238	1920	1930	2679	1295	105	2662	0	251	
2 Penydarren ...	16	812	3420	109	470	755	470	151	774	7	31	
3 Tydfil's Well .	46	1151	4778	311	570	875	832	166	1138	3	10	
Total	129	4878	20436	2340	2970	4309	2597	422	4574	10	292	
<i>Lower Merthyr :</i>												
4 Merthyr	103	2797	11303	1304	1419	1172	1653	228	2525	101	171	
5 Gellydeg	43	1085	4387	243	591	993	610	70	868	32	185	
6 Troedyrhiw ...	49	1120	5027	308	816	819	867	73	1023	47	50	
Total	195	5002	20717	1855	2826	2984	3130	371	4416	180	406	
TOTALS.....	324	9880	41153	4195	5796	7293	5727	793	8990	190	698	
Houses outside of Divisions exam'd		1600	7932									
Workhouse		1	200									
Lodgers			4195									
		11481	53480									

SECTION 9.—*Common Lodging Houses.*

During the year 1866, your Inspector, Mr. Wrenn, reported to you that he had duly visited the Registered Common Lodging Houses, and had also frequently inspected houses in Dowlais and Merthyr in which lodgers were taken. In some instances of overcrowding, convictions had been obtained. In his report he called your attention to the facts which he had very frequently brought before your notice, that very few Common Lodging Houses had those conveniences, and that fullness of ventilation, that they needed. He expressed his strong opinion that the keepers of those houses should be made to supply these requirements.

From a perusal of the statements contained in the Sanitary Inventory of the Town (already frequently alluded to), and from my own knowledge of the state of these Registered Common Lodging Houses, coupled with the fact, as stated under the head of "Pauperism," that 2238 tramps received in 1866 at the parish cost, a night's lodging in some one or other of these registered Lodging Houses, I beg most earnestly to press upon you the great necessity there is for a thorough inspection, and a complete revision of those which are licensed. I recommend that, through Mr. Wrenn, your Inspector, notice to provide thorough ventilation, proper drains, and closets be served upon all who are unprovided with these necessaries.

It should ever be borne in mind that the mendicants who tramp from town to town, living in low, uncleanly, and unhealthy Lodging Houses, *are the persons who spread contagious diseases from place to place.*

SECTION 10.—"*Houses Let in Lodgings,*" under Sanitary Act, 1866.

Soon after the passing of this Act, in August, 1866, your Clerk by your direction, made the necessary application to the Secretary of State, to have the 35th section made applicable to Merthyr-Tydfil. This was granted. I then proceeded to ascertain from the Returns of the Inspectors the number of houses let in lodgings,

and the number of lodgers in each. The abstract which follows was presented to your Board. Regulations were subsequently compiled; an account of these, and of their working, will be laid before you in the report for 1867.

TABLE VII.

Number of Houses Let in Lodgings, including Common Lodging Houses.

Lodgers.	Houses.
One	1008
Two	616
Three	263
Four	133
Five	57
Six	27
Seven	16
Eight	6
Nine	2
Ten	1
Twelve	1
Sixteen	1
<hr/> Total of Houses in which } Lodgers are taken } 2131	

CHAPTER III.

*Marriages, Births, and Deaths in the Parish of Merthyr-Tydfil,
in 1866.*SECTION 1.—*Marriages.*

THE number of Marriages which took place in the parish in 1865 was 693, they increased to 713 in 1866. Of these, 633 were performed in the presence of the Registrars of Marriages.

The proportion of marriages for all England in 1866 was, to every 100 persons living, 0·874. In Merthyr the proportion would be (as 53,480 : 713 : : 100) 1·330.

The marriages are therefore 0·456 in excess of the average for all England.

SECTION 2.—*Births:—Legitimate and Illegitimate.*

In 1865 the Births numbered 2206; in the past year 2150 were registered: a diminution of 66.

Of these 1074 males and 974 females = 2048 were born in wedlock; while 50 male and 52 female children = 102, were illegitimate.

The proportion of illegitimate to legitimate births is 1 to 21.

The annual rate of births to 100 persons living, for all England, was in 1866, 3·55; in Merthyr the average birth rate was 4·03. The birth rate therefore in Merthyr was 0·48 per cent in excess of the average.

The proportion of children born out of wedlock (as stated in the last report of the Registrar General, that for 1864) was, on the mean of 28 years, for all England, for every 100 births, 6·4 illegitimate; all South Wales, 6·6.

The above number of illegitimate births in Merthyr (102 out of 2150) would give to every 100 births, 4·7 illegitimate.

Recurring to the fact mentioned in the paragraph relating to marriages, it will probably be conceded that the facility of entering into wedlock by means of the civil marriage in the presence of a Registrar (of which facility *six* out of *seven* couples availed themselves,) has materially conduced to the above result.

SECTION 3.—*Vaccinations.*

The number of children Vaccinated by the Public Vaccinators in this parish in the year 1866, was 1540; to this number may be added 60, as representing the children vaccinated by other Medical Practitioners. This total of 1600 would, in my opinion, indicate that a full number of the children born in 1865-6 had been protected by cowpock.

SECTION 4.—*Deaths.*

1373 Deaths were registered as having occurred in the Parish of Merthyr-Tydfil in 1866. In the previous year 1634 persons died; a diminution on the year of 258. In 1865 typhus, scarlet fever, small-pox, and measles were epidemic. In 1866, whooping cough and epidemic cholera prevailed.

The mean number of deaths for the five years—1861 to 1865, was 1360; as in 1866 the total was 1376, the excess 16, would represent the increased number consequent upon an increase of the population.

The mean estimated population being 53,480, the number of deaths recorded would give a per centage of 2·572. (This average is subject to corrections to be made under the heads:—Deaths in Workhouse, and Deaths from accidents.)

Comparing this with the proportion of deaths for all England, for every 100 persons living, on the mean of a period of 28 years ending 1864, which was 2·324, the excess is but 0·339.

The death rate for all England for 1866 was 2·362 per cent.; in Merthyr, 2·572—difference in excess is 0·210.

Bearing in mind that our people are principally a TOWN population, it is fairer to compare the death rate here with that which prevailed among residents in cities and towns. Thus, the mean death rate in 1866 in 146 Registration Districts and 56 Sub-districts, (comprising the towns of England and Wales,) is given by the Registrar General at 2·639 per hundred; in Merthyr the rate was 2·572—a difference of 0·47 in *favour* of Merthyr.

I find from Dr. Paine's exceedingly able report on the health of Cardiff in 1866, that the death rate there was $23\frac{1}{2}$ per thousand, while with us it was $25\frac{3}{4}$. In Merthyr therefore $2\frac{1}{4}$ lives out of every thousand perished in the year 1866 more than would have died in Cardiff; that is, 120 persons died in Merthyr more than would have in Cardiff. Our sanitary state is thus inferior to that of our county town. Doubtless the number of accidents which occur to our mining and manufacturing population, many of which occasion immediate death, others inflict injuries that ultimately shorten life,—these to some extent run up our average.

SECTION 5.—*Deaths in each Division.*

At page 10, I have stated in detail the temperature, rainfall, and weather in each month of the year 1866. In the table which follows, it will be seen that during cold and wet weather, the mortality in those parts of the town which are most elevated is increased; while in the third quarter, when an average high temperature and much rain prevailed, the divisions situated along the river banks more especially suffered.

TABLE VIII.

Deaths in each Division and District in each Quarter of the Year, 1866.

Districts and Divisions.	Population on 1st July, 1866.	1st Quarter. 90 days.	2nd Quarter. 91 days.	3rd Quarter. 92 days.	4th Quarter. 92 days.	Totals in each Division and District.	Per cent. to Population
A.—Upper Merthyr: Elevation.							
1. Dowlais	15420	127	107	80	79	393	2.562
2. Penydarren.....	4180	27	42	20	20	109	2.606
3. Tydfil's Well	6960	29	37	68	48	182	2.643
	26560	183	186	168	147	684	2.5
B.—Lower Merthyr:							
4. Merthyr	14380	86	113	88	70	357	2.481
5. Gellydeg.	5970	22	31	26	17	96	1.606
6. Troedyrhiw	6370	81	35	38	24	178	2.794
	26720	189	179	152	111	631	2.365
C.—Workhouse:							
Parishioners	80	6	12	17	3	38	
Non-Parishioners	53360	378	377	337	261	1353	2.536
	120	10	7	5	1	23	
	53480	388	384	342	262	1376	2.572
Mean Temperature.....	degrees	42.8°	58.5°	61.9°	49.3°		
Total Rainfall.....	inches	20.32	8.22	17.86	11.99		= 58.39

The Table may be read thus:—In the Division of Dowlais, elevated above the sea 825 to 1187 feet, the deaths numbered 393, giving a death rate of 2·562 per 100. In Penydarren, at a lower level—(702 to 825)—the mortality was 2·607 per 100. Here the action of deleterious influences on the health of the inhabitants is shown. Refer to the heading in the Abstract of House-to-House Inspectors Returns, “Conveniences Full,” and you have at once an explanation of *the* cause of this increase. In Tydfil’s Well Division—(570 to 670 feet)—the death rate amounted to 2·643 per 100. “Wretched houses, no drains, and poor people,”—these explain how in the third quarter of the year, when cholera prevailed, the deaths rose from 29 and 37 to 68.

The average annual mortality of the *District* of Upper Merthyr (exclusive of Vaynor) is shown to have been 2·5 per 100.

In the Lower District:—The Division of Merthyr (540 to 1280) the rate is 2·481 per 100. An exceedingly favourable average remembering that the houses are the oldest, and that Caedraw and the River-side are some of the poorest parts of the town. Gellydeg Division (560 to 860) comes out in the brightest colours—the average mortality was but 1·606 per 100; excelling in healthiness and length of life many of the best agricultural districts of England. A “fair grove,” indeed, in which mortals might hope to enjoy long days. Troedyrhiw (460 to 860 feet), usually a healthy country neighbourhood, *apparently* comes out in the darkest hues. 178 deaths out of a population of 6370, gives the high average of 2·794 per 100. One cause of this *apparent* unhealthiness is, that the 34 deaths which occurred at Cethin Colliery in December 1865, and which were registered in January 1866, (rightfully these should have been charged to 1865,) are debited to the district of Troedyrhiw, in which Cethin is situated; these however should be charged to the whole parish, inasmuch as the residences of the colliers who died there, were dispersed over most of the other divisions. By deducting these 34 deaths from the total of 178, 144 would be the number to be specially debited to this division. The per centage mortality would thus be reduced to 2·260 per 100.

The general death rate for Merthyr Lower, including the 34 cases at Troedyrhiw, was 2·365 per 100; exclusive of these it would be 2·234 per 100.

Upon the *whole Parish* the annual death rate, excluding the 23 deaths of non-parishioners which happened at the Workhouse, was 2·536 per 100.

SECTION 6.—*Interments of the Dead.*

TABLE IX.

Places of Burial and numbers Buried at each in 1866.

1.—Cefn Cemetery	...	...	...	...	...	581
2.—Dowlais Church Cemetery	...	...	...	...	...	217
3.—Dowlais Public Cemetery	...	...	...	...	...	190
						988
4.—Thomas Town Church Burial Ground...	...	...	...	...	...	61
5.—Abercannaid Chapel		„	...	...	...	28
6.—Elim	„	„	...	...	...	16
7.—Hebron	„	„	...	...	...	14
8.—Caepantwyll	„	„	...	...	...	10
9.—Zion	„	„	...	...	...	9
10.—Horeb	„	„	...	...	...	9
11.—Troedyrhiw	„	„	...	...	...	7
12.—Adulam	„	„	...	...	...	4
13.—Hermon	„	„	...	...	...	4
14.—Bethania	„	„	...	...	...	3
Parish Church, Bethesda, Tabernacle & Zoar (1 each)						4
						169
						1157
Burials in other Places of Sepulture	...	...	...	...	...	219
						1376

In the foregoing Table may be read the localities in which the bodies of 1157 persons were interred during the year 1866. 219 burials would have taken place in other places of sepulture, making up the total number of deaths, 1376.

The Burial Grounds at Zoar, Adulam, Tabernacle, Elim, and Zion Chapels have been ordered by the Privy Council to be closed.

It is again satisfactory to observe that the custom of interring the dead in public cemeteries, away from the residences of the living, is increasing.

CHAPTER IV.

*Causes of Death in Merthyr Parish in 1866.*SECTION 1.—*Rate of Deaths from all Causes in 1866, as compared with 1852.*

In the Table attached the classes and orders of, and the numbers of persons who succumbed to, the Diseases included therein, are given. This Table is condensed from one which will be found in the appendix: the latter will show in fuller detail the number who died of *particular* Diseases.

The rate of Death from all causes in 1852 was 3·24 per 100;—in 1866 this rate was reduced to 2·53 per 100. By examining the mortality from certain special causes, I may be able to point out in what particular class, or order of Disease, the rate of Death has diminished, and thus explain the “reason why” the Death Rate has been lessened.

SECTION 2.—*Rate of Deaths from Special Causes in 1866, as compared with 1852.*

Of the total deaths, 1376, 354 were occasioned by those forms of disease known as Fevers;—some of these epidemic, others endemic—most of them contagious. Of these 185, or more than half were children under five years old.

The per centage of deaths to the total *deaths* in 1852, is given at 29·91—or 1 in $3\frac{1}{10}$ ths; the proportion to *population*, one in 110.

Let us see how the account stands in 1866. 354 deaths out of 1376, would give 25·72 per 100—or 1 in $3\frac{9}{10}$ ths. The population being taken at 53,480, the proportion to the numbers of the people would be one death to 151 persons. That we have economized to some extent, may be seen by working out the figures as they would have been, had the rate of mortality from this class of diseases been the same in 1866 as it was in 1852.

TABLE X.

Summary of Causes of, and Ages at, Death, in Merthyr-Tydfil Parish in 1866.

DISEASES.		Ages at Death.		Totals.	
Classes.	Orders.	Under five years.	Five and upwards.	In each Order.	In each Class.
1. Zymotic	1. Miasmatic	185	169	354	364
	2. Enthetic	5	4	9	
	3. Dietic	1	0	1	
		<hr/> 191	<hr/> 173	<hr/> =	
2. Constitutional ...	1. Diathetic	4	24	28	252
	2. Tubercular	78	146	224	
		<hr/> 82	<hr/> 170	<hr/> =	
3. Local	1. Nervous System	131	52	183	467
	2. Circulation	1	60	61	
	3. Respiration	85	76	161	
	4. Digestion	3	28	31	
	5. Urinary Organs	0	16	16	
	6. Uterine Organs	0	5	5	
	7. Joints	1	5	6	
	8. Skin	1	3	4	
		<hr/> 222	<hr/> 245	<hr/> =	
4. Developmental ...	1. Of Children	23	0	23	167
	2. „ Adults	0	14	14	
	3. „ Old People	0	54	54	
	4. „ Nutrition	69	7	76	
		<hr/> 92	<hr/> 75	<hr/> =	
5. Violent Deaths ...	1. Accident or Negligence .	5	100	105	107
	2. Suicide	0	2	2	
		<hr/> 5	<hr/> 102	<hr/> =	
6. Sudden Deaths ...	No causes assigned	4	10	14	14
7. Causes not specified	... ..	1	4	5	5
		<hr/> 597	<hr/> 779	<hr/> =	<hr/> 1376

Population—under Five, 8210,—above, 45270 = 53480.

NOTE.—See appendix No. 2, for details of Causes and Ages at Death.

TABLE X

Summary of Cases of ...

Age	Sex	Order	Class
185	...	1. Rheumatic	1. Rheumatic
8	...	2. Rheumatic	2. Rheumatic
1	...	3. Diphtheria	3. Diphtheria
4	...	1. Diphtheria	2. Constitutional
78	...	2. Tubercular	2. Constitutional
131	...	1. Nervous System	3. Local
1	...	2. Circulation	3. Local
85	...	3. Respiration	3. Local
2	...	4. Digestion	3. Local
0	...	5. Urinary Organs	3. Local
0	...	6. Genital Organs	3. Local
1	...	7. Joints	3. Local
1	...	8. Skin	3. Local
23	...	1. Of Olfactory	4. Organizational
0	...	2. " Auditory	4. Organizational
0	...	3. " Vision	4. Organizational
09	...	4. " Nutrition	4. Organizational
3	...	1. Accident or Negligence	5. Violent Death
0	...	2. Suicide	5. Violent Death
...	6. Suicide Death
...	7. Cause not defined

1. ... under No. 2310 - above 40

2. ... for details of cases see

The population in 1852 was 47,778 ; there died in that year 434 persons from diseases of the class of fevers. The population in 1866 was 53,480 ; had the numbers of deaths from fevers been the same ratio in 1866 as in 1852, 483 persons would have died. The mortality was 354 ; so that we lost 129 lives *less* than we should have done in 1852.

The Deaths from Consumption and Scrofula in 1852 were 316, out of 1451 *deaths*, in a population of 47,778.

In 1866, 224 deaths were attributed to this order of diseases, out of 1376 deaths, the numbers of the people being 53,480.

The proportions are these :—	1852.	1866.
Per cent. of deaths from Tubercular Diseases		
to total Deaths	21·77	16·42
Proportion to Deaths	1 in 4 ⁶ / ₁₀ th—	1 in 6 ¹ / ₁₀ th
„ to Population	1 in 150—	1 in 238.

Here again the improvement in the public health is clearly shown, by the diminution in the rate of mortality amounting to 5 $\frac{1}{3}$ per 100, while the proportion of inhabitants who, having been smitten by these diseases, die of them, is lessened from one out of 151, to one out of 238.

To other *affections of the Lungs* in 1852, 144 persons fell victims ; in 1866 the deaths were 161. This is just the increase proportionate to the larger number of people resident in the parish in the latter year.

In 1852, the deaths referred to Convulsions, numbered 250 ; being 17 $\frac{1}{4}$ per cent. of the whole deaths, and indicating that one in 191 of the population had been destroyed by this form of disease.

Referring to the Table you will observe that to Diseases of the Nervous system, 183 fell victims. In the appendix under the same head, it will be seen that of the 183, 131 were young children under five years of age, who died of inflammation of the brain and convulsions. It is this latter number we have to compare with the mortality from convulsions in 1852.

In 1866, $9\frac{1}{2}$ per cent. of the deaths were attributed to convulsions, which attacked one in 408 of the people instead of one in 191. An economy of human life of more than half.

To Diseases of young children, teething, debility, &c., 96 deaths are referred. I have no means at present of comparing the proportion with that which formerly prevailed; but it will be well now to state the per centage and proportion.

To these causes in 1866, 96 deaths being attributed, the per centage to total deaths would be 7; the proportionate number attacked out of the whole population, 1 in 557.

By accidents or negligence, 54 deaths were occasioned in 1852; allowing for the increase of population, and assuming that this *item is necessary*, the corresponding number for 1866 would be 60. The deaths that occurred were 105—deducting the 34 deaths from suffocation at Cethin, leaves 71. So that deaths from accidents have increased in the parish beyond the ordinary rate.

Lastly to “sudden deaths,” “no cause assigned,” and “causes unspecified,” 85 deaths were referred in 1852; in 1866 only 19 were thus entered. A commendable exemplification of the care taken by the Registrars of Deaths, and also by the Medical Practitioners, in freely giving their aid in perfecting the Registration of the Causes of Death.

SECTION 3.—*The Mortality in each of the Six Divisions of Merthyr, from particular Diseases.*

Having considered the mortality in the town as a whole, I will now proceed to analyse the numbers who died of certain forms of disease in the Districts of Upper and Lower Merthyr, and in the divisions of those districts, as described in the section on the Sanitary Topography of the Parish.

I do this in the hope that I may be able to bring before you by their consequences—the rate of death—the special circumstances which have induced, in each neighbourhood, either the disease which may have caused the death, or that low state of constitutional health, which renders the subject of it *prone to die from disease*.

It is to the prevention of the causes which induce ill health, that your exertions have been directed, and just *in proportion to the extent to which you have carried the removal of those causes, has the constitutional health of our people been improved.* The establishment of the daily scavenging of refuse and ashes, was followed by a diminution of typhoid fevers; soon after an abundant supply of water had been afforded to the public, the proportionate number of deaths from that class of diseases which affect persons but once in their lifetime—measles, scarlet fever, &c., was reduced; as a sequence to better formed streets, and well laid gutters, the ground floors of houses became to some extent dried—hence an improvement in the health of those who pass their whole time at home, mothers and children. The thorough drainage of the subsoil, the conveyance away of all sewage,—these will, I believe, be followed by results as conclusive and satisfactory as those which have already followed the works directed by you.

SECTION 4.—*Mortality from Fevers, Epidemic and Contagious Diseases, in the Districts of Upper and Lower Merthyr.*

The total mortality from diseases of this class in Upper Merthyr, including three removed from the Workhouse to the Cholera Hospital, was 200; as these three persons were not parishioners, the number will be taken at 197. The population being 26,560, the proportion of persons who died to the whole number of the people would be one in 134.

In Lower Merthyr, 154 persons died of these ailings; but of these—eleven died at the Workhouse, who were parishioners and were chargeable to the whole parish,—leaving 143, the number of the people being 26,720; the proportionate rate of death would be one in 186.

From these figures it would appear that diseases of this class are *one-third more fatal in Upper than in Lower Merthyr.*

In the Division of Dowlais, out of a population of 15,420, 103 deaths from fevers took place. A proportion of one in 150.

TABLE XI.

The Mortality from Epidemic Contagious Diseases in 1866, in each of the Six Divisions.

Divisions.	Small pox.	Scarlet Fe- ver.	Diphtheria	Whooping Cough.	Typhoid Fever.	Others.	Diarrhea.	Cholera.	Total.
<i>A—Upper Merthyr :</i>									
1 Dowlais	1	12	1	45	10	12	8	14	103
2 Penydarren ...	0	1	0	15	4	4	1	3	28
3 Tydfil's Well...	0	1	0	9	8	3	3	39	63
<i>Hospital :</i>									
Parochial	0	0	0	0	0	0	0	3	3
Non-Parochial .	0	0	0	0	0	0	0	3	3
	1	14	1	69	22	19	12	62	= 200
<i>B—Lower Merthyr :</i>									
4 Merthyr	0	6	4	28	7	3	8	42	98
5 Gellydeg	0	0	0	8	2	3	1	5	19
6 Troedyrhiw ...	0	7	0	4	2	3	4	9	29
Workhouse ...	0	0	0	2	1	3	1	1	8
	0	13	4	42	12	12	14	57	= 154
Totals	1	27	5	111	34	31	26	119	= 354

In Penydarren, out of 4180—28 deaths occurred; a proportion of one in 149.

In Tydfil's Well the deaths from these causes were 67 out of a population of 6960. Giving the proportionate rate of one in 104.

From these figures it will be seen that the probability of a *favourable termination* to an attack of an epidemic disease, is *greater in Penydarren and Dowlais* than in Tydfil's Well.

In the Division of Merthyr, with a population of 14,380, the deaths were 106, excluding those in the Workhouse (eight parishioners and three non-parishioners,) in number 11, the remainder—95, would give a rate of deaths to people at one in 151.

Against Gellydeg Division 19 deaths from fever are recorded, out of a population of 5970; the rate would be one in 311.

In Troedyrhiw 29 deaths from these causes occurred, the people numbered 6370; the rate would therefore be one in 220.

The *gradations in unhealthiness* of the different divisions of the parish, as tested by the proportional rate of deaths, from Contagious Fevers would be as follows:—

Gellydeg	one in 311 of the population.
Troedyrhiw	„ 220 „
Penydarren	„ 155 „
Merthyr	„ 151 „
Dowlais.....	„ 150 „
Tydfil's Well	„ 104 „

The inferences from these figures are too evident to require any comment.

Passing from the consideration of the deaths caused by contagious fevers in *the bulk*, to those caused by *two forms* which prevailed in 1866, the following Table will show the deaths to 1000 persons living; the lower line showing the average for all England.

TABLE XII.

Deaths per 1000 of Persons living in 1866, from—1st. All Forms of Contagious Fevers; 2nd. Whooping Cough; 3rd. Typhoid Fevers.

Localities, &c.	All Forms.	Whooping Cough.	Typhoid Fever.	
Tydfil's Well	9.94	1.30	1.14	per 1000 living.
Dowlais	6.68	2.99	0.64	„
Penydarren	6.43	3.58	0.95	„
Merthyr	6.60	1.96	0.48	„
Troedyrhiw	4.70	0.27	0.31	„
Gellydeg	3.18	0.55	0.33	„
The Parish of } Merthyr	6.57	2.08	0.63	„
All England (1864)	5.48	0.41	0.97	„

SECTION 5.—*Mortality from Tubercular Diseases.*

Under this head are included Scrofula, or King's Evil, affecting the glands and the joints; Tabes, or wasting, a form of the disease affecting the bowels; Phthisis, or Consumption, affecting the lungs; and Hydrocephalus, or water on the brain.

These several forms of disease proceed from the deposit of "Tubercles" in the several organs of the body, as above named. They may be popularly described as imperfectly formed blood, which in certain states of the constitution, are deposited in the fine tissues of the different organs.

The disposition to deposit them is increased, if not occasioned, by those causes which *lower human health*:—long exposure to damp and cold being one of the chief.

The whole number of deaths from tubercular diseases registered in Merthyr parish in 1866, were 224—this out of the total mortality of 1376, would give *one* out of *six*.

Of these 224, ten were persons who belonged to other parishes but died at the Workhouse:—so that 214 would be the true number chargeable against this parish.

The population being taken at 53·360 (that is excluding the 120 in the Workhouse who were not parishioners), and the deaths at 214, the proportion of deaths out of living would be one out of 249, or 4·01 per 1000. The mean for all England was 3·49 per 1000.

The mortality in Upper Merthyr, with a population of 26,560, was 115, or one in 231. In Lower Merthyr, the people numbering 26,720, the deaths (exclusive of *all* those at the workhouse), were 89, or *one* in 300. The population being nearly the same in each district; the marked increase in the Upper over the Lower is at once apparent.

The following Table will show the proportional rate of mortality, and also the deaths per 1000 of the population, from Tubercular diseases in each of the six Localities or Divisions, and a careful study of the figures will indicate where the loose joints in your sanitary armour are.

TABLE XIII.

The Mortality from Tubercular Diseases in 1866, in each of the Six Divisions.

DIVISIONS.						Scrofula.	Tabes.	Phthisis.	Hydrocephalus.	All Tubercular	
<i>Upper Merthyr :</i>											
1	Dowlais	...	...	...	...	2	23	34	5	= 64	
2	Penydarren	...	...	...	...	0	12	10	2	= 24	
3	Tydfil's Well	...	...	...	...	0	7	19	1	= 27	
						<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	115
						2	42	63	8	=	
<i>Lower Merthyr :</i>											
4	Merthyr	...	...	...	...	3	13	34	4	= 54	
5	Gellydeg	...	...	...	...	0	1	12	0	= 13	
6	Troedyrhiw	...	...	...	...	0	3	16	3	= 22	
<i>Workhouse :</i>											
	Parishioners	...	...	...	...	0	4	6	0	= 10	
	Non-Parishioners	...	...	...	...	0	0	10	0	= 10	
						<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	109
						3	21	78	7	=	
						<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	224
						5	63	141	15	=	

Proportional rate of Mortality of the People resident in each District.

Deaths per 1000 of Population.

Divisions.	Population.	All Tuber.	Tabes.	Phthisis.	All Tuber.	Tabes.	Phthisis.
Dowlais	15420	1 in 241	1 in 627	1 in 453	4·15	1·49	2·20
Penydarren	4180	... 174	... 348	... 418	5·72	2·86	2·39
Tydfil's Well	6960	... 290	... 994	... 366	3·87	1·00	2·76
Upper Merthyr District ...	26560						
Merthyr (ex. Parishioners) .	14380	... 266	... 1106	... 423	3·76	0·90	2·36
Gellydeg	5970	... 460	... 5970	... 497	1·68	0·17	2·04
Troedyrhiw	6370	... 290	.. 2123	... 398	3·45	0·47	2·51
Lower Merthyr District ..	26720						
All Merthyr (ex. Non-Par.)	53360	... 249	... 845	... 407	4·01	1·18	2·45
All England ... ..	...	...	...	...	3·49	0·26	2·67

TABLE XII

The following table shows the results of the analysis of the samples of the various types of paper used in the manufacture of the various types of paper.

Sample No.	Analysis	Remarks
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

The following table shows the results of the analysis of the samples of the various types of paper used in the manufacture of the various types of paper.

Sample No.	Analysis	Remarks
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

By referring to the descriptions of each division as given in the section on "Sanitary Topography," and comparing the effects (as evidenced by death,) with the related causes of disease, you will be able to direct your Surveyor to repair those sanitary imperfections, which *needlessly* cause so much of disease and of death.

Examination of the Table will show that the division of Pen-y-darren is, as tested by the number of deaths from tubercular disease, the least healthy of the six. There, 1 in 174 of the people died last year of diseases of the tubercular class; while in Gellydeg the mortality was but 1 in 460. In the other districts the proportional rate was nearly alike—about midway between unhealthy Pen-y-darren, and healthy Gellydeg.

Testing the deaths from this class of diseases by that form which affects children chiefly—tabes, or wasting—of the whole population of Pen-y-darren, 1 in 348 died of this kind, while in Gellydeg only one death occurred out of 5970 people.

A still further test is the mortality from phthisis, or consumption; which chiefly attacks persons aged from 15 to 55 years; the highest proportional rates were in Tydfil's Well—1 in 366, and in Troedyrhiw—1 in 398; while in Gellydeg only 1 in 497 was affected.

The explanation of this varying mortality in districts apparently similar as to subsoil, buildings, and people, is to be read in the description I have given of the several localities. Pen-y-darren, built on a sloping hill-side, which is crossed beneath the surface by bands of clay, the subsoil water welling up causes the lower floors of the houses to be damp, the moisture being largely charged with cesspool stuff. In Tydfil's Well the larger proportion of the houses are old, dilapidated, undrained, no "conveniences," no gutters; the alleys unmacadamized, the surface saturated with house slops. Troedyrhiw recently built in a narrow gorge of the valley,—the river, canal, and water-course run within a confined space, the hills on each side rising to a considerable height, preventing the full influences of the sun's rays. Here moisture is ever present in the air, the subsoil ever saturated. Those who, (traversing this gorge at early morn,)

have noticed the fog which so frequently envelopes Troedyrhiw, will see in its cause—abundant moisture—the proximate originator of much sickness. In each of these districts excessive moisture, charged with the refuse of human beings, prevails.

A last test measure of the different rates of mortality in each of the six divisions, may be obtained by deducing the proportional rate of deaths of children, *under five years old*, to the estimated number living. I will here apply this method to one of the diseases already spoken of,—tabes, or wasting.

In Penydarren division the estimated number of children living, aged less than five years, in 1866 was 656; of these 12 died in the course of the year of Tabes; that is 1 out of 54! In Dowlais, out of 2398 living children, 23 died—1 in 104. In Tydfil's Well, 1087 children, 7 deaths—1 in 155. In Merthyr, 2089 children, 13 deaths—1 in 153. In Troedyrhiw, 994 children, 3 deaths—1 in 331. And in Gellydeg, 1 death out of 932 children.

The enormous disproportion between the death rate from this disease in Penydarren—1 in 54, as compared with Gellydeg—1 in 932, is most startling and most painful. Nevertheless *the deaths have occurred*: and though possibly some slight error in estimating the number living in each division may have been made, which might affect the deductions to a slight extent, yet no amount of error in calculation, can be adduced to show why *twelve* little ones should have perished in the smaller division of Penydarren, while only *one* died in the larger, much the larger division of Gellydeg.

SECTION 6.—*Mortality from Diseases of the Lungs in the Six Divisions.*

The Table shows that diseases of the organs of breathing caused the deaths, in 1866, of 161 persons. This on the whole population would give a proportional rate of 1 out of 332, or 3·01 per 1000. The mean annual rate for all England was 3·11.

To acute diseases of the lungs 140 deaths were referred (2·61 per 1000); while chronic affections of these organs are said to have caused the deaths of 21 persons only (0·39 per 1000.)

TABLE XIV.

The Mortality from Diseases of the Lungs, in 1866, in each of the Six Divisions.

DIVISIONS.	Acute Bronchitis.	Chronic Bronchitis.	Inflammation of the Lungs.	Other Diseases of the Lungs.	All Lung Diseases.
<i>Upper Merthyr ;</i>					
1 Dowlais	11	2	29	5	= 47
2 Penydarren	0	0	11	0	= 11
3 Tydfil's Well	7	2	5	1	= 15
	18	4	45	6	= 73
<i>Lower Merthyr :</i>					
4 Merthyr	23	2	18	5	= 48
5 Gellydeg	5	0	5	1	= 11
6 Troedyrhiw	4	0	12	3	= 19
					78
<i>Workhouse :</i>					
Parishioners... ..	4	0	4	0	= 8
Non-Parishioners... ..	0	0	2	0	= 2
	36	2	41	9	10
Totals	54	6	86	15	= 161

That in a wet and cold climate like that of Merthyr, the mortality from diseases of these organs, which are necessarily the most subject to atmospheric changes, should be high is to be expected: and that the weight of effects produced by cold and wet would fall upon those who are in the first dawn of life, will naturally occur to you; and upon reference to the Table in the appendix, it will be

seen that of the whole number of deaths (161), more than half (85) were those of children under five years. Of these 85, 51 had not completed their first year of life.

Many may be disposed to pass over this fact with the trite remark, that young infants have so little of vitality in them, that it is not to be expected that they can resist the low temperature and moist atmosphere of these elevated regions; and yet let us suppose for a moment that we are dealing with animal, but not human life. A lot of calves for example, say two thousand, are born in a given year, and 50 of them—that is 1 out of 40—die of lung disease before the year's end; would a grower of beef contentedly sit down under such a loss, shrug his shoulders, and say 'tis *all* owing to the cold and the wet? Not a bit of it. A wise man, he would set about seeking how he might warm and dry his cattle sheds; how drain his wet meadows; how treat his stock so that a money loss so large should not thus, yearly, fall upon him.

In the matter of human life, the public take no such care. Happily the legislature is more wise. With bucolic prudence it has invested the "local authority" with ample powers. You as such local authority here have, to a great extent, used those powers. In a few more years, I trust the effects of your labours will be evident, even upon such diseases as Bronchitis and Inflammation of the Lungs. A well macadamized road, a dry ground floor to the house, good water, good drainage, and thorough ventilation, *will* tell most favourably.

Chronic diseases of the lung figure only as 21. This doubtless arises from the mode of registering the causes of death. I find that our medical men do not always give the duration of the disease. It will be apparent to them, that if they would kindly insert in the proper column in the death certificate, the time the original complaint has lasted, that the vital statistics under this head might be more satisfactorily brought out. As one of their number, I would ask that they will, in all cases, state the duration of the *primary disease*.

SECTION 7.—*Mortality from Accidents in 1866.*

Deaths from accidents figure this year at the high number of 105; but 34 of these occurred in December, 1865, at the Cethin Colliery,—these should be deducted, leaving 71 as the number truly chargeable to the year 1866.

The Table will show the number of deaths which occurred in each division of the parish, and also the causes of them, whether by contusions and fractures, by suffocation in the coal works, or by other causes, as drowning, &c.

TABLE XV.

The Mortality from Accidents in 1866, in each of the Six Divisions.

DIVISIONS.	Contusions.	Suffocation.	Others.	All Accidents
<i>Upper Merthyr:</i>				
1 Dowlais	18	2	4	= 24
2 Penydarren	3	1	1	= 5
3 Tydfil's Well	2	0	2	= 4
	23	3	7	= 33
<i>Lower Merthyr:</i>				
4 Merthyr	12	2	3	= 17
5 Gellydeg	5	3	0	= 8
6 Troedyrhiw	10	34	2	= 46
Workhouse	1	0	0	= 1
	28	39	5	= 72
Totals	51	42	12	= 105

Taking the number of fatal accidents at 71, it will be seen on reference to page 32, that that number is 11 in *excess* of the estimated average. The proportional rate of deaths from accidental causes to the whole population would be 1 out of 753, or 1·33 per

1000; the death rate for all England from the same causes being 0·69.

Of the 71 deaths, 42 were those of workmen employed in the iron-works, and in the coal and iron mines. At page 7 the estimated number of persons so employed is given. It may be useful to work out the rate of mortality from accidents, as it affects each of the four divisions of working-men.

The number of males, ten years old and upwards, who were engaged in Iron-making, in 1866, is estimated at 4117;—of these six were killed while at work = 1·45 per 1000; of Colliers there were 6615, of whom 16 lost their lives = 2·42; of Iron-stone miners, 1896 were employed, 10 perished at work = 5·27; of Craftsmen, Quarrymen, and Labourers the number was 1789, 10 were accidentally killed = 5·59 per 1000. From these figures it will appear that in 1866, fatal accidents occurred to Iron-stone miners at the proportional rate of 52, while Colliers suffered only at the rate of 24 per 10,000 persons employed. The proportional rate of death of Labourers, &c., nearly 60, is very high; doubtless many of these accidents result from inexperience; men unused to the perils attendant upon machinery in motion, fall victims to ignorant temerity.

Referring back to the statement that the rate of death from accidents for all England was but 0·69, and seeing that the *mean* rate of mortality from the same causes among our working population is 3·68 (*five times as great*), it must be admitted that there is here a ground for enquiry, as to whether it might not, by proper precautions, be greatly reduced. -

As to the *ages at death* of persons fatally injured in iron-works and iron and coal mines, the materials for forming an estimate are now but few, but it may be convenient to state the averages deduced from these. They would be as follows:—

Of 100 deaths from *Accidents* (of male persons 10 years old and upwards), received while employed in getting coal, or iron-stone, or limestone, or in working those materials into iron.

At the following ages the under-mentioned would be the number of deaths:—

Years of Age.....	15	25	35	45	55	65	75	
Deaths	22	32	18	6	6	2	14	= 100

It is worthy of remark that but three deaths are put down to "drowning." Doubtless the walling in of the Plymouth Feeder, has prevented the sadly frequent recurrence of the sacrifice of lives of young children which formerly took place.

SECTION 8.—*Mortality from Childbirth, Diseases of the Brain, of Nutrition, and Sudden Death.*

The deaths from *childbirth and childbed fever* were 20. As the births amounted to 2124, allowing say 24 for twin births, the rate of death would be one death of the mother out of 105 confinements, or $9\frac{1}{2}$ per 1000.

The usual mortality of mothers from child-bearing is 5 per 1000 births; the rate of mortality in Merthyr is therefore *nearly double* that in the kingdom generally.

I attribute this distressing waste of female adult life to the fact, that in nearly all cases in Merthyr, the women are attended by *untrained* midwives.

Diseases of the Brain.—To affections of this organ of life, 183 deaths are referred—131 occurred to children under five years old, and of these 131—116 were under one year.

The *mortality from Brain Disease and Convulsions* in infants is in Merthyr very much higher than it should be. It is a subject which needs enquiry; in the report for 1867 I will hope to be able to examine this cause of death more in detail.

At present, however, I would ask my medical friends, whenever they have to certify as to the cause of the death of a child who has died of "convulsions," to be kind enough to state the primary disease, whether teething, intestinal irritation, &c., &c., which may have set up the immediate cause of death.

Diseases of Nutrition.—To Atrophy, or Debility, 69 deaths were set down. All the subjects were under one year. I purpose in my next report to enquire more particularly into the probable causes of this proportionately large mortality.

“*Sudden Deaths,*” “*Causes not assigned.*”—Nineteen deaths were registered under the above terms. All these were derived from the records of the Coroner’s courts. I may be permitted to say that small as the blot is, still it is a *blot*; and, being so, the Coroner and his Deputy will, I hope, endeavour to reduce it to a pin’s point.

SECTION 9.—*Mortality in Union Workhouse in 1866.*

TABLE XVI.

Deaths in Union Workhouse in 1866.

Diseases.	Ages.				Parish- ioners.	Non- ditto.
	Under 5.		Above 5.			
	M.	F.	M.	F.		
Typhus	0	0	1	0 = 1	1	0
Whooping Cough ...	1	1	0	0 = 2	2	0
Cholera	0	0	3	1 = 4	1	3
Diarrhea	0	1	0	0 = 1	1	0
Erysipelas	0	0	0	3 = 3	3	0
Cancer	0	0	0	1 = 1	1	0
Diseases of Brain ...	0	0	4	6 = 10	8	2
Tubercular Disease .	2	1	8	9 = 20	10	10
Diseases of Lungs...	0	0	5	5 = 10	6	4
„ Heart ...	0	0	3	0 = 3	1	2
„ Kidneys.	0	0	1	1 = 2	2	0
„ Joints ...	0	0	0	1 = 1	0	1
„ Old Age	0	0	1	0 = 1	0	1
Accident.....	0	0	1	0 = 1	1	0
Still-born		1		= 1	1	0
	3	4	27	27 = 61	38	23

In the Table may be read the number of deaths which occurred in the Workhouse, and the diseases which occasioned them. To Tubercular affections, 20 deaths are attributed, and to other affections of the Lungs, 10 deaths. In both these instances the diseases would have commenced previous to their admission into the house.

Of Cholera, 4 paupers died; one died in the Idiot ward, the other three were removed to the Cholera Hospital.

But *one* death is attributed to Typhus. Last year they amounted to eleven. The enlargement of the Union Infirmary has doubtless contributed to this improvement.

In my first report, at page 23, I drew your attention to the sanitary errors that had been committed in constructing this infirmary. To a very great extent these have been obviated; as new wards have been made, and set apart for the treatment of fever cases, and the closets attached to all the wards, have been reconstructed.

I regret to have to say that two errors in ventilation have been made in the arrangements for promoting a free current of air through the wards, and through the closets.

1st as to the wards at the east end:—In the partition walls between the wards, windows hung on a centre have been placed near the ceiling. This was done by order of the Poor Law Board. The intention in placing these windows was that they should act as ventilators. It was forgotten that air passing from one into another ward would be vitiated by passing over the sick in the first ward. It is well known to Hospital Medical and Surgical Practitioners, that there is no atmosphere more poisonous to the sick, than that which has been vitiated by the breathings of other sick persons. In this way, not only are diseases conveyed from one ward into another, but cases of sickness which are in themselves mild become converted into the most malignant forms, by breathing the vitiated air transmitted from infected wards. I notice that *three* deaths from erysipelas occurred in the Union Infirmary; I know not whether to attribute these cases to the spread of the disease from other sick persons, but it is a well recognised truth that “Erysipelas,”

Hospital Gangrene, and Childbed Fever, are forms of diseases which peculiarly affect the poor sick people in hospital wards, and that they are generated within, and are spread through the air current in, the wards. At the east end of each of these four wards are windows. They do not reach to the ceiling. Had they been made of the same height as the ceiling, ventilation could have been perfectly effected, by simply opening them a few inches.

2nd.—In the new closets constructed the same error which I pointed out in the former ones has been made. The Louvre Ventilators have been so placed that the current of air must come from without to within. The wards are of course always warmer than the external air; the draught is therefore always inwards, and the air is necessarily contaminated by the offensive odours from the closets.

SECTION 10.—*Mortality of Illegitimate Children in 1866.*

The number of deaths of Illegitimate Children registered in the year was 46. Upon investigating the causes of these deaths the following unpleasant results come out.

Of 100 legitimate children born in this parish, the proportional number of deaths in 1866, (of those not more than one year old,) was $19\frac{1}{2}$ per 100.

Of 100 illegitimate children the proportionate number who died at the same age was $38\frac{1}{4}$ per 100. A mortality nearly double that of children born in wedlock.

Passing to the diseases of which they died: it appears that of 100 deaths from Convulsions at the age as above,—the rate of deaths of legitimate children was 5·07; that of illegitimates 11·76 per 100. From Atrophy, the proportion of the first named class was 2·83, in the last 10·07 per 100. By the first disease the destruction of infant life was *twice as great*, and by the second nearly *four times as great* among *Illegitimate*, as compared with *Legitimate* children.

The enquiry into the causes of this wicked waste of human life belongs rather to the makers of the laws, than to members of the

medical profession; of course the reason why they die is because they *are neglected*:—but why so neglected? The able secretary of the Harveian Society, Mr. Curgenvén, has lately directed public attention to this subject—the waste of Infant Illegitimate Life, and has pointedly called upon the magistrates who administer the Bastardy Laws to enquire, *whether those laws do not press unjustly upon the mothers of those unfortunate children?*

SECTION 11.—*Mortality from Epidemic Cholera in 1866.*

As in the previous epidemics of 1832–3, 1849, and 1854, the inhabitants of this parish suffered most severely from Cholera; much alarm prevailed among the people during the summer of 1866, lest the wave of the pestilence, which was then spreading over England, should again overwhelm them with its poisonous influence.

A.—*Origin of last Epidemic.*

The story of the origin and spread of this last epidemic is told in graphic language by Mr. Radcliffe, in the 8th and 9th Annual Reports of the Medical Officer to the Lords of the Privy Council. I condense in the briefest possible terms the facts as he has given them, with the single view of showing the direction which the pestilence took, and whence our town was probably afflicted by it.

Cholera prevailed in China and the Eastern Archipelago from 1862. In March 1865, vessels having as passengers Mohammedan pilgrims to the sacred city of Mecca, reached the port of Jedda on the Red Sea. They were afflicted with the pestilence, numbers perished, and the disease was spread by their fellow-pilgrims, who departed to the surrounding countries.

On the 11th of June the existence of Epidemic Cholera was officially recognized in Alexandria, in Egypt; on the 28th of the month it appeared at Valetta, in Malta. On the 19th of July Gibraltar was inflicted, and on the 23rd Marseilles, the great southern seaport of France became the seat of the disease. At the

beginning of September many towns in the south of France, and in the middle of that month the city of Paris became infected. On the 24th of this month a case occurred at Southampton, and during the autumn and winter of the year it spread from town to town along the northern coast of France.

Early in the spring of 1866, it showed itself in several localities in Belgium and Holland; it broke out in Rotterdam on the 21st of April, and in Antwerp on the 29th. On the 22nd of April, a sailor who had just returned from the East Indies, left Rotterdam, passed through London, and arrived in Bristol on the 23rd;—he was seized with cholera and died.

B.—*Dates of first Outbreak in South Wales.*

On the 6th of July the epidemic broke out at Llanelly, in Carmarthenshire; at Swansea on the 23rd of July; Briton Ferry on the 28th; at Aberdare—in Cwmbach on the 1st of August, Millstreet on the 9th of August, and Hirwain on the 18th. On the 3rd, 10th, 13th and 22nd of August, seaman afflicted with cholera were under treatment at Cardiff.

From the last paragraph it will be seen that in many towns with which the inhabitants of Merthyr are in constant communication, Epidemic Cholera prevailed previous to the 22nd of August, when the first sickening under the disease seems to have taken place.

C.—*Outbreak in Merthyr in 1866.*

In my report to you dated the 5th of September, 1866, I stated that “the fourth outbreak of epidemic cholera in this parish commenced on the 23rd of August; cases of the most malignant character occurred almost simultaneously at Abercannaid, at Caedraw in Merthyr, and at Cae Harris, Dowlais. The first-named place is two miles south-west of Merthyr, the last-named two miles north-east. Abercannaid is about 500 feet above the sea, on the west bank of the river Taff; Cae Harris 1100 feet above the sea, and no watercourse near. On the 24th of August, cases equally malignant occurred in Quarry row, Tramroad north, George town, and Penyard, Penydarren; places, as you are aware, widely separate.

<p>State of the Territory of Washington</p>	<p>County of _____</p>
<p>Know all men that _____</p>	<p>_____</p>
<p>_____</p>	<p>_____</p>
<p>_____</p>	<p>_____</p>
<p>_____</p>	<p>_____</p>
<p>_____</p>	<p>_____</p>
<p>_____</p>	<p>_____</p>
<p>_____</p>	<p>_____</p>
<p>_____</p>	<p>_____</p>
<p>_____</p>	<p>_____</p>

TABLE XVII. *Abstract of First Cases of Cholera in Epidemic of 1866, in Merthyr-Tydfil.*

No.	When taken ill.	When died.	Where died.	Sex.	Age.	Occupation.	Circumstances.	Habits.	Any evidence of contagion or infection.	State of the Dwellings or Neighbourhood.
1	22nd August...	24th August ...	15, David square, Abercannaid	M.	36	Wife of Puddler ... (Welsh)	Very poor ..	Dirty	No possible contact ...	Damp, dirty, and unventilated.
2	22nd " ...	25th " ...	57, Quarry row, Tydfil's Well	F.	45	Wife of Fireman ... (Irish)	Poor	Dirty	ditto ...	Dirty, unventilated—yard at back most filthy.
3	23rd " ...	25th " ...	31, do do ...	M.	32	Fireman..... (Welsh)	Good	Clean and regular	ditto ...	A drain, which carries away house slops from houses above, runs under the house.
4	23rd " ...	26th " ...	13, Morris court, Merthyr	F.	75	Rag cleaner (Irish)	Poor	Clean	As a rag cleaner might have picked infected clothes	An untrapped gully at end of court, also heaps of ashes steeped with excrement, &c. House, no ventilation.
5	24th " ...	25th " ...	7, Cwm Canol street, Dowlais	M.	21	Hooker in Iron Mills (Irish)	Young Irish Labourer	Regular	No possible contact ...	Cesspool at back of house above level of lower floor—offensive.
6	24th " ...	25th " ...	1, Flag & Castle ct., Dowlais	M.	8	Son of Labourer ... (English)	Very poor ...	Dirty	ditto ...	Court unpaved, no convenience, earth sodden with house refuse.
7	24th " ..	1st September	16, Sunny Bank, Tydfil's Well	F.	53	Wife of Tailor (Welsh)	Very poor ...	Intemperate & Dirty	ditto ...	Cesspool in garden overflowing, floor of sleeping room thickly covered with dirt and filth.
8	25th " ...	27th August ...	1, Miles' court, Cae-draw	F.	50	Wife of Hawker ... (Scotch)	Poor	Clean and regular	Her husband and herself travelled about the neighbouring towns—had been in Aberdare	Cesspool near house overflowing.
9	26th " ...	30th " ...	8, Coffin's ct., George Town	F.	80	Wife of Skinner ... (Welsh)	Poor	Very clean ...	Had attended her son, case No. 3	Unventilated—common cesspool in gardens full.
10	27th " ...	1st September	4, Lewis' square, Abercannaid	F.	32	Wife of Collier (Welsh)	Comfortable .	Clean and regular	Apparently spontaneous	Overcrowded with family and lodgers—9 out of the 12 attacked, 7 died. At back of bedroom heap of ashes foul with excrement.
11	28th " ...	1st " ...	9, Sunny Bank	F.	42	Wife of Labourer ... (Irish)	Comfortable .	Clean	May have visited case No. 7	
12 13	3rd September 6th " ...	5th " ... 8th " ...	13, Mt. Pleasant, Penydarren	F., F.	21 8	Wife and { of } Daughter { Collier } (Welsh)	Comfortable .	Clean	No known contact ... {	Unceiled cow shed under the house in a most filthy state.

“ No communication had taken place between any of the three first afflicted, with each other, or with any other place in which cholera had been.”

The facts as I laid them before you in September 1866, have not been materially altered by subsequent enquiry ; but in order to bring more clearly before you the incidence of the epidemic and its spread, I have prepared from the facts kindly supplied me by the medical officers, Messrs. Probert, Allday, James, Thomas, Cresswell, and Miles, the following Table, in which the story of the first thirteen cases may be read.

But I must first remark that Dr. J. Henry Thomas, the surgeon of the Cyfarthfa Iron Works, had under his care in July and August, four cases of disease which presented all the appearances of malignant cholera.

In endeavouring to make out the advent of the disease, the facts stated as to the first six cases are of moment. Taking Merthyr Parish Church as the centre, case 1 was affected on the 22nd of August, at Abercannaid, *two miles south* of the church ; case 2 on the same day at Quarry row, *three quarters of a mile north* of the church ; case 4 was an old woman who lived about 100 yards from the church, she was affected on the 24th ; while cases 5 and 6 broke out on *that day* at Dowlais, *two miles north-east* of the church.

In cases 1, 2, 5 and 6, *it has been distinctly proved to my thorough conviction, that no contact with anything infected, nor with any person affected, nor any communication with each other, could have taken place.* In case 4, the aged Irishwoman was employed at a rag store in picking and cleaning rags ; so it is very possible that she may have come in contact with clothing brought from Aberdare, where cholera then prevailed.

As the supposition that the germs of the disease were communicated from other persons to the four cases alluded to, cannot be sustained ; the enquiry naturally is, whence came that “ something ” which causes cholera ?

Was it from the water used ? The history of the outbreak in East London, the frequency with which outbreaks of cholera have

been traced to drinking water polluted by sewage, the fact that cholera germs find in water a fit medium in which to grow, these induced a general belief in the powerful influence the use of water thus polluted has in the production of the disease. But in Merthyr I confidently say no such pollution of the water supply occurred. The water used for all domestic purposes, by all the inhabitants of the town, was supplied to the houses of the deceased persons above named. It is derived directly from the lesser Taff river, five miles north of the town, discharged from the main supply pipe into two uncovered receivers at Penybryn, thence it passed into uncovered filtering basins, and then into the covered reservoirs. From these Merthyr and Dowlais are supplied. It is true the position of these open receivers and filtering beds on the sloping hill-side above Penydarren, renders them liable to receive from the winds that blow over them, whatever of the seeds of disease may be conveyed through the air. Yet it is scarcely possible to imagine such should have been the case in this epidemic, when we remember the sparseness of the first cases, spread over a widely extended surface of hill and dale.

Was it from the air? It should be borne in mind that Aberdare had been the seat of the epidemic for some three weeks before Merthyr was affected. With this sister town our people were in constant communication, yet in no one instance had either of the persons first attacked been there. Aberdare is distant five miles west of Merthyr, at about the same elevation above the sea,—*but between us rises a hilly range from six to seven hundred feet in height.*

Here I should state the atmospheric phenomena of the first three weeks of the month. Westerly winds blew upon 20 days; rain fell on 14 days. The mean temperature at night was 49°, while that of the day, taken at 10 a.m., was 63°. The highest reading of the barometer was 29·70, and the lowest 29·20. On the 21st a blue mist was first noticed, this was perceived on five other days in August up to the 31st, and on six days out of the thirty in September.

In the foregoing you have two states to notice—a temperature, both night and day higher than is usual in these upland valleys, and an atmosphere loaded with moisture. These atmospheric conditions are those in which it is said minute insect and vegetable germs most rapidly spring into life.

The opinions of the medical men of the town are unanimous as to the spontaneous origin of the epidemic influence, and bearing in mind the statements I have made relative to the absence of any contact or communication with any body or thing infected, and to the freedom of the water from pollution, I am constrained to say that I must attribute the infection of the inhabitants to the pernicious germs of the disease conveyed through *the air*.

Arrived in the atmosphere of the town, these germs or seeds would find places where all the necessary elements abounded, in which they could propagate themselves in infinite multitudes; for everywhere human excrements were to be seen or smelt.

The town infected by the epidemic influence, cholera quickly followed its usual laws; it sought out especially the filthy houses, affected principally the intemperate, the dirty, and the weak, and increasing the number of its victims up to the fourth week, gradually declined, and finally ceased in the eleventh week from its commencement.

D.—*Sanitary Measures adopted previous to the outbreak of Cholera.*

Fear has, at all times, so much to do in predisposing men's bodies to disease, that advisedly no *public* measures were taken previous to the outbreak. Yet by your direction, your surveyor, Mr. Harpur, and I took care to put in use every precaution in our power. With this view, an extra Inspector was appointed, who was specially charged with the supervision of the scavenging, and the disinfection and removal of nuisances. Water was freely used in flushing courts and gutters; and aware of the extremely deleterious influence of large quantities of sewage, our attention was especially directed to the sewer-mouth, at the southern boundary of the Taff Vale Railway Station. Through this a large quantity of sewage

was poured daily into the dry bed of the river Taff—the odour evolved was most offensive. At my suggestion, Mr. Harpur put up a simple apparatus, by which, daily, a solution of sulphate of iron (copperas), 12 pounds to 120 gallons of water, was continuously added to the sewage some hundred yards from the sewer-mouth. This proved so successful that no odour was perceived, nor was the health of the railway pointsmen, who stay day and night in the lodge placed over the mouth of the sewer, in the slightest degree affected during the epidemic.

A report, of which the following is a copy, was presented to you on the 28th July; it was made known to the public by the local press; and a paper containing “Directions to Cottagers” prepared by your Clerk, Surveyor, and Medical Officer, was printed in the English and Welsh languages, and widely circulated.

“In his recently published memorandum, the Medical Officer of the Privy Council has plainly enunciated the doctrines *now* generally held by the medical profession with regard to Epidemic Cholera. These are:

“1st.—That individuals, in whom the poison of the ferment is working, carry the disease in their bodies from one place to another.

“2nd.—That the poison of the disease is thrown out of the human body in the discharges from the stomach and bowels.

“3rd.—That those discharges can, when they become decomposed or putrified, give rise to the *living things* which cause the disease.

“4th.—That persons who are in such a state of health as to be open to infection, may be affected with it, by breathing the air charged with the living things, or drinking the water in which they may be contained. Each person so affected with cholera will thus be a source whence the disease may be spread.

“These opinions being accepted as true, the duties of the local authority are clear and well defined, *viz.*:

“A.—To prepare for the possible advent of cholera by removing every known cause which can promote its growth.

“1st.—By ascertaining whether every house within reach of the water-pipe is supplied with pure water. The use of water obtained from wells in the town should be discontinued.

“2nd.—By requiring that every cesspool should be frequently disinfected, by pouring into it one pound of copperas (sulphate of iron) dissolved in a gallon of hot water.

"3rd.—By requiring that all drains and gully holes should be frequently cleansed, and kept properly filled with water; and that all ash-heaps should be regularly removed. In places where the scavenger's cart does not go to, the ash-heaps should be frequently limed.

"4th.—By a well-organized system of daily street sweeping, and washing of the courts and lanes, as well as of the main thoroughfares.

"5th.—By a careful examination of those places in which cholera first appears—Common Lodging Houses. The most complete evidence should be given the Board that these houses are properly supplied with water, properly drained, ventilated, and cleaned, and that they are not *overcrowded*.

"6th.—By inspection of other houses used as Lodging-houses, that they also are not overcrowded.

"7th.—By inspection of courts, and lanes, and other places where house refuse is thrown upon the earth, which, becoming soddened, retains the objectionable refuse; these places should be limed regularly, and when possible, turned up with the spade.

"8th.—When party walls prevent thorough ventilation of courts, their removal would be advisable.

"9th.—Wherever living animals are kept, the frequent removal of the manure, sprinkling the floor with lime, limewashing the walls, in addition to frequent washings with water, should be insisted on.

"10th.—Wherever meat is *killed* or *kept* for human food, the strictest cleanliness should be enforced—meat, fish, and vegetable stalls and shops should be often inspected.

"11th.—The amplest possible ventilation of houses, more especially of bedrooms, should be pointed out; the Surveyor is prepared to recommend a simple and inexpensive mode of ventilation.

"12th.—The use of gas-tar (which contains carbolic acid) as a paint around fire-places, and along the lower borders of rooms should be recommended to cottagers.

"13th.—Cleanliness of person and of clothing, of kitchen and bedroom—of pavement, gutters, and back yards should be earnestly pressed upon all.

"B.—In case the Epidemic should spread to this district, it would be absolutely necessary that further steps should be taken, some of these would lie with this Board to carry out; others would have to be executed by the Board of Guardians of the Union.

"14th.—The first great necessity is, that the public should be well instructed that Cholera in its first stage, that of diarrhoea, may be controlled, so that any one who has had *one loose painless motion*, should be told

immediately to retire to bed, and to send for medicines to the appointed Medical Visitor.

" 15th.—In order that this may be brought home to each occupier, house-to-house visitation should be established, and District Medical Visitors be appointed.

" 16th.—It being well known that the persons about, and the relatives of, the sick are disposed to take the disease, from having breathed the putrifying poison, it would be wise to prepare Houses of Refuge to which the *healthy* could be removed.

" 17th.—As a rule it is not well to remove a patient in an advanced stage of Cholera from his bed, as the least extra exertion might be fatal, but as many cases would occur in which the removal would be imperative, convenient rooms in each Medical Visitor's District should be set apart to be used as temporary hospitals.

" 18th.—Means for the disinfection of clothing, soiled by discharges, and directions for using them, should be provided and published. Directions as to the mode and means for the disinfection of houses should be provided and published.

" 19th.—The removal of the dead to places set apart should be considered.

" 20th.—Burial grounds within the town should not be used for the interment of the dead from Cholera. Large attendances at funerals should be discountenanced.

" 21st.—Directions as to the *personal* precautions to be used should be prepared and published in English and Welsh.

"T. J. DYKE, Medical Officer of Health."

" July 28th, 1866."

E.—*Sanitary Measures adopted when Cholera commenced.*

On Saturday, the 26th of August, at a full meeting of the Board of Guardians, a committee of that Board was formed and was authorized to carry out the measures necessary for the preservation of the public health. Your Board also met, and a permanent committee of the whole Board formed to carry out those laws which belonged to your initiative. The clerks of the several Boards, Messrs. James and Russell, quickly put all matters of detail into full operation.

The Board of Guardians were further pleased to appoint your medical officer as their medical adviser.

The town was apportioned into convenient districts, and medical officers named for each. These appointments were made public, so that any poor person afflicted was enabled at once to apply for medical aid. A night dispensary was established at the Union Workhouse.

The House of Refuge at Tydfil's Well was furnished as a Temporary Cholera Hospital. This work was quickly and efficiently done under the direction of the master of the workhouse, Mr. T. B. Meredith. The medical charge of this Hospital was given to the medical officer of the district, R. Miles, Esq.

To the relieving officers of Upper and Lower Merthyr, Messrs. W. J. Jones and G. Price, were entrusted the administration of material relief, the speedy interment of the dead, the disinfection of the houses in which death had occurred, and the destruction of clothing worn or soiled by the deceased.

The officers of your Board, under the vigilant supervision of your Surveyor, were fully employed in carrying out the various measures of prevention which it was my duty to suggest. The inspectors, Messrs. Jenkins and Williams, with the assistant inspector, Howells, saw to the daily covering, with a mixture of lime and Mc.Dougal's disinfecting powder, of all discoverable sources of atmospheric pollution.

The Superintendent of the Glamorgan Constabulary, Mr. Henry Wrenn, your Inspector of Common Lodging Houses, gave his valuable aid and experience. Numerous were the heaps of festering refuse removed, many the crowded Lodging Houses cleared out by his direction. To one member of the police force, Sergeant William Thomas, the gratitude of the inhabitants of Penydarren more especially, is abundantly due. He, together with your assistant inspector, Howells, by firmness and unwearied supervision of the men employed, so cleansed this pestiferous suburb, as that in a few days it became comparatively pure and clean. He may justly claim that to this thorough cleansing do we owe the fact that in this, (in other respects the most unhealthy division of Merthyr,) only four lives fell sacrifices to the disease.

The other means recommended to be used were the free ventilation of dwellings, washing away all filth with water, and early application for medical assistance. Stations in Merthyr and Dowlais were appointed, at which Lime for disinfecting and whitewashing, Copperas for deodorizing and disinfecting privies, and Mc.Dougal's powder for disinfecting houses in which disease existed, and for the purification of clothes soiled by patients, were freely and gratuitously distributed to the public.

F.—*Extent of Epidemic and number of Persons afflicted.*

The extent of the Epidemic may be judged of by the fact that deaths occurred in houses in fourteen streets in Dowlais, in three streets in Penydarren, and in fifteen streets in Tydfil's Well. Houses in five streets were infected in Gellydeg, in twenty-seven streets in Merthyr, and in five in Troedyrhiw division.

Altogether in 69 different localities the disease carried off victims.

The area of the surface over which these residences are spread cannot be less than eight square miles.

The number of persons affected and who applied to medical men for assistance, may be seen by the following Abstract of the Weekly Returns made to the Board of Guardians. These have been submitted to each of the medical gentlemen for correction.

It will hence appear that the number of the cases of Cholera which occurred between the 24th of August and the 9th of Nov.—77 days, was 278; while 1909 persons were afflicted with the milder forms of the malady. A total therefore of 2178 were afflicted out of a population of 53,480. This would give a proportional rate of 1 out of 24 as having been *touched, wounded, or killed*, in the fray with this potent enemy of life.

TABLE XVIII.

Number of Cases in each Week under Medical Treatment.

Medical Men.	Thomas.		Probert.		Cresswell.		Dyke.		Miles.		Allday.		James.		Total Cholera.	Total Diarrhoea.
	Ch	Diar	Ch	Diar	Ch	Diar	Ch	Diar	Ch	Diar	Ch	Diar	Ch	Diar		
Weeks ending:																
24th August	3	13	0	0	2	2	3	20	0	4	0	0	0	0	8	39
31st „	24	57	5	84	1	94	5	107	2	14	2	32	2	10	41	398
7th September...	27	105	8	79	12	50	2	37	6	31	3	11	1	5	59	138
14th „	31	167	9	55	4	56	9	29	8	42	9	4	1	9	71	362
21st „	7	108	11	53	2	53	10	31	9	39	3	7	1	5	43	296
28th „	5	59	3	27	7	74	0	20	1	0	0	0	1	0	17	180
5th October.....	6	36	6	17	0	39	2	11	3	2	0	0	0	0	17	105
12th „	3	23	7	11	0	30	1	3	2	1	0	0	0	0	13	68
19th „	3	18	1	11	0	22	0	1	0	1	0	0	0	0	4	53
26th „	2	12	0	8	0	1	0	1	1	0	0	0	0	0	3	22
2nd Nov.	0	1	0	4	2	37	0	0	0	0	0	0	0	0	2	42
9th „	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	26
Totals	111	599	50	349	30	484	32	260	32	134	17	54	6	29	278	1909

G.—*Deaths from Cholera and Diarrhœa in 1866.*

The total number of Deaths registered as having been occasioned by Cholera and Diarrhœa in the eleven weeks subsequent to the 24th of August, when the first death occurred, were from Cholera, 119, Diarrhœa 17; together, 136. In 1854, the deaths were 424; in 1849, 1432.

The proportional rate of mortality in each of the three Epidemics will appear from the following:—

Year.	Deaths.	Population.	
1849.	1432.	44,278	= 1 out of 30, or 323 per 10,000.
1854.	424.	47,634	= 1 out of 112, or 89 „
1866.	136.	53,480	= 1 out of 391, or 25 „

To place the results which these figures point to, in a way that may make the inference from them very plain:—Assuming Merthyr to have been in the same discreditable state as to sanitary matters in 1866, as it was in 1849, and that the epidemics in both periods were of the same virulent character, the deaths in 1866, if they had been in the same proportion to population as they were in 1849, would have been 1730; they amounted to *but* 136,—the difference, 1524, expresses the *lives saved*.

In the accompanying Tables I have worked out as fully as I could, the proportionate rates and per centages of deaths from Cholera, in each district and division in 1866. I have placed side by side the mortality in each Registration District of the Parish in the previous years, but unfortunately I cannot carry out the parallel in the divisions, as I have no means of estimating the population in those parts of the parish in previous years.

Sufficient may however be learnt from the figures to demonstrate the great disparity in the salubrity of the divisions; and at the same time to show that in each *district* in 1866, the mortality rate was very nearly alike.

TABLE XIX.

Comparative Rates of Mortality from Cholera in the Three last Epidemics in Merthyr.

	1849	1854	1866
<i>Upper Merthyr :</i>			
A.—Dowlais	504	194	18
B.—Penydarren	191	31	4
C.—Tydfil's Well	267	55	41
	<hr/>	<hr/>	<hr/>
Total Deaths	962	280	63
Population	22139	23817	26560
Proportional Rate	1 in 23	1 in 85	1 in 421
<hr/>			
<i>Lower Merthyr :</i>			
D.—Merthyr... ..	336	106	48
E.—Gellydeg	100	26	6
F.—Troedyrhiw	34	12	12
	<hr/>	<hr/>	<hr/>
	470	144	66
Population	22139	23817	26720
Proportional Rate	1 in 47	1 in 165	1 in 405
<hr/>			
Workhouse and Non-Parochial (200) ... ..	...	...	7
	<hr/>	<hr/>	<hr/>
Total Deaths	1432	424	136
Population	44278	47634	53480
Proportional Rate	1 in 30	1 in 112	1 in 391

The Table will read thus :—The proportional rate of deaths to people living in Upper Merthyr in '49 was 1 out of 43; in '54 1 out of 85; and in '66—1 out of 42!. Referring to the divisions it will be seen that the sanitary state of Dowlais, *as tested by Cholera*, has been immensely improved; the number of victims having been in the three epidemics respectively :—504, 194, and 18! In Penydarren also, the health-progress was in this instance most gratifying,

as the mortality which in 1849, was 191, was in 1866 but 4. As I have before said, I attribute this improvement largely to the "cleaning" Penydarran got, under the superintendence of Sergt. Thomas and Assistant-Inspector Howells.

TABLE XX.

Deaths in each Division and District from the Cholera Epidemic in 1866.

Districts and Divisions.	Diar- rhœa	Cho- lera.	Total.	Popu- lation.	Proportional Rate.	Rate per 1000.
A.—Dowlais	4	14	= 18	15420	= 1 in 856	1·17
B.—Penydarren	1	3	= 4	4180	= 1 „ 1045	0·95
C.—Tydfil's Well	2	39	= 41	6960	= 1 „ 170	5·88
Total Upper Merthyr	7	56	= 63	26560	= 1 „ 421	2·37
D.—Merthyr	6	42	= 48	14380	= 1 „ 300	3·33
E.—Gellydeg... ..	1	5	= 6	5970	= 1 „ 995	1·00
F.—Troedyrhiw	3	9	= 12	6370	= 1 „ 531	1·88
Total Lower Merthyr	10	56	= 66	26720	= 1 „ 405	2·47
Parishioners died at Workhouse	0	1				
Ditto Cholera Hos	0	3	= 4	80		
Total of Parishioners	17	116	= 133	53360	= 1 „ 401	2·49
Non-Parishioners died at Cholera Hospital	0	3	= 3	120		
Grand Totals	17	119	= 136	53480	= 1 „ 391	2·54

In Tydfil's Well the deaths in '49 were 267 ; in '54, 55 ; and in '66, 41. Here the progress in health matters since 1854, has not been great ; in fact, the old neighbourhoods were those again affected, and this because they were as abominably filthy in 1866 as they

have ever been. The proportional rate of deaths to living being 1 out of 170; by far the highest proportion in any of the divisions during the last epidemic.

As to Lower Merthyr, the proportional rate of deaths in '49 was 1 out of 47 of the living people; in '54, 1 out of 165; and in '66 1 out of 405. The number of deaths in Merthyr proper, declined from 336 in 1849, to 48 in 1866. Gellydeg was but very slightly touched, the mortality being reduced from 100 in '49, to 6 in 1866.

The population of Troedyrhiw was comparatively small in 1849, when 34 persons died of cholera, &c. It had increased in 1854, when the deaths were 12; in 1866 the number of inhabitants having been more than doubled, the mortality from cholera was but 12.

Running the eye down the figures under the rate per 1000, it will be seen that in the divisions of Merthyr and Tydfil's Well, the death rate continued high.

Passing to the localities in these divisions in which it particularly prevailed, we may be able to point out where our great blots are.

In Merthyr Division are the streets of Twynyrodyn and Tram-road side, north and south, in these streets the deaths in the three epidemics ran thus,—61, 10, 15; so that the number who died in 1866 was nearly a fourth of the number who perished in 1849, and half as much again as in 1854. The number (15) does not express the whole figure, for two out of the three parishioners who were removed to the Cholera Hospital were residents, and were taken ill, at Twynyrodyn: so that the true number is 17. Here you have a clear warning that, in the streets named, and in the alleys and courts thereof, a great amount of sanitary improvement is required. Caedraw in each epidemic has paid a heavy penalty for its filth: the numbers were 63, 30, and 12. Population 1414—death rate in 1866, one out of 118. A reduction it is true, but still a much larger proportion of people died here, than in other localities, except in Tydfil's Well.

With regard to the Upper District:—the state of Dowlais, as viewed in relation to the Cholera Epidemic is most satisfactory; for out of this large population of 15,000 persons, but 18 deaths occurred. Much of this immunity must in Dowlais especially, as in all divisions to a great degree, be attributed to the abundant supply of pure water, instead of the painfully insufficient quantity of hard and impure water, with which the people had in former days to be satisfied.

In Tydfil's Well in this as in former epidemics, the seeds of disease found places in plenty, where they could settle down and cause a crowd of victims. The un-macadamized streets and gullies, the filthy dilapidated houses, the absence of ventilation, and the over-crowding of sleeping rooms, these told the old tale—*easily taken ill, soon dead.*

According to the Sanitary Inventory of the Town, taken in August 1866, the following streets—Quarry, Back of Charles', Sunny Bank, Bank, and Llwyfen—contained 163 houses, occupied by 824 people. In these houses 34 people died of cholera in 1866—that was one out of 24 inhabitants!

Crossing Pontstorehouse, you descend to the "Cellars." There in August last 267 people lived. Two died of cholera in September, that is one out of 123!

Why this great difference in people of the same class, occupying houses as badly situated, and as dilapidated as those in Quarry-street? Again, as when writing in my first report of the immunity from Fever which sanitary improvements give, I told you that in these Cellars, inhabited by the poorest of the poor, which in old times were the constant seat of fevers of the most malignant characters, yet by simply draining and paving the courts, you had converted these plague-spots into a most healthy locality, so now the benignant influence of cleanliness has been all-powerful to protect the wretched inhabitants of this place, from the ravages of the most frightful of diseases.

J.—*Influences of Age, Sex, Habits, and Circumstances, as predisposing to Choleraic Disease.*

It scarcely comes within the scope of such an enquiry as I have to write on, to enter in detail into a consideration of the above. I must therefore content myself with directing your attention to the schedule in which I have placed the replies which my medical friends have given me, in answer to my enquiries upon the above-mentioned points. The substance of those replies is, that while no age or sex is free from the liability to the disease, yet that the disposition to take it is greatly enhanced by every cause which lowers human health. Thus children of tender age and delicate constitution, are apt to be affected by choleraic diarrhoea, while men and women are prone to be afflicted with the more serious forms of the disease, *just in proportion to their neglect of cleanliness, prudence, and temperance.*

K.—*Occupations of Persons who died of Cholera.*

In the Table the details as to occupations are brought out.

With regard to the occupations of the deceased, it will be seen that of the 136—90 were persons connected with the iron and coal works, 46 were engaged in other employments. In explanation of the table I must add, that the orders named are those adopted by the Registrar General in the census tables. No deaths occurred of persons engaged in occupations, the numbers of which, in the regular sequence from 1 to 18, are omitted.

In round numbers it may be taken that the persons engaged in the iron-works, in the coal and ironstone mines, and labourers and *their families*, number 45,000; other "occupations" and their families numbering 8,400. The rate of mortality from cholera, &c. per 10,000 of those engaged in the iron-works would be 20; of those not so engaged, 54.

Of coal-miners and their families the numbers are about 20,000; of these 22 died = 11 per 10,000. Of iron-miners and families, out of 5,500 people 14 died, or 25 per 10,000. Of iron-makers,

(furnace-men, firemen in all grades,) and their families, the population would be about 13,500—of these 35 died, or 26 per 10,000. Taking the labourers at iron and coal works and their families at 6,000,—of these 19 died, or 30 per 10,000.

TABLE XXI.

Occupations of Persons, including Wives and Children, deceased from Cholera and Diarrhœa in 1866.

Order 4.—	Wives, Widows, &c.	...	...	...	...	..	4
5.—	Domestic Servants	...	...	...	...	...	2
6.—	Tradesmen	...	...	...	...	...	2
7.—	Engaged in conveyance of Men, Animals, Goods, &c.	...	...	...	...	...	1
8.—	Farmers	...	...	...	...	...	1
9.—	Engaged about Animals	...	...	...	...	...	3
10.—	„ in Art and Mechanic Productions	...	...	...	...	...	10
11.—	„ in working articles of Dress	...	...	...	...	...	2
13.—	„ in dealing in Animal Substances	...	...	...	...	...	1
14.—	„ „ in Vegetable do.	...	...	...	...	...	3
15.—	„ in working and dealing in Minerals...						
	A. Coal Miners	...	...	...	...	...	22
	B. Iron-stone Miners	...	...	...	...	...	14
	C. Iron Makers	...	...	...	...	...	35
	D. Labourers in Iron and Coal Works	...	...	...	...	...	19
16.—	Labourers—Branch of Labour undefined	...	...	...	...	...	10
18.—	Persons supported by the Community	...	...	...	...	...	7

 136

Regarding these differences, I will only briefly say, that as the labourers earn the least wages, so they live in the worst class of houses, and are therefore more liable to those epidemic diseases which settle down in imperfectly ventilated and dirty houses. The firemen in this country earn high wages, but their labour is said to be exhausting; possibly also, the charge generally urged against them—that they are intemperate, may have lead to their being prone

to attacks. I must however here call attention to the remark before made, in the chapter on the Sanitary Description of Merthyr, that Tydfil's Well was principally tenanted by the iron-workers of the Cyfarthfa iron-works, and that the lower portion of this division was *undrained and filthy in the extreme*. Doubtless more of the liability to disease should be set down to the latter causes, than to the nature of the labour of the iron-workers; for the same class of workers resident in other localities, George-town for example, did not suffer to the same extent.

Iron-miners suffered to double the extent that colliers did. I do not know how to account for this difference.

In future years I hope to be able to throw some light, however glimmering, upon the causes which occasion differences such as these, in the rate by which certain of our working bees are liable to various forms of disease.

L.—*Ages at Death of Persons who died of Cholera in 1866.*

The following Table, showing the ages at death of those who perished from the effects of the epidemic in August, September, October, and November, may be interesting to those who study these matters.

It will appear from the figures that no death from *diarrhœa* occurred to any person beyond the age of five years. Choleraic Diarrhœa has of course been included in Cholera. There is here a marked improvement as compared with former epidemics, when "Diarrhœa" was returned as having been the cause of many deaths. I must be allowed freely to state my own conviction, founded upon the practice of my medical friends and upon my own, that the *astringent treatment* of the premonitory Diarrhœa was eminently successful, and it was to the very general use of this treatment, that I venture distinctly, but with all modesty, to attribute to a very great extent, not alone the small number of deaths, but also the comparatively small number of cases. The destruction of the germs of the "Zymotic stuff which occasions Cholera" in the intestines, by such

remedies as Dilute Sulphuric Acid and the Sesquichloride of Iron, was, to my mind, the great preventive cause of the spread of the disease.

With regard to the rate of deaths, it will be evident that those who were in the prime of life full of vitality—from 10 to 30 years—suffered only to the extent of $5\frac{3}{4}$ in 10,000; while those who were, as it were, unripe—5 to 10—and those whose life was beginning to wane, from 30 to 50, were taken off at the rate of 25 and 30 per 10,000.

Those approaching to three score years and ten, died at the rate of $57\frac{3}{4}$, while the very aged were carried off by this exhausting disease at the death rate of 176 per 10,000.

TABLE XXII.

Ages at Death of Persons who died of Cholera, &c., in 1866.

Ages.	Diarrhœa.	Cholera.	Total.	Population at each period of age.	Proportion of Deaths to number living.	Rate of Death per 10000.
Under 5 years	17	13	= 30	8201	1 in 273	36·8
5 under 10 „	0	16	= 16	6316	1 „ 395	25·3
10 „ 30 „	0	12	= 12	20628	1 „ 1719	5·8
30 „ 50 „	0	39	= 39	12977	1 „ 332	30·0
50 „ 70 „	0	27	= 27	4671	1 „ 173	57·8
70 „ 90 „	0	12	= 12	680	1 „ 56	176·4
	17	119	= 136	53473	1 „ 393	256·2

M.—Influence of Water contaminated with Sewage.

I have already described the water supply of Merthyr, and have pointed out that it was wholly out of the question to suppose that the inhabitants could have been inflicted with cholera through its

means. I know that it has been maintained that the *course of cholera* is, as a rule, along the *course of rivers*. Neither in this present epidemic, nor in any of the three previous ones, did this hold good as to Merthyr. In each of the three former epidemics the first persons afflicted were proved to have travelled from other towns where cholera was in full force, and not situated in the valley of the river Taff. The wide divergence of the residences of the four first affected cases, together with the fact that they had not been out of Merthyr, nor had had any communication with any person or thing which could have been in contact with cholera; and further, that in the case at Dowlais, no watercourse flowed near the residence, would also show that the seeds of cholera disease did not find their way here along a watercourse. The first case occurred in Dowlais, the man having been taken ill on the 22nd. Yet the street where the man lived is two miles to the north-east, and 600 feet above the *dry bed* of the river Taff. It must be borne in mind that the water of the river is diverted at the northern confines of the parish into two watercourses, which convey it to the Cyfarthfa Iron Works and Glamorganshire Canal. It is only flooded after heavy rains, and then the flow of water through its bed from Cefn to Troedyrhiw does not long continue. However, a small stream of water does run in the river from the Cefn to the Mill Weir in the town. The Morlais pours in its filthy water just above the Weir; but the first cases were two miles south and two miles north of this Weir. I cannot therefore think that in Merthyr, the usual route of cholera along a watercourse was followed.

As will be seen in the summary of the Sanitary Inventory of the Town, made in August 1866, a number of persons used water from wells, which being situated near old and deep cesspools, was contaminated by sewage. As to the pernicious influence of such a water, Mr. Allday states that he was in attendance upon a tradesman, who was affected with and died of cholera; his wife and son were also ill of the disease, but recovered. This family used the water of a well, which upon enquiry at the time, Mr. Allday ascertained became most offensive when kept for 24 hours. The use of

it was at once discontinued. I have however obtained some, and find that it is very highly charged with sulphuretted hydrogen gas.)

Mr. Cresswell informs me that the young man Roach (who was the first person taken ill), was said to have drunk freely of water which came from under the houses known as Forge row, Dowlais. I have made enquiry, and have ascertained that some water does indeed drop in dry weather at this place, but I also learned that at the time Roach was taken ill, a water main had burst in the street in front of the works, and that this water for some days flowed freely through openings in the wall, that separates the works from the street, and was drank by the workmen.

N.—*Influence of Dwellings.*

In reply to the question, in what kind of dwellings did the disease more especially appear? Mr. Probert answers, "Most frequently in houses built back to back, in dwellings without back doors, and unprovided with suitable conveniences and ventilation." Mr. Allday says, "Principally in small badly-ventilated and over-crowded houses." Dr. Thomas reports the cases as principally occurring in "the ill-ventilated, small and over-crowded houses;" in this Mr. Cresswell also concurs, for he describes the places chiefly chosen by the disease as "the ill-ventilated, over-crowded, and undrained houses." Dr. Miles adds his testimony to the same effect.

If you will refer to the "postscript" of Dr. Kay's Report, published in 1854, you will see that Mr. White, Mr. Russell, and Mr. Probert there say, that in the epidemic of 1849 and 1854, cholera particularly effected the inhabitants of such houses as above described.

The unanimous testimony of the medical men, who have had ample experience in more than one epidemic of cholera, should convince you and our townsmen of the need, the urgent need, that the class of houses in which fever, cholera, and such-like *preventible*

pestilences of human life, delight to nestle, and like serpents sting the *poor trusting tenant*, should be done away with. Ample opportunity will be afforded you in the execution of private drainage works, to insist upon those most necessary improvements—thorough ventilation, and good drainage.

O.—*Conveyance of Disease by those who have been in contact with it.*

E. H. was afflicted with cholera and died. His aged mother, K. H., attended him, she was seized with the disease and died. S. P., a neighbour of the latter visited her house, was attacked, and also died. S. F. had assisted in clearing a cesspool, was attacked with cholera and died; a next door neighbour's daughter helped his wife during the husband's sickness, she was attacked, her two brothers had the disease and died; lastly, S. F.'s wife, who had removed from the house, was attacked and recovered. There was no local cause to have occasioned a liability to the attack of S. F.

The family Connolly occupied the house No. 9 Sunny Bank, it is a small four-roomed house—total cubic space of the three sleeping rooms about 1,200 feet. Here thirteen persons slept nightly. The wife was first seized; to her bedroom was a small window about 18 inches square, outside was a heap of ashes saturated with putrifying house slops. Eight others of this family were attacked within five days; they were removed to the Cholera Hospital. On the 1st Sept., Connolly and his surviving children were admitted into the convalescent ward, within the walls of the Union Workhouse. They were not inspected by the House Surgeon, neither were they confined to the ward and its yard, but unfortunately were allowed to go about the lawn of the Workhouse. Two of the family were taken ill of cholera at the Ward, and removed to the Hospital. No case of diarrhœa or of cholera had up to this occurred within the walls of the Union Workhouse. The House Surgeon reports that the Nurse of the Cholera Hospital was allowed to come to the house, to visit her son in the idiot ward. There is

no question but that she did go from the Hospital to the House, and into the Ward, on more than one occasion after her appointment and employment as nurse to the Hospital, to see her idiot son, in the interval between the date of her employment and the seizure of the old woman and the said nurse's son, on the 12th September.

On the 12th September, this old woman who stayed in the idiot ward was taken ill, she died that night; the idiot lad, who was in the same ward as this aged woman, was next seized, and he died at the Hospital. An old man in a ward wholly disconnected from the idiot ward was taken ill and died; all these died on the 13th.— On the 16th, a woman staying in the female ward, apart from the last wards, was attacked and died. The House Surgeon and the Master of the Workhouse, applied themselves vigorously to check the spread of the disease, and happily succeeded by the prompt removal of the sick, and the abundant use of disinfectants. Upon the recommendation of the House Surgeon, a better diet was given to the occupants of the house, this doubtless contributed greatly to the immunity they subsequently enjoyed.

P.—Propagation of the Disease by the excretions of the Sick.

In the replies of the medical gentlemen, attached hereto, it will be seen that they are of opinion, the disease may be propagated by these excretions, and in confirmation they cite instances in their own practice. One case I may be allowed to give. M. T. had cholera in October and died. She had long been separated from her husband. After her death the man claimed her bed-clothes, took them away on the day of her burial to his own house, a mile up the hill side, slept under the unwashed clothes, had cholera, and died in three days after his wife.

In order to guard against this mode of diffusing the disease, the public were fully warned, by notices published in Welsh and English, and by the unceasing efforts of the medical men, to use those precautions which would destroy the germs of the disease, in the motions which came from the sick.

It will be seen that the medical officers are of opinion that this mode of procedure was efficient.*

Q.—*Proportion of Deaths to Persons attacked.*

The total of cases of Cholera treated by the medical men was 278—the deaths 119; this is nearly equal to a rate of deaths to cases of 43 per 100.

1909 cases of Diarrhœa were reported; 17 deaths occurred from this form of the epidemic; these numbers would give a rate of 0·88 deaths to 100 cases.

Taken together there were 2187 cases of Cholera and Diarrhœa, of whom 136 died: that is a proportion of deaths to cases 6·21 per 100.

The perusal of the foregoing will, I trust, prove that the work of meeting the epidemic by appropriate means, (which resulted in depriving it of much of its virulence;) was successfully and satisfactorily done, each in his proper sphere, by the Medical Men, the Police, the Officers of the Board of Guardians, and the Officers of this Board.

* Dr. Snow asserted in 1849, "That when the matter, contained in the rice water discharges of cholera, is communicated to the human body, it is propagated therein, multiplies in the intestines, is diffused by handling or by water, or by suspension in the air."

Dr. Farr writes, "These species of matter which are peculiar to each Zymotic Disease, are introduced into the blood by inoculation, or by air, or by water—and induce the diseased transformations in a certain number of persons exposed to their action. For a time dormant, suddenly from some atmospheric vicissitude, the peculiar poison becomes developed, destroys large numbers of people, and after a time becomes quiescent. This Zymotic stuff acquires its extreme diffusiveness in some wretched families, placed in hygienic conditions, that favour its creation. Asiatic Cholera thus originates in the Delta of the Ganges, in spots where the huts of the natives are surrounded with pits, which are receptacles for the dejections of the people."—*Med. Times and Gazette*, 13th Oct., 1866.

CHAPTER V.

SECTION 1.—*Ages of Deceased at Seven Periods of Life.*

TABLE XXIII.

Ages at Death in 1866 in parish of Merthyr-Tydfil.

AGES.....	Undr 5 years	5 undr. 10	10 under 30	30 under 50	50 undr. 70	70 undr. 90	90 and abve.	Totals
Population	8201	6316	20628	12977	4671	680	7=	53480
1. Dowlais	201	29	38	49	50	23	3=	393
2. Penydarren ...	68	6	6	11	11	9	0=	111
3. Tydfil's Well ...	66	5	25	36	28	18	2=	180
Total Upr. Merthyr	335	40	69	96	89	50	5=	684
4. Merthyr	162	28	48	60	65	32	0=	395
5. Gellydeg... ..	37	3	14	12	13	15	2=	96
6. Troedyrhiw ...	61	8	32	41	21	14	1=	178
Total Lr. Merthyr .	260	39	94	113	99	61	3=	669
Workhouse :	595							1353
Non-Parochial ...	2	0	10	1	5	5	0=	23
Totals	597	79	173	210	193	116	8=	1376
Proportion at each } period of 1,000 dths }	434	58	126	152	140	84	5=	1000

In pursuing the enquiry into the Mortality in Merthyr, the next subject is that of the Ages at death. In the foregoing Table I have set out the ages at seven periods; and have placed under each period the number of persons living of those several ages. These have been calculated from the data afforded by the Census Tables of 1861—(No. 2: Ages, Civil Condition, Occupations &c. of the People; Division XI., Monmouthshire and South Wales, page 56). Under each of the periods, I have placed the numbers that have died, in each of the six divisions of the parish. This

table has cost much time and labour, but I will hope that the results will amply justify me in delaying the presentation of this Report until the work was properly done.

First as to the total deaths—1376, in relation to deaths under five years.

Upon referring to Dr. Kay's report (page 15, table 9,) it will be seen that the deaths under five years amounted, on the average taken from 1848 to 1853, to 527 in the 1,000 *deaths*; in 1866, the average per 1,000 *deaths* of children under five years was reduced to 434: a diminution of 93. In Cardiff the proportion was 404 per 1,000 *deaths*.

Comparing Merthyr with Cardiff, Bristol, and Liverpool, the proportion of deaths of children under five years, to every 1,000 of the *Population*, the figures run thus:—

Liverpool... ..	14·46	Cardiff	9·52
Merthyr	11·12	Bristol	9·49

Here again our sanitary state contrasts unfavourably with that of Cardiff and Bristol; but it must be remembered that in the past Merthyr has, (as Dr. Kay expressed it,) “competed for notoriety with the worst sanitary town in the kingdom—Liverpool.” Happily, the results of the labours of your Board have been to set a wide space between your present and your past: then your rate was 527, Liverpool 528; now in Liverpool 14·46 per 1,000 of the people die under five years—in Merthyr the average *was* nearly the same, but it has been reduced to 11·12: thus having distanced the great emporium on the Mersey by 3·34 per 1,000. We have, however, 30 in a thousand more deaths than Cardiff; this will I trust be corrected when the sewerage is complete.

Bearing in mind the published opinion of the highest authority on this subject, Mr. Simon, the Medical Officer of the Privy Council, that “it cannot be too distinctly recognized that a high local mortality of children, must necessarily denote a high local prevalence of those causes which determine a degeneration of race;” it will be most satisfactory to the inhabitants of the parish to know, as the figures above demonstrate, that the *unnecessarily* high mor-

tality of children has been greatly diminished in Merthyr; that a saving of nearly one-fifth of the number, which would have died in 1852, has been brought about in 1866; that this saving has been the necessary and happy result of the removal of the many nuisances that occasioned disease, and of the unlimited supply of pure water to a town in which, in 1850, the water supply was "cruelly scant and disgustingly foul," is my own firm conviction, and I thoroughly believe, that a persistence in the same course of sanitary improvement, will be followed by still more striking results in the diminution of disease, and the prolongation of life.

SECTION 2.—*Mortality of Children and of Aged Persons in 1848-53, and in 1866.*

Passing to the proportionate averages of deaths at the different periods,—under 5 years, under 10, &c., to 50 under 70,—I would merely say that I have no standard of comparison, by which I could weigh the improvement or otherwise; but with regard to the deaths of persons of 70 and upwards, Dr. Kay has left us at page 23 of his report, in table 15, the necessary groundwork on which I may base a comparison.

In 1852—The number of Persons who died, having attained the age of 70 years and upwards, was	90
Being in proportion to 1,000 deaths	55
In 1866—The number of Persons who reached 70 and upwards was...	124
Being in proportion to 1,000 deaths	89

From this it will appear, that the chance of living to "three-score years and ten, and upwards," was greatly increased in the latter year,—34 in a thousand having reached that age, *more than would have done in 1852.*

Thus whether we regard the results of the sanitary works as affecting the *very young* or the *very old*, in both extremes we find that a great amount of good has been done:—*we do not now prematurely destroy our young children, we do not now shorten unnecessarily the lives of the already aged, to the same extent as in 1852.*

SECTION 3.—*Mortality of Children and Aged Persons in each Division of the Parish.*

Having regarded the proportional deaths at different ages in the whole Parish, it is right now to turn to the Districts and Divisions, in the hope that the most disease-causing localities may be discovered, by testing the proportional numbers of deaths.

In the district of Upper Merthyr in 1852, the mortality of young children under 5 years, is placed by Dr. Kay, at 549 per thousand of total deaths. In 1866, the number who died at those tender years was 335 out of 684; which would give a proportionate rate of 509 in a thousand. A saving of 40 lives in the thousand.

In the district of Lower Merthyr in the former period the deaths were, under 5 years, 502 of the 1,000 deaths. In 1866 the number who died was 260 out of 669; a proportionate number of 406 in the thousand:—thus in this district *some means* had been at work, which resulted in saving or prolonging the lives of little children, at the rate of 96 in a thousand: nearly 1 in 10.

With regard also to the deaths of aged persons, the results have been equally satisfactory.

In Upper Merthyr, the average annual number of deaths of aged persons above 70 years was, for 1852, 38; or in the proportion of 43 per 1,000 deaths. In 1866, the number was 55 out of 684; a proportion of 80 in the 1,000. Thus 37 persons in a thousand attained 70 years and upwards in 1866, who would have died at a younger age in 1852.

In Lower Merthyr, in 1852, 52 persons out of 733 reached the ages of 70 and upwards; a proportion of 70 in the thousand. In 1866, 64 persons out of 669 attained those ages; a proportion of 90 in the thousand. An addition of 20 in the thousand.

Passing to the examination of the rate of mortality of children under five years, in the *six localities or divisions* that I have before described, it will appear that considerable diversities will come

out; these may be explained by referring to the description of each locality, in chapter 2, and to the causes of death as shown in the subsequent pages.

Dowlais, with an infant population of 2398 under 5 years, lost 201 children out of a total mortality of 393. That is 88 out of a 1000 children *living*, aged less than 5 years, died there in 1866. The proportional mortality per thousand of *deaths* would be 511.

In Penydarren the infant population amounts to 656; of these 68 died. The total deaths were 111.

The rate of deaths to 1,000 living children would be ... 103!

The proportional rate of 1,000 deaths would be 612!

In Tydfil's Well, 1,087 children under 5 years, are calculated to have been living there in 1866; of these 66 died. The whole number of persons who died was 180.

The rate of deaths to 1,000 living children would be 61

The proportional rate of 1,000 deaths would be 366

In Merthyr, including the deaths at the Union Workhouse of children who were parishioners, the deaths were 162 out of a total of 395; the infant population being 2089.

The rate of death to 1,000 children *living* would be 77

The proportional rate of 1,000 *deaths* would be 410

The infant population of Gellydeg was 932; the deaths of little folk were 37, out of a total of 96.

The rate of deaths to 1,000 children living would be 39

The proportional rate of 1,000 deaths would be 385

At Troedyrhiw, with a population of children, under 5 years, of 994, the deaths in that period of life were 61. The total mortality being 178. In this case, as before, the 34 deaths, which occurred at Cethin colliery in 1865, are to be deducted, and the total deaths will be taken at 144.

The rate of deaths to 1,000 children living would be 62

The proportional rate of 1,000 deaths would be 425

The disproportion of the deaths to population will perhaps be better seen by the following Table.

TABLE XXIV.

Showing the rate of Mortality of Children under Five years, in the six Localities, or Divisions, of the parish of Merthyr-Tydfil.

DIVISIONS.	Population under 5 years	Deaths under 5 years	Rate of deaths to 1,000 children living	Deaths at all ages	Proportional rate of deaths under 5 years to 1,000 dths of all ages
Gellydeg	932	37	39	96	385
Tydfil's Well... ..	1087	66	61	180	366
Troedyrhiw	994	61	62	178	360*
Merthyr	2089	162	77	395	410
Dowlais	2398	201	88	393	511
Penydarren	656	68	103	111	612
	3156	595	mean 72	1353	
Workhouse : Non-Parochial ...	45	2		23	
Total	8201	597	72	1376	434

* Excluding the 34 deaths at Cethin the rate would be 423.

SECTION 4.—*Duration of Life of Persons deceased in Merthyr in 1866.*

At page 46 of the report of the late Dr. Kay on the Sanitary state of Merthyr, a table is given, by which it appears that the average length of life of the people who died in the year 1852 in Merthyr, was but $17\frac{1}{2}$ years. In Liverpool it was 17; in Bolton 19; in Clifton 33 years.

I have no means of bringing before you the details of the length of life in other towns for the year 1866, but for our own town I

have noted all the deaths, the time each deceased person lived; and in Table 25 you will read the sum of the duration of life in each quarter, in the Upper and Lower Districts of the Parish.

TABLE XXV.

Sum of the Years lived by the 1376 Persons whose deaths were registered in Upper and Lower Merthyr in 1866; showing average age at death.

Districts.	No. of Deaths.	Sum of Duration of Life.	Average Age at Death.
Upper Merthyr :		Years Mths. Dys.	
1st Quarter	183	3841 . 3 . 18	
2nd „	186	3530 . 6 . 12	
3rd „	168	4209 . 6 . 18	
4th „	147	3935 . 0 . 20	
	684 ÷	15516 . 4 . 12	=22y. 8m. 25d.
Lower Merthyr :			
1st Quarter	205	5465 . 10 . 15	
2nd „	198	5058 . 12 . 16	
3rd „	174	4355 . 5 . 25	
4th „	115	3321 . 0 . 6	
	692 ÷	18201 . 3 . 6	=26y. 3m. 26d.
Whole Parish	1376 ÷	33717 . 7 . 18	=24y. 6m. 11½d.

As to Table 25, it will be most satisfactory to notice that the average age at death in Upper Merthyr in 1866 was $22\frac{3}{4}$ years; in Lower Merthyr $26\frac{1}{4}$ years.—While for the whole parish the average is $24\frac{1}{2}$ years.

In Table 26 you may also read the number of persons who lived to certain definite times—from not more than one day, to not

more than 100 years. This Table is at present of little value, as it needs that I should be able to form an estimate of the number of persons *living* at each age, and thence deduce the proportionate rate of death; at present I cannot do this, but I will endeavour to learn the rule.

TABLE XXVI.

Duration of Life of Persons deceased in Merthyr in 1866.

Age at Death not more than	No. in U.Merthyr	No. in L.Merthyr.	Total.
One Day.....	10	13	= 23
One Week	26	18	= 44
One Month.....	18	20	= 38
Six Months.....	74	63	= 137
One Year	111	88	= 199
			<hr/> = 441
Two Years	56	28	= 84
Three Years	22	15	= 37
Four Years.....	19	16	= 35
			<hr/> = 156
5 years under 10 ...	28	34	= 62
10 „ „ 20 ...	32	54	= 86
20 „ „ 30 ...	48	56	= 104
30 „ „ 40 ...	59	64	= 123
40 „ „ 50 ...	38	49	= 87
50 „ „ 60 ...	55	45	= 100
60 „ „ 70 ...	34	60	= 94
70 „ „ 80 ...	29	39	= 68
80 „ „ 90 ...	20	27	= 47
90 „ „ 100 ...	5	3	= 8
	<hr/>	<hr/>	<hr/> = 779
	684	692	= 1376

Dr. Kay, in the report referred to, worked out the average duration of life in Merthyr for the year 1852; his conclusion was

that the mean age at death was $17\frac{1}{4}$ years. I have followed the same plan as Dr. Kay, and have shown, in table 25, that the mean age at death in Merthyr in 1866 was $24\frac{1}{2}$ years.

Bearing also in mind, that in 1866 Whooping-cough had assailed the young, Cholera the young and middle aged, it was therefore no year of *sunshine without cloud*; nevertheless seven years of life were given on the average to each of the 1376 persons who died.

It is difficult perhaps at once to comprehend this:—let me put it another way. Take it that the year was 1852,—at the rate of death which then prevailed in Merthyr, the sum of the whole time these 1376 persons would have lived, would have been equal to a length of life to *each* of $17\frac{1}{2}$ years. It was their good fortune to be alive in 1866,—some change had taken place which had diminished the rate at which the people died, and the consequence was that *the sum of the days they had lived* was equal to a length of life to each, amounting to $24\frac{1}{2}$ years.

Less young children died in 1866, than 1852; old people lived *longer* in 1866, than in 1852; and if I could have filled in the intervals of ages between youth and old age, and have worked out the details at each period of ten or five years, the same results would, I am persuaded have appeared, namely, *an increased span of life to every human being in Merthyr.*

CHAPTER VI.

*Sanitary Progress in 1866.*SECTION 1.—*The Water Supply.*

Your Surveyor informs me that the number of houses in the Parish supplied with water from the Service Reservoirs at Penybryn and Dowlais, on the 1st of January 1866, was 9148; in the course of the year 423 houses were newly supplied from the same sources; so that on the 31st of December, 1866, the total number receiving the water supply was 9571.

The gross revenue received for water in the year was:—

	£	s.	d.
Supply to Houses in Merthyr	3471	7	4
„ in Cefn... ..	92	0	0
„ for purposes other than domestic... ..	704	3	6
	<hr/>		
	£4267	10	10
	<hr/>		

Of the character of the water, I reported to you in the last quarter of the year, as follows:—

“The water supplied to the inhabitants from the Filter Beds has been frequently examined by me during the past year. That taken from a tap in Merthyr on the 26th of December, was of $3\frac{1}{2}$ degrees of hardness, and slightly discoloured. The water is certainly nearly pure, but frequently during the last 12 months, I have observed it to be very much coloured. As I have before reported, I am satisfied that the colouring is wholly derived from vegetable organic matter, principally peat, dissolved in it.

“After heavy rains the water in the river bed at Ystrad is much discoloured, in this state it is received into the main pipe, and from it is discharged, unchanged, into the Filtering Beds at Penybryn. It is quickly freed from all earthy matters by the process of filtration, but the vegetable colouring being in solution, for the most part passes through the sands used, unaltered; a portion of this vegetable colouring remains attached to the materials used in filtration, and stains them deeply. However diligently these materials—sands of various degrees of fineness—are cleansed, there

still remains a certain amount of colour, that is not wholly washed away ; and when, after the storms have passed, and the river water at Ystrad becomes quite clear, this clear water passing through the stained filtering materials, dissolves some portion of the colouring matter.

“ Although this vegetable colouring is perfectly harmless in the state in which it is found in the water, still it is both *unsightly* and *unnecessary*. Men who drink water wish to have it clear and bright. This may be had after a time, by adopting the ready remedy suggested by your Surveyor, that is, to draw the supply, *in rainy seasons*, from the great body of water in the Pentwyn Compensating Reservoir.”

In the Abstract of the Returns made by the temporary Inspectors, you will notice that 185 houses still derive their water supply from springs and pumps. Of the bad quality of the water obtained from the latter source, the examination which I made of waters obtained from six different wells in the town, in November, 1866, will be a proof.

The results of my analysis were, that these waters were shown to be of from 14 to 28 degrees of hardness, which was caused by the presence in solution in the water, of certain salts of lime and magnesia. In four cases out of the six, there was a considerable quantity of putrescible organic matter present in the waters.*

It will also be seen by the Table in the Appendix, that many houses are still without a proper supply of water. Doubtless your Surveyor will take care that in each case, in which it can be taken from your mains, the occupiers of the houses shall be made partakers of the great boon we enjoy—*an unlimited supply of pure water*.

* I am aware that in one instance the accuracy of my analysis was disputed, and that a quantity of the water was sent for examination to Mr. Herapath of Bristol. It will be satisfactory to you to know that that eminent chemist confirmed, in every essential particular, the analysis made by your medical officer ; we differ however in one matter.—Mr. Herapath uses a water of 12 degrees of hardness, and does not think one of 14 degrees bad ;—I, through your exertions, am blessed with water of only 3 degrees of hardness, and desire that all my fellow-townsmen should use—plentifully use—a beverage so pure.

SECTION 2.—*Sanitary Improvements in Merthyr in 1866.*

Your Surveyor has also favoured me with the following Return, showing the sanitary improvements which have been executed under his supervision during the year.

		Yards.		
1. <i>Improvements in Drainage.</i>	{	Main Sewers constructed	14,960	} 10 miles, 560 yards. Number.
		Drains „	3,200	
		Drains provided for Junction with Sewers	1,808	
		Traps and Gully Holes fixed ...	86	
		Cesspools abolished	30	
	{	„ cleansed	147	
2. <i>Do. in Water Closets.</i>	{	Newly constructed or re-built ...	45	
		Pan and Trap provided	45	
		Water apparatus provided... ..	30	
3. <i>Do. in Public Ash-pits.</i>	{	Newly constructed	1	
4. <i>Do. in Ventilation.</i>	{	Ventilation in Houses improved ,	52	
5. <i>Do. in Cleanliness.</i>	{	Pigstyes removed or cleansed ...	190	
		Manure Heaps removed	90	
			2,524	
6. <i>Do. in Pavement.</i>		Re-laid, or Newly Laid	(yards) 200	
7. <i>Proceedings Taken.</i>	{	First Notices to remove Nuisances issued	327	
		Parties Summoned	8	

SECTION 3.—*Sewage Distribution.*

Ere I conclude, I would draw your attention to the possible evil influence upon the health of the inhabitants, of Penydarren more especially, and to some extent to the residents of Troedyrhiw, of the proposed mode of distributing the sewage in subsurface channels. Speaking of Penydarren: I would ask you to consider that the fall of the pasture land is southward towards the houses; that these pasture lands are “well-fields,”—in wet weather water springs up in numberless points, caused, as I have reason to believe, by the clay bands which crop up to the surface; it will need great care so

to open deep sub-ways through these bands of clay, as that the sewage can not well up to the surface. Catch drains along the wall which separates the fields from the gardens would seem to be needed, to prevent the possible pollution of the houses immediately beyond and below them. At Troedyrhiw also, remembering the vast amount of moisture there, it would be wise to provide, that in summer time when great heat prevails, the sewage may not by being vaporized, prove a most fruitful source of disease. I am well aware that sub-surface drains, well constructed, do so safely convey away sewage to the subsoil of lands, as that no effects injurious to man or animal have arisen; yet at Carlyle, where all has been done that a profitable undertaking can induce a man to do, to render the system perfect, it has been found by Dr. Clouston, the Physican of the County Asylum, that when the winds blow over the meadows irrigated by the sewage of the city, his poor patients suffer from Diarrhœa and other ailings.

Your Surveyor is fully alive to the possible evils, and will, I am sure do all he can to obviate their occurrence; it is with a view rather of strengthening his hands, than of opposing the scheme, that I venture to mention to you the circumstances peculiar to the neighbourhoods, where the distribution of the sewage through pasture lands is to be made, in the belief that you will sanction the use of any precautionary measure which your Surveyor may deem it his duty to lay before you.

CONCLUSION.

WHAT were the changes, what the means whereby results so felicitous as those detailed in the previous pages were produced?

In Merthyr, previous to the formation of this Board, every thing *insanitary* prevailed. A population consisting principally of hard-working but poor people, crowded into small ill-ventilated undrained houses, the surface of the streets and lanes of the town formed of ashes—here levelled, there in mounds, there in pools;—the lanes and bye-ways unchanneled: few “conveniences;” the ash-heap in front of the door the receptacle for all the excretions of healthy and of sick; the air sickening with its putrescent smells; “water cruelly scant and disgustingly foul;” no supervision—no thought taken for the *prevention of disease*.

With the establishment of this Board in 1850, a brighter day dawned; since then gradually, but safely, various means for the promotion of health have been begun—some have been completed, others are still in progress; the wide-spread good which has resulted may be seen in the beneficent results—better health, less sickness, longer life.

The changes that have produced these happy consequences, have been the appointment of a legal practitioner as Clerk of the Board, to see to the due working of the laws passed for the promotion of the public health; of a Surveyor, to whose watchfulness and knowledge the formation of streets, and the proper construction of dwellings was entrusted; of Inspectors of Nuisances, who should carefully enforce the removal of refuse by the public scavengers, and seek out all nuisances prejudicial to the health of the people; of an Inspector of Common Lodging Houses, to whom the onerous duty of preventing overcrowding was confided.

Roads have been macadamized, stone gutters formed, pavements laid, and an unlimited quantity of pure water supplied to nearly ten thousand houses.

These are the means which you have gradually introduced. What the sanitary results have been, may be seen by the following comparisons of facts, as they were in 1851–2, and in 1866.

The number of poor people relieved by the parish, decreased from 55 hundreds in 1851 to 33 hundreds in 1866; the death rate diminished from 36 to 25 in a 1000 living; the mortality of children under 5 years was reduced from 527 to 434 in the 1,000 deaths; the number of people who attained the age of 70 years and upwards, was increased from 55 to 89 per 1,000 deaths; and the average age at death was extended from $17\frac{1}{2}$ to $24\frac{1}{2}$ years.

Looking back to the labours of 17 years, this Board may confidently point to these results and say, that they afford ample proofs not only of their *desire* to fulfil the duties entrusted to them by their fellow-townsmen, but also of the *success* of the means they have used to preserve the health, and prolong the life of every one of the fifty-four thousand human beings who reside in Merthyr-Tydfil.

I am, Gentlemen,

Your obedient Servant,

T. J. DYKE,

Medical Officer of Health.

APPENDIX.

—

SUMMARY of Information contained in the ten Books of Returns made by the House to House Inspectors in August 1866, under the following Heads: (1) Streets. (2) Houses in each Street;—Inhabitants in each House, (4) Family, (5) Lodgers; (6) Total Inhabitants. Ventilation of Floors of Houses, whether by (7) Backdoors or Windows, or (8) by Upper Window Sashes made to open; “Conveniences.” (9) Number. (10) State of.—Water Supply, (11) from Waterworks, (12) from Well or Spring, or (13) none.

A.—DISTRICT OF UPPER MERTHYR.

I.—DIVISION OF DOWLAIS.

STREETS.	HOUSES. No.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
		Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.
1 Gellyfaelog ...	13	40	0	40	0	6	1	1	13	0	0
2 Brewery road.	8	30	0	30	1	3	3	0	8	0	0
3 Garden row ...	9	31	1	32	1	9	1	0	9	0	0
4 Gas row	20	87	1	88	3	7	1	0	20	0	0
5 Plough ct. lane	75	276	7	283	3	28	4	1	75	0	0
6 High street ...	187	729	140	869	115	185	83	4	154	0	33
7 Sand street ...	78	313	37	350	36	70	24	5	78	0	0
8 Balaclava st....	29	137	8	145	27	29	17	0	29	0	0
9 Davies street .	46	200	30	230	36	43	24	0	46	0	0
0 Elizabeth st....	54	219	22	241	52	53	48	1	54	0	0
1 Lwr. Union st	59	241	45	286	41	55	27	3	55	0	4
Forward...	578	2303	291	2594	315	488	233	15	541	0	37

STREETS.	HOUSES.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
		No.	Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.
Forward...	578	2303	291	2594	315	488	233	15	541	0	37
12 Up. Union st..	45	165	38	203	38	43	25	0	41	0	4
13 Castle street...	82	351	64	415	45	69	48	4	82	0	0
14 Lr. Brecon st.	42	153	42	195	24	37	19	2	39	0	3
15 Mary street ...	66	278	84	362	66	61	34	2	59	0	5
16 Walter street .	35	164	18	182	26	34	20	3	34	0	1
17 Wyndham st .	18	75	4	79	18	18	18	0	18	0	0
18 Russell street .	33	132	3	135	32	33	31	0	33	0	0
19 George street .	48	187	54	241	31	47	20	1	45	0	3
20 Wind street...	62	249	55	304	29	48	7	1	58	0	4
21 South street...	45	196	41	237	30	45	7	2	45	0	0
22 Cross street ...	60	258	117	375	18	60	6	0	60	0	0
23 Bryn Zion st..	43	169	22	191	33	42	23	0	43	0	0
24 Mary Ann st .	42	199	20	219	39	42	32	0	42	0	0
25 Watercourse. .	8	32	5	37	7	8	8	4	8	0	0
26 Horse street..	49	213	33	246	22	48	10	6	48	0	1
27 Church street.	25	108	25	133	21	25	5	1	25	0	0
28 Well street ...	92	361	61	422	29	88	8	2	90	0	2
29 East street ...	11	36	7	43	9	10	1	0	10	0	1
30 Commercial st.	7	32	3	35	7	7	7	0	7	0	0
31 Church row ...	15	70	21	91	14	14	10	0	15	0	0
32 Market street.	41	162	25	187	24	40	33	1	41	0	0
33 Garden street.	18	93	15	108	17	18	15	0	18	0	0
34 Charlotte st ...	18	91	11	102	17	18	14	0	18	0	0
35 Ivor street ...	129	563	115	678	118	128	109	16	128	0	1
36 North street...	70	278	32	310	32	68	53	5	70	0	0
37 Lewis street...	20	105	24	129	19	21	17	0	20	0	0
38 Lloyd street..	40	173	37	210	23	37	30	0	37	0	3
39 Victoria street	106	458	86	544	103	105	74	6	106	0	0
40 Berry square..	50	217	34	251	47	50	12	0	50	0	0
41 Odessa street .	30	123	20	143	30	30	30	2	30	0	0
42 Overton street	18	76	8	84	18	18	9	0	18	0	0
43 Spring street .	38	152	18	170	38	38	36	2	38	0	0
44 Mt. Pleasant st	51	213	45	258	50	50	32	0	50	0	1
45 Broad street...	38	145	22	167	37	37	37	0	37	0	1
Forward...	2073	8580	1500	10080	1406	1925	1053	77	2004	0	67

STREETS.	HOUSES. No.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
		Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.
Forward...	2073	8580	1500	10080	1406	1925	1053	77	2004	0	67
46 Alma street ...	30	139	14	153	30	30	22	1	30	0	0
47 White street .	47	221	21	242	47	46	46	5	46	0	1
48 Francis street.	52	252	22	274	52	52	52	2	52	0	0
49 Vaughan st....	13	62	4	66	10	13	7	0	13	0	0
50 Flg. & Cstle. ct.	7	23	10	33	2	6	0	0	6	0	1
51 Dwls. House } and Lodge }	2	17	0	17	1	2	2	0	2	0	0
52 Gwernllwyn rd	7	44	0	44	6	7	7	0	7	0	0
53 Cae Harris ...	79	301	80	381	40	78	24	10	78	0	1
54 Cwm Canol ...	31	124	40	164	27	29	2	0	30	0	1
55 Pond street ...	39	187	31	218	37	39	4	2	39	0	0
56 Antelope st ...	13	68	10	78	9	12	1	0	13	0	0
57 Twnty. Houses	84	333	53	386	42	84	13	0	84	0	0
58 Top of Dowl.	44	173	39	212	12	41	9	0	44	0	0
59 Blaen Dowlais	7	33	0	33	0	0	0	0	0	0	7
60 Ivor town.....	94	456	31	487	93	93	2	1	93	0	1
61 Gwernllwybch	70	327	21	348	57	68	24	2	70	0	0
62 Pengarnddu...	53	227	10	237	14	53	0	0	0	0	53
63 Pantyscallog .	39	178	15	193	23	23	23	4	23	0	16
64 Pantcadivor...	13	71	4	75	10	9	6	0	9	0	4
65 Tai yr evail...	10	47	2	49	3	2	2	0	10	0	0
66 C. Rhydybeth.	99	341	2	343	7	58	5	1	0	0	99
67 Coedcae	9	34	11	45	2	9	0	0	9	0	0
Totals Dowlais ...	2915	12238	1920	14158	1930	2679	1295	105	2662	0	251

2.—DIVISION OF PENYDARRAN.

1 Penydaran lge	7	27	0	27	4	7	7	0	5	0	2
2 Penydarran } rd.&courts }	436	1778	85	1863	208	400	215	42	417	7	12
3 Tramroad side	11	55	1	56	0	0	0	0	0	0	11
Forward	454	1860	86	1946	212	407	222	42	422	7	25

STREETS.	HOUSES. No.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
		Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.
Forward	454	1860	86	1946	212	407	222	42	422	7	25
4 Bowden's row.	12	51	2	53	1	9	3	1	8	0	4
5 Mus. Hall row	11	46	0	46	5	11	2	1	11	0	0
6 Soloman st ...	28	110	6	116	17	26	22	3	27	0	1
7 Mt. Pleasant sq	26	96	2	98	6	25	2	2	25	0	1
8 Garden row...	6	22	0	22	6	6	6	0	6	0	0
9 Jones' row ...	6	22	0	22	0	2	0	0	6	0	0
10 Baltic place ...	11	51	0	51	3	11	6	0	11	0	0
11 Plantation ...	82	392	1	393	60	82	59	11	82	0	0
12 Horeb street. .	41	190	3	193	33	41	32	9	41	0	0
13 Lewis street...	7	35	0	35	4	7	2	0	7	0	0
14 Church street.	78	328	4	332	75	78	71	62	78	0	0
15 Elim street ...	19	72	2	74	17	19	15	11	19	0	0
16 Up. Elim st...	31	145	3	148	31	31	28	9	31	0	0
Totals Penydarran	812	3420	109	3529	470	755	470	151	774	7	31

3.-DIVISION OF TYDFIL'S WELL.

1 Pont- } East	27	117	4	121	14	21	27	24	27	0	0
2 morlais } West	18	69	0	69	6	18	18	0	15	3	0
3 James' court .	7	18	0	18	0	0	7	0	7	0	0
4 Brecon road...	86	330	6	336	58	75	79	34	86	0	0
5 Grawen road .	101	438	12	450	55	74	72	16	101	0	0
6 Well street ...	20	78	0	78	16	20	20	5	20	0	0
7 Mount street .	24	96	1	97	23	12	23	0	24	0	0
8 Grawen terac.	28	107	0	107	28	28	28	4	28	0	0
9 Pleasant view .	8	30	0	30	8	8	8	1	8	0	0
10 Grawen place .	4	13	0	13	4	4	4	0	4	0	0
11 Margaret st...	8	34	0	34	8	8	8	0	8	0	0
12 Park row	5	21	1	22	5	5	5	0	5	0	0
13 Castle square .	15	64	0	64	0	15	15	0	15	0	0
Forward...	351	1415	24	1439	205	288	324	84	348	3	0

STREETS.	HOUSES. No.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
		Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.
Forward...	351	1415	24	1439	205	288	324	84	348	3	0
<i>Morgan Town:</i>											
14 Garth street..	22	105	3	108	14	22	18	0	22	0	0
15 Moriah street.	18	71	2	73	11	18	18	0	18	0	0
16 David street..	12	50	0	50	12	12	12	0	12	0	0
17 Cambrian st...	10	42	2	44	10	10	10	5	10	0	0
18 Edward street.	11	40	0	40	11	11	11	5	11	0	0
19 Sand street ...	12	55	5	60	12	12	12	0	12	0	0
20 William street	14	54	12	66	14	14	14	0	14	0	0
<i>Bryant's Field:</i>											
21 Brewery street	51	187	17	204	13	11	51	0	51	0	0
22 Bank street ...	24	102	19	121	0	0	9	0	24	0	0
23 Park street ...	28	125	6	131	24	12	25	8	28	0	0
24 Drysiog street	29	95	1	96	21	6	20	3	29	0	0
25 Sunny Bank .	38	174	23	197	22	34	34	10	35	0	3
26 Cross row ...	14	49	11	60	0	13	13	4	13	0	1
<i>Caepantwyll:</i>											
27 Cyfarthfa offic	2	18	0	18	2	2	2	0	2	0	0
28 William town.	30	136	6	142	18	18	30	0	30	0	0
29 William street	17	85	7	92	10	13	11	0	13	0	4
30 River side ...	13	58	0	58	1	7	12	0	13	0	0
31 Taff street ...	35	151	0	151	26	32	34	5	35	0	0
32 Chapel street .	18	66	4	70	12	12	14	0	18	0	0
33 King street ...	13	47	0	47	13	13	13	6	13	0	0
34 Queen street .	9	36	1	37	8	8	6	6	8	0	1
35 Hill street ...	13	55	7	62	6	13	5	2	13	0	0
36 Waterloo st...	32	154	6	160	17	25	25	6	32	0	0
37 Gate street ...	19	66	0	66	1	17	14	4	18	0	1
38 Llwyfen street	10	37	0	37	3	4	2	0	10	0	0
39 Jeremy row ...	11	57	1	58	0	11	11	0	11	0	0
40 Parrot row ...	8	35	0	35	1	6	8	0	8	0	0
41 Quarry street.	58	284	34	318	32	44	11	3	58	0	0
42 High Germany	8	27	3	30	0	8	0	0	8	0	0
43 Bk. of Charles.	25	116	5	121	2	4	0	0	25	0	0
44 Jackson's bg } & Bethesda }	90	364	65	429	35	88	23	2	90	0	0
45 China	68	243	24	267	1	54	27	0	68	0	0
46 Newfoundland	38	179	23	202	13	33	13	13	38	0	0
Totals Tydfil's W.	1151	4778	311	5089	570	875	832	166	1138	3	10

B.—DISTRICT OF LOWER MERTHYR.

I.—DIVISION OF MERTHYR.

STREETS.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.			
	HOUSES. No.	Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.
1 Plymouth st .	171	667	58	725	52	77	48	13	168	0	3
2 Holmes' row .	14	40	3	43	0	0	0	0	14	0	0
3 Pedwranfach .	31	105	55	160	6	0	21	16	31	0	0
4 Yew street ...	41	148	23	171	5	2	12	9	41	0	0
5 Ball court lane	19	73	6	79	6	0	3	3	19	0	0
6 Court street. .	20	73	14	87	17	7	20	9	20	0	0
7 Gillar street .	25	56	7	63	9	1	9	1	25	0	0
8 Broad street .	10	22	8	30	4	4	4	0	10	0	0
9 High st. East	77	387	24	411	74	64	69	4	66	8	3
10 High st. West	72	410	0	410	63	49	59	1	67	3	2
11 Snelling's row	4	21	0	21	2	0	2	0	4	0	0
12 Harman's ct. .	2	3	0	3	0	0	0	0	2	0	0
13 Barnett's ct...	2	4	0	4	0	0	0	0	2	0	0
14 Cross Keys st.	23	101	8	109	14	8	10	0	23	0	0
15 Mill street ...	22	79	13	92	8	4	7	2	21	0	1
16 3-Salmons st..	3	14	7	21	1	0	0	0	3	0	0
17 Pond side.....	10	35	2	37	6	5	10	0	10	0	0
18 Adam & Eve ct	9	34	6	40	0	0	9	0	9	0	0
19 Market square	3	12	11	23	3	3	3	1	3	0	0
20 John street ...	6	28	0	28	6	6	6	0	6	0	0
21 Swan street...	6	39	0	39	4	5	4	0	6	0	0
22 Albert street .	43	173	34	207	24	24	43	14	43	0	0
23 Chapel street .	29	94	11	105	6	18	29	4	29	0	0
24 Graham street	5	14	10	24	5	5	5	5	0	5	0
25 Wellington st.	37	150	23	173	33	23	35	4	37	0	0
26 Jenkins' court.	9	25	4	29	1	0	9	0	9	0	0
27 Victoria street	37	204	3	207	35	35	34	1	35	2	0
28 Temperance st	15	71	6	77	12	4	15	6	15	0	0
29 Garden street.	29	121	24	145	21	2	26	14	29	0	0
30 Bridge street	53	203	11	214	27	19	14	2	52	1	0
31 Picton street .	78	322	71	393	45	26	36	7	78	0	0
Forward...	905	3728	442	4170	489	391	542	116	877	19	9

STREETS.	HOUSES. No.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
		Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks	Pump.	None.
Forward...	905	3728	442	4170	489	391	542	116	877	19	9
32 Jenkins' court.	4	20	0	20	4	0	0	0	4	0	0
33 Morris' court.	16	62	4	66	0	0	0	0	16	0	0
34 Allcock's court	5	15	2	17	0	0	0	0	5	0	0
35 Lower Taff st.	8	33	13	46	4	0	2	2	8	0	0
36 Miles' court ...	7	30	4	34	0	0	1	1	7	0	0
37 Middle Taff st	21	88	18	106	7	0	3	0	21	0	0
38 Harris' court.	12	59	6	65	5	0	1	0	12	0	0
39 Badgers court.	20	63	18	81	1	0	10	10	20	0	0
40 Black Lion ct.	5	15	2	17	0	0	1	0	5	0	0
41 Vaughan's st.	8	32	13	45	3	0	4	4	8	0	0
42 Bryant's court	6	34	21	55	1	0	4	4	6	0	0
43 Lewis' court..	6	32	19	51	0	0	0	0	6	0	0
44 Lewis, tin- man's ct... }	7	39	3	42	0	0	0	0	7	0	0
45 Upper Taff st.	25	105	42	147	13	0	17	0	25	0	0
46 Picton square.	14	60	22	82	0	0	14	0	14	0	0
47 Pool street ...	15	47	6	53	4	0	15	0	15	0	0
48 Morgan's ct...	8	42	2	44	1	0	8	0	8	0	0
49 Currier's court	2	8	0	8	0	0	2	0	2	0	0
50 Isle of Wight.	12	37	5	42	4	0	0	0	12	0	0
51 Ivy Bush lane	7	19	7	26	1	1	1	0	7	0	0
52 River side ...	47	171	48	219	6	6	4	0	47	0	0
53 Ynysgau	77	297	46	343	43	12	33	11	77	0	0
54 Castle street .	54	333	19	352	40	25	46	15	51	0	3
55 Glebeland st .	54	231	16	247	41	30	43	5	53	0	1
56 Glebeland plee	8	33	1	34	8	8	8	0	8	0	0
57 Rosser's court.	9	34	2	36	2	9	2	0	9	0	0
58 Club court .	10	36	5	41	0	10	10	0	10	0	0
59 Lamb lane ...	22	80	14	94	1	8	10	0	22	0	0
60 Williams' sqre	16	41	10	51	8	12	15	0	16	0	0
61 Evans' court .	8	34	1	35	0	8	8	0	8	0	0
62 Wht Sheaf lne	23	89	5	94	0	0	13	0	23	0	0
63 Whitty's court	9	26	11	37	0	0	9	6	9	0	0
64 Post Office lne	11	41	3	44	2	0	7	0	9	0	2
Forward...	1461	6014	830	6844	691	520	835	176	1427	19	15

STREETS.	HOUSES. No.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
		Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.
Forward...	1461	6014	830	6844	691	520	835	176	1427	19	15
65 Castle yard ...	8	26	7	33	0	7	7	0	8	0	0
66 Vulcan court .	5	21	4	25	0	0	0	0	5	0	0
7 Pontmorlais...	63	254	17	271	42	30	49	7	62	1	0
68 Pottery row...	20	73	23	96	0	0	20	3	20	0	0
69 Robert's lane .	7	28	2	30	0	0	3	0	7	0	0
70 Russell's hs....	5	29	18	47	0	0	0	0	5	0	0
71 Professional r.	3	13	0	13	3	3	3	0	3	0	0
72 Tramrd. sd. N	191	746	78	824	82	27	112	19	179	0	12
73 Thomas street	90	372	54	426	77	78	89	1	88	2	0
74 Cross Thos. st	16	60	14	74	16	16	16	0	16	0	0
75 New Castle st.	15	68	6	74	15	15	15	0	15	0	0
76 Church street.	18	87	5	92	18	18	18	0	16	2	0
77 Union street .	23	89	6	95	23	23	23	4	23	0	6
78 Union terrace.	19	80	13	93	19	19	19	1	19	0	0
79 Courtland ter.	17	83	11	94	17	17	17	0	17	0	0
80 Do. villas	13	75	2	77	13	13	13	0	13	0	0
81 Alma street...	25	88	17	105	25	23	23	0	25	0	0
82 Coedcae court.	52	213	14	227	7	0	19	1	52	0	0
83 Tramroad Sth	55	178	8	186	4	2	15	0	54	1	0
84 Joseph's squar	24	108	6	114	10	0	24	0	24	0	0
85 Twynyrodin } and courts. }	167	555	52	607	55	42	90	3	121	0	46
86 Rees street ...	13	57	4	61	13	13	13	0	13	0	0
87 William street	40	170	26	196	40	40	40	0	40	0	0
88 Mary street...	46	209	10	219	43	44	46	4	46	0	0
89 Cilfach Cynon.	115	386	45	431	91	151	75	3	115	0	0
90 Penuel street .	14	54	3	57	14	14	14	0	14	0	0
91 Mountn Hare.	51	221	7	228	19	8	26	3	29	22	0
92 Mardy street .	11	51	1	52	11	11	11	0	11	0	0
93 Pwlllywhiad ...	26	134	6	140	9	0	4	0	0	13	13
94 Tai Level Dip.	4	20	0	20	0	0	0	0	0	0	4
95 Bradley row. .	11	37	0	37	1	9	3	1	0	11	0
96 Incline Top...	22	127	0	127	3	22	1	0	22	0	0
97 Penydarran yd	30	118	5	123	15	3	4	2	30	0	0
Forward...	2680	10844	1294	12138	1376	1168	1647	228	2519	71	90

STREETS.	HOUSES. No.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
		Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.
Forward...	2680	10844	1294	12138	1376	1168	1647	228	2519	71	90
98 Cwmnant- y-coed ... }	10	34	0	34	0	0	0	0	0	10	0
99 Penrynis ...	6	19	0	19	2	3	6	0	6	0	0
100 Penwaunfwr.	64	243	8	251	20	0	0	0	0	20	44
101 Tai-yr-Drift.	9	40	2	42	6	0	0	0	0	0	9
102 Trehir	20	91	0	91	15	1	0	0	0	0	20
103 Twynywaun.	8	32	0	32	0	0	0	0	0	0	8
Totals Merthyr ...	2797	11303	1304	12607	1419	1172	1653	228	2525	101	171

2.—DIVISION OF GELLYDEG.

1 Timber yard .	2	5	0	5	1	1	1	0	2	0	0
2 Canal square .	16	40	5	45	8	15	2	0	16	0	0
3 Penry street...	16	55	4	59	9	16	6	0	16	0	0
4 Brewery road.	8	28	3	31	4	8	3	0	7	1	0
5 Ynysfach sqre.	47	220	8	228	42	47	47	0	47	0	0
6 Dynevor street	20	70	1	71	17	20	20	0	18	2	0
7 Coffin's court .	18	59	4	63	1	18	18	0	18	0	0
8 Aberdare road	22	88	3	91	11	22	22	5	22	0	0
9 Tramroad row	24	96	9	105	8	23	18	3	23	1	0
10 Mathews' row.	6	18	2	20	0	2	6	0	6	0	0
11 John street ...	104	408	15	423	78	92	74	2	104	0	0
12 West lane ...	23	77	2	79	7	9	23	0	23	0	0
13 West court ...	5	14	0	14	1	5	5	0	5	0	0
14 Cyfarthfa lane	36	156	8	164	26	36	20	2	36	0	0
15 Nantygwnth } lane	10	54	1	55	10	10	0	0	10	0	0
16 White row ...	20	69	2	71	18	20	7	0	20	0	0
17 Bethel street .	37	159	15	164	18	37	28	10	37	0	0
18 George street.	44	179	11	190	38	43	42	0	44	0	0
19 Howell street.	18	72	3	75	14	18	18	6	18	0	0
20 Iron lane	55	132	20	152	39	55	55	23	55	0	0
Forward...	531	1999	116	2115	351	497	411	51	527	4	0

STREETS.	HOUSES. No.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
		Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks	Pump.	None.
Forward...	531	1999	116	2115	351	497	411	51	527	4	0
21 Nantygwnth } road	51	175	10	185	40	51	49	3	50	1	0
22 Cyfarthfa bk } row.....	63	182	31	213	58	62	59	0	58	5	0
23 Chapel row ...	5	22	0	22	5	5	5	0	5	0	0
24 Tramroad ct. .	6	15	0	15	0	6	6	0	6	0	0
25 Garden row ...	8	22	2	24	8	8	8	0	8	0	0
26 Great house } Cyfarthfa . }	6	29	1	30	1	6	6	0	5	1	0
27 Penlevel	8	37	0	37	0	8	8	8	0	8	0
28 Cwm capel ...	10	41	5	46	1	10	2	0	0	10	0
29 Ty mawr farm	3	20	0	20	0	3	0	0	0	3	0
30 Tranchbach ...	27	115	2	117	0	27	0	0	27	0	0
31 Penyard, Cyf.	5	25	1	26	0	5	1	0	5	0	0
32 Gellydeg	42	186	30	216	3	42	2	0	22	0	20
33 Clwydyfagwr .	24	132	1	133	0	24	0	0	0	0	24
34 Coedca, Bryntg	8	36	1	37	2	7	0	0	0	0	8
35 Llwynycuckoo	6	28	0	28	0	5	0	0	0	0	6
36 Wynchfawr ...	33	140	3	143	1	16	0	0	0	0	33
37 Heolgerrig ...	138	643	18	661	78	108	45	4	68	0	70
38 Tramroad side	9	47	2	49	3	9	6	4	3	0	6
39 Pencoedcae ...	2	13	0	13	2	2	2	0	0	0	2
40 Cwmglo	9	55	0	55	0	1	0	0	0	0	9
41 Up Colliers' r.	17	79	1	80	3	17	0	0	17	0	0
42 Lr. Colliers' } r. & Wern. }	30	140	11	151	18	30	0	0	26	0	4
43 Rhydycar & } Lr. Wern. }	44	206	8	214	17	44	0	0	41	0	3
Totals Gellydeg...	1085	4387	243	4630	591	993	610	70	868	32	185

3.-DIVISION OF TROEDYRHIW.

STREETS.	HOUSES. No.	INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
		Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.
1 Clynmil Ucha.	11	57	0	57	4	10	2	0	10	0	1
2 Clynmil Isaf .	9	40	4	44	0	0	0	0	9	0	0
3 Penyard, Plymouth }	15	86	8	94	15	5	15	0	15	0	0
4 Tai winches...	8	41	1	42	0	0	0	0	0	0	8
5 Duffryn	57	263	26	289	28	29	20	11	41	0	16
6 Taibach	15	69	8	77	12	2	1	0	15	0	0
<i>Pentrebach :</i>											
7 Lower row ...	31	168	14	182	30	16	31	0	31	0	0
8 Front row ...	32	173	5	178	0	6	8	0	32	0	0
9 Square	26	152	4	156	3	6	1	0	26	0	0
10 Bell row	9	42	1	43	0	7	3	0	9	0	0
11 Brown street .	35	201	19	220	7	14	7	0	32	0	3
<i>Troedyrhiw :</i>											
12 Club houses...	29	131	8	139	29	29	29	3	29	0	0
13 Mt. Pleasant .	7	29	1	30	7	7	7	0	7	0	0
14 Jones' square .	15	66	13	79	15	15	15	0	15	0	0
15 Chapel street .	29	128	16	144	24	29	29	2	29	0	0
16 Tyntaldwn ...	13	49	2	51	10	11	10	0	13	0	0
17 Cardiff road...	55	224	12	236	41	40	55	12	55	0	0
18 Bridge street .	52	211	4	215	48	51	51	1	51	0	1
19 Wyndham st .	45	167	15	182	40	36	45	15	45	0	0
20 Yew street ...	93	427	26	453	93	93	93	4	93	0	0
<i>Pontyrhun :</i>											
21 Glantaff street	31	118	18	136	27	29	31	0	31	0	0
22 Hill street ...	16	60	5	65	16	16	16	0	16	0	0
23 Church street .	20	83	6	89	20	20	20	0	20	0	0
24 Windsor st ...	19	87	5	92	19	19	19	12	19	0	0
25 Harriet town .	33	171	10	181	28	32	33	4	33	0	0
26 Plantation sq .	19	87	1	88	16	18	13	0	8	11	0
27 Ash road	14	51	6	57	5	7	7	0	14	0	0
28 Castle houses .	10	42	3	45	0	0	0	0	0	10	0
29 Furnace row .	14	58	1	59	4	0	0	0	0	14	0
30 Park square...	12	45	7	52	3	5	0	0	0	12	0
Forward...	774	3526	249	3775	544	552	561	64	698	47	29

STREETS.	HOUSES.		INHABITANTS.			VENTILA- TION.		CONVE- NIENCES.		WATER SUPPLY.		
	No.		Family.	Lodgers.	Total.	Bk. Doors.	Windows.	Number.	Full.	Wtr. Wks.	Pump.	None.
Forward...	774		3526	249	3775	544	552	561	64	698	47	29
<i>Abercannaid</i> :												
31 Newton street.	13		59	3	62	13	13	13	0	13	0	0
32 Chapel street .	28		146	6	152	28	28	28	0	28	0	0
33 Cardiff street .	18		75	7	82	18	18	18	0	18	0	0
34 Cethin street .	40		190	9	199	40	40	40	0	40	0	0
35 New Chapel st	12		51	0	51	12	12	12	0	12	0	0
36 Nightingale st.	81		351	9	360	81	81	81	0	81	0	0
37 River row ..	11		48	0	48	11	11	11	0	11	0	0
38 High street...	4		18	2	20	4	4	4	0	3	0	1
39 Canal row ...	11		45	7	52	4	0	11	0	11	0	0
40 Henry square.	14		58	1	59	1	5	14	0	14	0	0
41 David street...	15		47	1	48	14	0	14	0	14	0	1
42 Catherine st..	26		109	1	110	22	10	26	0	26	0	0
43 Pond row.....	11		39	1	40	9	6	6	0	5	0	6
44 Graig row ...	11		51	5	56	3	6	11	9	0	0	11
45 Old Farm row	12		61	2	63	8	12	12	0	12	0	0
46 Quay street...	7		30	1	31	3	4	1	0	7	0	0
47 Rees street ...	4		20	0	20	0	0	0	0	4	0	0
48 Jenkins' street	14		46	1	47	1	14	3	0	12	0	2
49 Lewis street...	14		57	3	60	0	3	1	0	14	0	0
Totals Troedyrhiw	1120		5027	308	5335	816	819	867	73	1023	47	50

APPENDIX No. 2.

*Causes of, and Ages at, Death in Merthyr-Tydfil in 1866,
including Deaths at Union Workhouse,*

Diseases.	Ages.												Totals.
	1	2	3	4	Under 5	10	30	50	70	90	Above 90	Above 6	
Class 1.—Zymotic.													
Order 1.—Miasmatic.													
1 Small Pox	0	0	0	0	0	0	0	1	0	0	0	1	1
2 Scarlet Fever	3	7	4	4	18	9	2	0	0	0	0	11	29
3 Diphtheria	0	1	0	1	2	1	0	0	0	0	0	1	3
4 Whooping Cough	59	22	19	6	106	4	0	0	0	0	0	4	110
5 Croup	6	5	1	2	14	2	0	0	0	0	0	2	16
6 Typhoid Fever	2	0	1	1	4	4	10	9	5	2	0	30	34
7 Erysipelas	1	1	0	0	2	0	0	1	1	0	0	2	4
8 Metria	0	0	0	0	0	0	3	2	0	0	0	5	5
9 Diarrhœa	6	2	0	0	8	0	0	0	1	0	0	1	9
" Choleraic.	7	5	4	1	17	0	0	0	0	0	0	0	17
10 Cholera	2	5	1	5	13	16	11	39	26	11	0	103	116
" Non-Parochial	0	0	0	0	0	0	1	0	1	1	0	3	3
11 Ague	1	0	0	0	1	0	0	0	0	0	0	0	1
12 Rheumatism	0	0	0	0	0	0	1	0	3	0	0	4	4
13 Other Miasmatic...	0	0	0	0	0	0	1	1	0	0	0	2	2
	87	48	30	20	185	36	29	53	37	14	0	169	— 354
Order 2.—Enthetic.													
1 Syphilis	5	0	0	0	5	0	0	2	2	0	0	4	— 9
Order 3.—Dietic.													
1 Want of Breast Mk	1	0	0	0	1	0	0	0	0	0	0	0	— 1
Class 2.—Constitutional													
Order 1.—Diathetic.													
1 Dropsy	2	0	0	0	2	0	0	3	0	5	0	8	10
2 Cancer	0	0	0	0	0	0	2	3	8	2	1	16	16
3 Mortification	1	0	0	1	2	0	0	0	0	0	0	0	2
	3	0	0	1	4	0	2	6	8	7	1	24	— 28
Order 2.—Tubercular.													
1 Scrofula	1	0	0	2	3	0	1	1	0	0	0	2	5
2 Tabes	40	15	3	3	61	2	0	0	0	0	0	2	63
3 Phthisis	0	1	0	1	2	0	32	65	28	3	0	128	130
" Non-Parochial	0	0	0	0	0	0	9	1	1	0	0	11	11
4 Hydrocephalus	7	5	0	0	12	3	0	0	0	0	0	3	15
	48	21	3	6	78	5	42	67	29	3	0	—	— 224
					78							146	616

APPENDIX No. 3.

*Abstract of Replies of Medical Practitioners as to Cholera Epidemic
of 1866, in Merthyr-Tydfil.*

A.—Cases under care of J. HENRY THOMAS, M.D.,
Surgeon of Cyfarthfa Iron Works.

District:—Principally Gellydeg and Tydfil's Well.

Case	Date	Age	Sex	Occupation	Circumstances	Habits.
1	6th July ...	50	... M. ...	Collier ...	... Easy ...	Sober.
2	20th „ ..	35	... M. ...	Roller „ ...	„
3	29th „ ...	63	... M. ...	Collier ...	... Poor ...	Temperate.
4	12th August...	16	... M. ...	Collier ...	... Easy ...	Sober.
5	9th Nov. ...	30	... M. ...	Miner ...	... Poor ...	Squalid.

B.—Cases under the care of JAMES PROBERT, M.R.C.S.,
Surgeon of Plymouth Iron Works. Troedyrhiw District.

1	24th August...	36	... F. ...	Puddler's wife.	Very poor	Sober.
2	25th „ ...	15	... M. ...	Forge labourer.	Comfortable	„
3	26th „ ...	32	... F. ...	Collier's wife...	„	„
4	29th „ ...	15	... M. ...	Asstnt puddler.	Indifferent	„
5	1st Sept. ...	3	... F. ...	Collier's child .	„	„
6	9th „ ...	23	... F. ...	„ wife .	„	„
7	13th „ ...	49	... M. ...	Farm labourer.	Comfortable	„
8	16th „ ...	8	... F. ...	Puddler's child	„	„
9	4th October .	37	... F. ...	Labourer	... Poor ...	Irregular.
10	9th „ ...	51	... F. ...	Widow ...	„	Sober.

C.—Cases under care of T. J. DYKE, F.R.C.S.,
Medical Officer of Town District.

1	25th August...	72	... F. ...	Rag cleaner ...	Poor ...	Sober & clean:
2	25th „ ...	50	... F. ...	Hawker's wife	„	„
3	26th „ ...	52	... M. ...	(hus. of case 2)	„	„
4	26th „ ...	10	... M. ...	Puddler's Daughter	„	„

D.—Cases under care of P. R. CRESSWELL, M.R.C.S., Chief Surgeon, Dowlais Iron Works, and Medical Officer of Dowlais District.

Case	Date	Age	Sex	Occupation	Circumstances	Habits.
1	23rd August...	30	M.	Forge labourer	Good...	Temperate.
2	30th „	43	M.	Tramp	Destitute	Not known.
3	30th „	15	F.	Tip girl	Poor	„
4	2nd Sept.	45	F.	Wife of labourer (mother of case 3)	Poor	„

E.—Cases under care of F. ALLDAY, M.R.C.S., House Surgeon to Union Workhouse, &c.

1	29th August...	6	F.	Labourer's child	Poor	_____
2	2nd Sept	40	M.	Labourer	Good	Intemperate.
3	7th „	31	M.	„	Poor	„
4	7th „	7	M.	Lodging H. keeper's child	Good	_____
5	9th „	6	M.	_____	Very poor.	_____
6	13th „	17	F.	Servant at an Inn	Good	Temperate.
7	13th „	65	M.	Pauper	Union Workhouse.	

F.—Cases under care of REES MILES, L.R.C.P., Edin., Medical Officer, Garth and Vaynor District.

1	27th August...	40	F.	Wife of Tailor	Poor	Intemperate.
2	27th „	4	F.	Child of Tinker	Very Poor.	Very Dirty.
3	27th „	35	F.	Wife of Collier	Good	Temperate.
4	2nd Sept.	65	F.	Wife of Pauper	Poor	Regular.
5	4th „	35	M.	Labourer at Iron Works	Poor	Very Dirty.
6	3rd „	29	M.	Labourer on Tramp	Poor	Not known.
7	8th „	19	M.	Puddler	Good	Regular

1st Question.—Had the person affected had any communication with any person or place where the disease was prevailing?

Case 6 had lost several relatives, in no other case had any communication taken place.—(*Thomas*). No. 1 was the first case of cholera in my district, it could not be traced to any source of contagion or infection. Numbers 3, 5, and 7 appeared to be of spontaneous origin. Nos. 8, 9, and 10 were preceded by attacks of cholera in others in the same house.—(*Probert*). Case 1. This aged woman was employed at a rag store, and may have handled clothes brought from an infected neighbourhood. Nos. 2 and 3 were accustomed to travel in the neighbouring towns.—(*Dyke*). No known communication with others by cases 1 and 3; case 2 a tramp from Ebbw Vale. Case 4 mother of case 2,—parties would not permit destruction of bed-clothes infected by a vomit of the daughter. A little boy in same house had all the premonitory symptoms of cholera.—(*Cresswell*). A nurse from cholera came to visit her idiot child in the same ward as case 7. The old woman was bed-ridden. In the same night that this patient died, the nurse's son was seized with cholera. In no other instance was there any communication with choleraic contagion.—(*Allday*). I carefully enquired into the previous history of case 1, at the time, and was satisfied that she had had no communication with any person suffering from choleraic disease. Case 2, wife of a travelling tinker, might have been to some of neighbouring towns. Case 4 attended case 2. Case 3 a near neighbour of case 1. Case 5 lodged in an over-crowded house in same street as cases 1 and 3. In this small house (9, Sunny Bank) 13 Irish people lived. The wife first seized; eight other persons afterwards attacked; 7 out of the 9 attacked died. Case 6.—A tramp brought over from Aberdare while ill of the disease.—(*Miles*).

2nd Question.—Were any other inmates of house in any case attacked?

Yes, three at house of case 2; two at case 4; three at case 5. That more than one were attacked was the rule rather than the exception.—(*Thomas*). Yes in same houses as cases 3, 5, 6, 7, and 9.—(*Probert*). In certainly 3 out of 5 cases, other persons were infected in the houses where cholera had occurred.—(*Dyke*). Yes, as in case 4, the mother of case 3, and a boy in same house.—(*Cresswell*). In case 7, a child in same dormitory; also several of the inmates of other parts of Union Workhouse.—(*Allday*). In case 3, two other children affected; case 1—a man residing next door, and using the same closet; in very many cases more than one person in a house was affected.—(*Miles*).

3rd Question.—In what kind of dwellings did the disease more especially appear?

The ill-ventilated, small, and over-crowded houses.—(*Thomas*). Most frequently in houses built back-to-back, and in dwellings without back doors, and unprovided with suitable conveniences and proper ventilation.—(*Probert*). In ill-ventilated, over-crowded, and badly-drained houses — (*Cresswell*). Principally in small, badly-ventilated, and over-crowded houses.—(*Allday*). In dirty residences, badly ventilated, and without conveniences.—(*Miles*).

4th Question.—Were there always premonitory symptoms?

Not always; for in the majority of the fatal cases, there were no premonitory symptoms.—(*Thomas*). Yes, in the majority of cases; but in the most malignant cases diarrhœa &c. were of very short duration prior to the algide symptoms.—(*Probert*). In case 4, there was not any premonitory diarrhœa.—(*Miles*).

5th Question.—Did any case occur in your practice in which collapse without purging came on?

Yes in the majority of the fatal cases.—(*Thomas*). No; but the loss by purging in some of the cases which were rapidly fatal, was not proportionate to the severity of the collapse.—(*Probert*.) In one case I noticed the absence of premonitory diarrhœa.—(*Dyke*). Yes, one.—(*Cresswell*). In case 3, diarrhœa came on after collapse.—(*Allday*). Yes, case 4 as referred to.—(*Miles*).

6th Question.—At what age were the attacks most frequent and most fatal?

In those above 40 years.—(*Thomas*). Under 16 years of age, and between 25 and 40.—(*Probert*). Childhood and old age.—(*Allday*).

7th Question.—Did any of your cases originate under circumstances in which contagion or infection was impossible?

Yes.—(*Thomas*). Cases 1, 3, 5, and 7, could not be traced to any known source of infection.—(*Probert*). I was convinced that in many of my first cases no possible source of infection or contagion had been touched.—(*Dyke*). Yes, cases 1 and 3.—(*Cresswell*.) No exposure to either had taken place in cases 1 and 7.—(*Miles*).

8th Question.—Was the disease introduced into your district by persons or goods arriving from a place where cholera existed, or did it seem to make its appearance spontaneously, and to spread independently of any traceable communication?

Apparently spontaneously.—(*Thomas*). The first cases appeared to be of spontaneous origin, and to have occurred almost simultaneously, at points in my district widely distant from each other.—(*Probert*). Yes, to the latter part of the question.—(*Cresswell*). It made its appearance sponta-

neously, and spread independently of any traceable communication.—(*All-day*). In my district it sprang up spontaneously.—(*Miles*).

9th Question.—Have you observed any cases suggesting the propagation of the disease by the excretions of the sick?

Yes, several.—(*Thomas*). Cases 6 and 9 nursed young children ill of cholera, and their aprons were often saturated with the children's excretions.—(*Probert*). Yes.—(*Cresswell, Dyke, and Miles*). Not any.—(*Allday*).

10th Question.—Were persons who had washed the clothes of the sick, or who had laid out their corpses affected?

Yes, in several instances.—(*Thomas*). Case No. 10 laid out the corpse of No. 9, and attributed her attack to this circumstance. Another fatal case occurred—a woman washed the clothes of a patient ill of cholera, and died the next day of the disease.—(*Probert*). No, but in nearly all instances the clothes were disinfected or burnt, and the corpses washed with some disinfecting fluid—carbolic acid or Condy's fluid.—(*Allday*).

11th Question.—Did any cases arise from the use of water contaminated by sewage, house drainage, &c.?

Yes, several.—(*Thomas*). Yes, probably in case No. 1.—(*Cresswell*) I had three patients ill of cholera in one house that was supplied with water from a well.—(*Allday*).

12th Question.—Do you know of any cases showing the value of prophylactic measures, medicinal or dietetic, &c., &c.?

I had many cases under treatment for cramps and serous diarrhoea, that were arrested by the use of spirits of chloroform and tincture of sesquichloride of iron. Disinfecting the motions was, I believe, the means of preventing contagion.—(*Cresswell*). The small number of cases in the Union House may be attributed to the disinfectants freely used in the wards and closets, and to the improved diet.—(*Allday*).

13th Question.—What in your opinion are the personal or local, predisposing or exciting causes of cholera?

Over fatigue of mind or body; fear and anxiety; personal uncleanness; over-crowding; insufficient ventilation; bad drainage.—(*Probert*) Filth, poor or unwholesome diet, impure water, badly ventilated and over-crowded houses are predisposing causes; an atmospheric poison the exciting.—(*Allday*).

Extract from Ninth Report to the Privy Council, 1866.

Report by Dr. BUCHANAN.—Merthyr-Tydfil.—(Pages 79 to 86).

It has been premised that the sanitary works in Merthyr have not been long in operation, and are not yet complete. But from the beginning that is above recorded by Dr. Kay, in 1854, a great deal of progress has every year been made in paving, cleansing, scavenging, and lighting. More of such works would have been done, but that it was considered desirable to defer them till the ground was no longer disturbed by the laying of sewer and water pipes. Where roads are macadamized and channelled they are well scavenged, but elsewhere indifferently. Many private courts are still unpaved and badly channelled. Ashes are removed by contract on the hypothesis that people will put them out for the cart to remove; but in practice they accumulate in many out of the way corners, and until lately fixed ash-bins had not entered into the scheme of the Merthyr board. Still, though these faults are readily seen in the town, there has been a considerable amendment since 1854.

The sewerage works of Merthyr are only just completed, and have at present only 204 houses connected with them. There is, therefore, no need to give a detailed account of the sewers. They lie deep and receive storm water as well as house drainage, and in the limited area of Merthyr, where surface gravel exists, have no doubt operated to dry that stratum. The arrangements hitherto existing for the disposal of night-soil do not differ materially from the wretched state in which they were found by Mr. Ram-mell. Many houses and courts are unprovided with any accommodation, and stools are seen about yards and entries. Privies have retained their old foul cesspools, which there is no systematic provision for emptying, and are frequently found full and filthy.

A better progress is to be recorded in respect of water supply. Public waterworks were constituted in 1859-60; the supply was first given in 1861, and every year since has seen it extended. The source of water supply is from the Taff-fechan river, before it receives any contamination from works or dwellings. Here a large storage reservoir for compensation to millowners, and to provide against dry seasons is constructed. The water is then conveyed by seven miles of iron pipes to a hillside near Merthyr, where filter beds and a service reservoir are formed, holding 36 hours supply. From these Merthyr proper and the lower parts of Dowlais are supplied by gravitation, while the upper parts of Dowlais are supplied by pumping.

The system of supply is that of constant pressure all 24 hours through. Stand pipes with screw taps are placed outside the poorer houses and inside those of better class. There are no cisterns except service boxes to the few waterclosets which exist in the town. The extremes of pressure are from *nil* at the junction of the pumping and the gravitation system to 220 feet in the lower parts of Merthyr; at places in these neighbourhoods a special arrangement is made for the reduction of pressure, or it would amount to some 80 feet beyond this. Nearly 1,000,000 gallons are delivered a day, of which the portion employed for houses and courts is about 15 gallons per head per day. In the absence of waste from closets this will be ample.

In quality the water is good and free from organic matter, though apt to be a little discoloured by peat. It has only 2-3° of hardness.

Little or no improvement has been effected in the structural defects of houses that were commented on by Mr. Rammell and Dr. Kay. The way in which a multitude of these houses are built makes a great difficulty in any scheme of tinkering them, and it is plain that some resolute and comprehensive alteration of them must be had recourse to. Many rooms built as before described against a hill, and half under the surface, continue to be occupied.

Since 1864, the local board having obtained the services of Dr. Dyke as medical officer of health, and two inspectors of nuisances, a great deal of inspection has been done within houses, and overcrowding has been as far as practicable discouraged. Common lodging houses have been regulated. Twenty-seven are registered, but others are under inspection from time to time, the definition of a common lodging house not appearing to be precisely settled. It is to be noted that the nuisance of overcrowding in other than common lodging-houses has certainly abated somewhat of late years on account of some little interruption to the staple manufacture, but that again, as trade is reviving, crowding is tending to increase. An average of five people has lately been found in a two-roomed house, and 8 to 10 is the common number in a three or four-roomed house, the family taking in three or four single men to lodge with them. Only in Irish quarters were two families found in one house. The inspection further took cognizance of ventilation—whether there were back doors, and whether windows and sashes opened—and of the state of the house as to cleanliness and surrounding conditions. A beginning is being made to the improvement of interiors, but the effect of any such work on the mortality cannot yet be expected. The spontaneous reduction of overcrowding is a change that was earlier in its operation.

The burial grounds continue open among the inhabited part of Merthyr, and still can sometimes be presumptively connected with disease, especially with certain local outbreaks of fever and cholera in 1865 and 1866.

In brief, then, Merthyr has advanced in its sanitary state in three chief respects:—(1.) Since 1854 by imperfect but extensive nuisance removal and public cleansing. (2.) Since the same time by the regulation of common lodging-houses, and since 1859 by a spontaneous reduction of crowding. (3.) Since 1861 by the introduction of ample good water, and by the services of an officer of health. Other works have either not been undertaken, or have been in operation too short a time to allow of their influence on public health being measured.

The mortality statistics of Merthyr have been extracted independently, for the purposes of this inquiry, from the death registers of the two sub-districts; from the total mortality a deduction has been made in respect of persons dying in the workhouse in Lower Merthyr, but not belonging to either sub-district. The statistics have been investigated for the 11 years before 1854; for the six next years, during which cleanliness was improved, nuisances removed, and some reduction of crowding occurred; and, thirdly, for the four years 1862--5, during which water supply has been given, and drainage works have been in progress. It must be confessed that if more frequent censuses had been taken, so as to enable the fluctuating population to be better estimated from year to year, the figures might not have turned out the same. But there is no reason to suppose that the general conclusions are vitiated by this defect.

Per 10,000 of total population yearly.	Before any Works (11 years, 1845-55.)	During Works of Paving, Inspection, and Nuisance Removal. 6 years, 1856-61	After addition of Water Supply and during Main Drainage. 4 years, 1862-5.
Deaths from all causes, all ages... ..	332	280	262
Or, omitting epidemic cholera... ..	300	280	262
All causes, under 1 year .	80 $\frac{1}{4}$	74 $\frac{1}{2}$	61
Males ...	44·4 }	41·3 }	34·4 }
Females ...	35·8 }	33·0 }	26·6 }
Epidemic diseases :—			
Small-pox - all ages	10 $\frac{2}{3}$	14 $\frac{2}{3}$	4 $\frac{2}{3}$
Measles - „	6 $\frac{3}{4}$	7 $\frac{3}{4}$	6 $\frac{1}{2}$

Per 10,000 of total population yearly.	Before any Works (11 years 1845-55.).	During Works of Paving, Inspection, and Nuisance Removal. 6 years, 1856-61	After addition of Water Supply and during Main Drainage. 4 years, 1862-5.
Epidemic diseases, contnued			
Scarlatina ... all ages .	11½	10	18
Under 5 ...	8·5 } 2·8 }	7·8 } 2·3 }	12·5 } 5·6 }
Diphtheria ... all ages .	0½	2	2½
Whooping cough ,,	5½	7¾	4¼
Croup ,,	4½	4½	4¼
Erysipelas ,,	0¾	1	0¾
Rheumatic fever ,,	0¼	0¾	0¾
Ague ,,	—	—	—
Continued fevers ,,	23	12¾	9¾
Fevers, Typhoid, &c ...	21½	12¾	8¾
[excluding what was probably <i>typhus</i>], all ages.			
Under 5 ...	6·9 } 14·4 }	4·7 } 7·9 }	1·5 } 7·2 }
Over 5 ...			
Diarrhœa, all ages ...	11¼	11¾	6¼
Under 5 ...	8·5 } 3·0 }	9·3 } 2·4 }	4·3 } 1·9 }
Over 5 ...			
Cholera, all ages... ..	In 1849, 267¼ ; in 1854, 83¾.	—	(In 1866, 20½)
Dysentery ,,	1¼	0½	0½
Phthisis, all ages and both sexes.			
Males 15-55	14·4 } 13·9 }	13·2 } 14·8 }	11·9 } 12·4 }
Females 15-55			
Lung diseases, all ages and both sexes.			
0-5, both sexes ...	13·7	21·7	16·2
15-55 { males ...	3·4 } 1·5 }	3·7 } 2·1 }	3·3 } 1·4 }
15-55 { females... ..			
55 upwards	8·5	9·5	10·3
Brain diseases, all ages and both sexes.			
0-5, both sexes ...	37·6	34·5	39·2
5-35 ,,	2·7	3·0	3·8
35-55 ,,	1·9	1·5	2·1
55 upwards ,,	3·3	4·1	4·3

The annual mortality from all causes, at all ages, in the two sub-districts of Merthyr taken together, has been reduced from 332 (or, after exclusion of cholera deaths, from 300) in the 10,000 to 280 in the middle period, and to 262 in the last four years. The mortality of infants under one year has fallen in the same three periods from 80 to 74, and thence to 61, still an enormously high absolute death rate.

In respect of various causes of death, the caution is required that before 1850, a great many deaths (almost wholly those of children) were registered without any statement of their cause, and great numbers of others were set down without medical certificate to "fits" and the like causes.

Bearing this in mind through all that follows, the following statements may be made:—Smallpox has fluctuated much, by far the worst epidemic having occurred in 1858; measles has shown little or no change; scarlatina (here, as in other Welsh towns) has been continuously epidemic and more fatal during several years of the more recent period than before; diphtheria, of which there were probably examples as early as 1850, has been more (but moderately) fatal of late. The last epidemic of whooping cough was somewhat less severe than those that preceded it. So-called "croup" was particularly prevalent in Merthyr about 1850, and on a mean of years has remained pretty stationary throughout the three periods under review. Fevers have been reduced. If a somewhat large excess of deaths from fevers in 1847-8, and a small excess in 1865 be deducted as being presumably true typhus—and probably no other year requires such a correction—the remainder that may be set to the account of endemic typhoid show a notable decrease since means were taken for keeping the town more cleanly. Since 1854 only half the adult deaths from fever have occurred that did occur before that year. In children the registered mortality from "fever" did not subside so rapidly, but has lately come down to a quarter of its earlier amount. There appears to be little difference in the death rate from fever, and any difference is almost all in children under five years old, attributed to the mere introduction of the new supply of water. Diarrhœa, on the other hand, has been reduced to a material degree on the average of the last four years as compared with either of the two former periods. Fewer deaths have been registered from "dysentery" lately than in earlier years. The three cholera epidemics have all affected Merthyr severely; per 10,000 of population existing at each time the mortality has been 267 in 1849, 84 in 1854, and $20\frac{1}{2}$ in 1866. It cannot fail to have been seen in the foregoing pages that Merthyr continues to afford peculiar facilities for the propagation of any disease that is liable to be conveyed by the stools.

Consumption was equally fatal in Merthyr before and after the introduction of comparative cleanliness into it in 1854. In the year 1863-5, however, the death rate of phthisis in both sexes and at all ages has fallen, not indeed to a very great, yet to a quite certain extent; this has occurred simultaneously with improvement in water supply, and the execution of main sewerage works.

Lung diseases, other than consumption, have not followed the same rule; as registered, they increased a good deal in fatality soon after the earlier operations of the local board, and have in late years declined. But the importance attaching to this fact is much reduced when it is remembered that all the registered increase has been among infants, and that children's lung diseases were rarely stated as the cause of mortality in the earlier times, when registration was carelessly done. For a similar reason it would be expected that deaths placed under brain diseases of children would have been much less frequent since medical certificates had become substituted for the statement of parents, that their children had died of "fits," or from "convulsions." But in fact there is very little reduction of the mortality so classified. Brain diseases above infancy have somewhat increased.

APPENDIX No. 5.

Extract from Report of Medical Officer to the Privy Council, 1866.

Report by JOHN SIMON, F.R.C.S. Eng.—(Page 15.)

Of few places in the list is the progress, all things considered, more pleasing and hopeful than that of MERTHYR. This place used to be abominable. It had almost the unwholesomeness, with but a fraction of the apology, of Liverpool. In our statistics for 1851-61 it showed every possible evidence of sanitary neglect; in fever, in diarrhoea, in cholera, in small-pox, in phthisis and other lung diseases, in mortality of children, test it how one would, it always was conspicuously bad; and when medical inspections were made there, every report told the same lamentable story of sanitary nonfeasance to the utmost. But now improvement has fairly begun. Till 1861 its steps were at best leisurely, but since 1861 they have been accelerated. Above all, since the above date, water, which used to be

cruelly scant and disgustingly foul, has been replaced by a good and ample supply. And now a system of sewers has just been completed. The results hitherto obtained—results, namely, from improved removal of nuisances, from abatement of over-crowding, and above all from the purer water supply, are, that the present mortality is a fifth less than the old; the death-rate from typhoid fever and diarrhoea has fallen from 33 to 15; and the death-rate from cholera, which in 1848 was 267, and in 1854 was 84, was in 1866 only 20. As an officer of health has now (since 1864) been appointed, and as further structural works are now coming into operation, I confidently expect and hope that a few years hence, a further great reduction will have been made in the still excessive mortality of Merthyr.



