On the mortality of the parish of Stoke-upon-Trent : with reference to its causes, and the ratio of deaths among children and potters / by J.T. Arlidge.

ON THE MORTALITY OF STOKE-UPON-TRENT, AND ITS CAUSES, WITH ESPECIAL REFERENCE TO CHILDREN AND POTTERS,

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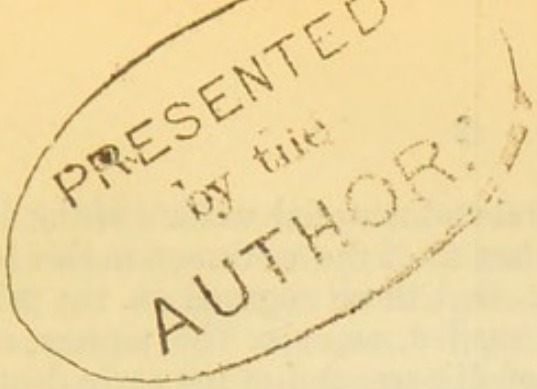

ON THE MORTALITY OF THE PARISH OF STOKE-UPON-TRENT, WITH REFERENCE TO ITS CAUSES, AND THE RATIO OF DEATHS AMONG CHILDREN AND POTTERS,

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The increase of wealth, the multiplication of the assumed wants and of the luxuries of civilized life, and the development of commerce concur to render this more and more a manufacturing country, and the welfare of those engaged in manufacture a matter of national importance. But this growth of manufacture brings its attendant evils with it: it collects men into large masses as inhabitants of towns, and thereby subjects them to conditions of life unfavourably contrasting with those enjoyed by the cultivators of the soil, and, also, to many injurious influences connected with the processes of manufacture; and these evils are augmented by the effects of keen competition in trade, by the demand for cheapness of production, and by ignorance, indifference to, or the wilful neglect of the laws of health, in towns themselves, in factories, and in private dwellings, by the population at large.

Granting the importance of sustaining the manufacturing interests of the country, of promoting and extending them, it must be equally important in policy to further the well-being of the workmen engaged in them. An unhealthy population, early deaths, and a high rate of mortality, are conditions to be deplored, not only from a philanthropic, but, also, from a practical and economical point of view, and I feel assured that any investigations relative to the sanitary state of the population in such a large manufacturing centre as "the Potteries" constitute, must be of interest to all those

who desire to advance the moral and material welfare of the district. There is a conviction that the health of the workmen in this locality is in an unsatisfactory state: that those engaged in the principal branch of manufacture here carried on, viz: the potters, are the victims of an undue amount of disease, and of too early death, and that the infant mortality is excessive. Having, at an early period of my residence in the neighbourhood, arrived at a similar persuasion, I became interested to ascertain how far that impression, as derived from observations without the aid of numerical researches, might be borne out by distinct facts capable of being dealt with statistically. With this desire I commenced recording facts falling under my observation, and sought on all sides for additional information from others. By the kindness of Mr. Griffin, I was put in possession of a copious analysis of the Registers of Deaths in Stoke parish, which had been prepared at the request of the Guardians, with a view to tabulating the deaths occurring in the parish, and their causes. This action, taken by the Board of Guardians, and the printing of a sheet of tables of the mortality in the several divisions of the parish, bears out my opinion that the state of the health of the district must invoke the interests of its inhabitants, and give value to this present contribution to its history.

The statistical results and tables now produced, are based on the records of the mortality of Stoke parish, in the official year ending March 31st, 1863. They would doubtless possess a higher claim to consideration had they been deduced from a series of years by way of average; nevertheless, the size of the population of the parish, the number of deaths within a year, and the absence of any exceptional causes of death, such as a severe epidemic in the period examined, are conditions which obviate the main objections to results obtained from the returns of any single year. Moreover, a reference to the reports of the Registrar General shows that the year in question may be taken as affording a fair average.

The reader will to a great extent have to draw his own conclusions from the general statements and tables put forward. The figures must largely tell their own tale; for a commentary upon the numerical calculations, and the facts they directly or indirectly interpret, would have too greatly expanded this pamphlet. It remains for me to explain that I have reckoned as potters,—pressers, ovenmen and placers, turners, throwers, slip-makers, dippers, handlers, figurers, saggar-makers, printers and gilders, but not packers, crate-makers, or those engaged in flint mills. With a better registration of occupations than now exists, it would be possible to collect facts and draw conclusions with reference to artizans engaged in the several distinct departments of the pottery manufacture, and thereby to arrive at a more correct appreciation of their respective influences upon health. At present this is impracticable.

It will illustrate somewhat the relative number of the different branches of the pottery business as registered, to say that some 34 are designated by the general appellation of "potters;" 39 as pressers; 17 ovenmen; 7 potters' printers; 7 turners; and 7 slip-makers. The workmen following other divisions of labour, such as handlers, dippers, &c., are for each only two, three, or four in number.

§ *I.—Mortality in relation to the population living.*

Relative Mortality of the two sexes.

The total number of deaths at all ages during the official year ending March 31st, 1863, in the five districts of Stoke parish, viz:—Hanley, Shelton, Stoke, Fenton, and Longton, was 2,107.

The population of the parish, according to the last Census, was 71,308; consequently the mortality equalled 2·95 in every 100 persons living, or 29,547 in one million. In England at large the mortality in 1861 equalled 2·16 per cent., or 21,626 per million, (Report of Registrar General, 1863, p. 223) consequently 7,921 in every million, or nearly 8 persons in every 1,000 alive, died in excess of the average for England; a proportion that represents a loss by death, in excess, in the population of Stoke, of 560 lives, in the course of the year. By taking the average mortality of England for ten years ending 1861, the result will be slightly more favourable to Stoke; that average being 2·221 per 100 living, and, therefore, the loss on the population of Stoke about 530 in the year. The average death-rate in country districts is 1·976, or just upon 1 per 100 lower than Stoke.

Of the 2,107 deaths, 1,123 occurred among males, being in proportion to the whole male population, 35,616 living, 3·15 per 100; and 984 happened among 35,692 females, or 2·75 per 100 living. Hence the relative mortality of males to females, of equal number living, was 114 to 100; the average of 24 years for all England being as 108 to 110. The greater difference in relation to this point indicates a considerable excess in the rate of destruction of male life.

Of the 2,107 deaths, 811 occurred at, and after the 20th year. In relation to the population alive at the same period, 37,460, this was equal to 2·16 per 100 for the two sexes; or, for the male sex 2·37, and for the female 1·96. Again 1,296 took place at various ages under twenty, being to 33,848 living at those ages, 3·82 per 100 living, viz: 4·00 for the male, and 3·64 for the female sex.

The deaths of males 20 years of age and under 60, were 298 in number; which, relatively to the whole number of males living at the same time in Stoke, 17,007, represents a death-rate of 1·75 per 100.

The relative mortality from all causes, at different ages, to the whole population living at those ages is shown in the subjoined Table.

TABLE I.

	Total Population, 71,308			Total Deaths, 2107.			Proportion of Deaths to 100 living.		
	Males.	Fem.	Total.	Males.	Fem.	Total.	Males	Fem.	Together.
Under 1 year	1248	1189	2437	320	296	616	26·64	23·71	25·27
1 and under 5	4004	4027	8031	268	230	498	6·69	5·71	6·20
5 10	4394	4508	8902	39	41	80	0·88	0·90	0·89
10 15	3765	3678	7443	23	17	40	0·61	0·46	0·53
15 20	3604	3431	7035	33	29	62	0·91	0·84	0·88
20 30	6595	6674	13,269	72	69	141	1·09	1·03	1·06
30 40	4923	4711	9634	66	57	123	1·34	1·20	1·27
40 50	3438	3445	6883	81	55	136	2·35	1·59	1·97
50 60	2051	2207	4258	79	51	130	3·85	2.30	3·04
60 70	1131	1220	2351	73	53	126	6·45	4·34	5·35
70 80	381	497	878	49	58	107	12·86	11·67	12·18
80 and upwards	82	105	187	21	27	48	25·60	25·66	25·66

From this table it appears that quite one-fourth of the whole number of children under one year old perished in the year. The relative mortality under one year of age to those living at the same age, from all causes, is, for all England, 17·73 per 100; in other words, 17·73 represents the average death-rate of such infants. It follows, therefore, that the infantile death-rate in Stoke parish is well nigh half as much again as that of England at large; and whereas of 2,437 children under one year of age existing in that parish, 616 died, there should not have been more than 430, had the average rate prevailed.

The following table exhibits the death-rate in each division of Stoke parish, distinguishing that of children under ten years old, and that of individuals at all ages above ten.

TABLE 2.

	Population.	Deaths. under 10	Deaths above 10	Total. Deaths.	Death-rate under 10	Death-rate above 10	Death-rate at all ages.
HANLEY	16,848	290	191	481	1·72	1·13	2·85
SHELTON	18,331	308	268	576	1·68	1·46	3·14
STOKE	11,390	179	160	339	1·57	1·40	2·97
FENTON	7,882	127	82	209	1·61	1·04	2·65
LONGTON	16,857	290	212	502	1·72	1·25	2·97

The death-rate of those above and under ten years of age is calculated in the preceding table from the whole population, but if the deaths above and under ten years old be calculated for that portion of the whole population living in each such period, we obtain a more accurate apprehension of the relative mortality.

The proportion of deaths among children under ten years of age to the number living at the same period, is seen in the next table.

TABLE 3.

	Population under 10 years old.	Deaths under 10.	Ratio of Deaths to 100 Living.
HANLEY	4699	290	6·17
SHELTON	4799	308	6·41
STOKE	3055	179	5·85
FENTON	2162	127	5·87
LONGTON	4655	290	6·22

From this table it appears that the death-rate among children is highest in Shelton. This circumstance is not shown by the preceding Table (II) in which their death-rate in the entire population at all ages, is smaller than in either Hanley or Longton; a difference due to a larger proportion of children under ten years in the population of these two towns than in Shelton

§ *II.—Ratio of Deaths of Males and Females, Adults and Children, at different ages to the whole number of Deaths.*

Of the 2107 deaths, 1123 were among males, and 984 among females, or as 53·29 per cent of the former to 46·70 of the latter, and nearly as 8 is to 7.

Under 10 years of age there were 1,194 deaths, and 913 at 10 and upwards.

Of the 1,194 deaths, 616 or 51·59 per cent. were at one year old and under, 498 or 41·70 per cent. aged one year and under five, and 80 or 6·70 per cent. were five and under ten.

Of the 1,194 children under ten years old, 627 or 52·51 per cent. were males, and 568 or 47·49 per cent. females, the males therefore being to the females as 10 is to 9.

Of the 913 individuals aged ten and upwards at death, 497 were males, and 416 females, or as 54·43 to 45·56 per cent. respectively, being nearly as 6 of the former to 5 of the latter sex.

It follows, therefore, that the ratio of mortality, from all causes and at all ages, is higher among males than among females.

As it will be frequently desirable to compare the present statistics with those issued by the Government, the ratio of mortality above and under 20 years of age becomes necessary as being in use in the latter.

The deaths under 20 years old were 1,296, and constituted therefore 61·50 of the whole mortality of 2,107. Those above 20 years formed consequently 38·49 per cent. 441 male deaths at and after the 20th year constitute 39·26 per cent. of the whole mortality

of males, viz: 1123 of all ages. Between 20 and 60 years of age 530 deaths of males and females occured, or 25·15 per cent. of the whole mortality, the male deaths being equal to 14·14 per cent. or, in reference to the whole number of male deaths, 26·53 per cent.

TABLE 4.

Table of proportion of Deaths at different ages to the whole number of Deaths. (2,107.)

	Males.	Females.	Total.	Ratio ℔ cent
Deaths under 1 year	320	296	616	29·23
At 1 and under 5 years.....	268	230	498	20·63
,, 5 ,, 10 ,, ...	39	41	80	3·79
,, 10 ,, 15 ,, ...	23	17	40	1·89
,, 15 ,, 20 ,, ...	33	29	62	2·94
,, 20 ,, 30 ,, ...	72	69	141	6·69
,, 30 ,, 40 ,, ...	66	57	123	5·83
,, 40 ,, 50 ,, ...	81	55	136	6·45
,, 50 ,, 60 ,, ...	79	51	130	6·16
,, 60 ,, 70 ,, ...	73	53	126	5·98
,, 70 ,, 80 ,, ...	49	58	107	5·07
80 and upwards	21	27	48	2·27

Supplement to the above Table:—

	Males.		Females		Total.		
Deaths at one year and under—	435	+	359	=	794	=	37·68.

Hence more than one-fourth of the whole number of deaths occurred among children under one year old; more than one-third among children one year old and under; and more than one-half among children under five years of age, viz:—52·86 per cent.

Throughout all England, out of a thousand deaths of children under fifteen years of age, 467 occur in the first year, 372 at from one to five years of age, and 161 at from five to fifteen years; or, making the calculation for Stoke, the numbers respectively are 499, 403, and 97; consequently, in this parish there is an excess of mortality over the average of England up to the fifth year, after which there is a remarkable reduction. The maximum mortality, or the most fatal period of childhood in Stoke, as compared with England, appears to be between the first and the fifth years of existence.

§ *III.—Ratio of deaths to the whole population of Stoke parish, according to their principal causes. Ratio of deaths from several causes to the whole number of deaths. Comparison of these proportions with those obtaining in England at large.*

Of the whole population living in Stoke parish, viz: 71,308, 649 died from diseases of the Respiratory organs, or 9·10 in every

1,000 persons living. Phthisis alone, as registered, killed 3·75 per 1,000; and lung diseases, other than phthisis, 5·34 per 1,000. In England at large the deaths at all ages, from lung diseases of all kinds registered, are (Report of Registrar General, 1863, p. 223) 3,233 per million living; or, 3·233 per 1,000; therefore, the deaths from these diseases being in Stoke parish, 5·343 per 1,000, are 2·110 in excess; whilst phthisis, having destroyed 3·758 per 1,000, exceeded the average fatality in England, (op. cit. p. 223) viz: 2·611, by 1·147. Diseases of the lungs and phthisis together, therefore, which carried off 9·10 per 1000, caused an excess of mortality above the average of all England, viz: 5·844, of 3·267 in every 1,000 living. If we adopted the average annual ratio of these pulmonary affections used by Dr. Greenhow, viz: 552 per 100,000, *i.e.* 5·52 per 1,000, the excess in Stoke would assume still more formidable proportions, viz: 3·58 in every 1,000 of the population. The mortality from zymotic diseases compared with that of all England, was 5·230 to 4·424.

The *deaths* from diseases of the lungs *to the whole mortality* in Stoke, were at the rate of 180,800 to one million deaths, or 18·08 per cent.; whilst in England they were only 149,539 per million, or, 14·95 per cent.: those from phthisis were as 127,100 to 120,754 per million, or 12·71 per cent. to 12·97 per cent.; and from all forms of diseases of the respiratory organs, 307,900 to 270,293 per million, or 30·79 per cent. to 27·02 per cent. Again, zymotic diseases caused 177,000 deaths to one million deaths in Stoke, instead of 204,592 in England; and all other causes, 514,900 in Stoke, contrasted with 525,145.

TABLE 5.

Of 913 deaths among those aged 10 years and upwards, the causes were:—

Diseases of the Respiratory Organs	379	or	41·52	per cent.
Zymotic Diseases	72	—	7·88	,,
Diseases of the Heart	58	—	6·35	,,
Diseases of the Stomach, Liver, and Kidneys ..	77	—	8·43	,,
Disease of the Brain, Spinal Cord, and Epilepsy	92	—	10·07	,,
Dropsy	37	—	4·05	,,
Cancer	25	—	2·73	,,
Accident and Suicide	58	—	6·35	,,
Old Age	72	—	7·88	,,
Sundry Diseases	43	—	4·70	,,

§ *IV.—The mortality from certain causes at different periods of life relative to the whole number living at those periods.*

The deaths from certain causes at different periods of life are represented in the proportion they bear to the whole number living at those periods in Stoke parish, as compared with all England.

TABLE 6.

Deaths of those under 5 years to the number living.

Population in Stoke under 5 years 10,468.			*Population in England under 5 years,* 2,700,782.		
Causes of Death.	No. of Deaths.	Ratio to 100,000 living.	No. of Deaths.	Ratio to 100,000 living in 1861.	Ratio to 100,000 living for 10 years average
Diseases of Lungs..	210	2000	29449	1090	1040
Consumption.....	50	477	3052	113	....
Zymotic Diseases..	265	2531	53654	1986	....
Convulsions	282	2693	29291	1084	} together
Cerebral Diseases..	49	486	3208	118	} 1337

TABLE 7.

Deaths of those aged 5 years and under 10 to the number living.

Population in Stoke from 5 *to* 10 *years old,* 8,902.			*Population in England from* 5 *to* 10 *years old,* 2,344,066.	
Causes of Death.	No. of Deaths.	Ratio to 100,000 living.	No. of Deaths.	Ratio to 100,000 living.
Diseases of Lungs..	8	89	1203	51
Consumption.....	2	22	1251	53
Zymotic Diseases..	36	404	7805	332
Convulsions	8	89	309	13
Cerebral Diseases .	8	89	850	36

TABLE 8.

Deaths of those aged 10 years and under 20 to the number living.

Population in Stoke from 10 *to* 20 *years old,* 14,478.			*Population in England from* 10 *to* 20 *years old,* 4,037,818.	
Causes of Death.	No. of Deaths.	Ratio to 100,000 living.	No. of Deaths.	Ratio to 100,000 living.
Diseases of Lungs..	8	55	1081	26
Consumption.....	35	241	8006	198
Zymotic Diseases..	14	96	5213	129
Cerebral Diseases..	13	89	1423	35

TABLE 9.

Deaths of those aged 20 years and upwards to the number living.

Population in Stoke aged 20 *& upwards,* 37,460.			*Population in England aged* 20 *and upwards,* 10,983,558.	
Causes of Death.	No. of Deaths.	Ratio to 100,000 living.	No. of Deaths.	Ratio to 100,000 living.
Diseases of Lungs..	155	413	32577	296
Consumption.....	181	483	39622	367
Zymotic Diseases..	58	154	16652	151
Cerebral Diseases..	79	210	24795	225

The general lesson deducible from the preceding tables is, that the several causes tabulated are destructive of life, in the parish of Stoke, in a much higher ratio in proportion to the population living at different periods, than in the population of England at large. There is only one single exception, viz: in the proportion of deaths from consumption occurring between the fifth and tenth years of existence, viz: 22 per 100,000 in Stoke, compared with 53 in England. But the number of deaths in Stoke, upon which the proportion is calculated, is too small to make this exception of importance. Had there been five deaths instead of two, the death-rate in Stoke would have equalled that in England at large. Besides, if we pursued the plan of treating diseases of the lungs and consumption together, as we have done elsewhere, the death-rate for that period of life would have been higher in Stoke than in England.

The figures representing the ratio of deaths in England from diseases of the lungs, in the recent parliamentary return (Feb. 5, 1864) are, for those under five, 1,040 per 100,000, as calculated from an average of the ten years, 1851-60. Were this used instead of the calculated ratio for 1861, viz: 1,090, the excess in Stoke would appear still higher. The average for London is 1,480 per 100,000 of those dying from those maladies under five years old; although, in some of the parishes largely occupied by the very poor, the death-rate rises higher than in Stoke. Of the towns and cities in England, only two or three surpass or equal Stoke in the death-rate, under five years of age, from diseases of the lungs. The deaths of males only, from twenty upwards, arising from diseases of the lungs, and from consumption, are equal, in each malady, viz: to 505 per 100,000 males living at the same period in Stoke; whereas, in England, they equal, for consumption, 373, and for diseases of the chest, 339 per 100,000. The deaths of females, in the same period of life, were 323 from diseases of the lungs, and 461 from consumption, in Stoke, compared with 259 from the former, and 349 from the latter malady, in England, in every 100,000 living. These figures exhibit an excessive mortality in Stoke, from the maladies in question, as compared with that in England; an excess much more striking in the case of adult men, in Stoke, than in adult women, and particularly as respects the mortality of chest diseases, not including consumption.

§ *V.—Deaths in relation to their causes and to the ages of those dead.*

Of the 2107 deaths in the parish of Stoke:—

381	were assigned to	Diseases of Lungs	..	or 18·08 per cent.
268	,,	Consumption (Phthisis)		or 12·71 ,,
373	,,	Zymotic Diseases	..	or 17·70 ,,
1085	,,	all other causes	..	or 51·49 ,,

The distinction between some forms of diseases of the lungs and pulmonary consumption is evidently far from being clear and decisive in the registered causes, it is desirable, therefore, to couple them together under the general term of *Diseases of the Respiratory organs.* On so doing, we have the sum of 649 deaths from such diseases, or 30·80 per cent. of the whole number of deaths, the average in England being 27·20 per cent. of the 2,107 deaths, 1,194 were, as already noticed, among children under ten years.

Of these 1194 children :—

218	died from	Diseases of the Lungs	or 18·25 per cent.
52	,,	Phthisis	or 4·35 ,,
301	,,	Zymotic Diseases	or 25·20 ,,
623	,,	all other causes	or 52·17 ,,
From diseases of the Respiratory Organs 270,			.. or 22·61 ,,

Of the 913 deaths of persons ten years old and upwards :—

163	were assigned to	Diseases of the Lungs	.. or 17·86 per cent.
216	,,	Consumption, or Phthisis	.. or 23·65 ,,
72	,,	Zymotic Diseases ..	.. or 7·88 ,,
462	,,	all other causes ..	.. or 50·60 ,,
From Diseases of the Respiratory Organs 379			.. or 41·51 ,,

Thus, whilst diseases of the lungs destroyed, those above and those under ten years of age, in nearly equal proportion to the number of deaths, consumption was almost six times more destructive in those above ten years old, and rendered the relative mortality among these last nearly double that among children under ten, from diseases of the respiratory organs as comprehending lung diseases and phthisis together. A more detailed notice of the causes of death is presented in the subjoined table :—Of the 913 aged ten years and upwards, 497 were males, and 416 females. Of the 497 males, 210 died from diseases of the respiratory organs, or 42·25 per cent. From phthisis alone, 110, or 22·13 per cent. Of the 416 females, 169 died from diseases of the respiratory organs, or 40·62 per cent. From phthisis alone, 106, or 25·48 per cent. Of 212 deaths in Longton, 114, or 53·77 per cent. happened from diseases of the respiratory organs; and 60, or 28·30 per cent. from phthisis alone; the proportion in the two sexes being nearly equal.

TABLE 10.

Deaths and their causes in relation to age:—

Of the 2107 deaths in Stoke parish:—

Diseases of the lungs produced	218, or 10·34 per cent.	among	those	under 10
,, ,,	163, or 7·73	,,	,,	above 10
Consumption or phthisis	52, or 2·46	,,	,,	under 10
,, ,,	216, or 10·20	,,	,,	above 10
Zymotic Diseases	301, or 14·28	,,	,,	under 10
,, ,,	72, or 3·41	,,	,,	above 10
All other causes	623, or 29·52	,,	,,	under 10
,, ,,	462, or 21·92	,,	,,	above 10

Diseases of the Respiratory organs caused	270, or 12·81	,,	under 10
,, ,, ,,	379, or 17·98	,,	above 10

TABLE 11.

Of the 2107 deaths, 649 were due to diseases of the Respiratory organs, viz:—

260	occurred	under	five	years	of age ..	..	or 12·34	per cent.
10	,,	at 5	and under	10	years ..	..	or 0·46	,,
9	,,	,, 10	,,	15	..	..	or 0·41	,,
34	,,	,, 15	,,	20	..	..	or 1·61	,,
85	,,	,, 20	,,	30	..	..	or 4·03	,,
64	,,	,, 30	,,	40	..	..	or 3·03	,,
59	,,	,, 40	,,	50	..	..	or 2·79	,,
45	,,	,, 50	,,	60	..	..	or 2·14	,,
47	,,	,, 60	,,	70	..	..	or 2·22	,,
29	,,	,, 70	,,	80	..	..	or 1·42	,,
7	,,	,, 80 and upwards			..	..	or 0·33	,,

TABLE 12.

Of 381 deaths assigned to diseases of the lungs:—

210	occurred	under	5	years	of age..	..	or	55·11 per cent.
8	....	at 5	years	and	under 10	..	..	2·09 ,,
1	....	10	....		15	..	..	0·26 ,,
7	....	15	....		20	..	..	1·83 ,,
18	....	20	....		30	..	..	4·72 ,,
12	....	30	....		40	..	..	3·14 ,,
22	....	40	....		50	..	..	5·77 ,,
24	....	50	....		60	..	..	6·29 ,,
44	....	60	....		70	..	..	11·55 ,,
28	....	70	....		80	..	..	7·34 ,,
7	....	80 and upwards			—	..	..	1·83 ,,

TABLE 13.

Of 268 deaths assigned to Consumption or Phthisis:—

50	occurred	under 5 years of age			or	18·65 per cent.
2	....	at 5	and under	10 years	..	0·74 ,,
8	....	10	....	15	..	2·98 ,,
27	....	15	....	20	..	10·07 ,,
67	....	20	....	30	..	25·00 ,,
52	....	30	....	40	..	19·40 ,,
37	....	40	....	50	..	13·80 ,,
21	....	50	....	60	..	7·83 ,,
3	....	60	....	70	..	1·11 ,,
1	....	70	....	80	..	0·37 ,,

On comparing these two tables (12 and 13), it appears that by far the highest proportion of deaths from diseases of the lungs takes place during the first five years of life; being actually more than half of their whole number, and that, again, after the 30th year the mortality from these causes ascends gradually to the 70th year. On the contrary, in the case of consumption, the mortality becomes greatest in the decennium from 20 to 30; and, next in order, in that between 30 and 40; whilst, after the 60th year, when lung diseases are the most rife among adults as a cause of death, consumption declines almost to its minimum.

It will be well to contrast these two tables (12 and 13) with those representing the mortality of male potters from these two groups of diseases relatively to that of males of all other classes.

TABLE 14.

Of the 1,194 children dead under 10 years of age:—

270	died from	Diseases of the Respiratory organs,	or	22·61 per cent.
301	..	Zymotic diseases	..	25·20 ,,
182	..	Marasmus, Debility, Tabes, &c.	..	15·24 ,,
57	..	Cerebral and Spinal disease	..	4·77 ,,
290	..	Convulsions and Teething ..	..	24·28 ,,
94	..	All other causes, Accidents, &c.	..	7·87 ,,

TABLE 15.

Of 794 who died aged one year and under:—

149	died from	Diseases of the Lungs ..	or	18.76 per cent.
35	..	Consumption or Phthisis ..	..	4·40 ,,
128	..	Zymotic diseases	..	16·12 ,,
158	..	Marasmus, Debility, Tabes, &c.	..	19·89 ,,
30	..	Cerebral and Spinal disease	..	3·77 ,,
244	..	Convulsions and Teething ..	..	30·73 ,,
50	..	All other causes, Accidents, &c.	..	6·29 ,,

TABLE 16.

Of 320 who were above one year old and under five years:—

61	died from	Diseases of the Lungs ..	or 19·06 per cent.
15	..	Consumption or Phthisis ..	.. 4·68 ,,
137	..	Zymotic diseases	.. 42·81 ,,
20	..	Marasmus, Debility, Tabes, &c.	.. 6·25 ,,
19	..	Cerebral and Spinal disease	.. 5·93 ,,
38	..	Convulsions and Teething ..	.. 11·87 ,,
30	..	All other causes, Accidents, &c.	.. 9.37 ,,

TABLE 17.

Of 80 who were five years old and under ten years:—

8	died from	Diseases of the Lungs ..	or 10·00 per cent.
2	..	Consumption or Phthisis ..	.. 2·50 ,,
36	..	Zymotic diseases	.. 45·00 ,,
4	..	Marasmus, Debility, Tabes, &c.	.. 5·00 ,,
8	..	Cerebral and Spinal diseases	.. 10·00 ,,
8	..	Convulsions	.. 10·00 ,,
14	..	All other causes, Accidents, &c.	.. 17·00 ,,

The most striking facts from the three last tables (15, 16, and 17) are the rapid rise of the death-rate from zymotic diseases after the end of the first year, and the great decline in that from convulsions. The destruction of infantile life by diseases of the strumous class, as represented in a majority of cases assigned to marasmus, tabes mesenterica, atrophy, and consumption, and in a large proportion of the deaths entered to cerebral diseases and convulsions, is most apparent in children aged one year and under; and it is a fact which indicates the procreation of a very numerous feeble offspring, as, indeed, does also that of the exceedingly large mortality of children in the parish. This undue infantile mortality may be partially explained by various causes, such as neglect and ignorance of mothers, many of whom are occupied in work away from home, to the grievous injury of their offspring, and some of whom are married too young to be robust mothers. But after allowing for all such general explanations of a very high death-rate, the array of causes of death, as set forth, is of itself sufficient to demonstrate a large production of a feeble progeny, and, therefore, a deteriorated and weakly parentage.

§ *VI.—Number of Potters in the population.*

The number of males and females, aged 20 and upwards, returned in the last census as engaged in the earthenware manufacture in Stoke, is 9,151, viz: 5,813 males and 3,338 females. In

Wolstanton and Stoke together the total given is 14,503 of those aged 20 and upwards, and 9,600 males and females under 20. These numbers are smaller than those assumed by Mr. Longe in his report to the Childrens' Employment Commissioners. For instance, Mr. Longe estimates the potters, aged 20 and upwards, at 11,000. However, as we cannot discover that he based his estimate upon any thorough personal investigation of the actual numbers, we shall adopt the census returns.

These returns, however, unfortunately do not exhibit the number of potters in each district of Stoke parish separately.

The number of male potters, aged 20 and upwards, is alone of much importance, as we shall see in our subsequent analysis of the mortality tables. This number was 5,813; and, in relation to the whole male population living at the same ages, viz: 18,601, is equal to 31·25 per cent. Assuming an equal distribution of potters in the five districts of Stoke, we may construct the following tables to exhibit their number in each of them.

TABLE 18.

Males, aged 20 and upwards, in—

Hanley	= 4,322,	therefore the potters,	at 31·25 per cent.	= 1,353	in Hanley.
Shelton	,, 5,044,	....	....	,, 1,575	..Shelton.
Stoke	,, 2,931,	....	....	,, 918	..Stoke.
Fenton	,, 2,061,	....	....	,, 644	..Fenton.
Longton	,, 4,230,	....	....	,, 1,322	..Longton.

§ *VII.—Of the relative mortality of potters.*

At the outset of the enquiry on the relative mortality of potters, it is necessary to remark, that the registers of deaths in Stoke parish are so imperfectly kept, excepting in Longton, that they more or less fail to exhibit the occupation of those whose deaths are recorded. Thus, of 913 individuals above ten years old, whose deaths were registered, the occupation was noted in only 507, of whom 449 were males, and 58 females. Indeed, the occupation of females is virtually unrecorded, except in Longton. For example: in the Hanley district the occupation of one female only out of 93, is shown, and that one is described as a servant.

This being the case, it becomes impossible to investigate the mortality of females in reference to their occupations; and a similar inquiry in reference to the male population, must, for the like reasons, be imperfect and unsatisfactory.

That a large number of potters, of both sexes, when dead are not entered as such in the Register, is evidenced by an appeal to the Longton returns, which deserve much credit for their completeness

and accuracy. Thus, in Longton, the occupation is shown in 34 females deceased, and of these no less than 30 were employed in the potteries; whereas, in Hanley, no one female deceased is recorded to have been so engaged; and, in Fenton, only two such

Of the whole number of male deaths (109) in Longton, 52 or 47·89 per cent. occurred among potters, aged 10 and upwards; and of 103 deaths of females, 30 or 29·12 were among those occupied in the pottery manufacture; or for the two sexes together, 82 to the whole number of deaths (212), the proportion was 38·67 per cent. Again, of 63 deaths of males between the ages of 20 and 60, in Longton, 40 are entered as happening among potters, or 63·49 per cent. On the other hand, in Hanley, of 98 males at 10 and upwards, deceased, 26 only, or 26·53 per cent., are recorded as having been potters; in Shelton, of 151 males, 43 are stated to have been potters, or 28·47 per cent.; in Fenton, of 43 males, 8 are entered as potters, or only 18·60 per cent.; and, lastly, in the Stoke district, of 96 males, 19 are registered as potters, or 19·79 per cent. In fine, the registration of occupations of all sorts is equally defective in these four districts compared with that carried out in Longton.

It is worth while also, in passing, to notice that, with the exception again of Longton, the special department of the pottery manufacture is in most instances not particularized, the general appellation potter being employed. This is another defect of registration calling for correction, inasmuch as it materially lessens the value of the registers as repositories of information touching the prevalent causes of death and the relative longevity of different occupations.

To return; the very wide variation in the relative number of potters deceased in Longton and in the other districts of Stoke parish, as shown by the registers, neither necessarily proves that potters exist in a much higher ratio in the population of that town, nor shows that the mortality of those artisans is at a higher rate. Nevertheless, a certain higher proportion of the inhabitants of Longton, compared with the other towns, may be engaged in the pottery manufacture, but no such proportion as the registers of deaths would indicate. The variation is chiefly due to the greater completeness of the Longton records compared with those of the other districts, although the very high ratio of deaths from diseases of the respiratory organs, as frequently seen, certainly seems to imply a positive difference in the health of that town as contrasted with the others.

There were 811 deaths from all causes among the inhabitants of Stoke parish aged twenty and upwards, including 441 males and 370 females, of whom 138 males, and 37 females were potters.

Restricting our calculations to male potters of the period of life in question, 138 deaths occurred among them, which, relative

to the whole mortality, 441 of male adults, equalled 31·29 per cent. and relative to the whole number of male potters *living* (5813), equalled 2·37 per cent. In Longton 46 such artizans died, or 3·47 per cent. to those living, viz: 1322, as calculated in the foregoing table (Table 18), an excess over their mortality in Stoke at large of 1·10 per cent. Allowing, however, for a higher ratio of potters in the population of Longton than elsewhere in Stoke parish, it is fairly deducible that the relative mortality of adult potters to their whole number living, amounted, in the whole parish, to 3·00 per cent. in the year, instead of 2·37 as calculable from the incomplete records of the entire parish.

The following table and analysis indicate the mortality from all causes of males of all ages, from ten upwards, in each decennial period, potters being distinguished from others.

TABLE 19.

Stoke Parish	10		20-30		30-40		40-50		50-60		60-70		70-80		80-90		90-100	
	Potters.		Potters.		Potters.		Potters.		Potters.		Potters.		Potters.		Potters.		Potters.	
In four Districts	4	39	15	47	17	38	20	42	22	34	8	46	6	34	4	10	0	3
In Longton.....	6	7	6	4	8	3	11	8	15	8	5	14	1	8	0	4	0	0
Total	10	46	21	51	25	41	31	50	37	42	13	60	7	42	4	14	0	3

Ratio of deaths of Potters to others in each decennial period separately.

(A) Analysis of the above table:—

Potters = 17·8 per cent. to 82·1 per cent. of all other classes between 10-20
,, ,, 29·1 .. 70·8 20-30
,, ,, 37·8 .. 62·1 30-40
,, ,, 38·2 .. 61·7 40-50
,, ,, 46·8 .. 53·1 50-60
,, ,, 17·8 .. 82·1 60-70
,, ,, 14·2 .. 85·7 70-80
,, ,, 22·2 .. 77·7 80-90

(B) Analysis of the same table so far as regards Longton only:—

Potters = 46·1 per cent. to 53·8 per cent. of all other classes between 10-20
,, ,, 60·0 .. 40·0 20-30
,, ,, 72·7 .. 27·2 30-40
,, ,, 57·8 .. 42·1 40-50
,, ,, 65·2 .. 34·7 50-60
,, ,, 26·3 .. 73·6 60-70
,, ,, 11·1 .. 88·8 70-80

Analysis (A) shows that of all males dying in any one decennial period, the potters stand in a certain ratio to males of

other occupations. Analysis (B) does the same for Longton, considered apart from the other districts in Stoke.

This supplementary analysis (B) for Longton exhibits a much higher ratio of deaths of potters to individuals of all other occupations, at each of the decennial periods tabulated up to the 70th year, than in Stoke parish at large; but as the numbers involved are small, less importance can be attached to this fact than otherwise. Nevertheless, the legitimate inference is, that the relative mortality of male potters to males of all other classes is actually greater in Stoke parish generally, than the first analysis (A) shows, reference being had to the more perfect registration of occupations in Longton.

The table and analysis (Table 19 A) for Stoke at large, show that, in the ten years, from 50 to 60, nearly one half of the whole number of deaths of males occurred among potters; that from 40 to 50, and again from 30 to 40, more than one-third took place among those workmen. The proportion, again, between 20 and 30 was little less than one-third of potters to all others; between 60 and 70 and between 10 and 20, rather more than one-sixth.

These proportions imply that the occupation of potters is connected with a rapidly rising ratio of mortality after the 20th year, which advances to its maximum in the decennium between the 50th and 60th years of life.

The same fact is demonstrated by the following table, showing the mortality of male potters relatively to others not potters, and to the entire mortality (441) of males, 20 years of age and upwards, in decennial periods.

TABLE 20.

	20—30	30—40	40—50	50—60	60—70	70—80	80—90
Male Potters	4·76	5·66	7·02	8·39	2·94	1·58	0·90
Males not Potters	11·56	9·29	11·33	9·52	13·60	9·52	3·17

This circumstance, however, does not hold good with respect to males not potters, among whom a progressive ratio does not exist, and the maximum is attained in the subsequent decennium to that in potters, viz: in that between the 60th and 70th years. On the contrary, in the last named decennium the per centage of mortality among potters drops suddenly to less than a third of that found in the preceding one, and it continues relatively small to that among other males in following decenniums, a circumstance which implies that the former class of workmen have died out before reaching the 60th year, in a much larger proportion than other males; a fact illustrated more at large in the following section and tables.

The most fatal period among potters is from the 20th to the 60th year, during which their mortality equals 37·91 per cent. (being 113 of 298) of the whole number of deaths among males in that period.

Of male potters who died between 50 and 60, the mean age was 54; and of those who died between 40 and 50, the mean was 43·6. The maximum number of deaths occurred at 42, and the next largest at 50 years of age.

§ *VIII.—Ages attained at the time of death of male Potters compared with others in Stoke parish. The mean age of Potters at the time of death.*

TABLE 21.

IN STOKE PARISH.

Of 348 males, not Potters,

13·21	died between	10—20
14·65	....	20—30
12·06	....	30—40
14·36	....	40—50
12·06	....	50—60
17·24	....	60—70
12·35	....	70—80
4·59	....	80—90
0·85	....	90-100

TABLE 22.

IN STOKE PARISH.

Of 149 males, Potters,

6·71	died between	10—20
14·09	....	20—30
16·10	....	30—40
20·80	....	40—50
24·83	....	50—60
8·72	....	60—70
4·02	....	70—80
2·68	....	80—90
0·00	....	90-100

TABLE 23.

IN THE TOWN OF LONGTON.

Of 54 males, not Potters.

12·50	died between	10—20
7·14	....	20—30
5·35	....	30—40
14·28	....	40—50
14·28	....	50—60
25·00	....	60—70
14·28	....	70—80
7·14	....	80—90

TABLE 24.

IN THE TOWN OF LONGTON.

Of 52 males, Potters,

11·53	died between	10—20
11·53	....	20—30
15·38	....	30—40
21·15	....	40—50
28·84	....	50—60
9·61	....	60—70
1·92	....	70—80
0·00	....	80—90

Among other facts these tables show that in the parish of Stoke, 83 in every 100 male potters die before completing their 60th year, and that only 17 in 100 live beyond that period; whereas, 66 only in every 100 males, not potters, die before attaining the 60th year, and 35, or more than twice 17, survive beyond that age. Between 60 and 70 years of age there were 2 men, not potters, to 1 potter alive; 3 to 1 among those between 70 and 80; and nearly 2 to 1 among those between 80 and 90.

Of 223 males who attained 50 years and upwards, 62 were potters and 161 not; being 27·80 per cent. of the former to 72·19 of the latter.

The mean age at death of male potters in Stoke parish, of 20 years and upwards, was 46·50, and that of males, not potters, was 52. The mean age at death of males of all classes, aged 20 and upwards, in all England, is 56, and in the city of London 52. Therefore the value of life among male potters is 9½ years less than that of males in the general population of the country.

The year for which these statistics are worked out was that in which the terrible boiler explosion occurred at Shelton, by which some 13 men and youths, in the vigour of life, were killed. Altogether there were 47 deaths from accident among those aged 10 and upwards, no one of whom was a potter. This circumstance duly allowed for enhances the value of life among those not potters to 54 as compared with 46·50 among potters.

§ *IX.—On the mortality of Potters from Diseases of the Lungs and Phthisis.*

The mortality of potters from diseases of the lungs and from phthisis or consumption may be calculated approximatively from the data in hand.

Among male potters, aged 20 and upwards, who died in Stoke parish, diseases of the lungs was the cause of death in 37, and consumption in 42; consequently the deaths to the whole number living within the same period, viz. 5813, were from

Diseases of the Lungs	0·63 per cent.,	or 6·36 per 1000
Phthisis, or Pulmonary Consumption ..	0·72 ,,	or 7·22 ,,

In Longton, taken singly, the proportion in reference to the calculated population (1322) of adult male potters was from

Diseases of the Lungs	1·28 per cent.	or 12·85 per 1000
Phthisis or Pulmonary Consumption ..	1·13 ,,	or 11·34 ,,

As before remarked, the loose manner in which the causes of death are registered, and the absence of correct distinction between the prevalent form of disease of the chest among potters and phthisis, renders it desirable to group diseases of the lungs and phthisis together as diseases of the respiratory organs. And, in passing, we may observe that acute diseases of the lungs figure as a very inconsiderable cause of death among potters.

Diseases of the respiratory organs caused death among adult potters in the ratio of 1·35 per 100 such artisans living, *i.e.* 13·58 per 1,000, or 1,358 per 100,000. In Longton alone 32 deaths resulted from such diseases; equal to 2·42 per 100, *i.e.* 24·20 per 1,000, or 2,420 per 100,000 adult potters living.

In the above statistics, Longton again presents a much higher ratio of mortality from lung disease and consumption among

adult potters. Indeed lung disease appears to destroy double the number of potters, compared with the whole number of such workmen living in that town, to what it does in the parish of Stoke at large; and the deaths there also from phthisis are in a similar though lesser degree in excess. These facts force upon the mind the conclusion, even after allowing for the greater relative proportion of potters in the population of that town and the more perfect registration,—that the sanitary condition of the potters in Longton is more unfavourable than in the other districts of Stoke parish.

Also, when we compare the mortality in Stoke parish from lung disease and phthisis among potters, aged 20 and upwards, with that among the males in the parish, and with those in England at like ages, the conclusion is inevitable that the occupation of the potter tends greatly to the development of those diseases. Reference to table 9 will at once prove this, for instead of there being 1,000 deaths per 100,000 as among the adult males in the parish generally, there are 1,341, and in the case of potters in Longton, even 2,420 in the 100,000 living. The excessive death-rate from the diseases in question, appears still greater in relation to that obtaining among males 20 years old and upwards, in England, viz:—654; it being in fact double the amount.

The mortality from diseases of the lungs and from phthisis of male potters compared with that of all males aged ten and upwards at the time of death, stands thus:

(A.) Of 210 such deaths in all Stoke from lung diseases and consumption, 85 were among potters, or 40·47 per 100 of the whole number. Of 57 in Longton, 33 were among potters, or 57·89 per 100.

(B.) Of 110 deaths in all Stoke from consumption, 46 were among potters, or 41·81 per cent. of the whole number. Of 26 in Longton, 16 were among potters, or 61·53 per 100.

(C.) Of 148 male potters in all Stoke deceased, 46, or 31·08 per 100 died from consumption, and 85 from consumption and diseases of the lungs taken together, or 57·43 per 100. Of 52 in Longton deceased, 16, or 30·76 per 100 died from consumption; and 33, or 63·46 per 100 from diseases of the lungs and consumption taken together.

In the case of Longton, the mortality from the diseases under consideration, may be calculated for the two sexes. Thus, of 114 deaths from diseases of the respiratory organs, 57 occurred in each sex, and 52 were among potters, or 45·61 per cent. of the entire number. Of 60 deaths, male and female, from consumption, 31, or 51·66 were among potters of the two sexes, in the proportion of 61·23 per 100 males, to 44·11 per 100 females. These, along with preceding figures, demonstrate the terrible fatality of phthisis among potters, particularly of the male sex.

It is curious to observe that though the ratio of male potters dead from phthisis, to the whole mortality of males in Longton, is 20 in 100 higher than in Stoke at large, yet, that the proportionate number of deaths from that disease among potters is nearly the same in the single district as in the whole parish, being as 30·76 to 31·08 per 100, or as 307 to 310 per 1000. Nevertheless, the ratio of deaths from diseases of the lungs and phthisis taken together is nearly 6 in 100 greater in Longton than in Stoke parish; an excess that will be found due to the former group of maladies.

The deaths among potters as a class, from diseases of the respiratory organs, in relation to the entire mortality among them from all causes, may be stated to be equal to 60 per cent.

The prevalence of diseases of the respiratory organs (*i.e.* lung diseases and phthisis together) and of phthisis alone, in reference to the ages at which death occurred, is displayed in the following tables:—potters being distinguished from males of other classes.

TABLE 25.

Number of deaths in decennial periods of potters and others, in Stoke parish, from Diseases of the Respiratory organs:

10—20		20—30		30—40		40—50		50—60		60—70		70—80		80—90	
Potters.		Potters.		Potters.		Potters.		Potters.		Potters.		Potters.		Potters.	
6	16	15	24	15	18	18	19	19	12	9	21	2	13	1	2

TABLE 26.

Number of deaths in decennial periods of potters and others, in Stoke parish, from phthisis:—

10—20		20—30		30—40		40—50		50—60		60—70		70—80		80—90	
Potters.		Potters.		Potters.		Potters.		Potters.		Potters.		Potters.		Potters.	
4	12	11	20	12	13	9	12	7	5	2	1	0	1	0	0

The foregoing table (25) indicates a very high rate of mortality from diseases of the respiratory organs among potters, compared with the male population at large, extending from the 20th to the 60th year. The maximum occurs in the decennium from 50 to 60, and declines progressively in each antecedent decennium as the 20th year is approached. In the twenty years of life between 40 and 60, 37 of the whole number of 85 deaths from those diseases occurred, or 43·52 per cent.

The proportion of adult male potters to the whole adult male population of Stoke is less than one-third; but the mortality from diseases of respiratory organs among the class of artisans in question, is as 85 to 125, or more than half as many, and relatively to the total 210, is as 40·47 per cent. to 59·52 per cent.

An examination of Table 26 shows that the maximum mortality from phthisis is at the earlier decennium of 30 to 40, among male potters, at which period the deaths were nearly equal in that class to those of all other adult men in the population. Of the whole number of deaths from phthisis among potters, viz: 451, 23 occurred in the 20 years intervening between the 20th and 40th years, or 51·11 per cent.

On comparing Tables 25 and 26 together, we observe that 12 of 15 deaths, in the decennium 30 to 40, were due to phthisis; 11 of 15 in that between 20 and 30; 9 of 18 in that between 40 and 50; and, lastly, only 7 of 19 in that between 50 and 60, when lung diseases are more rife. The inference is, therefore, that phthisis cuts off potters predisposed to it in the largest proportion prior to the 40th year, or in the earlier periods of life; whilst those not so predisposed fall victims to those forms of chest disease, not tubercular in character, and to which their occupation exposes them, at a later period.

The following is a summary of the principal conclusions arrived at:—

The mortality of Stoke exceeds the average of all England by upwards of 7 lives annually in 1,000 living, and by 10 that of country districts.

The relative mortality of males to females is higher in Stoke than in England at large.

The death rate of infants under 1 year of age is half as much again in Stoke parish as in England.

The deaths under 20 years of age to the whole mortality of all ages were 65½ per cent.; and those of children under 5 years equalled 52 per cent.

Of 1,000 deaths under 15 years of age, there are 32 more among children in their first year in Stoke than in England at large.

The deaths from diseases of the chest and consumption together, at all ages, in Stoke, exceed those in England by 3·26 in every 1,000 individuals living.

Among 100,000 adult males living, aged 20 and upwards, there die in Stoke from diseases of the chest and from consumption separately, 505 from each; whilst in England the proportions are for diseases of the chest 339, and for phthisis 373. Adult females die in Stoke in the ratio of 323 from lung diseases, and in that of

461 from consumption; and in England in that of 259 for the former and 349 for the latter diseases.

Of children who died under 10 years old, 22·61 per 100 perished from diseases of the lungs and consumption together; and of individuals above 10, 41·52 per cent. were cut off from the same causes.

The deaths of adult male potters (aged 20 and upwards), with reference to the whole number of such workmen alive at the same period, equalled 3·00 per cent.

The mortality of male potters between 50 and 60 years old constitutes nearly one-half of the whole male mortality in that period, whilst their proportion in the male population is under one-third. The ratio of deaths among potters rises progressively to the 60th year. Between the 40th and 60th year of their age, one-half of the whole number of deaths among them occurs.

Eighty-three out of 100 potters die before completing their 60th year.

The mean age of adult male potters was 46½; whilst that of adult men in all England equals 56.

Consumption and diseases of the lungs were the causes of death in 13·50 per 1,000 male potters living, or 1,350 in 100,000 compared with 1,010 in the male adult population of the parish, of all callings.

Above 40 per cent. of the whole number of deaths from diseases of the respiratory organs among adult males of all occupations happen among male potters.

Among male potters themselves, nearly 60 per cent. die from diseases of the respiratory organs.

Newcastle-under-Lyme,
May 28th, 1864.

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