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*D. Longstaff -  
With kind regards, from  
H.S.*

**SUPPLEMENT**

TO THE

**FIFTY-FIFTH ANNUAL REPORT**

OF THE

**REGISTRAR-GENERAL**

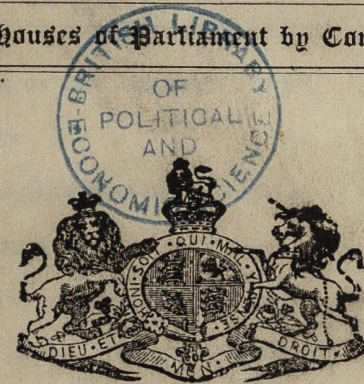
OF

**BIRTHS, DEATHS, AND MARRIAGES**

IN ENGLAND.

**PART I.**

Presented to both Houses of Parliament by Command of Her Majesty.



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SUPPLEMENT

TO THE

FIFTY-FIFTH ANNUAL REPORT

REGISTER

REGISTER GENERAL

BIRTHS, DEATHS AND MARRIAGES

Mortality from Zymotic Diseases in England

Mortality from Constitutional Diseases

Mortality from Diseases of the Nervous System

Mortality from Diseases of the Circulatory System

Mortality from Diseases of the Respiratory System

Mortality from Diseases of the Digestive System

Mortality from Diseases of the Urinary System

Mortality from Violence

Local Variations of the Death-rates in 1881-90

Correction of Crude Death-rates

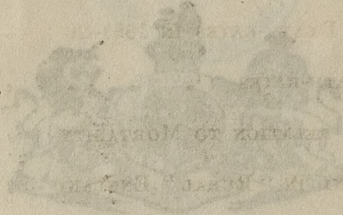
Density of Population in Relation to Mortality

Mortality in "Urban" and in "Rural" England

Local Distribution of Mortality from Zymotic Diseases

Local Distribution of Cancer Mortality

Local Distribution of Mortality from Phthisis



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## L E T T E R

TO

The REGISTRAR-GENERAL on the MORTALITY in ENGLAND and WALES during the Period of TEN YEARS 1881-90, by JOHN TATHAM, Esq., M.A., M.D.

*General Register Office,  
Somerset House, London,*

*1st February 1896.*

SIR,

I have the honour to submit for your consideration the following remarks on the Vital Statistics of England and Wales in the decennial period last completed: these remarks, together with the appropriate tables, form Part I. of the Supplementary Report for the years 1881-90.

In the course of his preparations for taking the census of 1891, Dr. Ogle projected a scheme for ascertaining, by appeal to a basis of fact larger and more trustworthy than any previously available, the effect of certain definite occupations on the health and longevity of persons engaged therein. Complete records of the deaths of males over fifteen years of age, occurring in England and Wales during the three years 1890-2, were thought to be not more than sufficient for this investigation; accordingly these deaths, numbering more than half a million, have been extracted from the registers, and by means of the population figures obtained at the last census, the rates of mortality from several different causes have been worked out for a large number of occupations.

With the help of a temporarily increased staff the work has proceeded uninterruptedly ever since the census year, and the whole of the tabular matter in connection therewith is now in a forward condition. Nevertheless, much still remains to be done before this valuable mass of information can assume a form in which the true relations of the facts shall be demonstrable. It has, therefore, been thought inadvisable to delay the publication of the greater part of this Supplement, for the sole purpose of including under the same cover the section relating to occupational mortality. The latter important section will therefore shortly be issued as Part II. of the Supplementary Report for 1881-90.

For the unique and valuable fund of information respecting deaths and their causes which throughout the last half-century has been accumulating in the General Register Office, the State is manifestly indebted to the generous co-operation of the medical profession; failing which, the organization of a system of vital statistics which should be worthy of the English nation would have been impossible. It is therefore clearly incumbent on the officer who is responsible for the classification and analysis of the national mortality records to take care that every detail shall be utilized which may serve to increase our knowledge of the intimate nature of preventable diseases, and may thus tend to diminish their prevalence, as well as to mitigate their baneful effects on human health and life.

Influenced by the above-mentioned considerations, I have striven to develop to the utmost the practical value of these volumes as a work of reference for students of Preventive Medicine; for I feel assured that to have succeeded in this endeavour would constitute the highest tribute I could offer to the memory of Dr. William Farr, whose life-long labours in behalf of that science which must ever be identified with his name, still continue to influence beneficially the health conditions of his fellow men. I trust that I may venture to entertain the hope that these

volumes may be regarded as a not unworthy contribution to the series of supplementary reports of which the first and second were written by Dr. Farr himself, and the third was from the pen of my eminent predecessor, Dr. William Ogle.

It is desirable to explain that the elaborate series of decennial tables in the present volume are by no means mere summaries of facts already published in the successive annual reports of the Registrar-General; those reports contain certain details for each year as to causes of death in each of the 632 Registration Districts of England and Wales, but they give no information respecting the combination of cause with sex or with age. The decennial tables herewith submitted have been prepared from hitherto unpublished manuscripts in the custody of this office; and in order to obtain a comparative statement of the mortality in each district amongst males and females at certain age-groups and from specified causes, it has been necessary to extract from the original tabling sheets of each of the registration districts, the facts required to compile the tables on pages 97-728.

With the object of presenting to readers of this volume as much useful material as could be brought within reasonable limits, I have carefully revised some of the tables appended hereto, and have considerably added on the present occasion to the amount of routine information which has appeared in previous decennial supplements.\*

Throughout the period that has elapsed since the passing of the first Public Health Act, there has been observed in relation to sanitary progress a steadily growing public interest, the development of which has doubtless been encouraged by the knowledge that in the reports emanating from the General Register Office may be found statistics by which the local variations of healthiness in every part of England and Wales can be measured, as can also the beneficial effect of works undertaken from time to time for the improvement of the health of the community.

Ever since the commencement of civil registration in 1837, records have been kept in this office of the numbers of births, marriages, and deaths taking place in each successive year throughout England and Wales. Particulars have also been tabulated with ever increasing care since 1847,† in regard to causes of death and age at death, in the case of every such occurrence in any registration district of this country. In issuing a work

\* Information given in the tables of the present volume, in addition to, or in modification of that contained in the tables of the Supplement for 1871-80.

In each of the district tables (pages 97-728).

(a) Four vertical columns showing the deaths and crude death-rates at all ages of *males and females separately*, from each of the specified death-causes, in addition to the columns for persons.

(b) Six lines showing populations, deaths, and death-rates at 12 groups of ages among males and females separately, together with the lines for persons, as before.

(c) Death-rates in standard population in each district.

(d) Decennial increase or decrease (per cent.) of population in each district.

For each of the 45 registration counties (pages 6-95).

Two tables are now given, one for males, the other for females, showing—(1) Mean population, (2) deaths, (3) death-rates at the several age-groups and “in standard population” for males and females separately. The corresponding rates for *Persons* are shown in another table (page xxxix). The *facts of Death* at the several ages and from specified causes relating to *Persons* can be obtained by adding the figures for males and females given in these Tables.

In Table 2 (Children under 5 Years), pages lxxxii-xcvi. The figures for the last four columns of Table 2, as it appeared in the previous Supplement are now given in the county and district tables (pages 6-728). They are therefore omitted from Table 2 in this volume, and the available space in that table has been utilized by the insertion of the death-rates under five years from diphtheria, fever, tubercular diseases, and respiratory diseases. All the principal zymotic diseases of children are now included in this table.

† From 1837 to 1842 the deaths were abstracted by age and by cause, separately. From 1843 to 1846 by age only, and from 1847 onwards by age and cause in combination.

like the present, which shows in detail the vital statistics of each of the 632 registration districts, during a period of ten years, it is impossible not to feel regret that the elaborate series of tables therein contained cannot, except in a few instances, be utilised for definite administrative purposes, because of the overlapping and confusion of areas which still very frequently persist.

In 1888 the Commissioners who had been appointed under the Act of the previous year\* made a valuable series of recommendations for the simplification of areas, such, for example, as parishes, boroughs, sanitary districts, unions, and counties. In cases involving so many and such complex interests improvement must necessarily be slow; but it is a fact that the adjustments, effected by the County Councils under the provisions of the Local Government Acts of 1888 and 1894, on the basis of the commissioners' recommendations, have already resulted in the simplification of a considerable number of territorial boundaries, and, not rarely, in closely assimilating the limits of administrative and registration areas. Many urban sanitary districts, for example, which before 1888 had extended into two, three, or even four separate registration districts, have under these Acts, been made to lie wholly within one registration district, and in a few instances an urban sanitary district has been made co-extensive with a registration district or sub-district. Obviously, therefore, in every case where an administrative area such as an urban sanitary district is made to correspond exactly with a registration district, the decennial tables of the present and previous supplements referring to such area, will furnish a valuable test of the success of local effort for the improvement of the Public Health. The urban sanitary districts of Leicester, Portsmouth, Norwich, Devonport, Plymouth, and Barrow-in-Furness are already coterminous with the corresponding registration districts. This process of adjustment is still going on in various parts of the kingdom under the sanction of the Local Government Board, and it is greatly to be hoped that the many remaining anomalies of the kind here alluded to may ere long be rectified. At present, however, the fact remains that there are still in England and Wales eleven urban sanitary districts, including three county boroughs, which extend not only into more than one registration district, but even into more than one registration county.†

\* *i.e.*, the Local Government (Boundaries) Act, 1887, 50 & 51 Vict. c. 61.

† The following are a few instances out of many in which the operations of the county councils under the Local Government Acts of 1888 and 1894 have tended to the simplification of areas.

#### *Yorkshire, West Riding.*

Before the passing of the Local Government Acts, 1888 and 1894, the registration county of Yorkshire, West Riding, included the whole of the administrative county of that name, together with the county boroughs of Bradford, Halifax, Huddersfield, Leeds, and Sheffield, but with the exception of 11 entire parishes and part of another parish situate in Nottinghamshire, 19 entire parishes and part of one other parish situate in Lancashire, and 4 entire parishes and parts of two other parishes situate in Yorkshire, East Riding; it also contained 5 entire parishes belonging to Derbyshire, part of one parish belonging to Lancashire, 10 entire parishes belonging to Lincolnshire, 2 entire parishes and part of one other parish belonging to Nottinghamshire, 8 entire parishes belonging to Yorkshire, East Riding, and 24 entire parishes and 4 parts of parishes belonging to Yorkshire, North Riding. Before 1888, therefore, the differences between the registration and administrative counties of York, West Riding, amounted to 83 parishes and 10 parts of parishes.

The effect of the alterations under these Acts has been to reduce this difference from 83 parishes and 10 parts of parishes to 74 parishes only, and to reduce the difference in population from 48,070 to 38,410.

#### *Dorsetshire.*

Before the passing of the Acts registration Dorsetshire contained the whole administrative county of Dorset with the exception of 10 parishes situate in Wilts, Devon, and Somerset; it also contained 8 other parishes situate in the county of Somerset. Registration Dorset therefore differed from administrative Dorset by 18 parishes. The effect of the alterations under the Acts has been to reduce the difference between the registra-

*Changes in the Death-rate of England and Wales.*

In the decennial period, 1871-80, there had occurred a mortality equal to 21·27 annual deaths, from all causes, in each thousand of the population. In the succeeding ten years, namely, the period to which the present volume relates, the mean annual proportion fell to 19·08 in a thousand. This decline in the mortality at all ages was shared by both sexes in almost equal proportions; the rate among males having fallen by 10·6 per cent. and that among females by 10·0 per cent. The figures show a decreased mortality among *females* at every one of the age-periods into which the span of life has been divided for the purposes of the Registrar-General's Reports, and among *males*, a decrease at all but the age-period 65-75 years. The experience of 1881-90, although agreeing with that of the preceding decennium in showing a greater reduction of mortality at the earlier ages, nevertheless differs from it in other important respects. For example, Dr. Ogle, commenting, in the last Decennial Supplement, on the varying incidence of mortality at the several ages, showed that, whilst the rates had fallen at the earlier periods of life, they had risen at the later periods. As has been already stated, this was by no means the case in the decennium under present notice, where a decrease was observed in both sexes at every age-period save one. Again, as compared with the mortality in the preceding decennium, the rate among females in 1871-80 was found to have decreased more rapidly than among males; this inequality has now been redressed, for in 1881-90 the male rate decreased actually faster than the female. Perhaps, however, the most significant difference between the two sets of figures lies in the fact that whereas in 1871-80 there had been a considerable rise in the male mortality after the age of 45, and in the female mortality after 55, recent figures show that this blemish has been almost completely removed, the only rise of mortality in the whole course of life during 1881-90 having been the trivial one of less than one per cent. at the age-group 65-75, among males (*see Table A.*)

In the recent decennium the mortality among infants under one year of age, which is generally accepted as the most sensitive test of the health of a given population, has shown a decline. The rate of mortality among infants of both sexes under the age of twelve months, was equal to 142 per 1000 births registered, as compared with 149 per 1000 in the preceding decennium. In 1881-90 the infantile rate among males was equal to 155 per 1000 births, and among females, to 128 per 1000; the rates in 1871-80 having been 163 and 134 respectively.

tion and the administrative county from 18 parishes to 3; and to reduce the difference in population from 9738 to 3359.

*Surrey.*

Before the passing of the Local Government Acts, 1888 and 1894, registration Surrey included the whole of the administrative county of Surrey, together with the county borough of Croydon, but with the exception of the parishes of Lingfield situate in Sussex, and Thorpe and Egham situate in Berkshire. It also contained the parishes of Penge belonging to the county of London, Aldershot and Dockenfield belonging to the county of Hants, and Hampton, Hampton Wick, and Teddington belonging to the county of Middlesex, therefore differing from administrative Surrey by 9 parishes. The effect of the alterations under the Acts has been to reduce the difference between the registration and administrative county from 9 parishes to 7, and to reduce the difference in population from 78,421 to 77,613.

*Westmorland.*

Before the passing of the Acts of 1888 and 1894, the registration county of Westmorland differed from the administrative county only in this, that the former area included the Lancashire civil parish of Dalton whereas the latter area did not include it. Under these Acts the parish of Dalton was transferred from Lancashire to administrative Westmorland, so that the Administrative county of Westmorland now exactly corresponds with the registration county of the same name.

TABLE A.—ENGLAND AND WALES.—Annual Rate of Mortality among Persons, Males, and Females, in successive Decennia.

PERSONS.						
Ages.	1841-50.	1851-60.	1861-70.	1871-80.	1881-90.	Increase or Decrease per cent. in 1881-90 compared with preceding Decennium.
All Ages	22·28	22·17	• 22·42 †	21·27	19·08	-10·3
0-	66·03	67·60 †	• 68·30 †	63·12	56·82	-10·0
5-	• 9·03	8·46	7·95	6·43	5·29	-17·7
10-	• 5·27	4·97	4·47	3·70	3·02	-18·4
15-	• 7·46	7·04	6·39	5·33	4·35	-18·4
20-	• 9·28	8·67	8·19	7·04	5·61	-20·3
25-	• 10·25	9·76	9·79 †	8·93	7·53	-15·7
35-	• 12·85	12·31	12·72 †	12·62	11·42	-9·5
45-	• 17·03	16·54	17·30 †	• 17·72 †	17·06	-3·7
55-	29·86	28·86	30·28 †	• 31·49 †	31·33	-0·5
65-	63·69	61·74	62·45 †	• 64·85 †	64·65	-0·3
75 & upds.	• 162·81	159·78	158·79	161·59 †	153·67	-4·9
MALES.						
Ages.	1841-50.	1851-60.	1861-70.	1871-80.	1881-90.	Increase or Decrease per cent. in 1881-90 compared with preceding Decennium.
All Ages	23·11	23·05	23·61	22·61	20·22	-10·6
0-	71·20	72·43	73·16	68·14	61·69	-9·5
5-	9·16	8·51	8·15	6·67	5·34	-19·9
10-	5·12	4·88	4·48	3·69	2·94	-20·3
15-	7·05	6·69	6·16	5·23	4·30	-17·8
20-	9·50	8·83	8·45	7·32	5·71	-22·0
25-	9·94	9·57	9·90	9·30	7·73	-16·9
35-	12·85	12·48	13·46	13·74	12·35	-10·1
45-	18·22	17·96	19·16	20·05	19·28	-3·8
55-	31·81	30·85	33·00	34·76	34·66	-0·3
65-	67·51	65·33	66·69	69·57	70·17	+0·9
75 & upds.	168·56	165·40	164·64	169·08	162·18	-4·1
FEMALES.						
Ages.	1841-50.	1851-60.	1861-70.	1871-80.	1881-90.	Increase or Decrease per cent. in 1881-90 compared with preceding Decennium.
All Ages	21·58	21·32	21·28	20·00	18·01	-10·0
0-	61·09	62·74	63·43	58·10	51·99	-10·5
5-	8·89	8·42	7·76	6·20	5·25	-15·3
10-	5·42	5·06	4·48	3·70	3·09	-16·5
15-	7·88	7·38	6·62	5·43	4·40	-19·0
20-	9·08	8·53	7·96	6·78	5·51	-18·7
25-	10·55	9·92	9·68	8·58	7·34	-14·5
35-	12·91	12·15	12·03	11·58	10·55	-8·9
45-	16·04	15·20	15·55	15·59	15·04	-3·5
55-	28·44	27·01	27·77	28·54	28·40	-0·5
65-	60·97	58·66	58·80	60·82	60·08	-1·2
75 & upds.	157·89	155·45	154·28	155·83	147·32	-5·5

There is no doubt that a considerable proportion of the diminution in the death-rate since the year 1870 is the direct result of what is implied by the term "improved sanitation"; but that the whole of the difference between the rates of the two most recent decennia cannot thus be accounted for will be obvious on reflection. The published returns show that the birth-rate of England and Wales has been steadily decreasing in recent years. In the year 1878 the rate was 35·6 per 1000 of the population, but since that date the fall has been steady, and the rate at the end of the last decennium did not exceed 30·2. It is evident that this change in the rate of birth, continued as it has been for so many years, must have seriously affected the age constitution of the population, and, as the death-rates at the different ages vary enormously, the aggregate rate of mortality must have been modified accordingly. Table B. shows the mean age-distribution of the population of England and Wales in each of the last three intercensal periods. On comparing the columns referring to the decennial periods ending respectively with 1880 and 1890 it will be seen that the numbers both of males and of females living between the ages of 10 and 45 years, were relatively greater in 1881-90 than in the preceding decennium. Sanitary conditions remaining unchanged, the effect of this variation in the age-constitution of the population will be to *reduce the mortality at all ages*; and that this has actually been the case may readily be shown.

The crude death-rate at all ages in the decennium 1871-80 was equal to 21·27 per 1000 living; but if the number of persons living in the several age-groups during that decennium had been in the same proportion as in 1881-90, the death-rate in the earlier decennium would have been, not 21·27 per 1000, but 20·84. It is this latter figure, therefore, and not the former, that should be used for the purpose of showing the actual decrease in the death-rate since 1880.\*

TABLE B.—ENGLAND AND WALES.—Males and Females at Eleven Groups of Ages in a Million Persons Living at all Ages, 1861-70, 1871-80, and 1881-90.

AGE-PERIODS.	PERSONS.			MALES.			FEMALES.		
	1861-70.	1871-80.	1881-90.	1861-70.	1871-80.	1881-90.	1861-70.	1871-80.	1881-90.
All Ages	1,000,000	1,000,000	1,000,000	487,048	486,762	485,527	512,952	513,238	514,473
0—	134,930	135,400	128,679	67,589	67,660	64,122	67,341	67,740	64,557
5—	118,034	120,237	119,006	58,997	59,963	59,333	59,067	60,274	59,673
10—	105,880	107,310	109,571	53,313	53,875	54,806	52,567	53,435	54,765
15—	96,147	97,103	100,007	47,749	48,329	49,720	48,398	48,774	50,287
20—	89,631	88,997	90,486	42,361	42,399	42,922	42,270	46,598	47,564
25—	147,190	146,529	148,630	69,792	70,063	71,131	77,398	76,466	77,499
35—	115,240	113,211	114,039	55,454	54,405	55,095	59,786	58,806	58,944
45—	87,313	85,674	84,950	42,270	40,997	40,472	45,043	44,677	44,478
55—	58,700	59,050	58,044	28,171	27,998	27,151	30,529	31,052	30,893
65—	33,267	33,226	33,510	15,410	15,305	15,184	17,857	17,921	18,326
75 & upds.	13,638	13,263	13,078	5,942	5,768	5,591	7,696	7,495	7,487

\* For observations on the "Crude death-rate" and the means appropriate for its correction, see pages xxxvi-xxxviii.

## NEW ENGLISH LIFE TABLE.

A Life Table based on the mortality in the ten years, 1871-80, was published in the last Decennial Report. The changes of the death-rate during the decennium 1881-90, which have already been noted, suggest that since 1880 a further increase in the average lifetime of the population has taken place. The new Life Tables on pages x-xix show that this has actually been the case. In Tables C., D., and E. the figures of the new Life Table are given in detail. In Tables F. and G. the number surviving at each age out of a million of each sex born, and also the expectation of life at each age, are placed in comparison with the corresponding figures based on the mortality of 1838-54, and of 1871-80. It will be useful to indicate briefly the main features of the three Life Tables.

*Males.*—By the Table of 1838-54, a million males born are reduced to half a million during the 45th year of age; by the Table of 1871-80 this amount of reduction is not reached until the 48th year, and by the new Table it is further postponed until the 52nd year. At the end of the first year of age the number of survivors by the new Table occupies an intermediate position between the numbers by the two previous Tables; at every other age until 79 the new Table shows a larger number of survivors than is shown by either of the older Tables; from age 84 onwards the survivors are fewer by the new Table than by either of the others. This change is probably due, in part at least, to more accurate statement of age in recent than in earlier years.\*

The average life-time of males, or the expectation of life at birth, which had been 39·91 years by the first of the three Life Tables, and 41·35 years by the second, is further increased by the new Life Table to 43·66 years; that is to say, a male exposed throughout life to the rate of mortality obtaining in England and Wales in 1881-90, would on an average live 2·31 years longer than he would have lived had he been subject to the rates prevalent in 1871-80, and 3·75 years longer than he would have lived had he been subject to the rates prevalent in 1838-54. In the last Decennial Report it was shown that the expectations of life among males by the Life Table therein published were higher than those by the earlier Table for ages below 19, equal thereto at age 19, and lower at all subsequent ages. The new Life Table shows improved expectations of life, compared with those in the earlier Tables, up to 26 years of age; from age 27 until age 44 the expectations are lower than those in the first Table, but higher than those in the 1871-80 Table; for ages 45 and upwards the expectations of life are lower by the new Table than by either of the others.

According to the first Life Table, the 495,770 survivors at age 45, out of a million males born, will live about 11,284,000 years of life, or an average of 22·76 years each; according to the second Life Table the 522,374 survivors at the same age will live about 11,529,000 years of life, or an average of 22·07 years each; and according to the new Life Table the 564,437 survivors at the same age will live 12,451,000 years of life, or an average of 22·06 years each. The successive additions to the working time of life may be shown in a striking form by considering the years lived between the ages 20 and 60. A short calculation shows that

\* As an example, it is evident that the inclusion within the age-group 65-75 of a number of persons under 65 years of age, would reduce the calculated mortality of the age-group; and the rate would be still further reduced if a number of persons whose ages had nearly reached the upper limit of the group were returned in the next age-group, 75-85. There is little doubt that a tendency does exist to overstate the ages of old people, both in the census returns and in the death register; but there is reason to believe that such overstatement is less frequent now than formerly.



TABLE C.—Life Table for England and Wales, based on the Mortality in the Ten Years 1881-90.—Males.

Age $x$	Dying in each Year of Age. $d_x$	Born, and Surviving at each Age. $l_x$	Population, or Years of Life lived, in each Year of Age. $P_x$	Population, or Years of Life lived, in and above each Year of Age. $Q_x$	Expectation of Life at each Age. $E_x$
0	81,996 †	509,180	457,817	22,231,338	43.66
1	24,478	427,184	414,945	21,773,521	50.97
2	9,596	402,706	397,908	21,358,576	53.04
3	6,048	393,110	390,086	20,960,668	53.32
4	4,416	387,062	384,854	20,570,582	53.15
5	3,185	382,646	381,054	20,185,728	52.75
6	2,278	379,461	378,322	19,804,674	52.19
7	1,629	377,183	376,368	19,426,352	51.50
8	1,185	375,554	374,962	19,049,984	50.73
9	897	374,369	373,920	18,675,022	49.88
10	730	373,472	373,107	18,301,102	49.00
11	661	372,742	372,412	17,927,995	48.10
12	674	372,081	371,744	17,555,583	47.18
13	754	371,407	371,030	17,183,839	46.27
14	889	370,653	370,208	16,812,809	45.36
15	1,062	369,764	369,233	16,442,601	44.47
16	1,247	368,702	368,079	16,073,368	43.59
17	1,418	367,455	366,746	15,705,289	42.74
18	1,557	366,037	365,258	15,338,543	41.90
19	1,661	364,430	363,650	14,973,285	41.08
20	1,741	362,819	361,948	14,609,635	40.27
21	1,811	361,078	360,173	14,247,687	39.46
22	1,890	359,267	358,322	13,887,514	38.66
23	1,991	357,377	356,381	13,529,192	37.86
24	2,113	355,386	354,330	13,172,811	37.07
25	2,248	353,273	352,149	12,818,481	36.28
26	2,383	351,025	349,833	12,466,332	35.51
27	2,507	348,616	347,389	12,116,499	34.75
28	2,623	346,135	344,823	11,769,110	34.00
29	2,729	343,512	342,148	11,424,287	33.26
30	2,826	340,783	339,370	11,082,139	32.52
31	2,921	337,957	336,496	10,742,769	31.79
32	3,015	335,036	333,529	10,406,273	31.06
33	3,113	332,021	330,464	10,072,744	30.34
34	3,214	328,908	327,301	9,742,280	29.62
35	3,318	325,694	324,035	9,414,979	28.91
36	3,423	322,376	320,665	9,090,944	28.20
37	3,533	318,953	317,186	8,770,279	27.50
38	3,644	315,420	313,598	8,453,093	26.80
39	3,761	311,776	309,896	8,139,495	26.11
40	3,880	308,015	306,075	7,829,599	25.42
41	4,001	304,135	302,134	7,523,524	24.74
42	4,122	300,134	298,073	7,221,390	24.06
43	4,244	296,012	293,890	6,923,317	23.39
44	4,368	291,768	289,584	6,629,427	22.72
45	4,493	287,400	285,154	6,339,843	22.06
46	4,624	282,907	280,595	6,054,689	21.40
47	4,760	278,283	275,903	5,774,094	20.75
48	4,903	273,523	271,071	5,498,191	20.10
49	5,049	268,620	266,096	5,227,120	19.46

TABLE C.—Life Table for England and Wales, based on the Mortality in the Ten Years 1881-90.—Males—continued.

Age $x$	Dying in each Year of Age. $d_x$	Born, and Surviving at each Age. $l_x$	Population, or Years of Life lived, in each Year of Age. $P_x$	Population, or Years of Life lived, in and above each Year of Age. $Q_x$	Expectation of Life at each Age. $E_x$
50	5,214	263,571	260,964	4,961,024	18.82
51	5,383	258,357	255,665	4,700,060	18.19
52	5,558	252,974	250,195	4,444,395	17.57
53	5,742	247,416	244,545	4,194,200	16.95
54	5,933	241,674	238,708	3,949,655	16.34
55	6,134	235,741	232,674	3,710,947	15.74
56	6,344	229,607	226,435	3,478,273	15.15
57	6,565	223,263	219,980	3,251,838	14.57
58	6,799	216,698	213,299	3,031,858	13.99
59	7,042	209,899	206,378	2,818,559	13.43
60	7,286	202,857	199,214	2,612,181	12.88
61	7,525	195,571	191,808	2,412,967	12.34
62	7,750	188,046	184,171	2,221,159	11.81
63	7,955	180,296	176,319	2,036,988	11.30
64	8,139	172,341	168,271	1,860,669	10.80
65	8,303	164,202	160,051	1,692,398	10.31
66	8,446	155,899	151,676	1,532,347	9.83
67	8,566	147,453	143,170	1,380,671	9.36
68	8,659	138,887	134,557	1,237,501	8.91
69	8,721	130,228	125,868	1,102,944	8.47
70	8,749 †	121,507	117,132	977,076	8.04
71	8,737	112,758	108,390	859,944	7.63
72	8,679	104,021	99,681	751,554	7.23
73	8,572	95,342	91,056	651,873	6.84
74	8,412	86,770	82,564	560,817	6.46
75	8,194	78,358	74,261	478,253	6.10
76	7,918	70,164	66,205	403,992	5.76
77	7,580	62,246	58,456	337,787	5.43
78	7,185	54,666	51,074	279,331	5.11
79	6,735	47,481	44,113	228,257	4.81
80	6,234	40,746	37,629	184,144	4.52
81	5,695	34,512	31,665	146,515	4.25
82	5,125	28,817	26,254	114,850	3.99
83	4,537	23,692	21,424	88,596	3.74
84	3,948	19,155	17,181	67,172	3.51
85	3,369	15,207	13,522	49,991	3.29
86	2,816	11,838	10,430	36,469	3.08
87	2,302	9,022	7,871	26,039	2.89
88	1,837	6,720	5,801	18,168	2.70
89	1,428	4,883	4,169	12,367	2.53
90	1,079	3,455	2,916	8,198	2.37
91	791	2,376	1,980	5,282	2.22
92	562	1,585	1,304	3,302	2.08
93	385	1,023	830	1,998	1.95
94	255	638	510	1,168	1.83
95	162	383	302	658	1.72
96	99	221	171	356	1.61
97	58	122	93	185	1.51
98	32	64	48	91	1.42
99	17	32	24	43	1.33
100	8	15	11	19	1.24
101	4	7	5	8	1.13
102	2	3	2	3	0.98
103	1	1	1	1	0.69

*normal  
F. M. Lexis*

Note.—The figures at the higher ages in the  $l_x$ ,  $P_x$ , and  $Q_x$  Columns were calculated to one or more places of decimals. For convenience the nearest whole numbers only are printed, but the Expectations of Life are derived from the more exact values.

TABLE D.—Life Table for England and Wales, based on the Mortality in the Ten Years 1881-90.—Females.

Age. $x$	Dying in each Year of Age. $d_x$	Born, and Surviving at each Age. $l_x$	Population, or Years of Life lived, in each Year of Age. $P_x$	Population, or Years of Life lived, in and above each Year of Age. $Q_x$	Expectation of Life at each Age. $E_x$
0	64,359	490,820	451,096	23,155,981	47.18
1	22,481	426,461	415,220	22,704,885	53.24
2	9,291	403,950	399,335	22,239,665	55.18
3	5,973	394,639	391,702	21,890,330	55.46
4	4,284	388,716	386,574	21,498,628	55.31
5	3,022	384,432	382,921	21,112,054	54.92
6	2,105	381,410	380,358	20,729,133	54.35
7	1,462	379,305	378,574	20,348,775	53.65
8	1,034	377,843	377,326	19,970,201	52.85
9	767	376,809	376,425	19,592,875	52.00
10	627	376,042	375,729	19,216,450	51.10
11	536	375,415	375,122	18,840,721	50.19
12	628	374,829	374,515	18,465,599	49.26
13	737	374,201	373,832	18,091,034	48.35
14	901	373,464	373,014	17,717,252	47.44
15	1,098	372,563	372,014	17,344,238	46.55
16	1,303	371,465	370,813	16,972,224	45.69
17	1,485	370,162	369,420	16,601,411	44.85
18	1,627	368,677	367,863	16,231,991	44.03
19	1,722	367,050	366,189	15,864,128	43.22
20	1,787	365,328	364,435	15,497,939	42.42
21	1,838	363,541	362,622	15,133,504	41.63
22	1,897	361,703	360,754	14,770,882	40.84
23	1,979	359,806	358,817	14,410,128	40.05
24	2,086	357,827	356,784	14,051,311	39.27
25	2,208	355,741	354,637	13,694,527	38.50
26	2,327	353,533	352,369	13,339,890	37.73
27	2,438	351,206	349,987	12,987,521	36.98
28	2,540	348,768	347,498	12,637,534	36.23
29	2,630	346,223	344,913	12,290,036	35.50
30	2,712	343,598	342,242	11,945,123	34.76
31	2,788	340,886	339,492	11,602,881	34.04
32	2,856	338,098	336,670	11,263,389	33.31
33	2,922	335,242	333,781	10,926,719	32.59
34	2,984	332,320	330,823	10,592,938	31.88
35	3,043	329,336	327,815	10,262,110	31.16
36	3,098	326,293	324,744	9,934,295	30.45
37	3,152	323,195	321,619	9,609,551	29.73
38	3,201	320,043	318,442	9,287,932	29.02
39	3,251	316,842	315,217	8,969,490	28.31
40	3,302	313,591	311,940	8,654,273	27.60
41	3,356	310,289	308,611	8,342,333	26.89
42	3,413	306,933	305,224	8,033,722	26.17
43	3,483	303,515	301,771	7,728,498	25.46
44	3,568	300,027	298,243	7,426,727	24.75
45	3,660	296,459	294,629	7,128,484	24.05
46	3,763	292,799	290,917	6,833,855	23.34
47	3,882	289,036	287,095	6,542,938	22.64
48	4,016	285,154	283,146	6,255,843	21.94
49	4,169	281,138	279,054	5,972,697	21.24

TABLE D.—Life Table for England and Wales, based on the Mortality in the Ten Years 1881-90.—Females—continued.

Age. $x$	Dying in each Year of Age. $d_x$	Born, and Surviving at each Age. $l_x$	Population, or Years of Life lived, in each Year of Age. $P_x$	Population, or Years of Life lived, in and above each Year of Age. $Q_x$	Expectation of Life at each Age. $E_x$
50	4,334	276,969	274,802	5,693,643	20.56
51	4,512	272,635	270,379	5,418,841	19.88
52	4,697	268,123	265,774	5,148,462	19.20
53	4,890	263,426	260,981	4,882,688	18.54
54	5,089	258,536	255,992	4,621,707	17.88
55	5,297	253,447	250,798	4,365,715	17.23
56	5,516	248,150	245,392	4,114,917	16.58
57	5,749	242,634	239,760	3,869,525	15.95
58	5,994	236,885	233,888	3,629,765	15.32
59	6,251	230,891	227,765	3,395,877	14.71
60	6,520	224,640	221,380	3,168,112	14.10
61	6,797	218,120	214,722	2,946,732	13.51
62	7,082	211,323	207,782	2,732,010	12.93
63	7,370	204,241	200,556	2,524,228	12.36
64	7,659	196,871	193,041	2,323,672	11.80
65	7,944	189,212	185,240	2,130,631	11.26
66	8,224	181,268	177,156	1,945,391	10.73
67	8,499	173,044	168,800	1,768,235	10.22
68	8,736	164,555	160,187	1,599,435	9.72
69	8,956	155,819	151,341	1,439,248	9.24
70	9,143	146,863	142,291	1,287,907	8.77
71	9,288	137,720	133,076	1,145,616	8.32
72	9,384	128,432	123,740	1,012,540	7.88
73	9,422 +	119,048	114,337	888,800	7.47
74	9,396	109,626	104,928	774,463	7.06
75	9,301	100,230	95,580	669,535	6.68
76	9,129	90,929	86,364	573,955	6.31
77	8,880	81,800	77,360	487,591	5.96
78	8,553	72,920	68,644	410,231	5.63
79	8,150	64,367	60,292	341,587	5.31
80	7,678	56,217	52,378	281,295	5.00
81	7,142	48,539	44,968	228,917	4.72
82	6,556	41,397	38,119	183,949	4.44
83	5,932	34,841	31,875	145,830	4.19
84	5,284	28,909	26,267	113,955	3.94
85	4,631	23,625	21,310	87,688	3.71
86	3,987	18,994	17,000	66,379	3.49
87	3,369	15,007	13,323	49,378	3.29
88	2,790	11,633	10,243	36,056	3.10
89	2,262	8,848	7,717	25,813	2.92
90	1,793	6,586	5,689	18,096	2.75
91	1,387	4,793	4,099	12,406	2.59
92	1,047	3,406	2,883	8,307	2.44
93	768	2,359	1,975	5,424	2.30
94	543	1,591	1,317	3,449	2.17
95	380	1,043	853	2,132	2.05
96	255	663	536	1,280	1.93
97	165	408	326	744	1.82
98	103	243	191	419	1.72
99	62	140	108	227	1.63
100	36	77	59	119	1.54
101	20	41	31	60	1.45
102	11	21	16	29	1.37
103	5	10	7	13	1.28
104	3	5	3	6	1.17
105	1	2	2	2	1.01
106	1	1	1	1	.70

Note.—The figures at the higher ages in the  $l_x$ ,  $P_x$ , and  $Q_x$  Columns were calculated to one or more places of decimals. For convenience, the nearest whole numbers only are printed, but the Expectations of Life are derived from the more exact values.

TABLE E.—Life Table for England and Wales, based on the Mortality in the Ten Years 1881-90.—Males and Females.

Age. <i>x</i>	Chance of Living One Year from each Age. <i>p<sub>x</sub></i>		Of 1,000,000 Males born, the Number Surviving at each Age. <i>l<sub>x</sub></i>	Of 1,000,000 Females born, the Number Surviving at each Age. <i>l<sub>x</sub></i>	Of 1,000,000 of both Sexes (509,180 Males and 490,820 Females) born	
	Males.	Females.			The Number Surviving at each Age. <i>l<sub>x</sub></i>	Population, or Years of Life lived, in and above each Year. <i>Q<sub>x</sub></i>
0	*8896	*8687	1,000,000	1,000,000	1,000,000	45,387,319
1	*94270	*94729	838,964	868,874	853,645	44,478,406
2	*97617	*97700	790,891	823,072	806,686	43,648,241
3	*98461	*98487	772,046	804,142	787,799	42,850,998
4	*98859	*98898	760,167	791,973	775,778	42,069,210
5	*99168	*99214	751,494	783,244	767,078	41,297,782
6	*99400	*99448	745,239	777,087	760,871	40,533,807
7	*99568	*99615	740,766	772,798	756,488	39,775,127
8	*99684	*99727	737,566	769,819	753,397	39,020,185
9	*99761	*99796	735,238	767,714	751,178	38,267,897
10	*99805	*99833	733,477	766,151	749,514	37,517,552
11	*99823	*99844	732,044	764,874	748,157	36,768,716
12	*99819	*99833	730,745	763,679	746,910	36,021,182
13	*99797	*99803	729,423	762,400	745,608	35,274,923
14	*99760	*99759	727,941	760,897	744,117	34,530,061
15	*99713	*99705	726,194	759,062	742,327	33,786,839
16	*99662	*99649	724,109	756,826	740,167	33,045,592
17	*99614	*99599	721,660	754,171	737,617	32,306,700
18	*99575	*99559	718,876	751,145	734,714	31,570,534
19	*99544	*99531	715,818	747,831	731,530	30,837,413
20	*99520	*99511	712,555	744,321	728,147	30,107,574
21	*99498	*99494	709,136	740,681	724,619	29,381,191
22	*99474	*99476	705,579	736,937	720,970	28,658,396
23	*99443	*99450	701,867	733,072	717,183	27,939,320
24	*99406	*99417	697,958	729,039	713,213	27,224,122
25	*99364	*99379	693,809	724,788	709,014	26,513,008
26	*99321	*99342	689,392	720,290	704,558	25,806,222
27	*99281	*99306	684,714	715,549	699,848	25,104,020
28	*99242	*99272	679,788	710,581	694,903	24,406,644
29	*99206	*99240	674,637	705,408	689,740	23,714,323
30	*99171	*99211	669,279	700,049	684,381	23,027,262
31	*99136	*99182	663,728	694,523	678,843	22,345,650
32	*99100	*99155	657,992	688,844	673,134	21,669,662
33	*99063	*99128	652,070	683,024	667,263	20,999,463
34	*99023	*99102	645,957	677,071	661,228	20,335,218
35	*98981	*99076	639,645	670,992	655,030	19,677,089
36	*98938	*99050	633,129	664,792	648,669	19,025,239
37	*98893	*99025	626,405	658,479	642,148	18,379,830
38	*98845	*99000	619,467	652,058	635,463	17,741,025
39	*98794	*98974	612,309	645,535	628,618	17,108,985
40	*98740	*98947	604,923	638,912	621,606	16,483,872
41	*98685	*98918	597,304	632,185	614,424	15,865,857
42	*98627	*98886	589,446	625,347	607,067	15,255,112
43	*98566	*98851	581,350	618,384	599,527	14,651,815
44	*98503	*98811	573,014	611,277	591,795	14,056,154
45	*98437	*98765	564,437	604,007	583,859	13,468,327
46	*98366	*98715	555,612	596,550	575,706	12,888,544
47	*98290	*98657	546,532	588,833	567,319	12,317,032
48	*98207	*98591	537,184	580,975	558,677	11,754,084
49	*98120	*98517	527,554	572,791	549,758	11,199,817

TABLE E.—Life Table for England and Wales, based on the Mortality in the Ten Years, 1881-90.—Males and Females—continued.

Age. <i>x</i>	Chance of Living One Year from each Age. <i>p<sub>x</sub></i>		Of 1,000,000 Males born, the Number Surviving at each Age. <i>l<sub>x</sub></i>	Of 1,000,000 Females born, the Number Surviving at each Age. <i>l<sub>x</sub></i>	Of 1,000,000 of both Sexes (509,180 Males and 490,820 Females) born	
	Males.	Females.			The Number Surviving at each Age. <i>l<sub>x</sub></i>	Population, or Years of Life lived, in and above each Year. <i>Q<sub>x</sub></i>
50	*98022	*98435	517,639	564,299	540,540	10,654,667
51	*97917	*98345	507,398	555,468	530,992	10,118,901
52	*97803	*98248	496,827	546,276	521,097	9,592,857
53	*97679	*98144	485,911	536,706	510,842	9,076,888
54	*97545	*98032	474,634	526,743	500,210	8,571,362
55	*97398	*97910	462,981	516,375	489,188	8,076,662
56	*97237	*97777	450,934	505,583	477,757	7,593,190
57	*97060	*97631	438,476	494,343	465,897	7,121,363
58	*96862	*97470	425,583	482,631	453,583	6,661,623
59	*96645	*97293	412,230	470,419	440,790	6,214,436
60	*96408	*97098	398,400	457,682	427,497	5,780,293
61	*96152	*96884	384,090	444,399	413,691	5,359,699
62	*95879	*96649	369,311	430,550	399,369	4,953,169
63	*95588	*96392	354,091	416,122	384,537	4,561,216
64	*95277	*96110	338,468	401,107	369,212	4,184,341
65	*94943	*95801	322,482	385,503	353,414	3,823,029
66	*94583	*95463	306,176	369,316	337,167	3,477,738
67	*94191	*95094	289,589	352,562	320,497	3,148,906
68	*93765	*94691	272,766	335,266	303,442	2,836,936
69	*93303	*94252	255,761	317,468	286,047	2,542,192
70	*92800	*93775	238,632	299,220	268,370	2,264,983
71	*92252	*93256	221,450	280,592	250,478	2,005,560
72	*91656	*92694	204,292	261,669	232,453	1,764,094
73	*91009	*92085	187,246	242,550	214,390	1,540,673
74	*90306	*91429	170,411	223,353	196,396	1,335,280
75	*89542	*90721	153,890	204,208	178,588	1,147,788
76	*88716	*89960	137,797	185,260	161,093	977,947
77	*87822	*89144	122,248	166,661	144,046	825,378
78	*86857	*88271	107,360	148,568	127,586	689,562
79	*85817	*87338	93,249	131,142	111,848	569,844
80	*84699	*86343	80,023	114,536	96,963	465,439
81	*83500	*85285	67,779	98,894	83,051	375,432
82	*82217	*84163	56,595	84,342	70,214	298,799
83	*80848	*82975	46,531	70,985	58,533	234,426
84	*79391	*81720	37,619	58,900	48,064	181,127
85	*77845	*80398	29,866	48,133	38,832	137,679
86	*76209	*79009	23,249	38,698	30,832	102,848
87	*74482	*77551	17,718	30,575	24,029	75,417
88	*72666	*76026	13,197	23,711	18,358	54,224
89	*70762	*74435	9,590	18,027	13,731	38,180
90	*68772	*72778	6,786	13,418	10,041	26,294
91	*66699	*71057	4,667	9,765	7,169	17,688
92	*64546	*69274	3,113	6,939	4,991	11,609
93	*62319	*67432	2,009	4,807	3,382	7,422
94	*60024	*65533	1,252	3,241	2,229	4,617
95	*57666	*63581	752	2,124	1,426	2,790
96	*55253	*61580	433	1,351	884	1,636
97	*52794	*59534	239	832	530	929
98	*50297	*57448	126	495	307	510
99	*47773	*55326	64	284	172	270
100	*45230	*53175	30	157	92	138
101	*42681	*51001	14	84	48	68
102	*40137	*48808	6	43	24	32
103	*37608	*46605	2	21	11	14
104	—	*44397	1	10	5	6
105	—	*42192	—	4	2	2
106	—	*39997	—	2	1	1
107	—	—	—	1	—	—

TABLE F.—Comparison of Three English Life Tables, based respectively upon the Mortality in 1838-54, in 1871-80, and in 1881-90.—Males.

Age. <i>x</i>	Born and Surviving at each Age. <i>l<sub>x</sub></i>			Mean After-lifetime (Expectation of Life). <i>E<sub>x</sub></i>			Age. <i>x</i>
	1838-54.	1871-80.	1881-90.	1838-54.	1871-80.	1881-90.	
0	1,000,000	1,000,000	1,000,000	39·91	41·35	43·66	0
1	836,405	841,417	838,964	46·65	48·05	50·97	1
2	782,626	790,201	790,891	48·83	50·14	53·04	2
3	754,849	763,737	772,046	49·61	50·86	53·32	3
4	736,845	746,587	760,167	49·81	51·01	53·15	4
5	723,716	734,068	751,494	49·71	50·87	52·75	5
6	713,881	726,815	745,239	49·39	50·38	52·19	6
7	706,156	721,103	740,766	48·92	49·77	51·50	7
8	699,688	716,309	737,566	48·37	49·10	50·73	8
9	694,346	712,337	735,238	47·74	48·37	49·88	9
10	689,857	708,990	733,477	47·05	47·60	49·00	10
11	685,982	706,146	732,044	46·31	46·79	48·10	11
12	682,512	703,595	730,745	45·54	45·96	47·18	12
13	679,256	701,200	729,423	44·76	45·11	46·27	13
14	676,057	698,840	727,941	43·97	44·26	45·36	14
15	672,776	696,419	726,194	43·18	43·41	44·47	15
16	669,296	693,695	724,109	42·40	42·58	43·59	16
17	665,529	690,746	721,660	41·64	41·76	42·74	17
18	661,402	687,507	718,876	40·90	40·96	41·90	18
19	656,868	683,941	715,818	40·17	40·17	41·08	19
20	651,903	680,033	712,555	39·48	39·40	40·27	20
21	646,502	675,769	709,136	38·80	38·64	39·46	21
22	641,028	671,344	705,579	38·13	37·89	38·66	22
23	635,486	666,754	701,867	37·46	37·15	37·86	23
24	629,882	661,997	697,958	36·79	36·41	37·07	24
25	624,221	657,077	693,809	36·12	35·68	36·28	25
26	618,503	651,998	689,392	35·44	34·96	35·51	26
27	612,731	646,757	684,714	34·77	34·24	34·75	27
28	606,906	641,353	679,788	34·10	33·52	34·00	28
29	601,026	635,778	674,637	33·43	32·81	33·26	29
30	595,089	630,038	669,279	32·76	32·10	32·52	30
31	589,094	624,124	663,728	32·09	31·40	31·79	31
32	583,036	618,056	657,992	31·42	30·71	31·06	32
33	576,912	611,827	652,070	30·74	30·01	30·34	33
34	570,716	605,430	645,957	30·07	29·33	29·62	34
35	564,441	598,860	639,645	29·40	28·64	28·91	35
36	558,083	592,107	633,129	28·73	27·96	28·20	36
37	551,634	585,167	626,405	28·06	27·29	27·50	37
38	545,084	578,019	619,467	27·39	26·62	26·80	38
39	538,428	570,656	612,309	26·72	25·96	26·11	39
40	531,657	563,077	604,923	26·06	25·30	25·42	40
41	524,761	555,254	597,304	25·39	24·65	24·74	41
42	517,734	547,288	589,446	24·73	24·00	24·06	42
43	510,567	539,161	581,350	24·07	23·35	23·39	43
44	503,247	530,858	573,014	23·41	22·71	22·72	44
45	495,770	522,374	564,437	22·76	22·07	22·06	45
46	488,126	513,702	555,612	22·11	21·44	21·40	46
47	480,308	504,836	546,532	21·46	20·80	20·75	47
48	472,306	495,761	537,184	20·82	20·18	20·10	48
49	464,114	486,479	527,554	20·17	19·55	19·46	49

TABLE F.—Comparison of Three English Life Tables, based respectively upon the Mortality in 1838-54, in 1871-80, and in 1881-90.—Males—cont.

Age. <i>x</i>	Born and Surviving at each Age. <i>l<sub>x</sub></i>			Mean After-lifetime (Expectation of Life). <i>E<sub>x</sub></i>			Age. <i>x</i>
	1838-54.	1871-80.	1881-90.	1838-54.	1871-80.	1881-90.	
50	455,727	476,980	517,639	19·54	18·93	18·82	50
51	447,139	467,254	507,398	18·90	18·31	18·19	51
52	438,099	457,022	496,827	18·28	17·71	17·57	52
53	428,801	446,510	485,911	17·67	17·12	16·95	53
54	419,256	435,729	474,634	17·06	16·53	16·34	54
55	409,460	424,677	462,981	16·45	15·95	15·74	55
56	399,408	413,351	450,934	15·86	15·37	15·15	56
57	389,088	401,740	438,476	15·26	14·80	14·57	57
58	378,481	389,827	425,583	14·68	14·24	13·99	58
59	367,570	377,591	412,230	14·10	13·68	13·43	59
60	356,330	365,011	398,400	13·53	13·14	12·88	60
61	344,744	352,071	384,090	12·96	12·60	12·34	61
62	332,789	338,820	369,311	12·41	12·07	11·81	62
63	320,451	325,256	354,091	11·87	11·56	11·30	63
64	307,720	311,368	338,468	11·34	11·05	10·80	64
65	294,588	297,156	322,482	10·82	10·55	10·31	65
66	281,064	282,638	306,176	10·32	10·07	9·83	66
67	267,160	267,829	289,539	9·83	9·60	9·36	67
68	252,901	252,763	272,766	9·36	9·14	8·91	68
69	238,328	237,487	255,761	8·90	8·70	8·47	69
70	223,490	222,056	238,632	8·45	8·27	8·04	70
71	208,453	206,539	221,450	8·03	7·85	7·63	71
72	193,297	190,971	204,292	7·62	7·45	7·23	72
73	178,114	175,449	187,246	7·22	7·07	6·84	73
74	163,008	160,074	170,411	6·85	6·70	6·46	74
75	148,076	144,960	153,890	6·49	6·34	6·10	75
76	133,453	130,227	137,797	6·15	6·00	5·76	76
77	119,251	115,986	122,248	5·82	5·68	5·43	77
78	105,592	102,359	107,360	5·51	5·37	5·11	78
79	92,587	89,449	93,249	5·21	5·07	4·81	79
80	80,343	77,354	80,023	4·93	4·79	4·52	80
81	68,946	66,153	67,779	4·66	4·51	4·25	81
82	58,471	55,842	56,595	4·41	4·26	3·99	82
83	48,970	46,489	46,531	4·17	4·01	3·74	83
84	40,471	38,132	37,619	3·95	3·78	3·51	84
85	32,979	30,785	29,866	3·73	3·56	3·29	85
86	26,476	24,436	23,249	3·53	3·36	3·08	86
87	20,926	19,054	17,718	3·34	3·17	2·89	87
88	16,268	14,576	13,197	3·16	2·99	2·70	88
89	12,428	10,926	9,590	3·00	2·82	2·53	89
90	9,321	8,015	6,786	2·84	2·66	2·37	90
91	6,859	5,748	4,667	2·69	2·51	2·22	91
92	4,946	4,025	3,113	2·55	2·37	2·08	92
93	3,492	2,749	2,009	2·41	2·24	1·95	93
94	2,411	1,828	1,252	2·29	2·12	1·83	94
95	1,628	1,183	752	2·17	2·01	1·72	95
96	1,071	742	433	2·06	1·90	1·61	96
97	688	452	239	1·95	1·81	1·51	97
98	430	266	126	1·85	1·72	1·42	98
99	262	151	64	1·76	1·65	1·33	99
100	154	82	30	1·68	1·61	1·24	100

TABLE G.—Comparison of Three English Life Tables, based respectively upon the Mortality in 1838-54, in 1871-80, and in 1881-90.—Females.

Age. <i>x</i>	Born and Surviving at each Age. <i>l<sub>x</sub></i>			Mean After-lifetime (Expectation of Life). <i>E<sub>x</sub></i>			Age. <i>x</i>
	1838-54.	1871-80.	1881-90.	1838-54.	1871-80.	1881-90.	
0	1,000,000	1,000,000	1,000,000	41·85	44·62	47·18	0
1	865,288	871,266	868,874	47·31	50·14	53·24	1
2	811,711	820,480	823,072	49·40	52·22	55·18	2
3	782,990	793,359	804,142	50·20	52·99	55·46	3
4	764,060	775,427	791,973	50·43	53·20	55·31	4
5	750,550	762,622	783,244	50·33	53·08	54·92	5
6	740,584	755,713	777,087	50·00	52·56	54·35	6
7	732,771	750,276	772,798	49·53	51·94	53·65	7
8	726,116	745,631	769,819	48·98	51·26	52·85	8
9	720,537	741,727	767,714	48·35	50·53	52·00	9
10	715,769	738,382	766,151	47·67	49·76	51·10	10
11	711,581	735,405	764,874	46·95	48·96	50·19	11
12	707,770	732,697	763,679	46·20	48·13	49·26	12
13	704,155	730,122	762,400	45·44	47·30	48·35	13
14	700,581	727,571	760,897	44·66	46·47	47·44	14
15	696,917	724,956	759,062	43·90	45·63	46·55	15
16	693,050	722,084	756,826	43·14	44·81	45·69	16
17	688,894	718,993	754,171	42·40	44·00	44·85	17
18	684,378	715,622	751,145	41·67	43·21	44·03	18
19	679,463	711,946	747,831	40·97	42·43	43·22	19
20	674,119	707,949	744,321	40·29	41·66	42·42	20
21	668,345	703,616	740,681	39·63	40·92	41·63	21
22	662,474	699,141	736,937	38·98	40·18	40·84	22
23	656,509	694,521	733,072	38·33	39·44	40·05	23
24	650,463	689,759	729,039	37·68	38·71	39·27	24
25	644,342	684,858	724,788	37·04	37·98	38·50	25
26	638,148	679,822	720,290	36·39	37·26	37·73	26
27	631,891	674,661	715,549	35·75	36·54	36·98	27
28	625,575	669,372	710,581	35·10	35·83	36·23	28
29	619,201	663,959	705,408	34·46	35·11	35·50	29
30	612,774	658,418	700,049	33·81	34·41	34·76	30
31	606,296	652,747	694,523	33·17	33·70	34·04	31
32	599,769	646,957	688,844	32·53	33·00	33·31	32
33	593,196	641,045	683,024	31·88	32·30	32·59	33
34	586,575	635,003	677,071	31·23	31·60	31·88	34
35	579,908	628,842	670,992	30·59	30·90	31·16	35
36	573,192	622,554	664,792	29·94	30·21	30·45	36
37	566,431	616,144	658,479	29·29	29·52	29·73	37
38	559,619	609,599	652,058	28·64	28·83	29·02	38
39	552,758	602,924	645,535	27·99	28·15	28·31	39
40	545,844	596,113	638,912	27·34	27·46	27·60	40
41	538,876	589,167	632,185	26·69	26·78	26·89	41
42	531,849	582,104	625,347	26·03	26·10	26·17	42
43	524,765	574,919	618,384	25·38	25·42	25·46	43
44	517,617	567,612	611,277	24·72	24·74	24·75	44
45	510,403	560,174	604,007	24·06	24·06	24·05	45
46	503,122	552,602	596,550	23·40	23·38	23·34	46
47	495,768	544,892	588,833	22·74	22·71	22·64	47
48	488,339	537,043	580,975	22·08	22·03	21·94	48
49	480,833	529,048	572,792	21·42	21·36	21·24	49

TABLE G.—Comparison of Three English Life Tables, based respectively upon the Mortality in 1838-54, in 1871-80, and in 1881-90.—Females—cont.

Age. <i>x</i>	Born and Surviving at each Age. <i>l<sub>x</sub></i>			Mean After-lifetime (Expectation of Life). <i>E<sub>x</sub></i>			Age. <i>x</i>
	1838-54.	1871-80.	1881-90.	1838-54.	1871-80.	1881-90.	
50	473,245	520,901	564,299	20·75	20·68	20·56	50
51	465,572	512,607	555,468	20·09	20·01	19·88	51
52	457,814	504,188	546,276	19·42	19·34	19·20	52
53	449,966	495,645	536,706	18·75	18·66	18·54	53
54	442,027	486,973	526,743	18·08	17·98	17·88	54
55	433,331	477,440	516,375	17·43	17·33	17·23	55
56	424,239	467,443	505,583	16·79	16·69	16·58	56
57	414,761	456,992	494,343	16·17	16·06	15·95	57
58	404,895	446,079	482,631	15·55	15·45	15·32	58
59	394,636	434,695	470,419	14·94	14·84	14·71	59
60	383,974	422,835	457,682	14·34	14·24	14·10	60
61	372,895	410,477	444,399	13·75	13·65	13·51	61
62	361,387	397,644	430,550	13·17	13·08	12·93	62
63	349,436	384,319	416,122	12·60	12·51	12·36	63
64	337,031	370,495	401,107	12·05	11·96	11·80	64
65	324,165	356,165	385,503	11·51	11·42	11·26	65
66	310,833	341,326	369,316	10·98	10·90	10·73	66
67	297,048	325,988	352,562	10·47	10·39	10·22	67
68	282,819	310,170	335,266	9·97	9·89	9·72	68
69	268,177	293,399	317,468	9·48	9·41	9·24	69
70	253,161	277,225	299,220	9·02	8·95	8·77	70
71	237,822	260,207	280,592	8·57	8·50	8·32	71
72	222,230	242,934	261,669	8·13	8·07	7·88	72
73	206,464	225,497	242,550	7·71	7·65	7·47	73
74	190,620	208,003	223,353	7·31	7·25	7·06	74
75	174,800	190,566	204,208	6·93	6·87	6·68	75
76	159,126	173,316	185,260	6·56	6·51	6·31	76
77	143,722	156,392	166,661	6·21	6·16	5·96	77
78	128,711	139,927	148,563	5·88	5·82	5·63	78
79	114,229	124,065	131,142	5·56	5·50	5·31	79
80	100,394	108,935	114,536	5·26	5·20	5·00	80
81	87,323	94,662	98,894	4·98	4·90	4·72	81
82	75,119	81,305	84,342	4·71	4·63	4·44	82
83	63,862	68,966	70,985	4·45	4·37	4·19	83
84	53,615	57,723	58,900	4·21	4·12	3·94	84
85	44,419	47,631	48,133	3·98	3·88	3·71	85
86	36,284	38,710	38,698	3·76	3·66	3·49	86
87	29,202	30,958	30,575	3·56	3·46	3·29	87
88	23,135	24,338	23,711	3·36	3·26	3·10	88
89	18,027	18,788	18,027	3·18	3·08	2·92	89
90	13,802	14,225	13,418	3·01	2·90	2·75	90
91	10,376	10,553	9,765	2·85	2·74	2·59	91
92	7,650	7,658	6,939	2·70	2·58	2·44	92
93	5,526	5,429	4,807	2·55	2·44	2·30	93
94	3,908	3,756	3,241	2·42	2·30	2·17	94
95	2,704	2,533	2,124	2·29	2·17	2·05	95
96	1,827	1,661	1,351	2·17	2·11	1·93	96
97	1,204	1,057	832	2·06	2·03	1·82	97
98	774	653	495	1·96	1·83	1·72	98
99	483	389	284	1·86	1·73	1·63	99
100	295	225	157	1·76	1·62	1·54	100

the average numbers of years lived between these limits of age by each male born are 20·92, 22·00, and 23·56, respectively, according to the three Life Tables.

*Females.*—By the two earlier Tables a million female children born were reduced to half a million in the 47th and 53rd years of age respectively; by the New Table this amount of reduction is not reached until the 57th year. As in the case of males, the number of infants surviving at the end of the first year of life by the new Table is intermediate between the numbers similarly surviving by the earlier Tables. At all other ages until 85 inclusive the numbers surviving are greater by the new Table than by either of the others; but as is also the case among males, the numbers of survivors at extreme ages diminish more rapidly by the new Table than by either of the older ones. The expectation of life at birth, which had been 41·85 years and 44·62 years respectively in the earlier Tables, is further increased by the new Table to 47·18 years. The expectations at the several ages up to 44 years are greater by the new Table than by either of the others. At age 44 and again at age 45 the expectations of life by the three Tables are practically equal, being 24·72, 24·74, and 24·75 respectively at age 44, and 24·06, 24·06, and 24·05 at age 45. At all ages beyond 45 the expectations of life are less by the new Table than by either of the previous Tables. The average numbers of years lived between the ages 20 and 60 by each female born are 21·65, 23·48, and 25·12 by the three Life Tables respectively.

*Changes of Classification.\**

In the year 1881 the classification of death-causes which had been used in the General Register Office up to the end of 1880 was modified and brought into conformity with the revised nomenclature prepared by the Royal College of Physicians about that period.†

Consequently, the whole of the Tables referring to the decennium 1881-90 have been compiled according to the new method, and the death-rates of the two preceding decennia, which are given in Table 5, have been as nearly as possible harmonized with the same classification.‡

Particulars of the nature of the corrections made will be found under the appropriate headings in Table H.

In comparing critically the rates of earlier decennia with those of 1881-90, it is important to remember that slight residual differences in the two sets of figures still exist in the Tables, for which no correction can be applied. The more important of these differences are here referred to:—

(1.) Up to the end of 1880 the deaths ascribed to Rôtheln were referred in the official Tables to Measles; the former disease is now classified under the new heading "Rubella," or Epidemic Rose Rash. (2.) The deaths from enteric fever were formerly augmented by the inclusion of the deaths referred by certificate to infantile remittent fever, and also of the deaths under 5 years of age referred to remittent fever. The deaths from these causes are now separated from enteric fever, and included under the heading "Remittent Fever." (3.) The deaths from "brain fever" used to be classed with those from simple continued fever; they are now otherwise dealt with, after special inquiry. (4.) Fibroid tumour was formerly

\* For further information on this point see Appendix to Tables 17 to 22 in the Registrar General's 57th Annual Report, pages lxxiv-lxxix.

† See the Registrar-General's 44th Annual Report, pages xvii-xx.

‡ This will explain why it is that some of the rates for 1861-70 and 1871-80, given in Table 5 of this volume, do not exactly agree with those published in the Decennial Supplement for 1871-80, pages cxii-cxvi.

TABLE H.—Changes of Classification adopted in 1881 which affect the DISEASES given in the DECENNIAL SUPPLEMENT.

Name of Disease.	Heading from which removed.*	Heading to which removed.*
Addison's Disease -	Dis. of Urinary System -	Other Causes (Dis. of Lymphatic System).
Adenitis -	Scrofula -	Other Causes (Dis. of Lymphatic System).
Atelectasis -	Dis. of Respiratory System -	Other Causes (Developmental Diseases).
Brain Fever -	Simple Continued Fever -	Dis. of Nervous System.
Cancrum Oris -	Other Causes (Diathetic Diseases).	Dis. of Digestive System.
Cerebro-Spinal Fever -	Typhus -	Other Causes (Miasmatic Diseases).
Chickenpox -	Small-pox (until 1875 inclusive)	Other Causes (Miasmatic Diseases).
Chlorosis -	Dis. of Generative System -	Other Causes (Constitutional Diseases).
Croup -	Other Causes (Miasmatic Diseases).	Dis. of Respiratory System.
Diabetes Mellitus -	Dis. of Urinary System -	Other Causes (Constitutional Diseases).
Epistaxis -	Dis. of Respiratory System -	Other Causes (Diseases of Organs of Special Sense).
Disease of Eye -	Dis. of Nervous System -	Other Causes (Diseases of Organs of Special Sense).
Fibroid Tumour -	Cancer -	Other Causes (Ill-defined and not specified causes; if localized, classed to organ affected).
Senile Gangrene -	Other Causes (Diathetic Diseases).	Dis. of Circulatory System.
Hæmorrhage -	Dis. of Circulatory System -	Other Causes (Ill-defined and not specified causes).
Hydrocephalus (chronic)	Hydrocephalus -	Dis. of Nervous System.
Hydropericardium -	Other Causes (Diathetic Diseases).	Dis. of Circulatory System.
Laryngismus Stridulus -	Dis. of Respiratory System -	Dis. of Nervous System.
Lumbar Abscess -	Scrofula -	Other Causes (Diseases of Organs of Locomotion).
Lupus -	Cancer -	Other Causes (Diseases of Integumentary System).
Lymphadenoma -	Scrofula -	Other Causes (Diseases of Lymphatic System).
Noma Pudendi -	Other Causes (Diathetic Diseases).	Dis. of Generative System.
Otitis, Otorrhœa -	Dis. of Nervous System -	Other Causes (Diseases of Organs of Special Sense).
Polypus -	Cancer -	Other Causes (Ill-defined and not specified causes; if localised, classed to organ affected).
Psoas Abscess -	Scrofula -	Other Causes (Diseases of Organs of Locomotion).
Quinsy -	Other Causes (Miasmatic Diseases).	Dis. of Digestive System.
Relapsing Fever -	Simple Continued Fever -	Other Causes (Miasmatic Diseases).
Remittent Fever (Under 5 Years of Age) -	Enteric Fever -	Other Causes (Malarial Diseases).
Rôtheln -	Measles -	Other Causes (Miasmatic Diseases).
Sea Sickness -	Dis. of Nervous System -	Dis. of Digestive System.
Spleen, Dis. of -	Diseases of Digestive System -	Other Causes (Diseases of Lymphatic System).
Tabes Dorsalis -	Diseases of Generative System	Dis. of Nervous System.
Teething -	Other Causes (Congenital Malformations and Developmental Diseases of Children).	Dis. of Digestive System.

Note.—Italics in the first column of the above Table indicate that correction for the change of classification respecting that disease could not be made for years prior to 1881; in all other instances complete correction has been applied.

\* When a disease has been removed from or to the line "Other Causes" in the Tables of the Supplement, the class of Diseases in the Annual Report list which is affected by the change is indicated in brackets.

included amongst cancerous affections; this is no longer the practice. (5.) Deaths from chronic hydrocephalus were formerly referred to "Tubercular Meningitis"; but under the new method of classification they are placed among diseases of the nervous system. (6.) Under the old method deaths ascribed to "Hæmorrhage," without further particulars, were classed to diseases of the circulatory system. Such cases are now made the subject of special inquiry, and whenever the actual cause of the hæmorrhage cannot be ascertained they are relegated to a separate heading "Hæmorrhage" in the group of indefinite causes.

#### Faulty Certification of Causes of Death.

At the commencement of the decennial period to which these remarks relate, my predecessor, Dr. Ogle, set himself to devise a remedy for the unsatisfactory manner in which a large proportion of the death-causes were certified by medical men; the cause of death being in many cases stated so vaguely that it was impossible to say to what definite heading the deaths ought to be referred. Accordingly, in the year 1881, a system of confidential inquiry was commenced between the General Register Office and the certifying medical practitioners throughout England and Wales. As a result of this system which has been continued ever since, a large number of ambiguously worded certificates have been so far improved as to render them serviceable for purposes of vital statistics. The exigencies of office work have permitted the carrying out of this laborious process only to a limited extent. More than twenty-two thousand letters were written from this Office in the course of the decennium 1881-90, and the results hitherto obtained have been so satisfactory as to encourage the hope that in future it may be possible to deal similarly with a much larger proportion of these faulty certificates, unless indeed, the practice of special inquiry now in force tends to render such inquiry less necessary as time goes on,—a consummation devoutly to be wished.

Of the letters addressed to medical practitioners, about four thousand related to deaths of which the certified cause was "Peritonitis," occurring in women of child-bearing age. More than one thousand of these deaths were eventually transferred to what is known as puerperal fever. Again, of more than three thousand deaths returned as from pyæmia, blood-poisoning, &c. about seven hundred were ascertained to have been due to puerperal causes. Of 272 deaths certified as from "Hæmorrhage" simply in the six years 1885-90, 69 were shown to have been connected with childbirth; and of 244 deaths ascribed in the certificates to metritis, nearly half were found to have been connected with the puerperal state. From the preventive, as well as from the statistical standpoint, it cannot be otherwise than important that a large number of deaths, the causes of which had been so inadequately returned that the certificates are without scientific value, should have been proved by the definite statement of practitioners in attendance to have been directly connected with childbirth.

Of the deaths in the last six years of the decennium, referred to "Dropsy" without specification of the disease producing it, not fewer than 3066 were made the subject of inquiry, and of these 51 were found to have been due to scarlet fever, 1662 to heart disease, 641 to disease of the kidneys, and 333 to other stated causes; whilst with respect to the remaining 379 deaths the cause of the dropsy could not be ascertained.

From the year 1887 to the end of the decennium inquiries were made concerning 2946 deaths which had been referred to "Tumour" without specification as to its nature. Of these deaths, 1426 came eventually to be classed with cancer, 92 with venereal disease, 36 with tuberculosis, 103 with uterine disease, and 952 with other definite causes; whilst, with respect to the 337 remaining deaths, the exact nature of the tumour was unknown. Letters of inquiry were issued respecting 412 deaths which had

been certified as from "Typhoid Pneumonia," leaving uncertain the exact nature of the disease. Of these 412 deaths, 181 were eventually found to have been due to enteric fever, 212 to pneumonia, and the remainder to other definite causes.

The important character of the work achieved by this system of inquiry will be appreciated when the fact is realized that several thousand deaths have by its aid been rescued from amongst the ill-defined group of ailments, and added to definite and serviceable headings in the statistical records of this Office. Since the year 1885, 1942 deaths have been added to diseases of the heart and circulatory system, 1548 to malignant diseases, 1458 to puerperal fever and other disorders of parturition, 818 to diseases of the urinary system, 458 to tubercular diseases, 248 to venereal diseases, 271 to uterine diseases, and 260 to enteric fever.

#### Balance of Gain and Loss in the Mortality from specified Causes.

From Table 5 it may be gathered that in the decennium under present consideration there was, as compared with the preceding ten years, a life saving equal in the aggregate to 2192 lives annually in each million of the English population. The following Table, which is a summary of the more extended Table above referred to, indicates the headings under which this life-saving has been accomplished.

TABLE I.—Annual Deaths per Million Persons Living.

	1871-80.	1881-90.	Annual Decrease in 1881-90.	Annual Increase in 1881-90.
Small-pox	234	45	189	—
Measles	378	440	—	62
Scarlet Fever	716	334	382	—
Diphtheria	121	163	—	42
Whooping-cough	512	450	62	—
Typhus	57	14	43	—
Enteric Fever	322	196	126	—
Continued Fever	103	25	78	—
Diarrhoeal Diseases	935	674	261	—
Cancer	468	589	—	121
Phthisis	2,116	1,724	392	—
Other Tubercular Diseases	747	696	51	—
Diabetes	38	57	—	19
Diseases of the Nervous System	2,789	2,592	197	—
"    "    Circulatory System	1,339	1,576	—	237
"    "    Respiratory System	3,899	3,729	170	—
"    "    Digestive System	1,165	1,104	61	—
"    "    Urinary System	350	435	—	85
Puerperal Fever, Childbirth	167	153	14	—
Violence	733	648	85	—
All other and unstated Causes	4,083	3,436	647	—
ALL CAUSES	21,272	19,080	2,192	566
Balance of Decrease and Increase	—	—	2,192	—

**Zymotic Diseases.**—Taking together the first eight causes of death in this Table, namely, those which are known as the "Common Infectious Diseases," we find that their average mortality in 1881-90 for the most part fell considerably, as compared with the corresponding mortality in 1871-80, the only exceptions being measles and diphtheria, both of which diseases showed an increase.

According to Table 5, it appears that the deaths directly ascribed to small-pox in the recent decennium were in the proportion of 45 per million persons living at all ages. The mortality from small-pox, which, in 1871-80 had shown an increase equal to 74 per million upon the mean rate of the preceding decennium, exhibited a striking decrease in the decennium ending with 1890, the fall being equal to 189 per million living, or 81 per cent. of the small-pox mortality in 1871-80. The decrease was common to all ages and to both sexes, although in varying degrees. Among children aged under five years the decline was equal to 84 per cent., and from 5-10 years, to 88 per cent. At all other ages the decline, though less considerable, was yet strongly marked.

With reference to the condition as to vaccination of the victims to small-pox, unfortunately the medical certificates furnish but meagre information.\* Of the 12,280 persons whose deaths were returned as due to that disease in England and Wales during the decennium under notice, 2145 were stated to have been vaccinated, and 3370 to have been unvaccinated, whilst with respect to the remaining 6765, or more than half, no information was obtainable.

The average annual mortality from measles has not fluctuated greatly in the course of the last thirty years. In the decennium last ended the rate among persons without distinction of sex or of age was 440 per million living, the same rate as that which had obtained in 1861-70 also; the rate in the intermediate decennium having been 378. As measles is mainly fatal to young children, it will be advisable, for purposes of comparison, to examine the mortality at the earlier ages. In 1881-90 the death-rate among children under five years old was 3131 per million living at that age, against 2568 in 1871-80, and 2998 in the preceding decennium.† According to these figures, therefore, it would appear that the mortality from measles among children was greater in the recent decennium than it had been in the previous ten years: and the table at foot shows that the increase of mortality extended to each of the years in the first quinquennium of life; it also shows that the disease is constantly more fatal in the second than in the first year of age.‡ In each of these decennia the male rate at all ages was considerably higher than the female, but at ages above five years the reverse was the case almost uniformly.

In the course of the last three decennia the annual mortality from scarlet fever has fallen steadily and very considerably; the mean death-rates in the decennia ending respectively with 1870, 1880, and 1890, having been

\* This does not apply to the deaths occurring in small-pox hospitals, from which the necessary particulars are much more frequently obtainable.

† Measles.—Death-rate per million living at each year of age under five:—

Decennia.	Under 1 Year.	1—	2—	3—	4—	Total under 5 Years.
1861-70	2,737	6,243	3,236 †	1,730 †	968 †	2,998
1871-80	2,767	5,411	2,465	1,389	778	2,568
1881-90	3,365 †	6,673 †	2,916	1,684	1,081 †	3,131 †

‡ For local distribution of measles mortality, see pages xlvi-lix.

972, 716, and 334 per million of the population at all ages. It is difficult to ascertain whether this rapid decline in the registered mortality depends upon a diminished prevalence of scarlet fever, or whether the disease has assumed a milder form in recent years; the returns, however, of the London Fever Hospital and of the hospitals of the Metropolitan Asylums Board would seem to support the latter view. In each of the decennia dealt with in Table 5 the mortality from scarlet fever was higher among males than among females, both at all ages and also in the case of children under ten years old, but, among persons aged from ten years to forty-five, the female rate in each decennium appears to have been almost uniformly the highest. The death-rates from this disease among children at the earlier ages are given in a table at foot.\* From this table it appears that scarlet fever, like diphtheria and unlike whooping-cough, is less fatal to infants under one year of age than to those in their second, third, fourth, or fifth years; and this is so whether the facts for the earlier or for the later decennia are considered.†

The annual rate of mortality from diphtheria, which in the two preceding decennia had fallen from 185 per million to 121, again rose to 163 per million in the decennium ending with 1890. Table 5 shows that it is during the periods of childhood and early youth that the mortality from diphtheria is especially formidable; it is relatively low at ages from fifteen to twenty years, and tends to become still lower as life advances. It is interesting to note that at all ages up to forty-five years, and especially between five and fifteen years, the mortality is uniformly higher among females than among males, whilst at ages from forty-five to seventy-five years the reverse holds good. The increase of diphtheria mortality in recent years has occurred during the earlier ages exclusively. Reference to Table 5 shows that in the last two decennia diphtheria mortality has increased among children under five years of age, from 472 per million living to 690, and among children from five to ten years of age from 291 per million to 424. The 1881-90 rate from five to ten years of age was even higher than the very high rate in 1861-70. The death-rates for each year of age under five are given in a table at foot.‡ The figures in this table show that diphtheria agrees with scarlet fever in being less fatal to infants in their first year of life than in any other year of the first five. They also indicate that the first year of age is the only period of those given in the table at which diphtheria mortality has decreased during the last decennium.§

\* Scarlet Fever.—Death-rate per million living at each year of age under five:—

Decennia.	Under 1 Year.	1—	2—	3—	4—	Total under 5 Years.
1861-70	2,026	5,172	5,907	5,687	4,667	4,624
1871-80	1,414	3,965	4,535	4,286	3,469	3,489
1881-90	671	1,886	2,112	2,048	1,706	1,669

†† For local distribution of scarlet fever mortality, see page xlix.

‡ Diphtheria.—Death-rate per million living at each year of age under five:—

Decennia.	Under 1 Year.	1—	2—	3—	4—	Total under 5 Years.
1861-70	581 †	909 †	803 †	832	736	767
1871-80	287	489	483	580	547	472
1881-90	282	685	773	896 †	848 †	690

§ For local distribution of diphtheria mortality, see page xlix.



The confusion which, in the last Decennial Supplement, Dr. Ogle had to deplore in regard to the medical certification of diphtheria, unfortunately still persists, although perhaps to a somewhat less extent. Instances are still probably numerous in which the diphtheritic nature of certain cases of sore throat is omitted from the certificates, but there is reason to believe that the instances are now comparatively rare in which laryngismus stridulus is confounded with diphtheritic croup. It is the practice in this Office to class under the head of Diphtheria all deaths which are referred to "membranous croup;" deaths returned as from croup simply, being referred to the heading "Croup," among diseases of the respiratory system.\*

The mortality caused directly by whooping-cough, which in the two previous decennia had been equal to 527 and 512 per million respectively, fell to 450 in the decennium under present notice. In each of the three decennia the mortality from whooping-cough was heavier among females than among males. As in the case of measles, and for a similar reason, the relative mortality from this disease at different periods may best be ascertained by examination of the rates amongst children at the earlier ages; particulars of the death-rates at each year of age under five are therefore appended.† From the table at foot it will be seen that throughout the last three decennia, with a single exception, whooping-cough mortality showed a decline in every year of age under five. In each period the mortality was highest in the first year, and decreased rapidly in each subsequent year.‡

The mortality from "fever," without distinction as to the forms of disease included under that term, was equal to 235 per million living. It was less than half of the mortality in the ten-year period ending with 1880, and hardly more than one-fourth of that in the preceding decennium 1861-70. In table 5 the mean rates of mortality are given for each of the eleven atal periods, and in the table at foot, the corresponding facts are given for each of the first five years of life.§ Since the year 1868 the three chief forms of disease in this unsatisfactory group, have been separately classified in the returns of the General Register Office. Accordingly, Table 5 shows the mean rates for typhus, for enteric fever, and for simple or ill-defined continued fever, respectively, in each of the last two decennia. It would appear from these figures as though the mortality from both typhus and simple continued fever had fallen in recent years

\* For further remarks on this point, see page xxxii.

† Whooping-cough.—Death-rate per million living at each year of age under five:—

Decennia.	Under 1 Year.	1—	2—	3—	4—	Total under 5 Years.
1861-70	7,255	6,072 †	2,732 †	1,422 †	748 †	3,766 †
1871-80	7,394 †	6,040	2,435	1,283	663	3,652
1881-90	7,085	5,490	2,168	1,186	641	3,370

‡ For local distribution of mortality from whooping-cough, see page xlix.

§ "Fever."—Death-rates per million living at each year of age under five:—

Decennia.	Under 1 Year.	1—	2—	3—	4—	Total under 5 Years.
1861-70	820	1,340	1,469	1,387	1,280	1,248
1871-80	401	679	756	734	691	646
1881-90	95	167	211	235	249	190

even more rapidly than that from enteric fever. There is no doubt that typhus is gradually becoming extinct in England, but it is at least probable that many of the deaths formerly ascribed to "Continued Fever" were really cases either of typhus or of enteric fever, so that the diminution of mortality from simple continued fever is, in part, only apparent. If this is the case, then the proportional decrease in enteric fever mortality must be actually greater than it appears to be from the Tables, the true rate in 1871-80 having been higher than 322 per million.

On reference to Table 5 it will be seen that the decrease in "Fever" mortality has been by far the greatest among children under 5 years, and among persons above 55 years of age, whilst it has been proportionally least among persons aged between 15 and 35 years.

Enteric fever mortality appears, according to the subjoined table, to have shown a remarkably steady decline since 1875; the uncorrected rate at all ages having fallen from 374 in the quinquennial period 1871-75, to 179 in the five years ending with 1890.

TABLE J.—ENGLAND AND WALES.—DEATH-RATES FROM ENTERIC FEVER per MILLION living at all AGES.

Quinquennia.	Persons.	Males.	Females.
1871-75	374	375	373
1876-80	277	281	273
1881-85	216	230	203
1885-90	179	195	164

At ages under 20 years, females suffered more heavily than males during 1871-80, and also (though the excess was less marked) during 1881-90.\* At ages above 20, males suffered rather more severely than females in 1871-80, and very much more so in 1881-90. In other words, the improvement in the male rates has not been commensurate with the improvement in the female rates, and this is especially noticeable among adults. May not differences of occupation or of habit have been operative here?†

The annual mortality from diarrhoeal diseases, which had previously fallen from an average rate of 1076 per million in 1861-70 to a rate of 935 in 1871-80, fell further and much more decidedly in the ten-year period under present review, when the mean rate did not exceed 674 per million. As will be seen on reference to Table 5, and also to the note at foot, it is at the extremes of life, and especially in early infancy, that diarrhoeal diseases are most fatal. According to the data for each of the last three decennia, it appears that these complaints are most fatal during the first year of life, the rates in each of the four subsequent years being very much lower. Not only is this the case, but the rate under one year has decreased far more slowly than has the rate in any other year under five.‡ Table 5 would seem to indicate that the decrease has recently been

\* See table 5, page ex.

† For local distribution of enteric fever mortality, see page l.

‡ Diarrhoeal Diseases (including cholera).—Death-rates per million living at each year of age under five:—

Decennia.	YEARS OF AGE.					Total under 5 Years.
	Under 1 Year.	1—	2—	3—	4—	
1861-70	19,645	6,097	1,309	525	333	5,985
1871-80	19,817	5,650	998	244	192	5,728
1881-90	16,044	3,768	601	292	145	4,346

greater among very old people than among young children; it is doubtful, however, whether this is actually the case, or whether on the contrary the question is not mainly one of improved diagnosis. Speaking generally diarrhoeal diseases are more fatal to males than to females. The deaths included in these tables under the head of "Diarrhoeal Diseases" are those which have been returned by the registrars under one or other of the following designations—diarrhoea, dysentery, intestinal or gastro-intestinal catarrh, cholera, or choleraic diarrhoea. Although the mortality from diarrhoeal complaints is known to be powerfully affected by meteorological conditions, nevertheless there is reason to believe that very much of the decrease in recent years has resulted directly from improvements in sanitary administration, especially in those parts of England and Wales which had formerly been notorious for filth abominations, and likewise for excessive fatality from diarrhoeal complaints. It is only fair, however, to recognise, as also contributory to this fall in mortality, the fact already alluded to, that medical practitioners are now more careful than they formerly were in certifying causes of death, and that consequently many deaths which would in earlier days have been referred to diarrhoea, without mention of its cause, are now attributed, with greater precision, to the actual diseases of which diarrhoea is often a symptom merely.\*

The total deaths in 1881-90 assigned to puerperal fever and other accidents of childbirth numbered 42,092, and were equal to a rate of 297 per million females living, the rates in the decennia ending with 1870 and 1880 having been 321 and 325 respectively. If, however, the mortality from these causes is expressed in relation to births (which is the only correct method) instead of to females living, it is found to differ but little from that of the two preceding decennia, the rates having been 4.69, 4.75, and 4.73 per 1000 births, respectively. There was, however, an actual decrease of mortality in the last decennium, calculated in the ordinary way, for in consequence of the system of inquiry referred to at page xxii, nearly three thousand deaths, which in the first instance, had been indefinitely certified, were added to the total deaths from puerperal fever and childbirth during that period.† In this connection it is important to remember that with respect to a large number of deaths taking place during the period of childbirth, no intimation of the fact of recent delivery appears in the medical certificate.

*Constitutional Diseases.*—This class of diseases, as constituted to-day, is in the aggregate but imperfectly comparable with what had been known as the constitutional class prior to 1881. Several of the diseases formerly included in that group have been excluded from our present constitutional class, which, on the other hand, now includes diseases that were originally distributed otherwise. In the present volume, as the several diseases affected by these changes have come under review, particulars have where possible been given of the nature of the transfers effected. As explained at page xx, this has not always been practicable, but we may assume that, where the incidence of the individual diseases included in this class, and not that of the entire class of constitutional diseases, is under consideration, the figures for successive decennia may in most cases be compared without serious risk of error.

The deaths referred to cancer or malignant disease, which in the two decennia immediately preceding had corresponded to annual rates of 384 and 468 respectively in each million persons living, further rose in the decennium last ended to 589. Throughout the entire period the increase has been steadily progressive from year to year. If, therefore, the correctness of the above figures be accepted without further question, it will

\* For remarks on local incidence of diarrhoea mortality, see pages l, lii.

† Puerperal fever mortality, with reference to its local incidence, is further dealt with at page lii.

appear that, in the course of the last twenty years the mortality from malignant disease has increased by 53 per cent. It is only right, however, to mention that within the last six years of the recent decennium the sum of the deaths ultimately referred to cancer has been augmented by not fewer than 1548, in consequence of the system of inquiry already referred to. These deaths have increased the rate of cancer mortality in the recent decennium by 6 per million. Moreover, the experience of the last ten years lends support to a contention advanced in the last decennial supplement, namely, that, apart from the additions just adverted to, the increase is not wholly real, but may be accounted for, to some extent, on the assumption that the true nature of obscure cases of malignant disease has been recognised with ever increasing certainty in recent years, and that, as a consequence, the statement of death causes by medical men has been made with greater precision than had formerly been the case. The experience of 1881-90 again confirms that of the earlier decennium in showing that the increase of cancer mortality is greater among males than among females. Thus, Dr. Ogle, writing in 1885 on the increase of mortality from malignant disease in 1871-80, remarked that the rate among males had increased within twenty years by 62 per cent. whilst the rate among females had increased by 43 per cent. only. The figures now available show that if the recent decennium is contrasted with 1861-70 the increase of mortality has been as great as 78 per cent. among males, the increase among females having been 42 per cent.

In the recent decennium the mortality from cancer among persons of both sexes was low up to the age of 25 years, and was not high until after the 35th year of life. Among males from 25 to 35 years old the mortality has increased since 1871-80 by 13 per cent., which is the lowest rate of increase observed at any period of life. Among females at the same age the rate shows, exceptionally, a decrease of one per million living. This is the solitary instance in which even the slightest abatement is apparent in the ravages of cancer; and even this exception will be found to conform to the rule, if the rates of the recent decennium be compared with those of 1861-70 instead of with those of 1871-80. The excess in the recent decennium, as compared with its predecessor, increases rapidly and progressively as age advances, reaching 44 per cent. for males between 55 and 75 years of age, and 30 per cent. for females over 75.\*

The aggregate mortality from tubercular diseases as a group has decreased continuously throughout the last three decennia, the rates having fallen from 3240 per million in 1861-70 to 2420 in 1881-90; but, in spite of this decline, the aggregate death-toll from diseases of the tubercular group is still so heavy as to demand constant and watchful attention. On reference to Table 5 it will be seen that pulmonary consumption, the principal disease in this group, is mainly fatal during adolescence and maturity, whilst tabes mesenterica, acute hydrocephalus, and the remaining forms of tuberculosis are fatal chiefly to young children. In fact, the mortality from tubercular diseases, as a group, is found to be very serious throughout the entire span of life, from infancy to old age.

Tubercular phthisis, the most destructive member of the group, caused a mortality, in the recent decennium, equal to 1724 per million; these figures indicate a life saving on the rate of 1871-80 equal to 392 per million living, the life saving in 1871-80 as compared with the previous decennium having been 359 per million. In the course of the last twenty years the crude mortality from phthisis has decreased by 30 per cent. Among males the rate of decrease has been equal to 25 per cent., and among females to 35 per cent. In Table K. the rates of mortality are given among persons, and also among males and females separately, in each

\* For remarks on local incidence of mortality from malignant disease, see pages lii-lvii.

TABLE K.—PHTHISIS.—ENGLAND AND WALES.—1851-90. ANNUAL DEATH-RATES among PERSONS, MALES, and FEMALES in each million living.

Year.	Persons.	Males.	Females.	Female Rate to Male Rate taken as 1000.
1851	2,734	2,649	2,816	1,076
1852	2,773	2,673	2,869	
1853	2,984	2,880	3,083	
1854	2,755	2,657	2,849	
1855	2,777	2,671	2,879	
1856	2,564	2,465	2,658	
1857	2,602	2,482	2,717	
1858	2,591	2,473	2,703	
1859	2,547	2,450	2,640	
1860	2,557	2,457	2,652	
1861	2,581	2,488	2,670	1,006
1862	2,502	2,440	2,561	
1863	2,476	2,430	2,520	
1864	2,533	2,520	2,545	
1865	2,541	2,525	2,557	
1866	2,602	2,608	2,597	
1867	2,539	2,549	2,530	
1868	2,336	2,353	2,321	
1869	2,352	2,393	2,313	
1870	2,410	2,467	2,357	
1871	2,342	2,404	2,284	918
1872	2,271	2,345	2,201	
1873	2,194	2,290	2,103	
1874	2,081	2,199	1,970	
1875	2,202	2,296	2,113	
1876	2,119	2,223	2,020	
1877	2,079	2,176	1,987	
1878	2,111	2,211	2,017	
1879	2,021	2,140	1,908	
1880	1,869	1,939	1,804	
1881	1,825	1,920	1,735	
1882	1,850	1,947	1,758	
1883	1,880	1,967	1,797	
1884	1,827	1,927	1,733	
1885	1,770	1,875	1,670	
1886	1,739	1,874	1,612	
1887	1,615	1,728	1,508	
1888	1,568	1,717	1,428	
1889	1,573	1,719	1,435	
1890	1,682	1,868	1,506	

of the forty years 1851-90. The following results are worthy of notice, as bearing upon the question of sex incidence in phthisis. From the year 1851 to 1865 the phthisis rate was greater among females than among males, although the difference gradually diminished as time went on. Ever since the year 1866, however, the mortality has been uniformly in excess, not among females as formerly, but among males; and in the last two decennia the excess of the male rate over the female rate was greater than had been the excess of the female over the male rate in the first decennium included in the table. From information obtained since 1890 it has been ascertained that a similar change in the sex incidence of phthisis mortality is still going on. As had been the case in the preceding decennium, so was it also in the ten years under present review, the mortality from phthisis showed a decline at each of the eleven age-groups in both sexes, with the single exception that in 1881-90 the rate among males over 75 years was higher by 14 per cent. than in the preceding ten years.\*

The term "Other Tubercular Diseases" includes the diseases known as tabes mesenterica, tubercular peritonitis, tubercular meningitis, and general tuberculosis or scrofula. It has before been stated that the diseases of the present group mainly affect infants and young children. Table 2 shows that among children under five years old the deaths from tubercular diseases were relatively more numerous than those referred to any other heading in the table, with the exception of respiratory diseases; tubercular diseases contributed nearly 8 per cent. to the mortality from all causes. The aggregate death-rate from these forms of disease has shown a slight decline in the course of the last three decennia, but the rate in 1881-90 appears, according to the tables, somewhat lower than, in strict accuracy, it ought to be; for, ever since the year 1881 the deaths referred to chronic hydrocephalus have been removed from the tubercular class to which they had previously belonged, and, in deference to the revised classification of the Royal College of Physicians, have been placed in the class of nervous diseases. This discrepancy, however, has not very seriously affected the calculated mortality from "Other Tubercular Diseases." As in the case of phthisis, the mortality from other tubercular diseases is considerably higher among males than among females.

According to the returns, the mortality from diabetes mellitus in recent years appears to have grown much heavier than formerly. It might appear, at first sight, as though this disease were of merely trivial importance, since the rate at all ages in 1881-90, although considerably higher than in either of the two previous decennia, nevertheless amounted to not more than 57 per million of the population. When, however, the mortality is considered in relation to age, the serious character of diabetes becomes apparent. This disease is seldom fatal within the first twenty-five years of life; but, throughout the periods of maturity and decline, the mortality, especially among males, becomes very high. Thus, in the decennium under review, the death-rates amongst males at the age periods 45-55, 55-65, 65-75, and 75 and upwards, were equal to 134, 282, 397, and 314 per million living; and, although amongst females the mortality was much lower, it is nevertheless obvious not only that the mortality has already become considerable, but that it is increasing as years go on.

*Diseases of the Nervous System.*—The registered mortality from diseases of the nervous system in the aggregate was lower in 1881-90 than it had been in the preceding decennium, the rate having fallen from 2789 per million to 2592—a gain, under this head, of 197 lives per million. The reduction of mortality was relatively greatest in both sexes at ages under 5, and from 25 to 35 years; whilst, in the case of females from 5-15 years, and above 55 years old, and in that of males above 65 years of age, the mortality

\* For further remarks on phthisical mortality and its local incidence, see page lvii.

showed an increase on the rates of the previous decennium. The reduction within the last 10 years among children is perhaps mainly due to the transference to other and more definite causes, of deaths which in earlier times would have been ascribed to convulsions. For, on reference to the detailed tables in successive annual reports, it is found that the mortality from nervous diseases, excluding convulsions, has actually increased. On the other hand the fact previously adverted to should be remembered in this connection, namely, that in the new classification chronic hydrocephalus is included among nervous diseases: this has been the case only since the year 1880.\*

*Diseases of the Circulatory System.*—The mortality attributed to diseases of the organs of circulation, both among males and females, has steadily and rapidly increased throughout the last forty years. As compared with the rates in 1871-80 the mortality among males increased, in the recent decennium, at all age-groups except those from 5-10 and 20-45 years. At ages under five years the increase amounted to 43 per cent. and at ages above 75 years, to 41 per cent. Among females the increase affected every age-group, but, as in the case of males, that increase was greatest among young children and old people. There is no doubt that, as was stated in the last decennial supplement, some of the excessive increase at the more advanced ages is due to the fact that many of the deaths which in former years would have been referred to decay of nature are now returned as due to some specified disease. It should, however, be mentioned, that in all cases where the deaths of very old people are ascribed in the certificates to senile decay accompanied by *failure*, as distinguished from *definite disease* of the heart, it has long been the practice here to refer such deaths to "Old Age," and not to Diseases of the Circulatory System.

*Diseases of the Respiratory System.*—As compared with that of 1871-80, the mortality in the recent decennium from diseases of the respiratory system has decreased somewhat, but as compared with that of 1861-70, it has slightly increased. The aggregate mortality in 1881-90 was considerably affected by the enormous rise in the death-rate from respiratory diseases which occurred in the year 1890 as a concomitant of the sudden outburst of influenza. In the classification used in this volume the disease indefinitely termed "Croup,"† without specification as to its nature, has been imported into this group from that of zymotic diseases, whilst the disease known as "Laryngismus Stridulus" has been transferred from this group to that of diseases of the nervous system. Epistaxis also has been eliminated, and placed among diseases of the "Organs of Special Sense."

On reference to Table 5 it will be noticed that the principal fatality from respiratory diseases takes place at the extremes of life; but that the mortality under 5 years, although excessively high, is less than that at ages over 65 years. At every age-group, except that from 10-15 years, the mortality from these diseases is considerably heavier among males than

\* See pages xxi, xxii.

† *Croup.*—Death-rates per million living at each year of age under five:—

Decennia.	YEARS OF AGE.					
	Under 1 Year.	1-	2-	3-	4-	Total under 5 Years.
1861-70	1,128	2,299	1,932	1,586	1,053	1,593
1871-80	702	1,430	1,233	1,101	801	1,047
1881-90	535	1,212	1,044	989	786	907

among females, and this is so whether the rates of earlier or of more recent decennia are compared.

Relatively to population the total deaths directly attributed to bronchitis were fewer in 1881-90 than they had been in the previous decennium, the mortality being equal to a rate of 2138 per million, as against 2285 in 1871-80. Nevertheless, the 1881-90 rates were higher by 21 per cent. than those of 1861-70. The changes in mortality from bronchitis will be more readily appreciated by contrast with concurrent changes in the mortality from other diseases of the respiratory organs. At ages under 5 years the death-rate from bronchitis was considerably higher than it had been in the previous decennium.\* On the other hand, the corresponding rate from pneumonia showed a very noteworthy decrease.† At all ages after the fifth year, both among males and females, there was a reduction in bronchitis mortality, whilst, on the contrary, the mortality from pneumonia, in both sexes, showed an increase at every age-group after the fifth year; the difference becoming more strongly accentuated after middle age.

The mortality from pleurisy, as contrasted with that from either bronchitis or pneumonia, is at present inconsiderable, except at the later ages of life; but it seems to be increasing steadily as one decennium succeeds another—and this is true with respect to males and females alike. The portion of Table 5 relating to pleurisy agrees with that relating to pneumonia in showing a mortality which is considerably heavier after than before middle life; but no excessive mortality from pleurisy, at all approaching that from either bronchitis or pneumonia, appears to beset early childhood.

Both laryngitis‡ and the morbid condition loosely designated "croup" have this in common, that they cause a considerable mortality in childhood, the last-named condition being returned as the cause of death at that

\* *Bronchitis.*—Death-rates per million living at each year of age under five:—

Decennia.	YEARS OF AGE.					
	Under 1 Year.	1-	2-	3-	4-	Total under 5 Years.
1861-70	12,426	6,346	2,157	1,026	565	4,741
1871-80	19,289	9,665	2,839	1,236	660	7,024
1881-90	21,436	10,322	2,804	1,195	642	7,497

† *Pneumonia.*—Death-rates per million living at each year of age under five:—

Decennia.	YEARS OF AGE.					
	Under 1 Year.	1-	2-	3-	4-	Total under 5 Years.
1861-70	12,658	7,779	2,889	1,421	818	5,945
1871-80	9,193	6,928	2,225	1,152	704	3,982
1881-90	7,892	5,922	2,224	1,201	782	3,668

‡ *Laryngitis.*—Death-rates per million living at each year of age under five:—

Decennia.	YEARS OF AGE.					
	Under 1 Year.	1-	2-	3-	4-	Total under 5 Years.
1861-70	232	290	230	202	153	223
1871-80	209	239	176	163	140	185
1881-90	275	313	246	244	203	256

period only. It will scarcely be denied, even by those who advocate the retention in scientific nomenclature of the term croup, that a large proportion of the deaths so returned have probably a diphtheritic origin. At any rate, the fact deserves mention that recently, in proportion as medical diagnosis has become more exact, the mortality from so-called croup has steadily fallen, whilst the mortality definitely ascribed to diphtheria has steadily risen. The accompanying figures, which represent annual rates of mortality in England and Wales, per million living at all ages, show this clearly:—

—	Croup.	Diphtheria.	Croup and Diphtheria.
1871-80 - -	168	121	289
1881-90 - -	144	163	307

There is little doubt that the last column in this table furnishes a truer measure than does the preceding column, of the actual increase of diphtheria in the recent decennium.

*Diseases of the Digestive System.*—According to Table 5, diseases of the digestive system in the aggregate give rise to a mortality which is slowly but steadily decreasing, the rates having been lower in 1881-90 than in either of the two decennia immediately preceding. In consequence of the adoption in 1881 of the new classification previously referred to, several important additions have been made to the list of diseases in this group. For example, the deaths from sore throat and quinsy, which had originally been classed among zymotic diseases, have since 1880 been included in the digestive group. The deaths from teething also have since that date, been transferred to this group, from that of developmental diseases. In respect of these diseases alone, the digestive group contained, in 1881-90, 52,309 additional deaths, which, under the former method of classification, would have gone to increase the mortality of other disease groups. Correction has been made for this difference in the rates for 1861-80. This class of diseases has likewise been increased by the addition of a large number of deaths which in earlier years would have been indefinitely assigned to diarrhoea, but which are now more correctly certified as due to enteritis or gastro-enteritis. Among diseases of the digestive system are included the large group of liver diseases which are ætiologically important from their frequent relation to intemperance. It is desirable therefore to examine somewhat further the group of liver diseases. This has been done in the following table:—

TABLE L.—MEAN DEATH-RATES per Million living at all Ages.

—	MALES.			FEMALES.		
	1861-70.	1871-80.	1881-90.	1861-70.	1871-80.	1881-90.
All Diseases of Liver - -	435	441	359	396	407	336
Cirrhosis - - - -	43	110	140	26	74	102
Ascites - - - -	26	17	9	40	27	15
Other Liver Diseases - -	366	314	210	330	306	219

It thus appears, firstly, that in the recent decennium there has been a decided fall in the mortality from liver diseases in the aggregate; and, secondly, that liability to these diseases is by no means restricted to one sex, females being almost as frequently as males the victims. That

cirrhosis of the liver should appear in the tables more frequently now than in earlier years, by no means proves that this particular form of liver disease has become relatively more prevalent in later years. It is probably due to the fact often before referred to in this volume, that generally speaking the cause of death is now more accurately stated in the medical certificates than it used to be. Included under the heading "Other Liver Diseases" in the above table the principal specific forms of disease are jaundice, icterus neonatorum, hepatitis, gallstone, and congestion of liver; most of the remainder being described as "liver disease," simply.

*Diseases of the Urinary System.*—The registered mortality from diseases of the urinary system has shown a rapid and progressive increase in the course of the last thirty years, and this is the case whether the periods compared are decennial, quinquennial, or annual. In 1861-70 the deaths from diseases of this class corresponded to a rate of 266 per million persons living, in the succeeding decennium the rate was 350, and in the decennium under present review it was as high as 435 per million. Therefore, within the period covered by these three decennia, the rate of mortality from diseases of the urinary system has increased by 64 per cent. As has already been mentioned, the group of urinary diseases does not now, as it formerly did, include diabetes, which in the new classification is placed among diseases of the constitutional class. Addison's disease also has been transferred from this class to the group of lymphatic diseases.

Under the heading "Diseases of the Urinary System" are now included several ailments of varying ætiological significance. Prominent among these is the group of kidney diseases which unfortunately cannot, except in certain instances, be distinguished from "Other Diseases of the Urinary System," e.g., those of the bladder, prostate gland, &c. If, however, the deaths definitely ascribed to acute nephritis and to chronic nephritis (Bright's disease) be taken to represent approximately the group of kidney diseases, the following Table will illustrate the age and sex incidence of the mortality thereby caused in the last thirty years.

TABLE M.—Annual Mortality returned under the Headings NEPHRITIS and BRIGHT'S DISEASE per MILLION LIVING, at ALL AGES and at 11 GROUPS of AGES, among PERSONS, MALES, and FEMALES, in THREE DECENNIA.

PERIODS.	ALL AGES.	0-	5-	10-	15-	20-	25-	35-	45-	55-	65-	75 and upwards.
1861-70 } Persons	112	56	40	29	37	59	97	160	220	314	392	330
1871-80 } Persons	199	105	70	44	60	86	149	264	399	608	777	728
1881-90 } Persons	281	157	78	50	70	105	172	338	557	934	1379	1384
1861-70 } Males	136	66	51	33	42	64	113	195	285	397	501	441
1871-80 } Males	234	125	86	46	61	88	167	312	506	766	982	942
1881-90 } Males	319	171	91	52	73	107	182	377	671	1138	1698	1760
1861-70 } Females	90	46	30	24	32	54	83	128	160	238	299	244
1871-80 } Females	164	90	55	42	58	83	133	220	302	466	601	563
1881-90 } Females	246	143	64	48	66	103	162	302	453	755	1114	1103

Comparing the figures of the last decennium with those of the first, we find that at each of the eleven age-periods, in both sexes, the mortality from these diseases has increased rapidly. The rate of increase, however, has been uniformly greater among females than among males. At the more advanced periods (over 65 years) the female rates in 1881-90 were to those of 1861-70 in the proportion of about four to one.

*Deaths by Violence.*—The deaths thus classified in the tables include those returned by the registrars as caused by accident, homicide, and suicide. Happily the deaths from homicide are relatively so few that they do not materially alter the aggregate mortality from violence. In the course of the last thirty years the deaths caused by violence have steadily decreased proportionally to population; but, inasmuch as deaths by suicide have unfortunately increased, it follows that the other violent deaths, namely, those due to accident, have relatively decreased during the same period. As in previous decennia, so also in 1881–90, violent deaths were most frequent among males, the mortality increasing gradually from the tenth year of age to the end of life.

#### LOCAL VARIATIONS OF THE DEATH-RATE IN 1881–90.

It is familiar knowledge that the death-rate varies not only in the same place at different times, but also in different places at the same time. Of the 27½ millions of persons constituting the mean population of England and Wales in 1881–90, about 11½ millions resided within the combined area of the 78 principal towns; an area which approximately represents the more distinctly urban portion of England: the remaining 16 millions inhabited those mainly rural portions of England which lie outside the boundaries of the principal towns.

During the ten-year period ending with 1890 the uncorrected or “crude” death-rate of the urban portion of England differed very materially from that of the rural portion, and when these rates are approximately corrected for age and sex constitution of the respective populations the difference is increased: this will be seen by the following table:

	England and Wales.	Urban England.	Rural England.
Crude Death-Rate - - - -	19·08	21·08	17·63
Corrected Death-Rate* - - - -	19·08	22·32	16·95

From these figures it is readily seen that if the crude mortality of the rural districts of England in 1881–90 be taken as 100, then the crude mortality of the urban districts will be represented by 120. If, however the mortalities, as here approximately corrected, be compared, the ratio will stand as 132 to 100.\*

The “*Crude Death-rate*,” by which is meant the rate of mortality calculated from population and registered deaths, without reference to sex or age, is useful as a rough measure of the sanitary condition of a given place, from time to time, provided that no serious disturbance has taken place in the age-constitution of its population; but, in comparing with one another the death-rates of different places, the use of crude death-rates is likely to lead to error unless adequate caution is observed.

For example, a crude death-rate which would be extremely low among the inmates of an infirmary for the aged would be abnormally high among the boys of a training ship. It is, of course, improbable that comparison would often be made between communities so differently constituted as

\* The method of correction hereafter described (pp. xxxvii–xxxviii) is inapplicable to “urban” and “rural” England, as the death-rates at the various ages are not known. The following method has therefore been used:—The English death-rates at 11 age-groups have been applied to the aggregate populations at the same ages in “urban” and “rural” England; the resulting death-rates are called “Standard death-rates.” The quotients of the rate for the whole country by these standard rates are the “factors for correction for age and sex distribution.” The crude death-rates multiplied by these factors give the corrected death-rates.

these, but a recent illustration taken from the English counties will show that the liability to error referred to is a real one.

At the Census of 1891 the populations of Norfolk and Lancashire were found to be distributed, respectively, as follows, over three groups of ages.

	Per 1000 Population.	
	In Norfolk.	In Lancashire.
Under 15 years of Age - - - -	353	352
15 and under 45 years - - - -	410	479
45 and upwards - - - -	237	169

If from every 1000 of the population of Norfolk 68 persons over 45 years of age were removed and their places filled by an equal number of persons between 15 and 45 years of age, the age-distribution of Norfolk, grouped as above, would become practically identical with that of Lancashire. And, since the death-rate at ages between 15 and 45 is considerably less than that at ages over 45, this change of age-distribution would of itself, and irrespective of sanitary condition, reduce the crude death-rate of Norfolk. The extent of the reduction may be roughly indicated by assuming a death-rate of 9 per 1000 among persons at ages between 15 and 45, and a death-rate of 40 per 1000 among persons at ages over 45 years, these being approximately the average rates in the two age-groups. It may readily be shown that the substitution of 68 younger persons for the 68 older persons would lower the crude death-rate of the county by 2·1 per 1000 living. This shows conclusively that no fair comparison is possible between the crude death-rates of Norfolk and Lancashire. In areas smaller than counties, for example in the crowded towns of Lancashire on the one hand, and in some of the rural parts of Norfolk on the other, the differences of age-distribution are still greater. It is therefore futile to compare the crude death-rates of different districts unless their populations are known to be alike with respect to age and sex constitution. If, however, it can be ascertained what the mortality in district A. would have been had the population in the various age-groups been subject to the death-rates incidental to those age-groups in district B., the mortalities of the two districts will have been reduced to a *common basis*, and will therefore be comparable with each other. Still better will it be to reduce the mortalities of the several districts to a *uniform standard basis*; and for this purpose the age-distribution of the entire country suggests itself. Taking, then, the mean population of England and Wales in 1881–90 as a standard,\* the following question has to be answered for each district:

\* The populations in the several age-groups in the Tables on pp. 4, 5, constitute the standard population adopted for the purposes of the present volume. For convenience in calculating the corrected death-rate, the standard population has been reduced to an average million of persons, grouped thus:—

Age.	Males.	Females.
0	64,122	64,557
5	59,333	59,673
10	54,806	54,765
15	49,720	50,287
20	42,922	47,564
25	71,131	77,499
35	55,095	58,944
45	40,472	44,478
55	27,151	30,893
65	15,184	18,326
75 & upds.	5,591	7,487
All Ages	485,527	514,473

What would have been the general death-rate in England and Wales had each age-group of the population been subject to the same mortality as that which prevailed in district A., district B., &c.

The necessary calculation has been made for every registration county and district in England and Wales, and the results are shown as "Death-rates in Standard Population" in the Tables on pp. 6-728.

The case of Norwich may be taken as an illustration. Among the 64,122 males under five years old (which is the proportion living, at this age, in each million of the standard population), the mortality has been calculated at the rate of 70.58 per thousand, *i.e.*, the Norwich death-rate at ages under five years. Similarly, the mortality among the 59,333 males aged from five to ten years in the standard population has been calculated at the Norwich death-rate of 3.82 per 1000; and so on for persons of both sexes at all the remaining age-groups. The sum of the deaths at the several ages thus calculated represents a death-rate of 18.81 per 1000 living at all ages. Sanitary conditions remaining unchanged, it is evident that if the population of Norwich had been constituted like that of England and Wales in regard to age and sex, the Norwich rate would have been that above mentioned, namely, 18.81 per 1000. This is the "Death-rate in Standard Population" as calculated for Norwich, and it is lower by 1.02 per 1000 than the recorded or "crude" death-rate. On taking separately the deaths calculated by the foregoing method for the male and female constituents of the standard population, the corrected death-rates appear as 20.20 for males and 17.51 for females, as against crude rates of 21.30 and 18.57 respectively.

The importance of this correction will be made evident by the following table which shows the "Death-rates in Standard Population" for several districts whose "Crude Death-rates" differed but slightly from the Norwich rate:

District.		Crude Death-rate.	Death-rate in Standard Population.
Number.	Name.		
56	Bridge - - - -	19.86	16.60
172	Biggleswade - - - -	19.88	17.85
37	Godstone - - - -	19.78	18.03
125	Uxbridge - - - -	19.88	18.55
225	Norwich - - - -	19.83	18.81
589	Bridgend - - - -	19.82	19.70
475	Chorley - - - -	19.82	20.22
497	Bradford - - - -	19.90	20.96
495	Huddersfield - - - -	19.86	21.50
502	Dewsbury - - - -	19.82	21.88

Judged by their crude death-rates alone, these ten districts would appear to be about equally healthy; but when their mortality is adjusted for differences of age and sex constitution of population, the rates are found to range between such extremes as 16.60 per 1000 for Bridge, and 21.88 for Dewsbury.

In the Tables on pages 6-95, both the crude and the corrected rates of mortality are given for males and females separately in every Registration County of England and Wales; and in Table N are given the rates for persons without distinction of sex. In the following table the two orders of rates, *for persons only*, are shown in parallel columns, the counties being arranged in the ascending order of their corrected death-rates. In column 3 of this table has been inserted the "comparative mortality figure," which represents the mortality of each county after

correction for age and sex constitution of population, compared with the mortality of England and Wales taken as 1000.

TABLE N.—MEAN ANNUAL DEATH-RATES per 1000 PERSONS LIVING in REGISTRATION COUNTIES during the Ten Years 1881-90, showing (1) Crude Rates, (2) Rates in Standard Population, and (3) Comparative Mortality figures.

Counties in Order of Standard Death-rate.	Crude Death-rate.	Rate in Standard Population.	Comparative Mortality Figure.	Counties in Order of Standard Death-rate.	Crude Death-rate.	Rate in Standard Population.	Comparative Mortality Figure.
Columns - -	1.	2.	3.	Columns - -	1.	2.	3.
England and Wales	19.08	19.08	1000	Essex - - -	16.82	16.32	855
Huntingdonshire -	16.41	13.94	730	Devonshire - -	18.30	16.56	868
Rutlandshire - -	16.25	14.20	744	Middlesex - -	16.13	16.62	871
Dorsetshire - - -	16.18	14.24	746	Worcestershire -	16.99	16.66	873
Westmorland - - -	15.52	14.32	750	Gloucestershire -	17.82	16.89	885
Sussex - - - - -	15.66	14.94	783	North Wales - -	18.68	17.06	894
Wiltshire - - - -	16.92	14.95	783	Cornwall - - -	18.98	17.18	900
Herefordshire - -	17.32	15.01	787	North Riding - -	18.15	17.67	926
Berkshire - - - -	16.17	15.02	787	Derbyshire - - -	17.74	17.88	937
Oxfordshire - - -	16.81	15.15	794	Leicestershire -	18.42	17.92	939
Buckinghamshire -	16.78	15.26	800	Cumberland - -	18.38	17.95	941
Suffolk - - - - -	17.61	15.29	801	South Wales - -	19.13	19.04	968
Cambridgeshire - -	17.29	15.40	807	Nottinghamshire -	19.44	19.13	1003
Hertfordshire - -	16.89	15.41	808	East Riding - -	19.48	19.14	1003
Somersetshire - -	17.34	15.50	812	Warwickshire - -	19.01	19.25	1009
Shropshire - - - -	17.42	15.51	813	Cheshire - - - -	18.85	19.43	1018
Surrey - - - - -	15.29	15.58	817	Monmouthshire -	19.70	19.53	1024
Norfolk - - - - -	18.03	15.58	817	Staffordshire - -	19.65	19.99	1048
Kent - - - - -	16.57	15.94	835	Northumberland -	19.78	20.19	1058
Lincolnshire - - -	17.51	15.94	835	Durham - - - - -	19.83	20.57	1078
Hampshire - - - -	16.70	16.00	838	West Riding - -	20.03	21.23	1113
Northamptonshire -	17.08	16.21	850	London - - - - -	20.31	21.42	1123
Bedfordshire - - -	17.31	16.30	854	Lancashire - - -	22.40	24.19	1268

On comparing this table with a similar one published by Dr. Ogle in his Decennial Supplement for 1871-80, a striking similarity will be noticed between the two tables, notwithstanding that the rates of mortality in the more recent decennium are everywhere lower than in the earlier. It is well known that correction for age and sex differences of population has the effect of increasing the death-rate of populous places, and of diminishing the rate of rural districts; the reason for this may be gathered from p. xxxvii. In the present instance we find that correction has increased the death-rate of eight of the principal mining or manufacturing counties, and has reduced, in some cases very considerably, the rates of those counties which are distinctively rural in character.

Hitherto, only the inherent defect of the crude death-rate has been dealt with, namely, the fact that it is largely affected by the age and sex composition of the population, independently of sanitary condition. But there are, in addition, other difficulties connected with the data on which death-rates are based, and these difficulties affect not merely the crude

death-rates, but the rates in the various age-groups also, and consequently the rates in standard population which are derived therefrom. The difficulties as to the deaths themselves will first be considered, and subsequently those connected with estimates of population.

The existence within a district of a hospital receiving patients from outside places causes the mortality of the district which contains the hospital to be overstated, and that of the districts from which those patients are drawn to be correspondingly understated. London City affords a typical illustration of this. The deaths registered within this district in the course of the last decennium, numbered 13,733; but 6,604, or nearly half of these occurred in St. Bartholomew's Hospital. On the other hand, 2,502 deaths occurred in workhouse establishments belonging to London City, but situated outside its limits; consequently none of these deaths were entered in the City registers. Unfortunately, up to the year 1885, no means existed of determining how many of the persons who died in St. Bartholomew's Hospital had been brought there from districts outside London City. Since the year 1885, however, this defect has been remedied, and a valuable series of tables has been published in the successive Annual Summaries, showing the mortality *belonging to* each sanitary area in Registration London, after complete distribution of the deaths occurring in public institutions.

A Summary of these tables for the six years 1885-90 is given in Table O. That table shows the deaths registered in the several areas, and also the deaths actually belonging to those areas, after distribution, as before mentioned. It will be seen that the effect of distribution is to lower the mortality of Whitechapel in these six years by 28 per cent., and that of the City of London by 29 per cent., but to raise the mortality of St. Giles by 24 per cent. In regard to zymotic mortality, the due assignment of deaths to the districts in which the deceased had lived lowers the mortality of Hampstead by 42 per cent., and that of the City of London by 47 per cent., whilst it raises that of St. Giles by 25 per cent.

Except in the instances specified in the subjoined list,\* each sanitary area is co-extensive with the registration district of the same name. A comparison of the *corrected* with the *registered* mortality will therefore give a rough indication of the probable adjustments needed in the Tables of London Registration Districts on pages 97-126.

With the exception of those districts which contain large workhouses or lunatic asylums, there are but few registration areas outside London, the mortality of which is seriously disturbed by that occurring in Public Institutions. The footnotes to Table 1 show how much of the registered

* Sanitary Areas.	Equivalent Registration Districts.
Hammersmith	Fulham.
Fulham	
St. George, Hanover Square	St. George, Hanover Square.
Westminster	
St. James, Westminster	{ Westminster.
St. Martin-in-the-Fields	{ Strand.
Strand	
Holborn	Holborn.
Clerkenwell	
St. Luke	Stepney.
Limehouse	
St. Saviour, Southwark	
St. George, Southwark	St. Saviour, Southwark.
Newington	
St. Olave, Southwark	St. Olave, Southwark.
Bermondsey	
Rotherhithe	
Battersea	Wandsworth.
Wandsworth	
Lewisham	Lewisham.
Woolwich	Woolwich.
Plumstead	

TABLE O.—MORTALITY in the METROPOLITAN SANITARY AREAS before and after DISTRIBUTION of DEATHS in INSTITUTIONS, 1885-90.

SANITARY AREAS.	All Causes.			Principal Zymotic Diseases.		
	Deaths.		Effect of Distribution.	Deaths.		Effect of Distribution.
	As Registered.	After Distribution.		As Registered.	After Distribution.	
Registration London	491,006	483,485	- 7,521	68,355	67,901	- 454
WEST.						
Paddington	12,505	11,246	- 1,259	1,487	1,423	- 64
Kensington	18,511	16,698	- 1,813	1,938	2,149	+ 211
Hammersmith	18,777	18,989	+ 212	3,606	3,230	- 376
Fulham						
Chelsea	12,585	11,905	- 680	1,535	1,590	+ 55
St. George's, Hanover Square	10,870	8,424	- 2,446	920	874	- 46
St. Margaret and St. John, Westminster	6,743	7,398	+ 655	859	921	+ 62
St. James, Westminster	2,740	3,065	+ 325	274	303	+ 29
NORTH.						
St. Marylebone	16,142	18,016	+ 1,874	1,794	1,941	+ 147
Hampstead	5,000	4,551	- 449	849	492	- 357
St. Pancras	29,773	28,508	- 1,265	3,461	3,675	+ 214
Islington	33,269	33,303	+ 34	4,896	5,009	+ 113
Hackney	23,270	22,095	- 1,175	4,345	3,236	- 1,109
CENTRAL.						
St. Giles	4,860	6,033	+ 1,173	510	640	+ 130
St. Martin-in-the-Fields	2,425	1,937	- 488	206	195	- 11
Strand	4,097	3,983	- 114	435	387	- 48
Holborn	5,046	5,132	+ 86	612	552	- 60
Clerkenwell	6,966	9,067	+ 2,101	1,161	1,375	+ 214
St. Luke	5,263	6,939	+ 1,676	801	991	+ 190
City of London	7,954	5,668	- 2,286	707	373	- 334
EAST.						
Shoreditch	18,097	17,029	- 1,068	2,651	2,757	+ 106
Bethnal Green	17,014	17,672	+ 658	2,550	2,892	+ 342
Whitechapel	13,450	9,714	- 3,736	1,435	1,307	- 128
St. George in the East	7,083	8,323	+ 1,240	1,100	1,319	+ 219
Limehouse	8,085	9,001	+ 916	1,532	1,540	+ 8
Mile End Old Town	12,550	13,381	+ 831	2,055	2,274	+ 219
Poplar	21,512	20,253	- 1,259	2,791	2,984	+ 193
SOUTH.						
St. Saviour	3,569	4,271	+ 702	486	587	+ 101
St. George the Martyr, Southwark	7,648	9,171	+ 1,523	1,274	1,325	+ 51
Newington	13,610	14,600	+ 990	1,827	2,056	+ 229
St. Olave	4,570	1,656	- 2,914	422	223	- 199
Bermondsey	9,679	11,437	+ 1,758	1,523	1,741	+ 218
Rotherhithe	5,291	4,954	- 337	685	754	+ 69
Lambeth	32,291	31,414	- 877	4,447	4,333	- 114
Battersea						
Wandsworth	26,206	27,552	+ 1,346	3,877	4,187	+ 310
Camberwell	24,919	24,460	- 459	3,379	3,715	+ 336
Greenwich	18,584	17,943	- 641	3,341	2,512	- 829
Lewisham (excluding Penge)	5,701	5,715	+ 14	658	697	+ 39
Woolwich	3,934	4,808	+ 874	421	463	+ 42
Plumstead	7,544	7,174	- 370	859	879	+ 20
Metropolitan Institutions situate outside Registration London	2,873	—	- 2,873	646	—	- 646



mortality of the several districts occurred in those institutions situated therein which receive a considerable proportion of their inmates from elsewhere. It must not, however, be overlooked that in nearly every case part of the institution mortality belongs to the district itself which contains that institution. One of the corrections necessary for the calculation of true death-rates is the due apportionment of institution deaths to the places from which the deceased originally came: and this is often difficult to effect, because the one condition essential to accuracy is, that with respect to every deceased inmate of a public institution a record of previous residence shall be forthcoming, and experience shows that such records, even when obtainable, are frequently untrustworthy.

The difficulty of correction is even greater in the case of another class of persons, of which domestic servants may be regarded as typical. At the census enumeration domestic servants are included in the population of the district in which they are employed, but of these persons a considerable proportion return to their homes in case of illness, and their deaths are recorded against the districts wherein those homes are situated; as therefore no records are made of the places in which the deceased had been employed, a just distribution of their deaths is impracticable. The consequence is that the districts, mainly towns, in which a relatively large proportion of domestic servants are employed, are made to appear healthier than they really are, whilst the reverse effect is produced on the country districts which furnish the supply of domestic servants to the towns.

The difficulties connected with estimates of population are of another kind altogether. The method hitherto used in the Registrar-General's reports is the best that is generally available. This method depends on the assumption of a constant ratio of increase or of decrease, such ratio being determined by the results of two successive census enumerations. For periods subsequent to the two censuses, the method is necessarily somewhat speculative, but, for inter-censal years, it probably gives results fairly approximate to the truth. Thus, if the population of a district at the beginning of April 1881 had been P, and at the beginning of April 1891

had become rP, the errors of assuming  $r^{\frac{1}{10}}P$ ,  $r^{\frac{2}{10}}P$ ,  $r^{\frac{3}{10}}P$ , . . . . .  $r^{\frac{37}{10}}P$ , as the populations at the middle of the respective years 1881, 1882, 1883, . . . . . 1890, probably lie within narrow limits. The mean

of these quantities, which may be shown to be equal to  $\frac{r^{\frac{1}{10}}}{r^{\frac{1}{10}} - 1} \times \frac{rP - P}{10}$

is very nearly the true mean population in the ten calendar years 1881-90. The true mean, on the assumption of a constant rate of increase, is

$$\frac{rP - P}{r^{\frac{1}{10}} \times \text{Hyp. log. } r}$$

The use of either of these formulæ would, however, have entailed a greater expenditure of time than was available for the calculation of mean populations. For the purpose of the tables on pp. 3-728, the mean populations have been obtained by the rough method used in previous Decennial Supplements, that is to say, by taking the arithmetical means of the populations in 1881 and 1891. Clearly it is of importance to ascertain the extent of the error introduced by the use of these convenient but scarcely accurate figures.

On the assumption of a constant ratio either of increase or of decrease, the arithmetical mean of the numbers at the beginning and end of any period is in every case greater than the true mean. Further, the inter-censal period is later by about three months, both in its beginning and in its ending, than the ten year period to which the deaths relate; and therefore the mean population in the inter-censal period is greater or less than the mean in the ten calendar years, according as the population is an increasing

or a decreasing one. Thus, by using the arithmetical means of the census populations instead of the true mean populations in the ten calendar years two distinct errors are introduced. But, whereas in districts with increasing populations, both errors tend to overstate the population, and therefore to understate the death-rates, the errors act in opposite directions in the case of decreasing populations. In the former case the resultant error is the sum, in the latter case it is the difference, of the two component errors.

The arithmetical mean of the two census populations is  $\frac{rP + P}{2}$ , and the true mean population in the ten calendar years is  $\frac{rP - P}{r^{\frac{1}{10}} \times \text{Hyp. log. } r}$ . In

order to obtain correct populations and rates the populations shown in the Tables must be divided, and the rates multiplied by  $\frac{rP + P}{2} \times \frac{r^{\frac{1}{10}} \times \text{Hyp. log. } r}{rP - P} = r^{\frac{1}{10}} (r + 1) \frac{\text{Hyp. log. } r}{2(r - 1)}$ , where r is the ratio which

the population in 1891 bears to that in 1881. In order to facilitate the correction of the rates of mortality whenever special accuracy is desired, the decennial increase or decrease per cent. of population in each district has been calculated, and is shown in the heading of the table relating to that district. A table has, moreover, been prepared (see Table P.) by which the factors for correction, according to the formula, corresponding to all rates of decrease up to 20 per cent., and all rates of increase up to 50 per cent., that is to say, for all values of r from .8 to 1.5, can at once be ascertained. A foot-note to the table provides for all the cases in which the proportional increase or decrease of population in the last inter-censal period was beyond the limits of the table.

The table is used in the same way as a table of logarithms. For example, by reference to page 569 it will be seen that the population of Burnley district increased by 39.67 per cent. between the Censuses of 1881 and 1891; that is to say, the population in 1891 was to that in 1881 as 139.67 is to 100, or as 1.3967 is to 1; therefore r = 1.3967. To obtain the factor for correction corresponding to this value, the figures 1.39 are found in the column in Table P headed r; opposite to these figures, in the columns headed .006 and .007 respectively, the numbers 7710 and 7768 are given; prefixing to each of these numbers the figures 1.01 (which apply to the whole line) the factor for correction is 1.017710 when r = 1.396 and 1.017768 when r = 1.397. Thus an increase of .001 in the value of r in this part of the table corresponds to an increase of .000058 in the factor for correction; taking  $\frac{7}{10}$  of this, or .000041, as the increase in the factor corresponding to an increase of .0007 in the value of r, the factor for correction when r = 1.3967 is 1.017710 + .000041 = 1.017751.

Given any district the population of which increased by 39.67 per cent. in the last inter-censal period, and the death-rates of which have been calculated on the arithmetical mean between the two census enumerations; the whole of such rates should be multiplied by the factor 1.017751. Thus the crude death-rate of Burnley, which appears on p. 569 as 21.40 becomes 21.78, and the rate in standard million which appears as 23.65 becomes 24.07 on further correction for the error in the mean population.

Turning to p. 712, the population of Forden district decreased by 10.74 per cent. in the last inter-censal period; that is to say, the population in 1891 was to that in 1881 as 89.26 (= 100 - 10.74) is to 100; therefore, in this case r = .8926. Table P shows .998232 and .998239 as the factors for correction when r = .892 and .893 respectively. The difference is .000007 and the proportional part of this for the final "6" in the value of r is .000004; thus the factor for correction when r = .8926 is .998236. When corrected by this factor the crude death-rate of Forden

TABLE P.—FACTORS for correcting DEATH-RATES calculated on ARITHMETICAL MEANS of CENSUS POPULATIONS.

r.	.000.	.001.	.002.	.003.	.004.	.005.	.006.	.007.	.008.	.009.	r.
.80	0.998560	8545	8531	8516	8502	8489	8475	8462	8449	8436	.80
.81	8424	8412	8400	8388	8377	8366	8355	8345	8334	8324	.81
.82	8315	8305	8296	8287	8278	8269	8261	8253	8245	8238	.82
.83	8231	8224	8217	8210	8204	8198	8192	8187	8181	8176	.83
.84	8172	8167	8163	8159	8155	8151	8148	8145	8142	8139	.84
.85	0.998136	8134	8132	8130	8129	8128	8126	8126	8125	8124	.85
.86	8124	8124	8125	8125	8126	8127	8128	8129	8131	8133	.86
.87	8135	8137	8139	8142	8145	8148	8151	8154	8158	8162	.87
.88	8166	8171	8175	8180	8185	8190	8195	8201	8207	8213	.88
.89	8219	8225	8232	8239	8246	8253	8260	8268	8276	8284	.89
.90	0.998292	8300	8309	8318	8327	8336	8345	8355	8364	8374	.90
.91	8384	8395	8405	8416	8427	8438	8449	8460	8472	8484	.91
.92	8496	8508	8520	8533	8545	8558	8571	8585	8598	8612	.92
.93	8625	8639	8654	8668	8682	8697	8712	8727	8742	8757	.93
.94	8773	8789	8804	8820	8837	8853	8870	8886	8903	8920	.94
.95	0.998937	8955	8972	8990	9008	9026	9044	9063	9081	9100	.95
.96	9119	9138	9157	9176	9196	9215	9235	9255	9275	9296	.96
.97	9316	9337	9357	9378	9399	9421	9442	9463	9485	9507	.97
.98	9529	9551	9573	9596	9618	9641	9664	9687	9710	9734	.98
.99	0.999757	9781	9805	9829	9853	9877	9901	9926	9950	9975	.99
1.00	1.000000	0025	0050	0076	0101	0127	0152	0178	0204	0231	1.00
1.01	0257	0283	0310	0337	0364	0391	0418	0445	0473	0500	1.01
1.02	0528	0556	0584	0612	0640	0668	0697	0725	0754	0783	1.02
1.03	0812	0841	0871	0900	0929	0959	0989	1019	1049	1079	1.03
1.04	1109	1140	1170	1201	1232	1263	1294	1325	1356	1388	1.04
1.05	1.001419	1451	1483	1514	1546	1579	1611	1643	1676	1708	1.05
1.06	1741	1774	1807	1840	1873	1907	1940	1974	2007	2041	1.06
1.07	2075	2109	2143	2177	2212	2246	2281	2316	2350	2385	1.07
1.08	2420	2456	2491	2526	2562	2597	2633	2669	2705	2741	1.08
1.09	2777	2813	2850	2886	2923	2959	2996	3033	3070	3107	1.09
1.10	1.003144	3182	3219	3257	3294	3332	3370	3408	3446	3484	1.10
1.11	3522	3561	3599	3638	3676	3715	3754	3793	3832	3871	1.11
1.12	3910	3950	3989	4029	4068	4108	4148	4188	4228	4268	1.12
1.13	4308	4349	4389	4430	4470	4511	4552	4593	4634	4675	1.13
1.14	4716	4757	4799	4840	4882	4923	4965	5007	5049	5091	1.14
1.15	1.005133	5175	5218	5260	5303	5345	5388	5431	5473	5516	1.15
1.16	5559	5602	5646	5689	5732	5776	5819	5863	5907	5950	1.16
1.17	5994	6038	6082	6126	6171	6215	6259	6304	6348	6393	1.17
1.18	6438	6483	6528	6573	6618	6663	6708	6753	6799	6844	1.18
1.19	6890	6935	6981	7027	7073	7119	7165	7211	7257	7303	1.19
1.20	1.007350	7396	7443	7489	7536	7583	7629	7676	7723	7770	1.20
1.21	7818	7865	7912	7959	8007	8054	8102	8150	8197	8245	1.21
1.22	8293	8341	8389	8437	8485	8534	8582	8630	8679	8727	1.22
1.23	8776	8825	8873	8922	8971	9020	9069	9118	9168	9217	1.23
1.24	9266	9315	9365	9415	9464	9514	9564	9613	9663	9713	1.24

TABLE P.—continued.—FACTORS for correcting DEATH-RATES calculated on ARITHMETICAL MEANS of CENSUS POPULATIONS.

r.	.000.	.001.	.002.	.003.	.004.	.005.	.006.	.007.	.008.	.009.	r.
1.25	1.009763	9813	9864	9914	9964	0015	0065	0115	0166	0217	1.25
1.26	1.010267	0318	0369	0420	0471	0522	0573	0624	0675	0727	1.26
1.27	0778	0829	0881	0932	0984	1036	1088	1139	1191	1243	1.27
1.28	1295	1347	1399	1452	1504	1556	1608	1661	1713	1766	1.28
1.29	1818	1871	1924	1977	2030	2082	2135	2189	2242	2295	1.29
1.30	1.012348	2401	2455	2508	2561	2615	2669	2722	2776	2830	1.30
1.31	2884	2937	2991	3045	3099	3153	3208	3262	3316	3370	1.31
1.32	3425	3479	3534	3588	3643	3697	3752	3807	3862	3916	1.32
1.33	3971	4026	4081	4137	4192	4247	4302	4357	4413	4468	1.33
1.34	4524	4579	4635	4690	4746	4802	4858	4913	4969	5025	1.34
1.35	1.015081	5137	5193	5249	5306	5362	5418	5475	5531	5587	1.35
1.36	5644	5700	5757	5814	5870	5927	5984	6041	6098	6155	1.36
1.37	6212	6269	6326	6383	6440	6497	6555	6612	6669	6727	1.37
1.38	6784	6842	6899	6957	7015	7072	7130	7188	7246	7304	1.38
1.39	7362	7420	7478	7536	7594	7652	7710	7768	7827	7885	1.39
1.40	1.017944	8002	8060	8119	8177	8236	8295	8353	8412	8471	1.40
1.41	8530	8589	8648	8707	8766	8825	8884	8943	9002	9062	1.41
1.42	9121	9180	9239	9299	9358	9418	9477	9537	9596	9656	1.42
1.43	1.019716	9776	9835	9895	9955	0015	0075	0135	0195	0255	1.43
1.44	1.020315	0375	0435	0495	0556	0616	0676	0737	0797	0858	1.44
1.45	1.020918	0979	1039	1100	1160	1221	1282	1343	1403	1464	1.45
1.46	1525	1586	1647	1708	1769	1830	1891	1952	2013	2075	1.46
1.47	2136	2197	2259	2320	2381	2443	2504	2566	2627	2689	1.47
1.48	2751	2812	2874	2936	2997	3059	3121	3183	3245	3307	1.48
1.49	1.023369	3431	3493	3555	3617	3679	3741	3803	3866	3928	1.49

Note.—For explanation and method of using the table, see pages xlii-xliii.

In the following Districts *r* falls out of range of the Table; the Factors for correction are given below.

District.			Factor for Correction.	District.		
No.	Name.	r.		No.	Name.	r.
540	Reeth - - -	.6820	1.002538	586	Cardiff - - -	1.6371
568	Alston - - -	.7323	1.000255	2	Fulham - - -	1.6447
14	London, City - -	.7455	0.999810	190	Orsett - - -	1.6572
453	Liverpool - - -	.7469	0.999766	129	Edmonton - - -	1.7393
7	Hampstead - - -	1.5052	1.024315	127	Hendon - - -	1.7691
587	Pontypridd - - -	1.5703	1.028450	186	West Ham - - -	1.8170
403	Blaby - - -	1.6206	1.031727	93	Christchurch - -	1.8407

becomes 17.27 instead of 17.30, and the rate in standard million becomes 14.79 instead of 14.82. The amount of correction is much less in this case than in that of any district which *increased* by 10.74 per cent. in the decennium, because, as already pointed out, the error is the *difference* between two separate errors, whereas in the case of an increasing population the error is the *sum* of the separate errors. In a population which decreased by 26.036 per cent. the two errors would exactly balance each other; therefore, the arithmetical mean of the two census populations would be the true mean population in the ten calendar years.

*Density of Population in relation to Mortality.*

Dr. Farr was convinced, as the result of careful and prolonged investigation, that within certain limits a definite relation subsisted between density of population and mortality; and he devised a mathematical formula by which the relation between density and mortality in the districts of England and Wales during the decennium 1861-70 was approximately shown. Examination of the figures for the period 1881-90 shows that, although density and mortality generally increase or decrease together, the relation between them is now too complex to admit of being expressed by a formula similar to that alluded to above. Comparison with the figures in previous decennia is, however, eminently useful, and exhibits in a striking form the improvement in the health of the population in recent years. This will be seen if Table Q. of the present volume be examined in conjunction with Table I, p. xx, in the Decennial Supplement for 1871-80.

In the earlier period there were 101 districts, with an aggregate population slightly exceeding two millions, that had mean annual death-rates below 17 per 1000; in 1881-90 there were not fewer than 284 districts, with a population of nearly seven millions, that showed death-rates below 17 per 1000. In 1871-80 there were 50 districts which contained nearly two and a half millions of inhabitants with an average density of 458 persons to a square mile; the rate of mortality in these districts averaged 20.56 per annum. In 1881-90, the mean death-rate of 85 districts, with over four millions of inhabitants, and a density of 457 persons per square mile, was 18.52 per 1000. Whilst, therefore, the mean density has increased, the rate of mortality has decreased enormously during the last decennium.

In making these comparisons only the *crude* death-rates were available; but two columns which have been added to Table Q. show clearly that these rates afford but a rough indication of health conditions. For example, in 80 districts whose crude rates were between 15 and 16 per 1000, the rates corrected for age and sex distribution ranged from 12.20 to 16.97; and in 20 districts whose crude rates were between 21 and 22 per 1000, the corrected rates ranged from 16.28 to 24.07. It thus appears that at least one district with a crude death-rate over 21 per 1000 is actually healthier than another district whose crude death-rate is under 16 per 1000. In order to obtain a truer basis of comparison Table R. has been constructed. The districts are there grouped according to their death-rates in standard population (further corrected to eliminate the error of using the arithmetical mean of the census populations as the mean population\*); and columns have been added showing for each group the mean density, the range of crude death-rates, and the mean crude and corrected death-rates. It will be seen that in the districts whose corrected rates were between 13 and 14 per 1000 the crude rates ranged from 13.22 to 17.79, whilst in the districts whose corrected rates were between 23 and 24 per 1000, the crude rates ranged from 20.90 to 23.39. Reference to the last two columns of the table shows that, as a general rule, crude

\* See pages xlii-xlv.

TABLE Q.—DENSITY AND MORTALITY. The Groups of Districts arranged in Order of their "Crude" Death-rates.

Crude Death-rates.	No. of Districts.	Area.	Population.	Deaths.	Density (Persons to a Square Mile).	Mean Crude Death-rate.	Range of Corrected Rates.	
							Lowest.	Highest.
12-13	1	62,284	23,832	3,059	245	12.84	12.24	12.24
13-14	12	532,559	437,745	59,213	526	13.53	12.59	16.05
14-15	30	1,476,723	783,172	114,805	339	14.66	12.11	16.04
15-16	80	4,438,660	1,881,086	291,606	271	15.50	12.20	16.97
16-17	161	11,126,635	3,856,965	637,422	222	16.53	12.56	19.01
17-18	125	8,986,436	3,790,074	663,015	270	17.69	13.42	20.11
18-19	85	5,778,821	4,129,606	764,737	457	18.52	15.01	21.13
19-20	51	2,542,450	3,498,811	680,969	881	19.46	15.71	21.83
20-21	32	1,372,317	2,890,822	592,218	1,348	20.49	16.33	23.33
21-22	20	494,214	1,954,361	418,975	2,531	21.44	16.28	24.07
22-23	16	354,274	2,125,464	475,188	3,840	22.36	20.77	25.40
23-24	6	31,419	789,901	184,691	16,090	23.38	23.97	25.33
24-25	5	36,381	529,544	129,309	9,316	24.42	24.41	27.03
25-30	5	81,191	495,734	132,411	3,908	26.71	26.53	32.47
30-34	3	3,521	301,365	97,153	54,778	32.24	34.14	35.99
	632	37,317,885	27,488,482	5,244,771	471	19.08	12.24	35.99

TABLE R.—DENSITY AND MORTALITY. The Groups of Districts arranged in Order of their Death-rates in Standard Population.

Corrected Death-rates.	No. of Districts.	Area.	Population.	Deaths.	Density (Persons to a Square Mile).	Range of Crude Rates.		Mean Crude Death-rate.	Mean Corrected Death-rate.
						Lowest.	Highest.		
12-13	33	1,754,620	379,547	55,977	138	12.84	16.62	14.75	12.70
13-14	89	5,780,431	1,346,786	211,885	149	13.22	17.79	15.73	13.45
14-15	141	9,868,667	2,880,170	469,333	187	13.05	17.88	16.30	14.48
15-16	85	6,285,403	2,103,777	350,533	214	13.97	19.42	16.66	15.41
16-17	69	4,773,404	2,288,928	337,346	307	13.71	21.04	16.92	16.47
17-18	45	3,062,940	2,083,093	366,350	435	16.23	20.32	17.59	17.35
18-19	40	2,144,505	2,217,053	409,319	662	17.16	21.98	18.46	18.55
19-20	28	1,205,504	2,412,662	448,492	1,231	16.62	20.71	18.59	19.39
20-21	29	876,315	2,468,103	432,095	1,803	17.99	22.03	19.53	20.43
21-22	23	678,797	2,584,803	520,256	2,437	18.45	21.77	20.13	21.47
22-23	9	252,110	1,299,363	271,537	3,299	20.21	21.54	20.90	22.50
23-24	19	304,865	2,538,283	557,346	5,329	20.90	23.39	21.96	23.41
24-25	8	178,583	1,196,372	272,197	4,295	21.40	24.88	22.71	24.51
25-30	9	136,469	1,220,216	298,641	5,722	22.78	26.94	24.47	26.22
30-36	5	15,272	467,326	143,464	19,534	27.82	33.13	30.70	33.00
	632	37,317,885	27,488,482	5,244,771	471	12.84	33.13	19.08	19.08

death-rates overstate the mortality of healthy districts, and understate that of unhealthy districts; for while the mean crude rates of the various groups increase from 14.75 to 30.70, the corrected rates begin at 12.70 for the healthiest group, and rise to 33.00 for the unhealthiest.

The value of corrected death-rates is incidentally confirmed by the columns in Tables Q. and R. showing density of population. The irregularities which are conspicuous in Table Q. are nearly removed when the districts are re-arranged in the order of their corrected death-rates as in Table R.

The following table shows that during the ten years ending with 1890 the urban portion of England differed very materially from the rural portion, not only with respect to the mortality from all causes as shown at page xxxvi, but also with respect to the mortality from certain of the more important diseases. The crude death-rate from all causes, at all ages, in the 28 chief towns of England averaged 21.51 per 1000 living and in the 50 smaller towns 19.73 per 1000.\* In rural England the average rate did not exceed 17.63 per 1000. Not only the death-rate at all ages, but infantile mortality also, or the ratio of deaths under one year to registered births varied extremely, the rate being as high as 160 per 1000 births in the 78 towns of urban England, whilst it was only 128 in the rural districts. In the several counties of England and Wales infantile mortality varied considerably. The rates were only 96 per 1000 in Dorsetshire and 100 in Westmorland, whilst they were as high as 164 in Leicestershire and 166 in Lancashire. In all the counties the mortality among male greatly exceeded that among female infants.

TABLE S.—BIRTH- and DEATH-RATES\* per MILLION LIVING in ENGLAND and WALES in URBAN ENGLAND and in RURAL ENGLAND respectively.

	Births.	Deaths from All Causes.	Small-pox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping-cough.	Fever.	Diarrhoea.	Deaths under one year to 1000 Births.
England and Wales	32,342	19,080	45	440	334	163	450	235	659	142
28 Towns	33,997	21,505	88	626	403	190	612	262	890	162
50 Towns	33,652	19,733	27	496	387	100	419	264	727	153
Urban England (78 Towns).	33,914	21,078	74	595	399	168	566	263	851	160
Rural England	31,204	17,634	24	329	286	159	366	216	520	128

As has already been stated the mortality from measles in England and Wales was equal to 440 per million living at all ages. In urban England as represented by the 78 principal towns, it was 595 per million, and in rural England it was 329. The mortality was very much higher in the 28 chief towns than in the 50 smaller towns. In the several counties (Table 4) the decennial measles-rate varied extremely, being as low as 133 per million in Westmorland, whilst in other counties it ranged upwards to 520 in Monmouthshire, 634 in London, and 709 in Lancashire. In the ten year period 1871-80, the last three counties had also shown the highest mortality from measles; but in Table 4 of the supplement relating to that period Monmouthshire instead of London was the second

\* Except where otherwise specified "crude" death-rates are given in these remarks on local mortality.

highest in the list. If, instead of the mortality at all ages, the rates among children under five be compared, it will be found that in 1881-90 the three counties above-mentioned stand in the same order, as highest in the list, and that in addition Cheshire and Staffordshire are included as counties with rates of mortality from measles above the average for England and Wales (Table 2).

The mortality due to scarlet fever in England and Wales was equal to 334 per million persons living at all ages. In urban England the rate averaged 399 per million, and in rural England 286. The mortality in the 28 chief towns was somewhat higher than that in the 50 smaller towns. The mean county rates showed as usual extreme variation, the rate being only 99 per million in Suffolk and 102 in Hampshire, whilst it amounted to 533 in the West Riding of Yorkshire, and 550 in South Wales. In 1871-80 Durham had shown the highest scarlet fever mortality, namely, 1376 per million; Northumberland having stood second with a rate of 1145, and Lancashire third with a rate of 1126. Scarlet fever mortality in the recent decennium is shown by Table 4 to have been considerably below the mean in the above-mentioned counties of Hampshire and Suffolk; this was also the case in most of the southern counties and in Westmorland. Table 2 further shows that the mortality under 5 years of age, like that at all ages, was highest in the West Riding and in South Wales.

The mortality from diphtheria which throughout England and Wales was in the mean proportion of 163 per million living at all ages, was equal to 168 in urban England, and to 159 in the rural districts. It is noteworthy that the rate was considerably lower in the 50 smaller towns than in the rural districts, and very much lower than in the 28 chief towns. The mortality from diphtheria was below the mean in Rutlandshire, where the rate was 71 per million, in Staffordshire 79, in Durham 82, in Oxfordshire and Cumberland 85, in the East Riding of Yorkshire 88, and in Gloucestershire 89 per million. In eighteen counties the rates were above the average for England and Wales, reaching 260 in London, 273 in Essex, and 284 in Middlesex. If, instead of the all age mortality, the mortality under 5 years be taken into account, it will be found that as many as 32 counties, including the whole of those in the South-Western, West Midland, North Midland, Yorkshire, and Northern Divisions, experienced rates below the average for England and Wales; the counties with rates above the average being mainly those of Essex, Middlesex, Hertfordshire, London, and the five counties of the South-Eastern Registration Division (Table 2).

The mortality from whooping-cough, which in England and Wales corresponded to a rate of 450 per million living, was equal in urban England to a rate of 566 per million, and, in the rural districts, to a rate of 366. The lowest county rates were 193 per million in Westmorland, 230 in Dorsetshire, and 231 in Herefordshire, and the highest rates were 520 in Lancashire, 537 in Essex, and 690 in London. Table 2 shows that the mortality, under 5 years of age, from whooping-cough was highest in the counties of London, Middlesex, Essex, Cornwall, Warwickshire, Lancashire, and Monmouthshire.

Unfortunately the returns in the possession of this office do not allow of the calculation of separate death-rates from the three chief forms of continued fever for "urban" and "rural" England. The mean rate of mortality in 1881-90 from "fever" (including typhus, enteric, and ill-defined fevers) averaged 235 per million throughout England and Wales; in urban England the rate was 263 per million, and in rural England 216.

Although typhus is now disappearing from the English bills of mortality, it nevertheless still appears to linger in certain manufacturing areas of the North-Western and Northern Registration Divisions. In the course of the recent decennium, 3,919 deaths from typhus were registered

in England and Wales; but of these 2,083, or more than half, occurred in ten registration districts containing not more than one eighteenth part of the total English population, and situated in the counties of Cheshire, Lancashire, Durham, and Northumberland. On reference to the successive Annual Reports it appears to have been mainly in the first half of the decennium that the high mortality occurred, the figures for the second half showing a very decided reduction. In the ten-year period 1881-90, the mean rate of typhus mortality within the area of these ten districts was 139 per million, the rate in the remainder of the country being only 7 per million. Among these areas typhus was most fatal in the registration district of Liverpool, where the rate was equal to 466 per million, Toxteth Park coming next with a rate of 242. The remaining districts stand in the order following: Sunderland 110 per million, West Derby 81, Gateshead and Prestwich 75, Birkenhead and Hartlepool 68, Easington 62, and Newcastle-on-Tyne 60. No death from typhus occurred in Westmorland during the recent decennium, and there were 23 other counties in England and Wales in which the rate did not reach 5 in a million of the population.

On investigating the incidence of fatal enteric fever, both as regards locality and as regards sex, remarkable changes are apparent in the course of the last twenty years (Table T.). The highest rates from enteric fever in 1881-90 were in the North Riding of Yorkshire, South Wales, Lancashire, Nottinghamshire, and Durham. On the other hand Herefordshire experienced a death-rate considerably below that of any other English county. The mortality showed a decrease on the rates prevailing in 1871-80, in every one of the registration counties of England and Wales: in no case was the decrease less than 20 per cent., and in 15 cases it was 50 per cent. or more. Although, in every case, the decrease was shared by both sexes, it was shared in unequal proportions. Thus, in 37 counties the female rates decreased by a greater proportion than the male rates; in one county the decrease was the same for both sexes, whilst in seven counties only, the male rates decreased by a greater proportion than the female rates.\* The differences in the sex incidence of mortality were so great that, whereas in the decennium 1871-80 there had been 25 counties in which the female rates were higher than the male, in the recent decennium the number of counties thus affected had fallen to 11† (Table 4). It is worthy of record that the whole of the counties containing the chief industrial centres have recently exhibited higher enteric fever rates among males than among females.

The mortality attributed to "simple and ill-defined forms of continued fever" varied considerably in the several counties during 1881-90, but the differences in the rates were not so great as in the case of typhus. The average rate in England and Wales was 25 per million of the population, and in twelve counties the rate was above the mean. The highest rate was in Huntingdonshire, and was equal to 79 per million, whilst it did not exceed 4 per million in Rutlandshire.‡

The mortality from diarrhoeal diseases, excluding cholera, in England and Wales was, as shown in Table S., equal to 659 per million living. In urban England, the rate was 851 per million, and in rural England 520. As in the case of enteric fever the county rates from diarrhoeal diseases

\* These were Bedfordshire, Cambridgeshire, Suffolk, Wiltshire, Shropshire, Rutlandshire, and Cumberland.

† The eleven counties in which the female rates exceeded the male rates in 1881-90 had an aggregate population of 2,526,000; they were Hertfordshire, Bedfordshire, Cambridgeshire, Suffolk, Wiltshire, Dorsetshire, Cornwall, Somersetshire, Shropshire, Rutlandshire, and Westmorland.

‡ It is worthy of note that six of these eleven counties are among the seven counties whose male rates decreased by a greater proportion than their female rates.

§ For further remarks on Continued fever, see pages xxvi, xxvii, ante.

TABLE T.—ENTERIC FEVER.—MEAN ANNUAL DEATH-RATES per Million Persons living 1871-80 and 1881-90.

COUNTIES.	Crude Death-rates.		
	1871-80.	1881-90.	Mortality in 1881-90 to that in 1871-80, taken as 100.
England and Wales - - -	322	196	61
London - - - - -	241	187	78
Surrey - - - - -	218	107	49
Kent - - - - -	251	158	63
Sussex - - - - -	193	133	69
Hampshire - - - -	302	208 +	69
Berkshire - - - - -	224	118	53
Middlesex - - - - -	241	163	68
Hertfordshire - - -	288	112	47
Buckinghamshire -	236	148	63
Oxfordshire - - - -	256	114	45
Northamptonshire -	326 +	181	56
Huntingdonshire - -	261	126	48
Bedfordshire - - - -	222	95	43
Cambridgeshire - - -	245	146	60
Essex - - - - -	238	177	74
Suffolk - - - - -	215	120	56
Norfolk - - - - -	252	191	76
Wiltshire - - - - -	236	101	43
Dorsetshire - - - - -	190	99	52
Devonshire - - - - -	312	175	56
Cornwall - - - - -	338 +	165	49
Somersetshire - - - -	257	106	41
Gloucestershire - - -	261	136	52
Herefordshire - - - -	194	60	31
Shropshire - - - - -	247	148	60
Staffordshire - - - -	363 +	203 +	56
Worcestershire - - - -	258	203 +	79
Warwickshire - - - -	296	138	47
Leicestershire - - - -	342 +	194	57
Rutlandshire - - - - -	306	80	26
Lincolnshire - - - - -	272	186	68
Nottinghamshire - - -	430 ++	268 ++	62
Derbyshire - - - - -	338 +	180	53
Cheshire - - - - -	288	210 +	73
Lancashire - - - - -	391 +	265 ++	68
West Riding - - - - -	452 ++	222 +	49
East Riding - - - - -	399 +	245 +	61
North Riding - - - - -	444 ++	260 ++	59
Durham - - - - -	559 +++	273 ++	49
Northumberland - - -	365 +	230 +	63
Cumberland - - - - -	293	135	46
Westmorland - - - - -	301	152	50
Monmouthshire - - - -	334 +	209 +	63
South Wales - - - - -	451 ++	264 ++	59
North Wales - - - - -	239	153	64

showed extreme variations. In the mainly rural counties of Wiltshire, Dorsetshire, Rutlandshire, Westmorland, and North Wales the diarrhoeal rate in no case exceeded 264 per million, whilst, in those counties of which the populations are for the most part urban in character, the rates were enormously greater. Thus, for example, the rate of Staffordshire was 838, that of Nottinghamshire 859, that of the East Riding of Yorkshire 875, that of Warwickshire 943, that of Lancashire 976, and that of Leicestershire 1,098, per million. According to Table 4 of the previous decennial supplement, the six counties last mentioned, together with Northumberland, Durham, and the East and West Ridings of Yorkshire, had been the counties showing the highest diarrhoea rates in 1871-80 also.

The local variations in the mortality incidental to the puerperal state are remarkable. When the ratio of deaths from puerperal fever and other accidents of childbirth to births registered is calculated for each county, as has been done in the subjoined table, it is seen that in 1881-90 the proportion varied from 3.31 deaths of mothers per thousand births in the county of Huntingdon, to as many as 6.74 per thousand in North Wales. If a line be drawn across the map of England and Wales from the Humber to the Severn, it will be found that the 17 registration counties to the north-west of this line include all the 14 counties in which the death-rate from puerperal fever and childbirth in 1881-90 exceeded the average rate for England and Wales, whilst in every one of the 28 counties to the south-east of this line the rate was below the average.

TABLE U.—DEATHS FROM PUERPERAL FEVER and other Accidents of CHILDBIRTH per 1000 Births, 1881-90.

England and Wales	- - -	4.73	Oxfordshire	- - -	4.51
North Wales	- - -	6.74	Surrey	- - -	4.44
South Wales	- - -	6.06	{ Buckinghamshire	- - -	4.34
Shropshire	- - -	5.52	{ Warwickshire	- - -	4.34
Lancashire	- - -	5.49	{ Lincolnshire	- - -	4.31
Cheshire	- - -	5.47	{ Cambridgeshire	- - -	4.29
Monmouthshire	- - -	5.30	{ Dorsetshire	- - -	4.29
West Riding	- - -	5.28	{ Devonshire	- - -	4.27
Northumberland	- - -	5.27	{ Hampshire	- - -	4.23
Durham	- - -	5.11	{ Somersetshire	- - -	4.23
{ North Riding	- - -	5.05	{ Leicestershire	- - -	4.22
{ Derbyshire	- - -	5.05	{ Sussex	- - -	4.17
Nottinghamshire	- - -	4.94	{ Berkshire	- - -	4.17
Herefordshire	- - -	4.77	Hertfordshire	- - -	4.16
Worcestershire	- - -	4.75	East Riding	- - -	4.09
Cumberland	- - -	4.70	Middlesex	- - -	4.06
Northamptonshire	- - -	4.67	Kent	- - -	4.02
{ Cornwall	- - -	4.66	Bedfordshire	- - -	3.97
{ Gloucestershire	- - -	4.66	London	- - -	3.94
{ Westmorland	- - -	4.66	Suffolk	- - -	3.71
Staffordshire	- - -	4.65	Essex	- - -	3.70
Norfolk	- - -	4.61	Rutlandshire	- - -	3.53
Wiltshire	- - -	4.55	Huntingdonshire	- - -	3.31

The mortality due to cancer or malignant disease in England and Wales during 1881-90 was equal to a mean annual rate of 589 per million living, without distinction of sex or age; but it varied widely in different parts of the country.\* Table V. shows the crude cancer death-rate in each registration county of England and Wales, for persons as well as for males and for females separately, in each of the last three decennia; and also the mortality

\* For further remarks on cancer mortality in earlier decennia, see pages xxviii, xxix.

of the several counties in 1881-90 as compared with that in 1861-70, the rate in the earlier decennium being taken as 100. The mean cancer death-rates of persons at all ages in 1881-90 ranged from 440 per million in Durham, 475 in Staffordshire, 477 in Lancashire, 482 in Derbyshire and in Monmouthshire, and 501 in South Wales, to 716 in Norfolk, 727 in Sussex, 736 in North Wales, 740 in Devonshire, 789 in Cambridgeshire, and 916 in Huntingdonshire. Moreover, it is noticeable that the counties which showed respectively either the highest or the lowest cancer rates in 1881-90 had also been among the counties with the highest or the lowest cancer rates in the two previous decennia. An examination of the uncorrected cancer rates in the separate registration districts within and around the counties of Huntingdonshire and Cambridgeshire, shows a fairly well defined area in which cancer would appear to be exceptionally prevalent. This area consists of the districts of Stamford, Bourn, Spalding, and Holbeach in Lincolnshire, Oundle and Peterborough in Northamptonshire, and the entire counties of Huntingdonshire and Cambridgeshire, with the exception of the registration districts of Caxton, Linton, and Newmarket. In 1881-90, this area had a mean population of over 300,000 persons, and its crude cancer rate in that decennium was equal to 859 per million persons living, or 46 per cent. above the general English rate. In the immediately preceding decennium the excess had been 44 per cent.

It is evident, however, that the mortality in a given place from cancer is largely dependent on the proportion of persons under and over middle age in the population; since the mortality from this disease is mainly confined to persons over 35 years of age. On this ground alone it might have been expected that the order of counties in the list would have varied considerably, according as the deaths of persons at all ages or of persons above 35 years of age were dealt with. Contrary to this expectation, however, Table X. shows that the counties with respectively the lowest or the highest crude death-rates at all ages are also among the counties with the lowest or the highest crude rates at ages over 35 years. But, although the same counties show the highest or the lowest cancer rates, as the case may be, whether the mortality at all ages, or that at ages over 35 years, is taken into account, the comparative mortality of the different counties is considerably altered by the second method of computation; for example, the cancer rate in Huntingdonshire to that in Durham, at all ages, is as 208 to 100; but, at ages over 35 years, it is only as 164 to 100.

If, however, account is taken of the varying age and sex distribution of persons over 35 years of age in the several counties—in other words, if the cancer mortality among that portion of a standard million of population which is over 35 years of age is considered, important changes become manifest, not only in the comparative mortality of different counties, but in their relative position as areas with high, medium, or low rates of cancer mortality (see Table X., page lvi). By this table, London is shown to have the highest rate of all, and Huntingdonshire, Cambridgeshire, Sussex, and North Wales, are still among the counties with the highest cancer rates; but the rates of Devonshire and Norfolk are below the mean rate for the whole country. At the other end of the list, Monmouthshire and Derbyshire are the only counties that after correction retain their places among the six with lowest cancer rates, the places of Staffordshire, Lancashire, Durham, and South Wales being filled by Dorsetshire, Buckinghamshire, Wiltshire, and Cornwall.

After this correction for age and sex differences of population, the cancer mortality of Huntingdonshire is to that of Durham as 127 only to 100, while the crude rate at all ages is as 208 to 100. On the other hand, although the crude rates for London and Cornwall are nearly equal, their difference being about 2 per cent. of either of them, the corrected rate for London is to that for Cornwall as 138 to 100.

TABLE V.—CANCER.—MEAN UNCORRECTED ANNUAL DEATH-RATES\* in REGISTRATION COUNTIES per Million living at All Ages.

COUNTIES.	PERSONS.				MALES.				FEMALES.			
	1861-70.	1871-80.	1881-90.	Ratio.†	1861-70.	1871-80.	1881-90.	Ratio.†	1861-70.	1871-80.	1881-90.	Ratio.†
England and Wales	387	473	589	152	244	315	430	176	523	622	739	141
London	487	554	683	140	285	352	504	177	664	732	843	127
Surrey	418	479	603	144	231	307	429	186	597	637	759	127
Kent	388	482	616	159	235	313	439	187	543	647	788	145
Sussex	459	573	727	158	311	396	542	174	595	735	890	150
Hampshire	394	513	632	160	265	339	472	178	523	684	784	150
Berkshire	446	538	656	147	268	346	486	181	620	732	823	133
Middlesex	434	465	547	126	268	291	385	144	585	623	692	118
Hertfordshire	406	464	668	165	264	263	511	194	543	657	817	150
Buckinghamshire	396	458	582	147	266	324	425	160	522	587	734	141
Oxfordshire	422	506	670	159	288	332	494	172	552	659	835	151
Northamptonshire	399	532	648	162	286	387	530	185	512	676	766	150
Huntingdonshire	647	778	916	142	504	658	795	158	784	894	1,032	132
Bedfordshire	380	543	655	172	259	429	482	186	488	646	809	166
Cambridgeshire	485	642	789	163	354	501	644	182	611	778	930	152
Essex	421	478	543	129	261	322	391	150	583	635	694	119
Suffolk	456	542	693	152	272	367	500	184	634	709	876	138
Norfolk	453	601	716	158	270	388	507	188	623	800	911	146
Wiltshire	428	520	617	144	271	339	442	163	579	690	786	136
Dorsetshire	431	509	629	146	300	374	467	156	555	639	785	141
Devonshire	467	598	740	158	318	421	538	169	603	756	922	153
Cornwall	379	513	667	176	269	403	530	197	477	611	787	165
Somersetshire	439	538	669	152	287	372	489	170	575	687	828	144
Gloucestershire	446	513	667	150	265	341	459	173	606	665	846	140
Herefordshire	356	561	708	199	163	369	529	325	551	744	881	160
Shropshire	425	518	704	166	291	353	542	186	558	672	865	155
Staffordshire	298	391	475	159	190	258	349	184	409	526	602	147
Worcestershire	366	450	553	151	223	286	407	183	499	601	687	138
Warwickshire	372	484	617	166	223	310	467	209	514	650	759	148
Leicestershire	372	493	563	151	257	354	426	166	482	643	691	143
Rutlandshire	384	599	687	179	275	457	631	229	493	741	743	151
Lincolnshire	388	535	662	171	275	382	497	181	500	687	825	165
Nottinghamshire	391	479	568	145	228	304	393	172	545	648	734	135
Derbyshire	295	372	482	163	184	243	320	174	406	501	643	158
Cheshire	350	441	547	156	225	312	407	181	467	561	678	145
Lancashire	306	379	477	156	184	241	335	182	419	508	609	145
West Riding	325	398	517	159	190	246	351	185	456	544	675	148
East Riding	437	483	594	136	261	290	416	159	606	671	767	127
North Riding	433	472	597	138	306	298	454	148	560	619	742	133
Durham	290	329	440	152	175	220	310	177	411	452	575	140
Northumberland	368	438	557	151	252	294	422	167	484	581	691	143
Cumberland	398	493	616	155	303	374	489	161	490	611	741	151
Westmorland	311	471	637	205	238	359	535	225	386	583	736	191
Monmouthshire	331	411	482	146	220	309	355	161	450	520	616	137
South Wales	296	398	501	169	230	314	400	174	362	481	603	167
North Wales	352	503	736	209	274	419	608	222	428	588	861	201

\* The rates in this table have not been corrected for age constitution of the population.  
 † That is, ratio of mortality in 1881-90 to that in 1861-70, the latter taken as 100.

In Table W. the corrected mortality from cancer at ages over 35 years is shown for each registration county. In Table X. both the crude and the corrected rates are shown for the two sexes together, and for each sex separately, the counties being arranged in the order of their corrected rates for "Persons."

TABLE W.—CANCER, 1881-90.—MEAN ANNUAL DEATH-RATES above 35 Years of Age, in REGISTRATION COUNTIES, corrected for Sex and Age Distribution of their several Populations.

Registration County.	Annual Death-rates in that Part of a Standard Million above 35 Years of Age.	Registration County.	Annual Death-rates in that Part of a Standard Million above 35 Years of Age.
England and Wales	1,844	Gloucestershire	1,825
London	2,250	Herefordshire	1,726
Surrey	1,891	Shropshire	1,792
Kent	1,815	Staffordshire	1,663
Sussex	1,999	Worcestershire	1,653
Hampshire	1,788	Warwickshire	1,976
Berkshire	1,818	Leicestershire	1,736
Middlesex	1,881	Rutlandshire	1,663
Hertfordshire	1,772	Lincolnshire	1,795
Buckinghamshire	1,578	Nottinghamshire	1,808
Oxfordshire	1,779	Derbyshire	1,597
Northamptonshire	1,881	Cheshire	1,779
Huntingdonshire	2,157	Lancashire	1,706
Bedfordshire	1,785	West Riding	1,765
Cambridgeshire	2,012	East Riding	1,831
Essex	1,732	North Riding	1,884
Suffolk	1,749	Durham	1,696
Norfolk	1,775	Northumberland	1,897
Wiltshire	1,604	Cumberland	1,914
Dorsetshire	1,578	Westmorland	1,746
Devonshire	1,835	Monmouthshire	1,574
Cornwall	1,630	South Wales	1,647
Somersetshire	1,732	North Wales	1,914

It will be noted that next to London, the high "corrected" rate in which is largely due to the presence of hospitals in which cancer is specially treated, Huntingdonshire and Cambridgeshire show the greatest liability to that disease. But whereas the crude rates at all ages represent Huntingdonshire and Cambridgeshire as subject to a cancer mortality in excess of the general English rate by 56 per cent. and by 34 per cent. respectively, the rates over 35 years, corrected for age and sex differences of population, show an excess of only 17 per cent. for Huntingdonshire, and of 9 per cent. for Cambridgeshire.

Referring to the group of registration districts in and around these two counties, which [as already stated showed an excess of cancer mortality amounting to 44 per cent. in 1871-80, and to 46 per cent. in 1881-90, it is found that by due correction for age and sex differences of population, the excess above the average rate for England is reduced, in both cases, to 14 per cent. This reduction does not, however, affect both sexes alike, and reference to Table X. shows that, as compared with the rates for the whole country, the corrected cancer death-rate of males is subject to much

TABLE X.—CANCER, 1881-90.—CRUDE and CORRECTED DEATH-RATES PER MILLION LIVING aged 35 and upwards. The Counties arranged in descending order of Corrected Rates.

REGISTRATION COUNTY.	PERSONS.		MALES.		FEMALES.		Male to Female Mortality, the latter taken as 100.	
	Crude.	Cor-rected.	Crude.	Cor-rected.	Crude.	Cor-rected.	Crude.	Cor-rected.
England and Wales	1,844	1,844	1,379	1,379	2,261	2,261	61	61
London	2,132	2,250	1,619	1,734	2,562	2,667	63	67
Huntingdonshire	2,529	2,157	2,320	1,916	2,718	2,373	85	81
Cambridgeshire	2,271	2,012	1,941	1,666	2,566	2,323	76	72
Sussex	2,144	1,999	1,648	1,491	2,549	2,454	65	61
Warwickshire	1,953	1,976	1,512	1,533	2,351	2,373	64	65
Cumberland	1,950	1,914	1,567	1,533	2,309	2,254	68	68
North Wales	2,112	1,914	1,789	1,596	2,408	2,198	74	73
Northumberland	1,820	1,897	1,407	1,484	2,234	2,267	63	65
Surrey	1,891	1,891	1,395	1,401	2,307	2,329	60	60
North Riding	1,908	1,884	1,436	1,380	2,389	2,336	60	59
Northamptonshire	1,983	1,881	1,663	1,526	2,288	2,198	73	69
Middlesex	1,809	1,881	1,307	1,408	2,228	2,304	59	61
Devonshire	2,099	1,835	1,606	1,366	2,497	2,254	64	61
East Riding	1,836	1,831	1,300	1,282	2,343	2,323	55	55
Gloucestershire	1,974	1,825	1,395	1,282	2,441	2,311	57	55
Berkshire	1,943	1,818	1,436	1,338	2,359	2,248	63	60
Kent	1,894	1,815	1,375	1,282	2,370	2,292	58	56
Nottinghamshire	1,814	1,808	1,236	1,206	2,359	2,348	52	51
Lincolnshire	1,956	1,795	1,501	1,303	2,391	2,236	63	58
Shropshire	1,991	1,792	1,537	1,359	2,372	2,180	67	62
Hampshire	1,889	1,788	1,458	1,338	2,269	2,192	64	61
Bedfordshire	1,939	1,785	1,486	1,303	2,310	2,217	64	59
Oxfordshire	1,966	1,779	1,490	1,296	2,388	2,211	62	59
Cheshire	1,740	1,779	1,320	1,338	2,120	2,173	62	62
Norfolk	2,009	1,775	1,464	1,220	2,483	2,273	59	54
Hertfordshire	1,939	1,772	1,556	1,366	2,274	2,136	68	64
West Riding	1,666	1,765	1,141	1,227	2,151	2,248	53	55
Suffolk	2,009	1,749	1,501	1,206	2,464	2,236	61	54
Westmorland	1,902	1,746	1,581	1,373	2,215	2,080	71	66
Leicestershire	1,780	1,736	1,359	1,289	2,166	2,136	63	60
Essex	1,744	1,732	1,275	1,234	2,191	2,180	58	57
Somersetshire	1,943	1,732	1,482	1,296	2,313	2,123	64	61
Herefordshire	1,932	1,726	1,443	1,220	2,391	2,180	60	56
Lancashire	1,562	1,706	1,123	1,275	1,951	2,092	58	61
Durham	1,543	1,696	1,087	1,227	2,026	2,117	54	58
Staffordshire	1,605	1,663	1,192	1,234	2,009	2,048	59	60
Rutlandshire	1,929	1,663	1,764	1,429	2,032	1,874	85	76
Worcestershire	1,713	1,653	1,275	1,213	2,096	2,048	61	59
South Wales	1,651	1,647	1,348	1,352	1,942	1,911	69	71
Cornwall	1,900	1,630	1,654	1,380	2,083	1,855	79	74
Wiltshire	1,799	1,604	1,343	1,122	2,215	2,036	61	55
Derbyshire	1,567	1,597	1,040	1,038	2,080	2,098	50	49
Buckinghamshire	1,714	1,578	1,285	1,129	2,105	1,980	61	57
Dorsetshire	1,784	1,578	1,356	1,143	2,163	1,967	63	58
Monmouthshire	1,557	1,574	1,170	1,157	1,961	1,948	60	59

greater local variation than is that of females. The extreme range of mortality in counties is for males from 75 to 139 per cent., and for females from 82 to 118 per cent. of the respective English rates. These local variations are shown in another way in the last column of Table X., from which it appears that the corrected mortality of males aged 35 and upwards, compared with that of females of the same age, ranged from 49 per cent. in Derbyshire, 51 in Nottinghamshire, and 54 in Norfolk and in Suffolk, to 71 per cent. in South Wales, 72 in Cambridgeshire, 73 in North Wales, 74 in Cornwall, 76 in Rutlandshire, and 81 in Huntingdonshire, the proportion for the whole country being 61 per cent. There appears to be no direct connexion between the general prevalence of cancer and the proportion of male to female mortality from that disease in any county, but it is obvious that the apparent local differences in cancer mortality are due very largely to differences in the age and sex constitution of the populations.

In the decennium 1881-90 the mortality from phthisis, which was equal to a rate of 1,724 per million living in England and Wales as a whole, showed considerable variation in the counties taken separately. In Table Y. the uncorrected or crude phthisis rates for persons, and for males and females separately, are shown for the several counties in each of the last three decennia. The mortality of each county in 1881-90 is also compared with that in 1861-70, the rate in the earlier decennium being taken as 100. In order, however, to obtain a fair basis of comparison between the various county rates, it is necessary to make allowance for the widely differing composition of the several populations in regard to age and sex.

Unfortunately there is no period of life that enjoys complete immunity from the ravages of phthisis; but, although the mortality from that disease varies considerably at different ages, the variations are not sufficiently extreme to warrant the selection of a group of ages as almost exclusively liable to the disease. In this respect phthisis differs widely from cancer. Following the principle already adopted in this supplement with respect to the general death-rates, the phthisis rates for the several counties have been reduced to a uniform basis of population, namely, that of a standard million (*see p. xxxvii*) and in Table Z. these corrected county rates are shown for persons as well as for males and females. The counties are arranged in the descending order of their corrected death-rates for "persons"; it will, therefore, be seen that the mean annual rates from phthisis in the last decennium have varied from 2,112 in North Wales and 2,095 in Northumberland to 1,217 in Worcestershire. The table shows that the 11 counties at the head of the list, representing an aggregate population of more than 14 millions, had rates above the average rate for England and Wales; and that the remaining 34 counties, representing a total population of about 13 millions, had rates below the average.

Of the 11 counties whose corrected rates for persons were in excess of the English rate, only 7 showed excess in the rates for both sexes. In London, although the male rate was largely in excess, the female rate fell below the average of the whole country; whilst in Cambridgeshire, Suffolk, and Durham, although the male rates were below the average, the female rates were in excess. In 10 other counties the rate for one or other of the sexes was above the average, although the rate for the two sexes together fell below it.

The table further shows that in 24 counties, containing more than three-fourths of the entire population of England and Wales, the male death-rates were in excess of the female rates; whilst in the remaining 21 counties, containing less than one-fourth of the population, the female rates were in excess of the male rates. The exact relation between the figures for males and those for females is shown in the last column of the table. In London, Hampshire, Sussex, Warwickshire, Surrey, Middlesex, and Worcestershire,



TABLE Y.—PHTHISIS.—MEAN UNCORRECTED DEATH-RATES\* in REGISTRATION COUNTIES per Million Living at all Ages.

COUNTIES.	PERSONS.				MALES.				FEMALES.			
	1861-70.	1871-80.	1881-90.	Ratio.†	1861-70.	1871-80.	1881-90.	Ratio.†	1861-70.	1871-80.	1881-90.	Ratio.†
England and Wales	2,475	2,116	1,724	70	2,467	2,209	1,847	75	2,483	2,028	1,609	65
London	2,842	2,511	2,078	73	3,350	3,002	2,547	76	2,397	2,076	1,659	69
Surrey	2,114	1,908	1,574	74	2,410	2,250	1,822	76	1,830	1,595	1,352	74
Kent	2,092	1,828	1,511	72	2,082	1,880	1,554	75	2,102	1,777	1,470	70
Sussex	2,515	2,052	1,662	66	2,509	2,177	1,855	74	2,520	1,938	1,493	59
Hampshire	2,426	2,199	1,849	76	2,474	2,424	2,088	84	2,378	1,989	1,625	68
Berkshire	2,370	1,924	1,473	62	2,357	1,952	1,596	68	2,382	1,913	1,353	57
Middlesex	2,141	1,780	1,376	64	2,232	1,973	1,556	70	2,058	1,606	1,216	59
Hertfordshire	1,920	1,746	1,434	75	1,898	1,822	1,546	81	1,941	1,673	1,327	68
Buckinghamshire	2,063	1,689	1,295	63	1,876	1,552	1,252	67	2,244	1,820	1,337	60
Oxfordshire	2,270	1,876	1,388	61	2,141	1,832	1,459	68	2,396	1,900	1,321	55
Northamptonshire	2,142	1,857	1,413	66	1,863	1,759	1,443	77	2,418	1,953	1,384	57
Huntingdonshire	2,418	1,932	1,536	64	2,302	1,726	1,468	64	2,531	2,130	1,602	63
Bedfordshire	2,368	2,118	1,507	64	2,009	1,896	1,388	69	2,690	2,317	1,612	60
Cambridgeshire	2,408	1,985	1,666	69	2,331	1,959	1,674	72	2,483	2,011	1,659	67
Essex	2,164	1,833	1,431	66	2,093	1,875	1,479	71	2,235	1,790	1,383	62
Suffolk	2,441	2,023	1,707	70	2,154	1,884	1,663	77	2,716	2,157	1,748	64
Norfolk	2,395	1,938	1,495	62	2,206	1,859	1,462	66	2,569	2,011	1,527	59
Wiltshire	2,038	1,741	1,451	71	1,923	1,699	1,429	74	2,149	1,763	1,471	68
Dorsetshire	2,022	1,719	1,392	69	1,797	1,629	1,352	75	2,236	1,806	1,430	64
Devonshire	2,317	2,066	1,708	74	2,293	2,067	1,757	77	2,339	2,065	1,663	71
Cornwall	2,491	2,198	1,766	71	2,623	2,365	1,877	72	2,372	2,050	1,669	70
Somersetshire	1,901	1,652	1,352	71	1,879	1,699	1,428	76	1,922	1,611	1,284	67
Gloucestershire	2,116	1,813	1,480	70	2,174	1,912	1,542	71	2,065	1,724	1,426	69
Herefordshire	1,806	1,521	1,249	69	1,746	1,508	1,206	69	1,866	1,514	1,291	69
Shropshire	2,169	1,641	1,369	63	2,022	2,643	1,368	68	2,316	1,640	1,371	59
Staffordshire	2,043	1,600	1,346	66	1,945	1,640	1,412	73	2,142	1,659	1,279	60
Worcestershire	1,704	1,481	1,196	70	1,628	1,551	1,338	82	1,774	1,416	1,067	60
Warwickshire	2,240	1,953	1,604	72	2,380	2,213	1,889	79	2,107	1,706	1,335	63
Leicestershire	2,183	1,769	1,292	59	1,903	1,750	1,372	72	2,450	1,787	1,217	50
Rutlandshire	1,899	1,418	1,272	67	1,613	1,501	1,191	74	2,183	1,336	1,352	62
Lincolnshire	1,959	1,688	1,467	75	1,688	1,516	1,326	79	2,226	1,860	1,606	72
Nottinghamshire	2,482	1,961	1,605	65	2,090	1,838	1,604	77	2,853	2,078	1,607	56
Derbyshire	2,494	1,903	1,406	56	2,062	1,776	1,365	66	2,925	2,029	1,446	49
Cheshire	2,444	2,008	1,606	66	2,282	1,954	1,667	73	2,596	2,057	1,549	60
Lancashire	2,923	2,467	1,954	67	2,904	2,600	2,101	72	2,940	2,343	1,816	62
West Riding	2,649	2,259	1,852	70	2,540	2,321	1,985	78	2,755	2,199	1,724	63
East Riding	2,329	1,967	1,653	71	2,196	1,940	1,685	77	2,458	1,993	1,622	66
North Riding	1,963	1,691	1,467	75	1,737	1,520	1,379	79	2,189	1,750	1,557	61
Durham	2,052	1,925	1,699	83	1,830	1,826	1,592	87	2,287	2,079	1,811	79
Northumberland	2,495	2,275	2,086	84	2,458	2,324	2,121	86	2,532	2,225	2,051	81
Cumberland	2,761	2,197	1,621	59	2,530	2,081	1,591	63	2,985	2,312	1,651	55
Westmorland	2,451	2,030	1,404	57	2,288	1,857	1,354	59	2,618	2,203	1,451	55
Monmouthshire	2,085	1,790	1,411	68	1,914	1,708	1,286	67	2,267	1,877	1,543	68
South Wales	2,981	2,543	2,008	67	2,969	2,515	1,936	65	2,993	2,576	2,080	69
North Wales	3,277	2,374	2,077	63	3,121	2,437	2,012	64	3,431	2,713	2,140	62

\* The rates in this table have not been corrected for age constitution of population.  
 † That is, the ratio of mortality in 1881-90 to that in 1861-70, the latter taken as 100.

TABLE Z.—PHTHISIS, 1881-90. MEAN ANNUAL DEATH-RATES from PHTHISIS in REGISTRATION COUNTIES, corrected for Age and Sex Distribution of their several Populations.

REGISTRATION COUNTIES.	ANNUAL DEATHS IN A STANDARD MILLION.			Mortality of Males to that of Females, taken as 100.
	Persons.	Males.	Females.	
England and Wales	1,724	1,847	1,609	115
North Wales	2,112	2,014	2,204	91
Northumberland	2,095	2,115	2,076	102
South Wales	2,003	1,872	2,126	88
London	2,001	2,447	1,580	155
Lancashire	1,923	2,074	1,730	117
Hampshire	1,845	2,084	1,619	129
West Riding	1,834	1,967	1,709	115
Suffolk	1,803	1,765	1,839	96
Cornwall	1,788	1,895	1,687	112
Durham	1,744	1,611	1,870	86
Cambridgeshire	1,736	1,730	1,742	99
Devonshire	1,718	1,782	1,658	107
Sussex	1,666	1,882	1,462	129
East Riding	1,656	1,672	1,641	102
Cumberland	1,656	1,613	1,697	95
Huntingdonshire	1,646	1,539	1,747	88
Nottinghamshire	1,623	1,619	1,627	100
Warwickshire	1,619	1,907	1,347	142
Cheshire	1,599	1,666	1,536	108
Surrey	1,560	1,815	1,320	138
Norfolk	1,553	1,514	1,590	95
Bedfordshire	1,549	1,462	1,631	90
Kent	1,528	1,567	1,491	105
Lincolnshire	1,527	1,355	1,689	80
Wiltshire	1,519	1,481	1,555	95
Gloucestershire	1,510	1,592	1,433	111
Hertfordshire	1,502	1,631	1,380	118
North Riding	1,502	1,392	1,606	87
Berkshire	1,494	1,615	1,380	117
Essex	1,479	1,518	1,442	105
Northamptonshire	1,453	1,473	1,434	103
Monmouthshire	1,451	1,279	1,613	79
Derbyshire	1,432	1,374	1,487	92
Oxfordshire	1,430	1,506	1,359	111
Shropshire	1,425	1,403	1,446	97
Dorsetshire	1,424	1,374	1,471	93
Westmorland	1,418	1,353	1,479	91
Somersetshire	1,411	1,512	1,316	115
Middlesex	1,394	1,594	1,205	132
Staffordshire	1,394	1,454	1,337	109
Rutlandshire	1,362	1,260	1,458	86
Buckinghamshire	1,355	1,316	1,392	95
Leicestershire	1,315	1,396	1,238	113
Herefordshire	1,304	1,240	1,365	91
Worcestershire	1,217	1,368	1,075	127

the mortality of males exceeded that of females by proportions varying from 27 to 55 per cent. On the other hand, in South Wales, Durham, Huntingdonshire, Lincolnshire, North Riding of Yorkshire, Monmouthshire, and Rutlandshire, the male rate was from 12 to 21 per cent. below the female rate.

The phthisis mortality of London is vitiated by inclusion therein of the deaths of strangers which occur in institutions situated in London, as well as by the omission of deaths of Londoners occurring in Metropolitan Institutions outside Registration London. In dealing, however, with London mortality, adjustments are now made for these disturbances; and in future years the metropolitan death-rates from phthisis corrected as above-mentioned will be regularly published.

I am indebted to my immediate predecessor, Dr. William Ogle, for much helpful advice in connexion both with this report and with the ordinary administration of my department, at a time when recent succession to office rendered such services especially welcome. Mr. Noel A. Humphreys has assisted me in the course of this work with many useful suggestions, which derive additional value from the fact of his long personal association with the late Dr. Farr in the statistical work of this department. To Mr. A. C. Waters my thanks are due for his able assistance in connexion with the present report, and especially in regard to the preparation of the New English Life Table. Mr. J. Hampden Shoveller, also, has rendered me continuous and willing help in the compilation of the mass of tabular matter which forms a large portion of this volume, as well as in the calculation of the many thousands of rates which will be found interspersed throughout its pages.

I have the honour to be,  
Sir,  
Your obedient servant,

JOHN TATHAM.

Sir Brydges P. Henniker, Bart.,  
Registrar General.

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99	1.000	1.000	1.000
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4	1.000	1.000	1.000
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