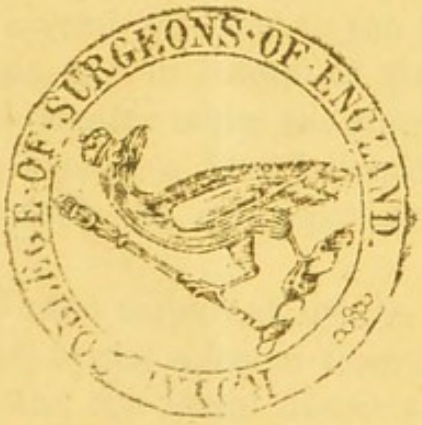
On a standard of public health for England / by E. Headlam Greenhow.

ON A

STANDARD OF PUBLIC HEALTH

FOR

ENGLAND.



From the JOURNAL OF THE STATISTICAL SOCIETY OF LONDON,
JUNE, 1859.

On a STANDARD of PUBLIC HEALTH for ENGLAND.

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[Read before the Statistical Society, 15th March, 1859.]

CONTENTS:

I.—*Introduction.*

As a teacher of Sanitary Science, I have found it desirable to have a Standard of Reference, showing what may be termed the normal mortality produced by particular diseases in healthy places. I say the normal mortality produced by particular diseases, because, while there are certain diseases, the products of local impurity, which perhaps ought not to exist in a well ordered community, there are other diseases which, although partially preventable, would probably cause a definite amount of premature death even under the most favourable circumstances; of death, that is to say, arising from other causes than natural decay. In the earlier Reports of the Registrar-General—reports which, at the period of their publication, exercised a very powerful influence on the formation of enlightened opinions on sanitary questions—Dr. Farr has contrasted the varying proportions of death from particular diseases in several urban districts and in the rural portions of several counties. I refer especially to the first three annual reports, in which tables of the mortality produced by several diseases in the Metropolis, in groups of densely-peopled Towns, and in several of the principal provincial Cities, are compared with similar tables showing the mortality caused by the same diseases in extensive *Rural* districts, each consisting of several counties from which the more populous towns have been excluded.

But the groups of Towns employed by Dr. Farr did not consist of adjacent towns, but of towns selected from different parts of the kingdom, and the counties, the Rural districts of which were used for the comparison, were also in some instances remote from one another. Of course, therefore, both the Urban and Rural groups comprised places of very different character, both as regards climate and the even more variable circumstances of habit, residence, and occupation peculiar to different populations. Such was, however, the only practicable method of dealing with the subject at a time when the

present careful mode of registering deaths had been in operation for a very brief period, and when the large population of the districts compared with each other, afforded the only guarantee of the reliability of the comparison. And indeed, although, perhaps, the limited period comprised in the calculation does not afford sufficient security against the fluctuations of mortality consequent upon variations of season or the greater or less diffusion of epidemic and contagious diseases, yet the large population of the groups of town and country districts contrasted with each other in these tables of Dr. Farr's, affords considerable assurance of the general correctness of the results at which he arrived.

Now that the registration of the causes of death has existed for twenty years, comprising a great variety of seasons and almost every degree of diffusion of the ordinary epidemic and contagious diseases, it seems desirable to make a more analytical investigation of the different prevalence of certain diseases in Healthy and Unhealthy places, so far as this can be done by means of the death registers. It is true indeed that the death registers do not correctly represent the prevalence of disease, for the *amount* of a disease, that is the number of persons *attacked* by it, and its *intensity*, as measured by the proportion of *fatal* cases, bear no constant relation to each other, but vary at different periods and in different places, but they are at present the only available data from which the prevalence of disease can be estimated. And, as large groups of districts, which comprise several dissimilar towns or the rural districts of separate counties, must commonly include districts of diverse character and of different degrees of salubrity, it seems desirable to select smaller and more compact areas, possessing similarity of character, both as regards the state of the Public Health, climate, and the habits, occupations, and other conditions of their inhabitants. The population of such selected districts should be at least equal to that of a considerable town; and, to ensure, as far as possible, a fair average amount of mortality from epidemic and contagious diseases, the calculations should be extended over a long series of years. Length of time being thus substituted for breadth of space, the results of such investigations would probably be quite as reliable as those obtained from the more extended areas and larger populations employed by the Registrar-General in the valuable reports to which I have already referred.

The population of many of the healthiest rural registration districts is, however, obviously enough, too small to afford a fair standard of comparison; neither is the public health of rural districts of almost exceptional salubrity always properly compared with that of less healthy places. Children and adults, boys and girls, men and women, die in different proportions, and as the aggregate

mortality of a place includes the deaths of persons of both sexes and of all ages, whilst the proportion of the living of each sex and of each age varies much in different places, it is necessary, for an accurate comparison of the sanitary state of any two places by means of their statistics of death, to compare the rate of mortality separately for each sex and for each period of life. Unless the ages both of the living and the dead be taken into consideration, a place which contains an excessive number of children under five years of age, when the proportion of deaths to the number of the living is large, may contrast unfavourably with another place, a smaller proportion of whose population consists of persons of tender years; and yet the latter may, perhaps, really be the unhealthiest district of the two. And so likewise a rural district, in which only a limited and nearly constant number of persons can find employment, may seem to suffer less from phthisical disease than it really does, unless the phthisical death rate be calculated separately for the period of early manhood, because the emigration of young adults produces in such districts a comparative deficiency of persons of that period of life when phthisis is chiefly prevalent. If, however, on the other hand, the towns to which young adults resort for employment be not too distant from their country homes, many of them, when suffering from serious illness which has perhaps been caused, or at least developed, by the unfavourable circumstances of their urban residence, by dissipation, or by the unhealthy character of their occupations, will naturally return to their families, and there dying, swell the death rolls of rural districts by the addition of deaths chiefly or altogether attributable to urban influences.

Thus there are sources of fallacy in the attempt to derive a standard of the proportion of deaths produced by particular diseases in healthy places, either from the deaths in registration districts of small population, or from the deaths in groups of healthy districts taken promiscuously from different and frequently remote parts of the country. The objection to the latter lies in the fact that there is often an absence of conformity in the character and circumstances of different populations. The former is liable to the objections already detailed, and to the want of confidence that must always be entertained respecting averages deduced from a very limited number of facts.

II.—*Groups of Selected Districts.*

It occurred to me, some months ago, that these sources of fallacy might, in a great measure, be obviated by selecting groups of Contiguous Healthy Districts, comprising an extensive area of country and containing a population sufficiently large to afford a considerable number of deaths. I say *groups of Contiguous* Healthy Districts,

because since the climate and the race, occupations, and habits of the people vary much in different parts of England, I have thought it desirable to select groups of districts from several parts of the country. In furtherance of this plan, I have selected Three compact groups of contiguous healthy rural registration districts, each comprising a considerable area of country, and containing a considerable population, and have calculated the rate of death from certain diseases for each group of districts, in the same manner as if it formed but a single registration district. The description of these groups and the results of my investigation into their mortality form the subject of this paper, which I am induced to offer to the notice of the Society, in the hope that such standard death rates as I have found useful for my purpose, may not be unacceptable to other inquirers, until they be superseded by standards of a more authorized and perfect character.

The first group of districts, which will henceforward be referred to briefly as "*The Northern Group*," is formed of the Registration districts of Glendale, Rothbury, Bellingham, and Haltwhistle, in Northumberland, and of Brampton, and Longtown in Cumberland. These districts, which include nearly all the hilly parts of Northumberland, border Scotland from the Solway Frith nearly to the German Ocean. The entire group comprises an area of 1,256 square miles, thinly peopled by 56,637 persons at the time of taking the census of 1851. Brampton and Longtown, the former of which contained a population of 3,074 persons, and the latter a population of 2,142 persons in 1851, are the only places in the entire group of districts which are designated as towns in the census report. The population of the entire group consists chiefly, but not quite exclusively, of persons engaged in agricultural pursuits and in supplying the wants of a rural population, for there are also a notable proportion of coal miners and a few stone quarrymen. The district is one of the most thinly peopled in England, Brampton, the most densely inhabited portion, having only an average of 76 and Bellingham of only 18 persons to the square mile. The average annual death-rate of these northern districts for the ten years 1841-50 according to the Registrar-General, was 15 per 1,000 in Glendale and Rothbury, 16 in Haltwhistle, and 17 in Bellingham, Brampton, and Longtown. The average annual death-rate of the entire group, treated as a single district for the nine years 1847-55, as computed by myself, was 16 in each 1,000 persons of all ages and of both sexes.

The second or "*Southern Group*," consists of the districts of Godstone, Reigate, Dorking, and Hambledon in Surrey, and of Petworth and Midhurst in Sussex. This, like the "Northern Group," consists partly of a hilly region. Its area is little more

than one-third the area of the "Northern Group," for it comprises only 470 square miles; whilst on the other hand, its population, which consisted of 71,330 persons at the time of the last census, is more than one-fourth greater than that of the northern group. The Southern Group contains the towns of Dorking and Petworth and the parliamentary boroughs of Reigate and Midhurst. The population of the town of Dorking in 1851 was 3,490; that of Petworth 2,427. The borough of Reigate, which is, however, coextensive with the parish, contained 4,927 persons in 1851; that of Midhurst, which comprises several parishes, contained at the same period a population of 7,021 persons. The population of the entire group is chiefly engaged in agricultural pursuits, but contains of course a proportion of persons employed in supplying the necessaries of life. The Southern is more densely inhabited than the Northern group; the average number of persons to each square mile, varies from 129 in Godstone to 182 in Dorking. The annual average death-rate of the six districts for the decennial period 1841-50, according to the Registrar-General, was 16 per 1,000 in Hambledon and Reigate, and 17 per 1,000 in Dorking, Godstone, Petworth, and Midhurst. The average annual death-rate of the entire group of districts treated as a single district for the nine years 1847-55 as computed by myself, was, in round numbers, 17½ per 1,000 persons of all ages and of both sexes.

The third or "*South-Western Group*," is formed of the Registration districts of Barnstaple, South Molton, Crediton, Okehampton, Torrington, Bideford, and Holsworthy in Devonshire, and of Stratton, Launceston, and Camelford in Cornwall. The entire district lies in the north of Devon and Cornwall, and includes an area of 1,449 square miles, occupied by a population of 183,154 persons. The South-Western Group is intermediate between the Northern and Southern Groups in density of population. Bideford, the most densely peopled district, has an average of 171 persons to a square mile, whilst Camelford, Okehampton, and Stratton have at the rate of a little over 100, and Holsworthy of only 84 inhabitants on each square mile of country. The South-Western Group contains a much greater proportion of urban inhabitants than either of the other groups. Nearly one-fifth of the entire population resides in districts which contain boroughs or towns, of which the whole district contains seven, namely, the boroughs of Barnstaple, Bideford, South Molton, Launceston, and Torrington, and the towns of Crediton and Ilfracombe. The collective population of the seven places amounted to 35,186 in 1851, of which 11,371 belong to Barnstaple and 5,775 to Bideford. The population is chiefly agricultural, but contains likewise both a small manufacturing and a small maritime element, and one-fifth of the adult male

inhabitants of Camelford are employed in slate quarrying. Rather more than one-fifth of the adult women of Torrington are engaged in glove making, and a small proportion of the women of each of the other six Devonshire districts are employed in the manufacture either of gloves or lace. Somewhat more than one-seventh of the adult women of Crediton, and a smaller proportion of those of Okehampton and South Molton are employed in the manufacture of woollen fabrics. The annual average death-rate of the ten districts for the decennial period, 1841-50, according to the Registrar-General, was 16 per 1,000 in Holsworthy and Okehampton, 17 in Camelford, Launceston, Torrington, Crediton, Barnstaple, Bideford, and Stratton, and 18 in South Molton. The average annual death-rate of the entire group of districts treated as a single district for the nine years 1847-55, as calculated by myself, was a little more than 17 per 1,000 persons of all ages and of both sexes.

The three groups of healthy districts here described may very fairly be employed as standards with which the mortality of other places from particular diseases may be compared. They are each sufficiently populous to avoid the doubt apt to be entertained when averages are founded upon the small number of deaths that occur in a small population. To avoid the errors that might arise from the varying prevalence of contagious and epidemic diseases at different periods, the calculations extend over the Nine Years, 1847-55; this particular term being selected in order that the year 1851, in which the last Census was taken, should be the middle year of the series; for I wished to use the population returns of the Census as the divisors in calculating the death-rates. It might, perhaps, have appeared more accurate if the average population of each group of districts had been estimated according to the rate of increase in each place during the decennial period intermediate between the Census of 1841 and that of 1851; but the accuracy of such an estimate would have been more apparent than real, for it would have rested on the assumption that the movements of the population had been uniform, and its progress constant, whereas both are liable to many disturbances. I believe the plan I have adopted is as nearly accurate as can be attained from the data at my command, and there is no practicable plan which is not open to the chance of minute inaccuracy. The results of my investigation must, therefore, be received only as close approximations to truth; and yet, as the errors that can arise from the different rate of progress of a population at different periods so near to an accurate census as four years on either side of it can be only fractional, they may be safely employed for the purpose they are intended to serve, provided undue importance be not attached to *minute* differences in comparing the death-rates with those of other places.

III.—*Course of Investigation Pursued.*

By the courtesy of the Registrar-General and of Dr. Farr, F.R.S., I have been permitted to extract the facts necessary to my purpose from the manuscript tables of district mortality in the General Register Office. I desire also to express my obligations to Mr. T. A. Welton for the valuable assistance he has afforded me, both in abstracting the facts at Somerset House and also in working out the death-rates. Besides the class of diseases grouped together by the Registrar-General under the name of Diseases of the Respiratory Organs, my investigation has extended to twenty-three particular diseases, viz.,

Small Pox,	Tabes Mesenterica,
Measles,	Phthisis,
Scarlatina,	Hydrocephalus,
Hooping Cough,	Cephalitis,
Croup,	Apoplexy,
Diarrhœa,	Paralysis,
Dysentery,	Convulsions,
Cholera,	Diseases of the Brain, &c.,
Influenza,	Bronchitis,
Typhus,	Pneumonia, and
Erysipelas,	Teething.
Scrofula,	

Several diseases, included in a more extensive investigation communicated to the General Board of Health last spring and published as a Parliamentary Paper,* have been omitted from the present enquiry, because the results afforded by them were negative or unimportant. Cephalitis and the undefined cerebral affections registered under the title of "Disease of the Brain, &c.," have been added to the present investigation, that the group of infantile nervous diseases may be rendered more complete. In order that the rates of mortality from all causes in the several groups of districts might be compared with one another, and also with the general death-rates of other districts, I have calculated the average annual proportion of deaths from All Causes in each of the three groups for the nine years 1847-55. To avoid the errors that might arise from the different proportions of males and females and of persons of the several periods of life in different populations, and to secure the possibility of comparing like things with like in the use of the results as standard rates of mortality, the death-rates have been calculated separately for each sex,

* Papers Relating to the Sanitary State of the People of England: being the Results of an Inquiry into the different Proportions of Deaths produced by certain Diseases in different Districts in England, communicated to the General Board of Health by Edward Headlam Greenhow, M.D., &c. With an Introductory Report by the Medical Officer of the Board on the preventability of certain kinds of premature death.

for children under five years of age, and for persons over five years of age, as well as for persons of all ages. I have also calculated the rate of mortality from certain diseases usually most fatal after middle life for persons of each sex over fifty years of age. As the mortality produced by Pulmonary affections is very different at the different periods of life, and that caused by Consumption in particular is greatest in early manhood, I have calculated the proportion of deaths produced by Phthisis and diseases of the respiratory organs in each sex separately for eight different ages, viz., for children under five years and between five and fifteen years of age; for persons between fifteen and twenty; twenty and twenty-five; twenty-five and thirty; thirty and forty; forty and fifty years of age; and for all ages above fifty years. The death-rates have in each case been calculated for one hundred thousand persons. This avoids the use of fractions, and will enable them to be the more readily compared with my former papers on analogous subjects. That the paper may be more conveniently referred to as a standard of reference, I have arranged the detailed results of the investigation in a series of tables at the end. Each reader can thus select such facts and arrange them in such a manner as may best suit his particular purpose. The following list shows the order and contents of the several tables.

Table I.—Average Annual Proportion of Deaths from all causes, and from the several particular causes in each Group of Districts during the nine years 1847-55, per 100,000 males and females of *all* ages.

Table II.—Average Annual Proportion of Deaths from all causes, and from the several particular causes in each Group of Districts during the nine years 1847-55, per 100,000 male and female children *under* five years of age.

Table III.—Average Annual Proportion of Deaths from all causes, and from the several particular causes in each Group of Districts during the nine years 1847-55, per 100,000 persons of each sex *over* five years of age.

Errors are so liable to occur in the registration of the causes of death, and particularly in registering deaths produced by disease of the lungs, by the several nervous diseases of infancy, and by diarrhœal diseases, that I have considered it more reliable, and certainly more convenient, to group these diseases into classes. The main facts are in this manner brought before the eye without the incumbrance of details. There are also certain diseases which prevail chiefly, or almost exclusively, at particular periods of life; as the nervous diseases of infancy and the exanthematous diseases which practically are all but limited to the period of life anterior to the fifth year; as apoplexy and paralysis, which are most frequently fatal after middle life; and, as affections of the lungs, which, exclusive

of phthisis, produce a considerable mortality at the two extremes of life, in infancy and old age, but are comparatively harmless at the intermediate period. I say diseases of the organs of respiration are comparatively harmless between childhood and old age, because the normal mortality they produce at that period of life is insignificant compared to the mortality in early and advanced age. But there are districts where this so called normal condition is disturbed, and where a considerable mortality is occasioned by such diseases in middle life. Such cases are, however, exceptional; and, I believe, in every instance explicable by the prevalence of some particular occupation among the inhabitants, or by some other definite local cause. These circumstances afford additional facilities for subdividing the results of the inquiry, and I now, therefore, proceed to arrange the more important facts brought to light by it in a more convenient form, leaving such persons as may desire to examine them in greater detail to refer to the Tables at the end of the paper.

IV.—*Statement of Results.*

The annexed Table (A) shows the average annual proportion of deaths per 100,000 Persons without limitation of age or sex, produced by All Causes, by Pulmonary Affections, by Alvine Flux, and by Typhus, in each of the three groups of districts during the nine years. All deaths, whether certified or not, are of course comprised in calculating the rate of deaths from all causes. The class Pulmonary Affections includes Laryngitis, Bronchitis, Pleurisy, Pneumonia, Asthma, Disease of the Lungs, &c., and Phthisis. These diseases form a convenient and natural group, and although, as will presently appear, Phthisis has also been treated separately, so much doubt

TABLE A.—AVERAGE ANNUAL PROPORTION OF DEATHS *produced by the several undermentioned* CAUSES *in each* GROUP OF DISTRICTS *during the Nine Years* 1847-55, *per* 100,000 PERSONS OF BOTH SEXES AND ALL AGES.

1	2	3	4
CAUSES OF DEATH.	Northern Group.	Southern Group.	S.-Western Group.
All Causes	1,626	1,764	1,736
Pulmonary Affections	301	432	420
Alvine Flux	29	46	29
Typhus	50	74	64

must frequently exist as to the correct discrimination of Phthisis from other chronic diseases of the lungs, that I consider it better at present to group it with the other diseases of the organs of respiration. Diarrhœa, Dysentery, and Cholera, are comprised under the term Alvine Flux. The two varieties of continued fever, respectively called Typhoid and Typhus fever, are both registered under the common name of Typhus. This is perhaps unavoidable, for however desirable it may appear to subdivide the causes of death in this and analogous cases, it is very questionable whether greater accuracy could be successfully attained at present.

In Table A the death-rates are given irrespective of sex, but as the rate of death, both from all causes and from each particular cause, is usually different in males and females, the same facts are presented in Table B separately for each sex.

TABLE B.—AVERAGE ANNUAL PROPORTION OF DEATHS *produced by the several undermentioned* CAUSES *in each* GROUP OF DISTRICTS *during the Nine Years* 1847-55, *in* PERSONS OF ALL AGES SEPARATELY FOR EACH SEX.

1	2	3	4	5	6	7
CAUSES OF DEATH.	Northern Group.		Southern Group.		S.-Western Group.	
	DEATH RATES.		DEATH RATES.		DEATH RATES.	
	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.
All Causes	1,640	1,612	1,766	1,762	1,757	1,716
Pulmonary Affections	297	304	411	454	446	395
Alvine Flux	30	26	49	44	31	28
Typhus	49	51	71	77	59	68

Table (C) shows the average annual proportion of deaths per 100,000 male and female children under five years of age, produced by All Causes; by Pulmonary Affections; by the four Contagious and Epidemic Diseases Small Pox, Measles, Scarlatina, and Hooping Cough; by Croup; by Alvine Flux; by Strumous Diseases, exclusive of Phthisis referred to the class of Pulmonary Affections, and Hydrocephalus, which, together with Cephalitis, Convulsions, Disease of the Brain, &c., and Teething, forms the class to which I have applied the term Nervous Diseases of Infancy.

TABLE C.—AVERAGE ANNUAL PROPORTION OF DEATHS *produced by the several undermentioned* CAUSES *in each* GROUP OF DISTRICTS *during the Nine Years* 1847-55, *in Children* UNDER FIVE YEARS OF AGE.

1	2	3	4	5	6	7
CAUSES OF DEATH.	Northern Group.		Southern Group.		S.-Western Group.	
	DEATH RATES.		DEATH RATES.		DEATH RATES.	
	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.
All Causes	3,693	3,194	4,080	3,450	4,099	3,467
Pulmonary Affections	328	220	665	589	869	704
Small Pox	67	61	14	28	42	41
Measles	143	132	69	57	86	80
Scarlatina	336	264	216	220	300	269
Hooping Cough	112	233	188	262	262	292
Croup	126	132	101	66	173	162
Alvine Flux	37	55	188	123	100	61
Strumous Diseases	60	49	122	142	62	59
Nervous Diseases of Infancy	289	264	1,120	773	685	514

Thus the group of Strumous Diseases consists only of Scrofula and Tabes Mesenterica. The class Nervous Diseases of Infancy, comprises the diseases registered under the names of Cephalitis and Disease of the Brain, &c. in addition to the three diseases Hydrocephalus, Convulsions, and Teething, grouped together in former papers of mine under the name of Nervous Diseases of Children; and, I here refer to the difference in the two groups to prevent the errors liable to occur if they should be compared without consideration of their different composition.

Table (D) shows the average annual proportion of deaths produced by Pulmonary Affections in each sex under 5 years of age, between the ages of 5 and 15; 15 and 20; 20 and 25; 25 and 30; 30 and 40; 40 and 50 years; and for persons upwards of 50 years of age.

TABLE D.—AVERAGE ANNUAL PROPORTION OF DEATHS *produced by* PULMONARY AFFECTIONS *in each* GROUP OF DISTRICTS *during the Nine Years* 1847-55, *at the several* UNDERMENTIONED PERIODS OF LIFE.

1	2	3	4	5	6	7
PERIOD OF LIFE.	Northern Group.		Southern Group.		S.-Western Group.	
	DEATH RATES.		DEATH RATES.		DEATH RATES.	
	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.
Under Five Years.....	328	220	665	589	869	704
5—15	96	90	86	121	79	113
15—20	169	323	217	516	154	259
20—25	379	402	517	611	399	400
25—30	349	420	510	635	415	356
30—40	335	376	390	485	337	339
40—50	260	346	428	434	403	324
50 Yrs. and upwards	572	470	728	645	955	688
ALL AGES	297	304	411	454	446	395

Tables (E) and (F) comprise the same facts as Table D, but in more analytical form. Table E shows the proportion of deaths produced in each Group of Districts by Phthisis, in each sex, and at each of the periods of life mentioned in connection with Table D; and Table F shows similar facts for Diseases of the Respiratory Organs, that is to say, for Laryngitis, Bronchitis, Pleurisy, Pneumonia, Asthma, and Disease of the Lungs, &c., conjointly.

TABLE E. — AVERAGE ANNUAL PROPORTION OF DEATHS *produced by* PHTHISIS *in each* GROUP OF DISTRICTS *during the Nine Years* 1847-55, *at the several* UNDERMENTIONED PERIODS OF LIFE.

1	2	3	4	5	6	7
PERIOD OF LIFE.	Northern Group.		Southern Group.		S.-Western Group.	
	DEATH RATES.		DEATH RATES.		DEATH RATES.	
	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.
Under Five Years.....	75	64	101	76	153	154
5—15	79	83	52	94	51	75
15—20	161	295	191	453	120	225
20—25	361	393	469	579	349	352
25—30	328	384	463	604	343	323
30—40	312	350	306	423	251	299
40—50	187	304	311	371	263	255
50 Yrs. and upwards	281	224	188	219	275	240
ALL AGES	200	229	212	288	195	214

TABLE F. — AVERAGE ANNUAL PROPORTION OF DEATHS *produced by* DISEASES OF THE RESPIRATORY ORGANS *in each* GROUP OF DISTRICTS *during the Nine Years* 1847-55, *at the several* UNDERMENTIONED PERIODS OF LIFE.

1	2	3	4	5	6	7
PERIOD OF LIFE	Northern Group.		Southern Group.		S.-Western Group.	
	DEATH RATES.		DEATH RATES.		DEATH RATES.	
	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.
Under Five Years.....	253	156	564	513	716	550
5—15	17	7	34	27	28	38
15—20	8	28	26	63	34	34
20—25	18	9	48	32	50	48
25—30	21	36	47	31	72	33
30—40	23	26	84	62	86	40
40—50	73	42	117	63	140	69
50 Yrs. and upwards	291	246	540	426	677	448
ALL AGES	97	75	199	166	251	181

Lastly, Table (G) shows the average annual proportion of deaths produced by All Causes, and by Diseases of the Respiratory Organs, Influenza, Phthisis, Apoplexy, and Paralysis, in persons of each sex over fifty years of age.

TABLE G.—AVERAGE ANNUAL PROPORTION OF DEATHS *produced by the several undermentioned* CAUSES *in each* GROUP OF DISTRICTS *during the Nine Years* 1847-55, *in Persons of each Sex* OVER FIFTY YEARS OF AGE.

1	2	3	4	5	6	7
CAUSES OF DEATH.	Northern Group.		Southern Group.		S.-Western Group.	
	DEATH RATES.		DEATH RATES.		DEATH RATES.	
	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.
All Causes	4,301	4,195	4,527	4,386	4,430	4,347
Diseases of Respiratory Organs	291	246	540	426	677	448
Influenza	112	126	86	82	130	138
Phthisis	281	224	188	219	275	240
Apoplexy	139	88	270	342	285	233
Paralysis	341	348	207	266	186	197

V.—*Conclusion.*

The purpose of this Paper, as described in the title and introductory observations, is to supply a standard of the normal mortality produced by certain diseases in healthy places. It is, indeed, too probable that the standard of health presented by the thinly peopled rural districts of Northumberland and Cumberland, of Surrey and Sussex, and of Devonshire and Cornwall, is at present unattainable for densely inhabited towns; unattainable because our acquaintance with the causes that modify the public health is still imperfect. On the other hand, a comparison of the death-rates of the several Groups of Districts with each other shows that conditions injurious to the public health must exist even in some of these healthy places. Why, for example, should the South Western Group lose upwards of 200 and the Southern Group nearly 100 persons more by death annually in proportion to their respective populations than the Northern

Group, unless conditions unfavourable to health exist in the two former from which the inhabitants of the latter are exempt? Hence even these standard districts, the public health of which is at present so eminently superior to the average condition of the public health in England, must be received as only comparative standards, and not as affording a correct illustration of the rate of mortality that would prevail if life were prolonged to its natural duration. The fact that some even of these healthy districts present a higher than the normal rate of mortality, does but afford additional encouragement for sanitary exertions, since a comparison of their death-rates with those of unhealthy places, or even of the country at large, demonstrates the great extent of the field which is open to such exertions. A single illustration will at once serve to show the extent of this field and the advantage of possessing such a standard of the public health as I have here endeavoured to supply, and will form a suitable termination to this paper. Pulmonary affections of all kinds, including Phthisis, produced on an average 98,969 deaths in England and Wales in each of the nine years 1847-55. If the deaths from Pulmonary affections in England and Wales, in each sex and for each period of life, had been at the same rate during these nine years as in the Northern Group of Districts, the average annual number of deaths would have been only 54,098. The two other groups of districts present a less favourable aspect. The average annual number of deaths from Pulmonary Affections in England and Wales would have been 73,555 if the same rate of mortality had prevailed during the nine years as in the South-Western Group, and 79,034 if the same rate of mortality had prevailed as in the Southern Group of Districts. If we may assume—and we may surely do so—that the healthy Northern Group pretty fairly represents the normal rate of death from affections of the lungs in this country, then is the mortality of England from this single class of diseases aggravated to the extent of nearly 45,000 deaths annually by the unhealthy, and it may be presumed, in some measure removable conditions to which the population of England is exposed.

Appendix of Tables.

TABLE I.—AVERAGE ANNUAL PROPORTION OF DEATHS *produced by the several undermentioned* CAUSES *in each* GROUP OF DISTRICTS *during the Nine Years* 1847-55, WITHOUT DISTINCTION OF AGE.

1	2	3	4	5	6	7
CAUSES OF DEATH.	Northern Group.		Southern Group.		S.-Westn. Group.	
	Population in 1851, 56,637. Area in Sq. Miles, 1,256.		Population in 1851, 71,330. Area in Sq. Miles, 470.		Population in 1851, 183,154. Area in Sq. Miles, 1,449.	
	DEATH RATES.		DEATH RATES.		DEATH RATES.	
	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.	Male per 100,000.	*Female*, per 100,000.
All Causes	1,640	1,612	1,766	1,762	1,757	1,716
Diseases of the Respiratory Organs	97	75	199	166	251	181
Small Pox	15	12	8	5	10	8
Measles	24	22	12	11	14	12
Scarlatina	76	57	56	61	75	68
Hooping Cough	17	30	26	38	36	39
Croup	21	21	15	15	28	24
Diarrhœa	17	15	36	33	21	17
Dysentery	4	3	7	7	2	3
Cholera	9	8	6	4	8	8
Influenza	24	26	23	21	30	32
Typhus	49	51	71	77	59	68
Erysipelas	10	6	11	8	8	7
Scrofula	8	7	17	18	12	7
Tabes Mesenterica	6	7	18	20	8	7
Phthisis	200	229	212	288	195	214
Hydrocephalus	26	17	35	27	29	24
Cephalitis	10	11	13	8	14	12
Apoplexy	28	20	52	67	60	52
Paralysis	56	62	37	43	35	40
Convulsions	8	11	108	76	56	41
Disease of Brain, &c.	9	9	20	16	13	12
Bronchitis	30	23	58	53	49	44
Pneumonia	39	26	101	74	161	107
Teething	9	7	12	10	9	7

TABLE II.—AVERAGE ANNUAL PROPORTION OF DEATHS *produced by the several undermentioned* CAUSES *in each* GROUP OF DISTRICTS, *during the Nine Years* 1847-55, *in Children* UNDER FIVE YEARS OF AGE.

1	2	3	4	5	6	7
CAUSES OF DEATH.	Northern Group.		Southern Group.		S.-Westn. Group.	
	DEATH RATES.		DEATH RATES.		DEATH RATES.	
	Male, per 100,000.	*Female*, per 100,000.	Male per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.
All Causes	3,693	3,194	4,080	3,450	4,099	3,467
Diseases of the Respiratory Organs	253	156	564	513	716	550
Small Pox	67	61	14	28	42	41
Measles	143	132	69	57	86	80
Scarlatina	336	264	216	220	300	269
Hooping Cough	112	233	188	262	262	292
Croup	126	132	101	66	173	162
Diarrhœa	29	49	163	102	79	48
Dysentery	....	3	18	21	1	2
Cholera	8	3	7	....	20	11
Influenza	6	6	46	33	44	36
Scrofula	20	6	21	26	20	20
Tabes Mesenterica	40	43	101	116	42	39
Phthisis	75	64	101	76	153	154
Hydrocephalus	126	92	193	137	156	110
Cephalitis	20	21	25	9	20	28
Convulsions	60	74	792	532	420	306
Disease of Brain, &c.	17	25	16	24	22	14
Bronchitis	67	43	115	109	84	72
Pneumonia	169	104	411	364	598	451
Teething	66	52	94	71	67	56

TABLE III.—AVERAGE ANNUAL PROPORTION OF DEATHS *produced by the several undermentioned* CAUSES *in each* GROUP OF DISTRICTS *during the Nine Years* 1847-55, *in Persons* OVER FIVE YEARS OF AGE.

1	2	3	4	5	6	7
CAUSES OF DEATH.	Northern Group.		Southern Group.		S.-Westn. Group.	
	DEATH RATES.		DEATH RATES.		DEATH RATES.	
	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.	Male, per 100,000.	*Female*, per 100,000.
All Causes	1,318	1,378	1,423	1,495	1,407	1,467
Diseases of the Respiratory Organs	73	63	144	111	182	128
Small Pox	7	5	8	2	6	4
Measles	5	6	3	3	3	2
Scarlatina	35	27	32	36	42	39
Hooping Cough	2	....	1	2	2	3
Croup	4	4	2	6	6	5
Diarrhœa	15	10	17	22	12	12
Dysentery	4	3	6	5	3	3
Cholera	10	9	6	5	7	8
Influenza	27	29	20	19	29	31
Scrofula	6	7	16	17	10	6
Tabes Mesenterica	1	2	5	4	3	3
Phthisis	219	253	229	322	202	223
Hydrocephalus	11	6	11	9	10	12
Cephalitis	8	9	11	8	13	9
Convulsions	....	1	5	4	2	4
Disease of the Brain, &c.	8	7	20	15	11	12
Bronchitis	24	20	49	44	43	40
Pneumonia	19	14	54	29	96	58