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SUPPLEMENT

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TO THE

FIFTY-FIFTH ANNUAL REPORT

OF THE

REGISTRAR-GENERAL

OF

BIRTHS, DEATHS, AND MARRIAGES

IN ENGLAND.

PART II.

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



LONDON:

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BY EYRE AND SPOTTISWOODE,
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1897.

[C.-8503.] Price 1s. 6d.

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LETTER

TO

The REGISTRAR-GENERAL on the MORTALITY of MALES engaged in certain occupations in the THREE YEARS 1890-92; and on an ENGLISH HEALTHY DISTRICT LIFE TABLE for the TEN YEARS 1881-90, by JOHN TATHAM, Esq., M.A., M.D.

General Register Office,
Somerset House, London,

27 May 1897.

SIR,

I have now the honour to submit, for your consideration, the second and concluding part of my Supplementary Report for the ten years 1881-90, Part I. of which has already been presented to Parliament.

The earlier portion of the present volume embodies the results of a study of English mortality as observed in each of several industries during the three years 1890-92.

In statistical researches on mortality, the need is frequently experienced of a standard of vitality more exacting than that which is supplied by a life table of the general population. Accordingly a selection has been made of those districts of England and Wales which are shown to be the healthiest, according to the death-rates prevailing in the ten years 1881-90, and a new Healthy District Life Table has been constructed, which will be found, accompanied by full explanations, in a later part of the volume.

The mortality during the three years 1890-92 in the same healthy districts has likewise been ascertained, and thus an independent standard has been established, with which the mortality in certain occupations may fairly and usefully be compared.

MORTALITY OF MEN ENGAGED IN DIFFERENT OCCUPATIONS.

In the Decennial Supplement to the Registrar-General's 25th Annual Report, Dr. Farr made an early attempt to determine the incidence of mortality on men engaged in different occupations; and the attempt has been renewed on an extended scale by him and by his immediate successor, respectively, in the Decennial Supplements which have since appeared.

Dr. Farr based the calculations in his first Supplement on the numbers living in 1861, and the deaths in 1860 and 1861; and the calculations in his second Supplement partly on the numbers living and the deaths in 1871, and partly on a combination of the two sets of facts. Dr. Ogle's calculations ten years later were based on the census population in 1881 and the deaths in three consecutive years 1880-81-82. In the following pages I have set out the details of mortality in the three years 1890-91-92, and in so doing I have taken frequent opportunities of comparing recent experience with the experience of earlier years.

In Dr. Farr's two Decennial Supplements the mortality of men engaged in several industries was considered *in relation to age only*; no attempt having been made to treat of the *causes of death*. In dealing with the

mortality of 1880-2, however, Dr. Ogle resolved to make such an attempt. The magnitude of the task deterred him from classifying the causes of the total deaths in the three years in combination with occupations and ages; but as an alternative he abstracted from the registers "considerable samples" of the causes of death in several industries, and divided out the total mortality of each industry among these causes according to the proportions existing in the respective samples. In this way Dr. Ogle was able to prepare the valuable tables on "Causes of Deaths of Males in Different Industries," which illustrated his decennial report. But when the time came for the preparation of material for the present Supplement, so strongly was he impressed with the necessity of securing the widest possible basis of fact for the elucidation of questions relating to occupational mortality, that he determined to face a task which had previously seemed impracticable. With the help of a portion of the census staff, he caused to be extracted from the death registers on separate slips of paper the age, the occupation, and the registered cause of death of every male over 15 years of age who had died in England and Wales in the three years 1890-92. The slips, more than half a million in number, were then examined by clerks who had been employed in classifying occupations for the Census Report, and each slip was distinctively marked with the heading under which the occupation should fall. This stage had been reached by the end of 1893, at which time I succeeded Dr. Ogle in this office, and consequently became responsible for the remaining processes of the work.

At the outset, thanks to the forethought of Dr. Ogle, I found myself in possession of a mass of statistical material on the subject of occupational mortality more copious than any that had been at the command of previous inquirers. In determining the uses to be made of this material, it was at once seen to be of the first importance for purposes of comparison that the methods adopted should be as nearly as possible identical with those which had been employed by my predecessors, and that any alterations in the form of tables should partake mainly of the nature of developments. Dr. Ogle had classed the causes of death under thirteen headings—alcoholism, liver disease, gout, phthisis, diseases of the nervous, circulatory, respiratory, digestive, and urinary systems, plumbism, accident, suicide, and "all other causes." After careful consideration, I determined to increase the number of headings to twenty-four by distinguishing valvular disease of heart and aneurism from other circulatory diseases; bronchitis, pneumonia, and pleurisy from other respiratory diseases; hernia from other digestive diseases; Bright's disease from other urinary diseases; and by separating influenza, rheumatic fever, cancer, and diabetes from "all other causes." The task of marking the half million slips in such a manner as to indicate clearly to which of the twenty-four headings each cause of death belonged, could, of course, be entrusted only to responsible persons possessing special knowledge and experience; and this duty necessarily fell upon the permanent staff of the department. The next process—that of sorting and counting the mass of slips thus prepared—was mainly executed by a staff of junior clerks specially engaged for the purpose; but the arrangement and supervision of their work, as well as the working out of the calculations that were necessary in order to reduce the bare figures to a form in which their meaning should be manifest, formed a further heavy addition to the work of the permanent staff. This fact will sufficiently account for the delay that has occurred in the completion of Part II. of the present Supplement.

There is abundant evidence to show that the mortality of men similarly employed is powerfully influenced by conditions of occupation, which for the most part prevail locally. With the object of learning something concerning the extent of that influence, whilst at the same time avoiding undue elaboration of detail, I adopted the following plan. As a preliminary to sorting, the slips belonging severally to London, and to certain groups of counties and districts, the populations of which are mainly engaged either in industrial, in agricultural, or in mining occupations,* were separated from those belonging to the remaining parts of the country. Provision having been made for the fact that some of these groups overlap one another—for example, that some districts in distinctively mining counties are the seats of other industrial occupations also—the work of sorting was commenced. The slips belonging to each group of districts were arranged, in accordance with the marking

* The sample of industrial districts was made up as follows:—

Registration County or District.	Special Industry for which selected.
Lancashire (Entire County)	Cotton.
Wolverhampton	Iron and Steel.
Birmingham (with Aston)	Iron, Steel, and Brass.
Leicester	Boots and Hosiery.
Nottingham	Lace.
Huddersfield	Woollen.
Halifax	
Bradford	Iron, Steel, Woollen, Boots.
Leeds (with Hunslet, Holbeck, and Bramley)	
Sheffield (with Ecclesall Bierlow)	

The "Agricultural Group" contains all those counties in which at least one-third of the occupied males over 10 years of age were returned at the census as farmers and their labourers; to these are added parts of certain counties in which, after the exclusion of some of their principal towns, a like proportion of the population was found to consist of farmers and their labourers. In order to avoid possible confusion as between different grades of labourers, it may be mentioned that all those who were described simply as "labourers" in these agricultural districts have been counted as "farm labourers" for the purposes of this report.

The following is a list of these counties and parts of counties:—

County.	Percentage of Farmers and their Labourers over 10 years of age.	County.	Percentage of Farmers and their Labourers over 10 years of age.
Radnorshire	61.2	Brecknockshire	39.0
Montgomeryshire	53.8	Westmorland	38.9
Huntingdonshire	53.7	Shropshire	38.4
Cardiganshire	50.0	Berkshire (less Reading)	38.4
Herefordshire	49.2	Hertfordshire	37.5
Anglesey	48.8	Bedfordshire	37.5
Norfolk (less Norwich)	48.5	Dorsetshire	37.5
Cambridgeshire	48.0	Buckinghamshire	37.4
Rutlandshire	44.4	East Riding (less Hull and Sculcoates).	36.7
Lincolnshire	43.6	Merionethshire	36.6
Suffolk	42.7	Devonshire (less Plymouth, Stoke Damerel, and Exeter).	36.1
Pembrokeshire	37.5		
Wiltshire	40.3		
Oxfordshire	39.8		

For comparison of the mortality of coal-miners in different parts of the country, separate statistics for this occupation were compiled for six local areas: (1) Durham and Northumberland; (2) Lancashire; (3) The West Riding of Yorkshire; (4) Derbyshire and Nottinghamshire; (5) Staffordshire; (6) Monmouthshire and South Wales.

already explained, in rather more than 400 parcels, corresponding to the extended list of occupations in the Census Report. To prepare complete mortality statistics for each of these occupations was obviously out of the question. My predecessors had selected for special notice some of the more definite industries, and had arranged others in groups, thus bringing the total number of headings within manageable limits. By a slight modification of Dr. Ogle's plan, I prepared a list of 100 separate headings, which included the whole of the occupations, and the assorted parcels of slips were then arranged under these headings, in readiness for the final sorting by age and by cause of death. On the completion of this final sorting the slips were counted and the numbers entered on sheets prepared for the purpose; and, finally, by adding together all the sheets belonging to each of the occupational groups, the 149 tables on pp. 2-150 were produced. In this manner the mass of detached facts, representing in the aggregate more than half a million deaths, have been reduced to tabular form, and adapted to the purposes of statistical investigation.

As previously stated, the extracts from the death registers have been limited to facts concerning males aged 15 years and upwards. Among the reasons for excluding the female sex from this inquiry may be mentioned: first, the uncertainty attaching to the statement of female occupations, both in the census returns and in the death registers; and secondly, the fact that, while 94 out of every 100 males at these ages are returned as following more or less definite occupations, only 38 out of every 100 females at the same ages are so returned. Even if trustworthy statistics could be obtained, the influence of occupation will scarcely be appreciable very early in life: for this reason it is that boys under 15 years of age have also been excluded. It will be seen further on that even in the next age-group, 15-20 years, there is considerable doubt as to the accuracy of the numbers, either of the living or of the dead.

Having thus roughly indicated the general lines of this inquiry and explained the earlier processes of the work, I proceed to minuter detail. In the course of these remarks it will be necessary to refer very frequently to the three-year period 1860-61, 71, and to the period 1880-81-82, in order to compare the rates of death in those years with the rates in the period 1890-91-92. In the following pages these three intervals will be referred to, sometimes under the shortened titles "1871," "1881," and "1891," and at other times as the "first, second, and third periods" respectively.

Although it is obvious that all references to the rates of mortality which prevailed in the three years 1890-92 should in strictness be made in the past tense, nevertheless, in the following pages it has at times been found possible to avoid tiresome repetition by using the present tense instead of the past. This conventional mode of expression has already been used in Part I., in discussing the general and local mortality of 1881-90; but its adoption must nowhere be taken to imply an assumption that the mortality has remained constant from the period dealt with until the date of writing.

The tables on pp. 2 to 150, already alluded to, present a statistical statement of mortality arranged in 7 age-groups and under 24 causes of death, for each of the 100 selected occupations, in the three years 1890-92. To each table there has been added a line of figures, (obtained by trebling the numbers enumerated at the census of 1891,) which show approximately the years of life at risk in each age-group during the three years 1890-92. A further line giving the mean annual rates of death completes each table. For facility of reference each of the

100 occupations bears a distinctive number, these numbers being as nearly as possible in the order in which the occupations appear in the Census Report. Among these tables have been interpolated similar tables showing the mortality in groups of occupations—for example, a table for shopkeepers as represented by the occupations numbered 28-38 is inserted immediately after the table numbered 38. Other tables likewise are given showing the mortality in localised or other subdivisions of some of the numbered occupations—for instance, following the table headed "Inn, Hotel—Servant," which is numbered 27 in the list of occupations, are tables headed "Inn, Hotel—Servant (London)," "Inn, Hotel—Servant (Industrial Districts)," and "Inn, Hotel—Servant (Agricultural Districts)," which are numbered 27*a*, 27*b*, 27*c* respectively.

For the sake of convenience the figures relating to ages have been collected from the whole of these tables, and have been placed together in Table I. (p. cxx). Table II., which immediately follows, is a key to the constitution of the selected occupational groups.

Dr. Farr, in his Supplement to the 35th Report, indicated the period of life between 25 and 65 years of age as that in which "the influence of profession is most felt."* Ten years later, Dr. Ogle adopted the same view, supporting it by the argument that "in the earlier age-periods the effect of occupation is not as yet fully developed; and the last age-period, 65 years of age and upwards, is that which is more especially affected by the . . . retirement from the industry of such men as have become too weakly to follow it."† My own recent inquiries having tended to confirm the opinion expressed on this subject by my predecessors, I have, in the present volume, retained the same interval, namely, that between 25 and 65 years of age, as marking the period of life during which the effects of occupation are most conspicuous. In the case of the majority of industries this is generally held to be the term of years which most accurately measures the duration of man's greatest capacity for effective work. There are, however, several industries in which this is by no means the case. The learned professions, for example, furnish striking exceptions: for, apart from the fact that save in rare instances the highest positions, whether in the church, in the law, or in medicine, are attained only by persons who have passed the meridian of life, it is assuredly true that much of the most useful work of our clergy, our lawyers, and our medical men, is done subsequently to their sixty-fifth year. On the other hand, with respect to many occupations which demand continuous and exhausting bodily labour the case is again different. Miners, cotton spinners, and some other workers begin the actual task of bread winning earlier in life than most other males do; and it is certain that, as a rule, their ability to labour profitably begins to decline at an earlier stage. Consequently it may safely be assumed that the working period both commences and terminates at an earlier date in the industrial occupations than it does in the learned professions. It is obvious then that no fixed term of years can indicate with precision the limits of working power for every occupation. The age group 25-65 years, however, presents as fair a compromise as any that can be devised; this is therefore the "main working period of life" referred to in the following pages.

In Part I. of this Supplement great stress has been laid on the influence of the age and sex constitution of populations on their death-rates.‡ It

* Supplement to 35th Report (1861-70), page clxxii.

† Supplement to 45th Report (1871-80), page xxiv.

‡ Supplement to 55th Report (1881-90), Part I., page xxxvi.

has there been shown that the mortality statistics of different districts cannot safely be compared until this disturbing influence has been eliminated. But the influence of age constitution alone on the mortality of occupations is enormously greater than is that of age and sex constitution combined on local general mortality. An example from Table I. will show how great is the influence first mentioned. The rates of mortality per 1,000 in 1890-92 in groups of ages, (1) among all Males and (2) among farmers, were as follows:—

	15-	20-	25-	35-	45-	55-	65 and upwards.
All Males	4.14	5.55	7.67	13.01	21.37	39.01	103.56
Farmers	1.30	2.40	4.29	7.03	11.20	23.97	87.81
Mortality of farmers to that of all males taken as 100	31	43	56	54	52	61	85

From the lower line of this table, it may readily be gathered that at ages above 15 years, the mortality of farmers averages between 50 per cent. and 60 per cent. of the mortality of all males; but, if the mortality be calculated on the total years of life, and the total deaths, at ages 15 and upwards, the result will be widely different. Thus reckoned the mortality of all males would stand as 18.74 per 1,000, and that of farmers as 19.58. The paradox that farmers die more slowly at each separate group of ages than do all males, but that farmers in the aggregate die faster than all males do, is easily explained when the difference of age constitution as between farmers and all males is taken into account. The figures in Table I. show that there are nearly three-fourths as many farmers above 65 years of age, when the mortality is about 88 per 1000, as there are at ages between 25 and 35 when it is only 4½ per 1000; while among all males the number over 65 years when the mortality exceeds 103 per 1,000 is less than one-third of the number between 25 and 35 when it does not reach 8. It is clear, then, that crude death-rates, the use of which as between separate localities demands caution, are entirely untrustworthy as a means of comparing one occupation with another; accordingly, in this volume, the death-rates have been intentionally omitted from the columns headed "Total 15 years and upwards." The use of a crude rate in the entire age-period 25-65 years is open to a similar objection, since different occupations show extreme variations in age constitution even within these limits. From what has already been said in Part I. of this Supplement it is evident that this objection can be met by the calculation of "death-rates in standard population." This is practically the method which was employed by Dr. Ogle in dealing with the occupational mortality of the years 1880-82, although his results were expressed in a somewhat different fashion. His "standard population" was the number of men aged 25-65 in the whole population among whom 1,000 deaths would occur in a year; the population in 1881 and the deaths in 1880-82 being taken as the basis. That number was found to be 64,641, including 41,920 between 25 and 45, and 22,721 between 45 and 65 years of age. The question then arose, how many deaths would occur in a year, according to the death-rates ascertained for a given occupation, among 41,920 men aged 25-45, and 22,721 men aged 45-65? The resulting number of

deaths was called the "comparative mortality figure" for that occupation; it represented with approximate accuracy the mortality prevailing in the occupation, as compared with the general male mortality. Following the same method for the purposes of the present Report, I find that on the average of the three years 1890, 1891, and 1892 1,000 deaths occurred annually among 61,215 men between 25 and 65 years of age. At the census of 1891 occupations were abstracted in *decennial groups of ages*, whereas at the previous census they had been abstracted in *vicennial age-groups* only. In this respect I have an advantage which was not possessed in 1881 by my predecessor, and consequently I am able to bring each occupation more exactly into relation with the "standard population" than had previously been possible. Of 61,215 men aged 25-65 at the census of 1891 there were—

22,586	in the age-group	25-35	years.
17,418	"	35-45	"
12,385	"	45-55	"
8,326	"	55-65	"

By applying to these four numbers the corresponding rates of mortality for any occupation shown in Table I., the number of deaths is ascertained which would occur among 61,215 men engaged in that occupation, but with the same age constitution as that which ruled in the general population. This number is the "comparative mortality figure" for the occupation on the basis of the statistics for 1890-92, and if the calculated deaths in each of the four age-groups be proportionally divided out according to the causes of death in that age-group, the final result will show the parts of the comparative mortality figure which are due to the several causes. This has been done for each of the 100 selected occupational headings, and also for the grouped and subsidiary headings, and thus Table IV. has been constructed. By means of that Table the mortality of men in a large number of occupations and groups of occupations can be studied, and their varying liability to several of the principal causes of death can be traced.

But there is another point of view from which recent statistics of occupational mortality are of interest: they may be regarded in their relation to the records of previous years. It is not possible to compare the mortality under every one of the occupational headings in 1891 with that in the earlier periods; this naturally follows from the fact that the means at hand in 1891 allowed greater development of detail than had been practicable either in 1871 or in 1881. It appears, however, that, after appropriate correction, comparison with 1881 can be made in the case of 98 headings or subsidiary headings, and that in the case of 76 such headings the comparison can be carried back to 1871 also. The death-rates under all these headings are given in Table VII., for the age-groups 25-45 and 45-65 separately. The teachings of that table will be discussed in detail in the course of my remarks on the several occupations, but the general results may conveniently be summarized here. Comparison of 1891 with 1871 shows that at ages 25-45 there was increased mortality during the later period in 13 occupational groups, and decreased mortality in 63; while at ages 45-65 there was increased mortality in 51 occupational groups and decreased mortality in 25. Comparison of 1891 with 1881 shows that at ages 25-45 there was increased mortality during 1891 in 44, and decreased mortality in 54 occupational groups; while at ages 45-65 there was increased mortality in 74, and decreased mortality in 24 of these groups.

Mention has already been made of the "comparative mortality figures" calculated by Dr. Ogle for the Supplement to the 45th Annual Report. Those figures, being based on the death-rates in the two age-groups 25-45 and 45-65, applied to a population of 64,641 men, of whom 41,920 were between 25 and 45, and 22,721 were between 45 and 65 years of age, are not comparable with the figures in Table IV. of the present volume, which are based on the death-rates in the four age-groups 25-35, 35-45, 45-55, and 55-65 applied to a population of 61,215 men of slightly different age constitution. It has been found by experiment that the mortality figures for 1891, obtained by dividing the age-period 25-65 into only two vicennial groups 25-45 and 45-65, differ from the figures resulting from the subdivision of these vicennial into decennial groups; and, moreover, that these differences are extremely irregular both in direction and in amount. For example, the "comparative mortality figures" of inn-keepers, and inn servants, when the whole age-period 25-65 is divided into four equal parts, are 1,642 and 1,725 respectively (Table VIII.); but when the age-groups 25-35 and 35-45 are combined into a single group, and when the age-groups 45-55 and 55-65 are similarly combined into a single group, the comparative mortality figure of innkeepers at ages 25-65, is raised to 1,676, while that of inn servants is lowered to 1,630. This experiment makes it clear that mortality figures for 1881, which can only be calculated on the basis of two vicennial age-groups, are not comparable with the mortality figures for 1891 given in Table IV., which are calculated on the basis of four decennial age-groups. Accordingly the following expedient has been devised:—The age constitution in 1891 (61,215 men, of whom 40,004 are between 25 and 45, and 21,211 are between 45 and 65 years of age) being taken as a standard, mortality figures have been calculated for each of the three periods 1860-61, 71, 1880-82 and 1890-92 by the respective rates of mortality in these two groups of ages. This has been done in the case of every occupational heading of which the statistics in the later period could be compared, either with those in the two earlier periods or with those in the second period only. Thus a second set of mortality figures for the period 1890-92 has been prepared, which will hereafter be referred to as "modified mortality figures," in order to distinguish them from the more accurate "comparative mortality figures" in Table IV. These latter figures will in all cases be used for estimating the relative healthiness of different occupations in 1891, the modified figures being used solely for the purpose of tracing changes of healthiness in the course of the three periods. Table VIII. contains, for all occupations in which comparison with the earlier periods is practicable, the "comparative mortality figures" for the third period, followed by the "modified figures" for the same period and the corresponding figures for the second and first periods.

By thus modifying the 1891 mortality figures, and by calculating new mortality figures for the two earlier periods, based on the age constitution in 1891, the statistics of mortality prevailing in certain occupations in the three several periods are brought as nearly as possible into line. Careful study of Dr. Ogle's "samples" of causes of death supplies the means for a further analysis of the changes in mortality between 1881 and 1891. But here again the statistics for 1881, as they stand, cannot fairly be compared with those already worked out in detail for 1891 (Table IV.). As has already been explained, correction has been made for age constitution in calculating that part of the comparative mortality figure for 1891 which is due to each cause of death severally; and it is found that in regard to some of the most important diseases such correction makes a very considerable difference.

For example, the mortality of farmers by cancer and by phthisis is represented by the figures 36 and 79 respectively when account is taken of the ages of those dying from the two diseases; but if no account be taken of these age differences the mortality figure for cancer will be raised to 41 and that for phthisis will be lowered to 64. In the same way the mortality figure of inn servants for cancer, which now stands at 65, will be lowered to 41, while that for phthisis, which stands at 476, will be raised to 572 if age constitution be disregarded in both cases. Clearly, then, the mortality figures for separate causes in 1891, in which ages at death are taken into account, must not be put in comparison with the figures for 1881, for which period ages and causes in conjunction were not abstracted. Under these circumstances it became necessary to calculate for 1891 a second set of figures, which, although less accurate than the figures in Table IV., should yet be fairly comparable with such figures as it is possible to compute for 1881. This has been done in Table IX. For a selected number of occupations both the "modified mortality figures" for 1891 and the mortality figures for 1881 (which latter have been re-calculated for this Report on the basis of the 1891 age constitution) have been distributed among those causes of death that are given in Dr. Ogle's Supplement. These figures do not present in their true relations the rates of mortality in *different occupations*, but they are nevertheless useful for comparing the causes of death in *any given occupation* in 1891 with the causes in the *same occupation* in 1881.

I have thought it advisable to preface my remarks on the several occupations with the foregoing explanations concerning the tables and the method of their construction. Tables I.-VI. deal exclusively with the statistics of 1890-92; the fourth of these tables presenting those statistics as fully, and at the same time as concisely as possible. In Tables VII.-IX., the statistics for 1890-92 are shown in less detail in order to render them comparable with the statistics of the two earlier periods.

In April 1891 the total male population above 15 years of age in England and Wales was 8,981,109. The average number living during the three years 1890-92 was probably about 27,000 more than this; but as the difference is less than one-third per cent. of the whole, no appreciable error will accrue from taking the census number as the average throughout the three years. The years of life at risk during this period amounted then to 26,943,327, against 23,734,308 years at risk in the period 1880-82.

The 26,943,327 years of life at risk in 1890-92 resulted in 504,923 deaths. For reasons which have been stated already, it is plain that occupational mortality cannot effectively be studied unless age constitution is taken into account: accordingly, this precaution has been taken in the following pages, where also frequent reference has been made to the influence of local conditions on the mortality in particular trades.

Of the 8,981,109 males aged 15 years and upwards, 8,464,045 were returned as following definite occupations, the remaining 517,064 being returned as unoccupied. The terms "occupied" and "unoccupied" must not, however, be understood as meaning "employed" and "unemployed," for those who were temporarily out of work were included in the Census Tables under their ordinary employment.

At the head of each of the Tables I., III., IV., VI.-VIII., are figures relating to occupied males as a whole, and corresponding figures relating to the unoccupied. Tables I. and III.-VI., also contain figures

for occupied males in three localized areas or groups of districts. The figures for occupied males will be found useful as a standard of comparison for the separate occupations. Another standard, showing the mortality under very favourable conditions, is obtained by summing the population and deaths in 1890-92 in the "selected healthy districts" from which the Healthy District Life Table in this volume has been derived. These figures have been added to Tables I., VII., and VIII.

Table I. shows the death-rates in groups of ages among (a) all males, (b) males in selected healthy districts, (c) occupied males, and (d) unoccupied males. Examination of these figures shows the mortality in healthy districts and also the mortality of occupied males generally to be less at every age-group, and the mortality of unoccupied males to be greater at every age-group than is that of all males. The mortality of occupied males is greater than the general mortality in healthy districts at every age-group except 15-20; and the mortality of unoccupied males at this age-group is abnormally high, exceeding that at either of the next three age-groups, 20-25, 25-35, 35-45. This point will be specially dealt with further on.

By the definition already given of the term "comparative mortality figure," the figure for all males between 25 and 65 years of age in 1890-92 is 1,000. Among the twenty-four causes and groups of causes of death which are tabulated in Table IV., the most fatal among men of these ages is phthisis, which disease is responsible for 192 out of 1,000 deaths; next follow pneumonia with 107, diseases of the nervous system with 102, and diseases (other than valvular disease and aneurism) of the circulatory system, also with 102. Thus, rather more than half—503 out of 1,000—of the mortality among men aged 25-65 is due to the causes just enumerated. Bronchitis, pleurisy, and other diseases of the respiratory system together contribute 117; alcoholism and diseases of the liver, 42; other diseases of the digestive system, 29; Bright's disease and other diseases of the urinary system, 44; cancer, 47; influenza, 34; valvular disease of the heart and aneurism, 30; accident, 56; and suicide, 15. Of the remaining 83 deaths, 17 are jointly due to rheumatic fever, gout, diabetes, and plumbism, and 66 to causes which it has not been thought worth while to classify separately.

Table VII. shows that among all males the death-rate at the age-group 25-45 years has steadily fallen from 11.27 in the earliest period, to 10.16 in the intermediate, and 9.99 in the latest period. At the age-group 45-65 the reverse has been the case throughout the three periods, the rate having increased steadily from 23.98 in 1871 to 25.27 in 1881, and 28.30 in 1891.

Turning now to the modified mortality figures in the last three columns of Table VIII., we find that the population which gave 1,000 deaths in 1891 would have given only 960 in 1871, and 942 in 1881. Apparently, then, the improvement in general health conditions which took place between 1871 and 1881 has not since been continued. Reference to the annual reports, however, shows that a general improvement in the rates at ages between 25 and 65 years had been maintained until 1889. The mortality in the next three years—the very years for which these statistics of occupations have been prepared—was exceptionally heavy. As has been elsewhere shown, this serious increase may be fairly attributed to epidemic influenza; and the indications of more recent years justify the opinion that it will prove to have been but temporary. Nevertheless the direct and indirect effect of influenza on the mortality in the three years under notice, its irregular local distribution, and the certainty that it unequally affects persons

of different occupation, are circumstances which tend to complicate the task of dealing with occupational mortality in 1890-92.

The comparative mortality figure for the selected healthy districts is 679, indicating that, after allowance for age-constitution, the mortality among men aged 25-65 is in these districts little more than two-thirds of what it is in the country as a whole. It would, however, be futile to compare the rates in the present healthy districts with the rates published in the previous Supplement for selected healthy districts, because the composition of the group of healthy districts is of necessity unstable. Dr. Ogle selected all those districts in which the crude death-rate for persons in 1871-80 averaged less than 17 per 1,000; their aggregate population being a little over two millions. In the present instance the selection has been made with the advantage of using as a test of healthiness, the rates in standard population instead of the crude rates and districts have been selected of which the aggregate population exceeds four and a half millions, and in which the corrected death-rates in 1881-90 did not exceed 15 per 1,000. The mortality of males aged 15 and upwards in these districts in the three years 1890-92 forms the basis of the figures for "selected healthy districts" in Tables I., VII., and VIII. Statistics of causes of death in the same districts would have been interesting; but it was thought that their importance would have been hardly commensurate with the time and labour that must have been expended on their preparation.

OCCUPIED MALES AND UNOCCUPIED MALES.

The figures showing the mortality of "occupied" and of "unoccupied" males differ so enormously that any consideration of them will be a waste of time, unless it be accompanied by a statement of the precise meaning attached to these terms. In censuses prior to 1881, persons who had retired from business, patients in lunatic asylums, and inmates of workhouses whatever may have been their ages, were classed under their former occupations whenever these were stated. In 1881 and 1891, on the other hand, all persons who were stated to have retired from business, all patients in lunatic asylums, and those inmates of workhouses who had passed their sixtieth year, were classed as of no occupation. This change was made after careful consideration, and the reasons for it are clearly set out on page 28 of the General Census Report for 1881. As a consequence, the mortality statistics for 1880-82 and 1890-92 present us with an "unoccupied class" which does not appear in the statistics of earlier years. This class is of a heterogeneous character, comprising as it does those who are unoccupied because of misfortune, of misconduct, or of failure in health, as well as those who are unoccupied by reason of easy circumstances. Reference to Vol. III. of the last Census Report shows that the number of unoccupied males living between the ages of 25 and 65 years was 208,857, distributed in the following proportions:—

Retired from business	35 per cent.
Pensioners	6
Living on private means	23
Lunatics	15
Others (including an unknown proportion of paupers and prisoners)	21

As regards four of these five sub-classes this plan of classification seems at first sight to indicate with sufficient accuracy the reason for persons'

being returned as unoccupied; but on reflection it will readily appear that among persons under 65 years of age described as "retired from business" there must be included many who have been compelled to retire on account of infirmity, and also an uncertain but possibly large proportion of unfortunate as well as of dishonest and dissolute persons who would be more accurately described as having failed in business, than as having retired from business. Again, the last of the sub-classes, constituting 21 per cent. of the entire class, must be regarded as extremely indefinite. On the whole, it seems probable that from one-third to one-half of the unoccupied males between 25 and 65 years of age were subject to a mortality which was not in excess of that incidental to occupied males at the same ages. From this it would follow that the mortality of the remaining two-thirds, or one-half as the case may be, must have been far in excess of the high figures given in the table for unoccupied males collectively—a mortality which must be regarded as truly appalling. The following table, which gives the annual death-rates per 1,000 living at several age-groups exhibits very strikingly the difference between the mortality recorded for occupied males, and that recorded for unoccupied males.

—	15-	20-	25-	35-	45-	55-	65 and upwards.
Occupied Males -	2.55	5.07	7.29	12.43	20.66	36.66	102.32
Unoccupied Males -	35.86	29.58	27.05	35.71	37.77	59.44	105.86
"Unoccupied" rates } per cent. of "Oc- cupied" rates. }	1,406	583	371	287	183	162	103

In view of the remarkable disparity between the mortality of "occupied" and of "unoccupied" males in the age-group 15-20 years, it will be desirable to inquire whether an error of any special kind is likely to affect the rates at this age. It has already been noted that the rate for all occupied males is less at ages 15-20, and at no other age-group, than is the rate for males in the selected healthy districts. This alone suggests the probability that the number of deaths of occupied males has been understated, and the number of deaths of unoccupied males correspondingly overstated. In order to raise the death-rate of occupied males aged 15-20 from 2.55 per 1,000 to 3.16 per 1,000, which is the rate of all males at that age in the healthy districts, 2,533 deaths must be transferred from the unoccupied to the occupied class (Table I.). This transfer would reduce the deaths of unoccupied males aged 15-20 from 7,523 to 4,990, and their death-rate from 35.86 per 1,000 to 23.79. The rates of unoccupied and of occupied males would then stand in the ratio of 933 to 100, instead of in the ratio of 1,406 to 100. It is easy to grasp the reason why a transfer of this kind should be required in order to bring these rates of mortality into their true relation with each other. By way of illustration, the occurrence of a case like the following may readily be imagined. A youth 18 years old, the son of a commercial clerk, having obtained employment as a draper's assistant, his name is entered in the latter capacity in the census returns. A few months later this youth is taken ill, and is removed to his father's home, where he dies. In the death register he will

probably be described as "son of a commercial clerk," and according to rule his death will be classed as that of an unoccupied person, although he had been classed at the census as occupied. There can be little doubt that cases similar to the above occur not infrequently. The number of deaths which have been wrongly registered as those of unoccupied persons cannot be ascertained, but we may reasonably assume the mortality of occupied males to be greater than that of males in healthy districts at ages 15-20 as it is at all other age-groups; and if that be the case, the error would be only partially corrected by the transfer suggested in the remarks following the table on the preceding page. Fortunately for the value of comparative statistics, the chance of this error rapidly diminishes as age advances, and it may be assumed with confidence that the mortality at ages between 25 and 65 years is not appreciably affected thereby.

Although the accuracy of some of the figures in the table on the preceding page is doubtful, their general tendency may confidently be indicated as follows:—At the earlier ages the bulk of the unoccupied are those who are physically unfit for employment; these rapidly get eliminated from the population by their high rate of mortality, but their places are partially taken by others who subsequently become incapable of work. Still, on the whole, as age advances the unoccupied class contains a diminishing proportion of unsound lives, and an increasing proportion of lives which, by contrast, may be considered sound. At ages over 65 years the mortality of unoccupied males exceeds that of occupied males by only 3 per cent., and it is probable that even this small excess depends on the presence of a larger proportion of very old persons in the former class than in the latter.

The Comparative Mortality Figures* of occupied and of unoccupied males between 25 and 65 years of age are 953 and 2,215 respectively. That is to say, the number of males of definite age-constitution within these limits that would give 1,000 deaths among the general population, and 679 deaths in the healthy districts, would give 953 deaths among occupied and 2,215 among unoccupied males. The comparative mortality figure of unoccupied males therefore exceeds that of occupied males by 132 per cent. Reference to Table IV. shows that nearly two-thirds of this enormous excess is due, either to diseases of the nervous system or to phthisis. The heavy mortality under the first of these headings is mainly, and that under the second is largely, due to the inclusion of a large proportion of insane persons in the unoccupied class. Among other causes of death, diseases of the circulatory system account for 114, and influenza together with diseases (other than bronchitis) of the respiratory system accounts for 100 of the excess in the mortality figure of unoccupied males. The mortality attributed to cancer is more than double, and that attributed to alcoholism together with liver disease, to diseases of the urinary system, and to suicide, is about double as heavy among the unoccupied as it is among the occupied class. The excess of mortality from accident among unoccupied males possibly results from the addition to their ranks of men who, having been permanently disabled whilst at work, finally die from their injuries. Under two headings only—bronchitis and rheumatic fever—is the mortality of occupied greater than that of unoccupied men, and it is known that these diseases are largely caused by exposure to the effects of cold and wet weather.

* For explanation of the term "comparative mortality figure," see pp. viii-ix.

The following table gives a summary of the causes of death of occupied and of unoccupied males, showing how in each case the comparative mortality figure is made up.

Cause of Death.	Occupied Males.	Unoccupied Males.	Excess of Unoccupied over Occupied.
Diseases of nervous system	82	630	+ 548
Phthisis	185	448	+ 263
Diseases of circulatory system	126	240	+ 114
Influenza and diseases (except bronchitis) of respiratory system	166	266	+ 100
Cancer	44	96	+ 52
Diseases of urinary system	41	82	+ 41
Alcoholism and diseases of liver	40	76	+ 36
Diseases of digestive system (except liver diseases)	28	43	+ 15
Accident (including plumbism)	57	81	+ 24
Suicide	14	28	+ 14
Bronchitis	88	84	- 4
Rheumatic fever	7	2	- 5
All other causes	75	139	+ 64
All causes	958	2,215	+ 1,262

If the rates of death among unoccupied males in 1891 be compared with those of the same class in 1881, it will be found that the mortality at ages 25-45 years has fallen from 32.43 per 1,000 in the earlier to 31.36 in the later period. At ages 45-65 years, however, the rate has increased in that interval from 36.20 per 1,000 to 51.10 (Table VII). Probably the increase at these ages was mainly due to epidemic influenza. It is known that this disease attacked with special severity persons who had passed middle life, and that it was the indirect cause of many deaths which were returned under other headings; there is also reason to believe that it was exceptionally fatal in some of the sections of the unoccupied class. In 1890-2, the "modified mortality figures" for occupied and for unoccupied males (computed, as already explained, for comparison with 1880-82) were 947 and 2,338 respectively, as against 910 and 2,065 in the earlier period.

For reasons which have already been specified, the comparison of these two great classes cannot be carried back to 1860-61, 71. In any investigations that may be made concerning the several occupations it must be borne in mind that in 1871 those persons who had retired from any occupation were classed under that occupation, and were not classed as unoccupied. The result is that the rates of mortality under all occupational headings in 1871 were higher than they would have been had the method of classification then in vogue been uniform with that which obtains at the present time.

The mortality of occupied males exhibits very wide variations in different parts of the country. Useful examples of these variations are furnished by London, and by the groups of districts which have been selected as representative of industrial and of agricultural areas respectively. At the census of 1891, London contained 1,230,010 occupied males aged 15 years and upwards, while the industrial districts contained 1,833,295, and the agricultural districts contained 1,246,156, at the

same ages: more than half of the occupied males in England and Wales are therefore included in these three sections of the population. At each age-group the highest death-rate occurs in the industrial, and the lowest in the agricultural districts, London occupying an intermediate position. At ages 20-25 the death-rate of occupied males in London is equal to that in the whole country; but at all other age-groups the London rates, as well as the rates in the industrial districts, are in excess. The rates in the agricultural districts are below those in the whole country at all age-groups (Table I.).

The following Table shows at a glance the departures from the average: the rate for all occupied males at each age-group is taken as 100, and the rates for occupied males in the three localized groups are shown proportionally:—

	15-	20-	25-	35-	45-	55-	65 and upwards.
All Occupied Males	100	100	100	100	100	100	100
Occupied Males, London	108	100	112	125	123	120	108
Occupied Males, Industrial Districts	120	109	119	128	135	137	118
Occupied Males, Agricultural Districts	82	92	82	72	67	71	92

In London the proportional excess of mortality is greatest at ages 35-45, but it maintains nearly the same level throughout the next two age-groups. In the industrial districts the excess equals 28 per cent. at the age-group 35-45, and reaches 37 per cent. at 55-65. In the agricultural districts the mortality is 33 per cent. below the general average at ages 45-55, and is also below the average at the age-groups 35-45 and 55-65, by 28 and by 29 per cent. respectively. Speaking generally, the mortality of occupied males in industrial districts exceeds by one-third part the average for all occupied males at the age-groups 45-55, and 55-65, while the mortality of occupied males in the agricultural districts falls one-third below this standard during the same two decennial age-groups. At 65 years and upwards, the proportional divergence becomes considerably less, the mortality in the industrial districts being only 18 per cent. above, and that in the agricultural districts being only 8 per cent. below the standard. Probably, however, if due allowance could be made for the age-constitution of occupied males above 65 years of age, the figures would approximate to those in earlier age-groups, because the agricultural districts contain more very old people than do the industrial districts. The comparative mortality figure among occupied males at ages 25-65 is 1,147 in London, 1,248 in the industrial districts, and 687 in the agricultural districts, these being respectively 20 per cent. above, 31 per cent. above, and 28 per cent. below the figure for all occupied males.

Among causes of death phthisis and diseases of the respiratory system are the most excessively fatal to occupied males both in London and in the industrial districts. In London these two headings contribute almost equally to the mortality figure. The industrial districts, on the other hand, show less mortality than does London from phthisis, but the difference is more than made up by the heavy death-toll from respiratory diseases; in the agricultural districts the mortality figure for

phthisis is less than half of that in London, and the figure for respiratory diseases is still lower. After due correction for age constitution these two classes of disease in the aggregate cause 48 per cent. of the total mortality among occupied males aged 25-65 years in London, 47 per cent. in the industrial districts, and 36 per cent. in the agricultural districts; against 43 per cent. among all occupied males within the same age limits.

The following Table, which has been deduced from Table IV., shows the mortality from certain specified causes in each of these three sections of occupied males, as compared with that among all occupied males, the mortality of the latter being taken as 100 in each case.

	All Occupied Males.	Occupied Males, London.	Occupied Males, Industrial Districts.	Occupied Males, Agricultural Districts.
All Causes - - - -	100	120	131	72
Influenza - - - -	100	100	100	100
Alcoholism - - - -	100	138	146	54
Rheumatic Fever - - -	100	100	114	86
Gout - - - -	100	300	100	100
Cancer - - - -	100	134	109	91
Phthisis - - - -	100	150	121	73
Diabetes - - - -	100	114	100	100
Diseases of Nervous System	100	107	132	77
" Circulatory "	100	107	122	75
" Respiratory "	100	124	166	51
" the Liver "	100	111	119	89
Other Diseases of Digestive System	100	100	129	82
Diseases of Urinary System -	100	137	122	78
Accident - - - -	100	86	105	79
Suicide - - - -	100	129	114	86
Other Causes - - - -	100	91	130	76

In the industrial districts not one of these causes of death, and in London only two fall below the average. In the agricultural districts not one rises above the average. In London the proportional excess from alcoholism, gout, cancer, phthisis, diseases of the respiratory and urinary systems, and from suicide is greater than that from all causes. In the industrial districts the excess of general mortality is exceeded only by that of alcoholism and by that of diseases of the nervous and respiratory systems. In the agricultural districts alcoholism and diseases of the respiratory system are barely more than half as fatal as they are among all occupied males, while phthisis is 27 per cent. below that standard; the mortality from all causes showing, as already stated, an advantage amounting to 28 per cent.

The Clerical Profession (1).—In the census reports the clergy of the Established Church, Roman Catholic priests, and ministers of other denominations are included in sub-order 1 of order 3 of the professional class. For the purposes of this work they are collectively designated the Clerical Profession. At the census of 1881 they numbered 33,486 at all ages, and by 1891 their numbers had reached 36,800, showing an increase of nearly 10 per cent. In the intercensal period, 1871-81, the increase had been 6 per cent. only, while in the period 1861-71 it had been 11 per cent. Examination of the figures relating

to the ages 25-65 years exclusively,* shows less variation in the rates of increase, the amount having been 8 per cent. in the first of these periods, 7 per cent. in the second, and again 8 per cent. in the third period.

Table I. shows that in the 1891 period, the members of the clerical profession in the aggregate died less rapidly than did occupied males, at each of the age-groups included in the Table. At the age-group 35-45 the death-rate was less than half that of occupied males, and at the next succeeding group of ages it barely exceeded half: whilst at the age-groups 55-65 and 65 and upwards, it was lower by 31 per cent. and by 18 per cent. respectively.

It will be useful at this point to illustrate by a definite numerical example the manner in which such differing death-rates may be used for the purpose of estimating the comparative mortality of men engaged in different occupations. For reasons already stated the comparison is limited to the age-period 25-65. Referring again to Table I. it will be seen that among clergymen and ministers aged 25-65 years, 933 deaths occur in every 92,103 years of life. At this rate the number of deaths *in one year* among 61,215 such persons would be 620; and it is conceivable that the ratio of mortality among the clergy to that among the general population might accordingly be stated as the ratio of 620 to 1,000.† Such a statement, however, would be erroneous, for the above-mentioned total of 61,215 clergymen, includes only 16,486 between 25 and 35 years of age, and 17,451 between 35 and 45, whilst it includes as many as 15,610 between 45 and 55, and 11,668 between 55 and 65: in round numbers the group contains 3,300 more above 55 years of age, and 2,700 more between 45 and 55, but 6,000 fewer under 35 years of age, than are to be found in an equal number of men in the general population.

If the age constitution among the clergy were the same as that among other males, the mortality of 61,215 males taken, (1) from among the general population and (2) from among the clergy, would stand as follows:—

Age.	Number Living.	ALL MALES.		CLERICAL PROFESSION.	
		Rate of Mortality per 1,000.	Deaths.	Rate of Mortality per 1,000.	Deaths.
25-35	22,586	7·67	173	4·23	96
35-45	17,418	13·01	227	5·18	90
45-55	12,885	21·37	275	10·52	136
55-65	8,326	39·01	325	25·35	211
25-65	61,215	—	1,000	—	533

* Members of the Clerical Profession enumerated at each of the last four censuses.

Census.	All Ages.	Ages 25-65.
1861 - - - - -	28,354	24,504
1871 - - - - -	31,578	26,427
1881 - - - - -	33,486	28,312
1891 - - - - -	36,800	30,701

† See first paragraph on page ix.

Within the limits of age under consideration, then, the true ratio of the mortality of clergymen to that of males generally is as 533 to 1,000, and this is expressed by terming 533 the "comparative mortality figure" for the clerical profession.

In no other occupation in the list is the mortality figure of the whole body of men employed so low as in that of clergymen; but the mortality figures of gardeners and of farmers are not much higher, being 553 and 563 respectively, whilst the mortality figure of those farmers who live in specially agricultural districts is actually lower, being only 506. From what has been said, however, at page vii, it will be seen that by limiting to the 40 years ending with 65 the age-period within which the mortality of the clergy shall be computed, the value of the comparative mortality figure as a measure of vitality in this profession is considerably reduced.

Table IV. shows the relative incidence of mortality from certain prevalent diseases at ages 25-65 years. Among local diseases, affections of the circulatory system are collectively the most frequent cause of death among the clergy, whose mortality from this group of maladies is represented by the figure 82. Next in order stand diseases of the nervous and of the respiratory system, each with a mortality figure of 69; and following these again, come diseases of the urinary system with a mortality figure of 39. This last figure is noteworthy, inasmuch as it shows that the diseases constituting one important group are almost as fatal to clergymen as they are to the general population: whereas the other figures already quoted indicate that, in the clerical profession, the mortality from the numerically important disease groups to which they refer, is, in each case, substantially below the standard for occupied males. The mortality among the clergy from phthisis and from respiratory diseases, for example, is represented by the figures 67 and 69, which are respectively but 36 per cent. and 31 per cent. of the standard figures. The clergy experience more than double the average mortality from diabetes, and one and a half times the average from rheumatic fever. They suffer slightly more than do occupied males from influenza, and also from diseases of the digestive organs other than the liver. On examining the figures in Table VII. we note that at both vicennial divisions of the main working period of life the mortality from all causes had fallen very considerably between the periods of 1871 and 1881, but that since the last-mentioned period it has slightly risen. Comparing the mortality at separate decennial age-groups in 1891 with that in 1871, a considerable decrease is observable at the age-groups ending with 35, 45, and 55 years respectively, but a substantial increase at the age-groups 55-65 years, and 65 years and upwards. The mortality figure of the clerical profession in the 1891 period, modified* for comparison with the figures of 1871 and 1881, was 547, against 605 and 524 respectively in the two earlier periods. The mortality figure in 1891 would probably have fallen to less than 500, but for the fatal prevalence of influenza at that time.

The Legal Profession (2).—Sub-order 2 of Order 3 of the professional class, as constituted at the last census, includes persons of very dissimilar social position; the first section of this sub-order consists of barristers and solicitors, the second of law clerks. It is not surprising, therefore, that the mortality of the two sections should differ considerably.

Barristers and solicitors constitute the legal profession, as arranged for the present work. At the census of 1891 there were enumerated

* For explanation of the term "modified mortality figure," see page x.

19,978 barristers and solicitors in the aggregate above the age of 15 years: their number has increased since the preceding census by nearly 15 per cent., the increase between the years 1871 and 1881 having been 9 per cent.

Barristers and solicitors are seen by Table I. to be liable to a mortality at the earlier ages which is substantially below that of occupied males as a standard: from 55 to 65 years of age lawyers sustain a death-rate which is very little below the standard, whilst at ages above 65 years their death-rate is actually in excess of it.

The comparative mortality figure for barristers and solicitors aged 25-65 years is 821, against 1,000 for all males, without reference to occupation, and 953 for all occupied males. Table IV. shows that, as compared with the last-mentioned class, lawyers suffer exceptionally from influenza, cancer, nervous diseases, diseases of the liver, Bright's disease, and diabetes; their mortality from the malady last named being four times the average, and being higher than that of any other occupation in the list. Lawyers suffer less severely than do occupied males in the aggregate, from phthisis, heart disease, and lung disease; their mortality from accident is also below the standard.

Dividing into two age-groups the main working period of life we find that at ages 25-45 the mortality had decreased very considerably between 1871 and 1881, but has increased slightly since the latter date; whilst at ages 45-65 an increase has taken place at each successive period. Comparing the mortality at decennial age-groups in 1891 with that in 1871, a considerable decrease is shown at ages 25-35, a slight decrease at 35-45, a still smaller decrease at 45-55, and a considerable increase at 55-65. In the 1891 period the mortality figure for lawyers, modified for comparison with the figures for 1871 and 1881, was 820, against 882 and 793 in the first and second periods respectively (Table VIII.).

Law Clerk (3).—At the recent census there were enumerated 26,244 males above the age of 15 years who were described as law clerks. On reference to the census returns, it will be found that although between the 1871 and 1881 periods law clerks had increased in number by 30 per cent., the rate of increase has fallen to 11 per cent. between the latter date and 1891. It will also be found that whereas the proportion of law clerks from 15 to 25 years of age had increased by 33 per cent. between 1871 and 1881, this increase has given place to a decrease of nearly 3 per cent. between the last-mentioned period and 1891. In the 1891 period, of the total number of law clerks living above the age of 15 years, rather more than half were included within the age group 25-65 years, but at these ages an increase of 28 per cent. has prevailed steadily throughout the last two decennia, whilst at ages above 65 years, the number in the 1891 period remained practically the same as it had been in 1871. The recent diminution in the rate of increase at all ages appears, therefore, to be mainly due to a falling off in the number of young men who at the present time engage in this occupation. Although in the census classification law clerks are included with barristers and solicitors in the same section of the professional class, a glance at their death-rates at the several ages, as compared with those of barristers and solicitors, at once reveals wide differences. The death rates of law clerks at all the age-groups of the working period are higher than the standard, and also higher than those of commercial clerks (No. 10), and so likewise is their death-rate at ages above 65 years: their comparative mortality figure is 1,070, the standard figure being 953, and the figure for commercial clerks being 915. Reference to Table IV. shows that

the mortality figure of law clerks from alcoholism stands at 22, as against 14 in the case of commercial clerks, and 13 in that of occupied males. The mortality of law clerks from diseases of the digestive system is seriously in excess; they also die at an excessive rate from gout, cancer, and phthisis, as well as from diseases of the nervous and urinary systems. These facts, taken together, point to intemperance as one cause of their exceptionally heavy mortality. It is satisfactory to note that the modified mortality figure among law clerks has declined rapidly though irregularly ever since 1871, in which year it stood at 1,536, or half as much again as it was in 1891 (Table VIII.).

The Medical Profession (4).—For the purposes of the present work, physicians, surgeons, and general practitioners are taken together as constituting the medical profession, under which title there were enumerated 18,936 men at the last census. Since the census of 1881 the number has increased by 25 per cent., as compared with less than 3 per cent. which had been the rate of increase between the years 1871 and 1881.

As is shown by Table I. the mortality of medical men is higher than that of the clergy at every group of ages therein specified: whilst, as compared with the mortality of lawyers, it is higher at all ages up to the 55th year; after this age there is little difference between the rates in the two professions. The comparative mortality figure for medical men is 966, as against 821 for lawyers, 533 for the clergy, and 953 for occupied males in the aggregate.

In connection with the present subject, it appears desirable that advantage should be taken of a laborious investigation by Dr. Ogle concerning the mortality of the medical profession, the results of which were published as a paper in the Transactions of the Royal Medical and Chirurgical Society for the year 1886. As this paper was avowedly based by Dr. Ogle upon statistics derived from the national records in the General Register Office, I have had no hesitation in regarding it as a further development of his previous remarks on the same subject which appeared in the Decennial Supplement for 1871-80. Dividing, in the first instance, the lifetime of medical men into two stages, Dr. Ogle found that since the year 1861 the death-rates had increased at ages above 45 years, whilst they had decreased at the earlier ages. After due allowance had been made for changes of age-constitution among medical men, the aggregate mortality was found to have been somewhat greater in 1880-82 than it had been either in 1860-61 or in 1871. I now find that in the years 1890-92 the death-rates at ages under 45 years have still further diminished; at ages from 45 to 65 there has been a decrease from the high rate of 1880-82, although the mortality still remains somewhat higher than it had been in 1871; whilst at ages above 65 years there has been a further increase. Still, allowing for differences of age-constitution, the result of these changes in the death-rates is, that the increase of total mortality which had taken place in 1880-82 as compared with 1871 has not been maintained since the first mentioned date; the corrected death-rate at all ages in 1890-92 being nearly identical with what it had been in 1871. Comparing the mortality of medical men at decennial age-groups in the 1891 period with that in 1871, it appears that there has been a considerable decline at the age 25 to 35 years; that at the ages 35 to 45, and 45 to 55 years there has been a slight increase, and at ages above 55 years a considerable increase. This limitation of the increase of mortality since the previous record almost exclusively to the higher ages, suggests that it may be partly due to the influenza epidemic, which in the year 1891 was generally at

its height, and which is known to have been especially fatal to persons beyond the prime of life. As is shown by Table VIII., the mortality in the age-period 25-65 years has decreased in each successive interval; but on extending the inquiry to all ages, it is found that since 1871 the decrease of mortality under 65 years of age, has been very nearly balanced by the increase at ages above 65 years.

In dealing with the causes of death of medical men, Dr. Ogle prepared for his paper a table for the ten years 1873-82, in which not fewer than 3,865 deaths were classified. It would have been instructive to compare that table in detail with corresponding data for the three years 1890-92; but, owing to great changes in the age-constitution of the medical profession which have taken place in the course of recent years,* it would be difficult at the present time to bring the two sets of facts exactly into line with each other. The comparison has therefore been limited to the more general features of the two tables. Dr. Ogle found that in the period covered by his investigation, there were only three numerically important headings, namely, phthisis, diseases of the respiratory system, and accident, under which the mortality of medical men was lower than that of the male population generally. On the other hand the mortality from diseases of the liver, from diseases of the circulatory and urinary systems, and from suicide, was found to be greatly in excess, whilst that from diabetes and from gout was more than three times as heavy as it was among the male population in the aggregate. From diseases of the nervous system, and from cancer, there was in each case a small excess. Dr. Ogle considered that this increase in the case of cancer admitted of rational explanation by supposing a more accurate diagnosis to have been usual at that time, in the case of the fatal diseases of medical men, than in the case of such diseases occurring among the general public.

The records of 1890-92 confirm those of 1873-82, as to the comparative immunity which is enjoyed by medical men from phthisis, respiratory diseases, and accident. The mortality in this profession from bronchitis is not more than one-seventh part of that to which the general male population is subject. The special liability of medical men to death by gout, diabetes, urinary diseases, and suicide, is also affirmed by recent figures quite as plainly as by those prepared by Dr. Ogle. It is a remarkable fact that among members of the medical, as well as of the clerical, and of the legal profession, diseases of the heart are the most frequent of all causes of death; phthisis and diseases of the respiratory system generally occupying less important places in the list of fatal diseases; whereas in most other occupations it is these latter diseases (or one of them) which stand higher than any others in the scale of mortality. The tendency to the commission of suicide has notably increased among medical men since the earlier period: the mortality from diseases of the digestive organs other than the liver has likewise increased. On the other hand, the mortality from diseases of the liver and of the urinary organs has diminished, both absolutely and relatively to the remainder of the population; and, concurrently, the mortality

* Proportional age-constitution of the medical profession.

	All Ages.	15-	25-	35-	45-	55-	65 and upwards
1871 - - -	1,000	42	253	207	202	178	118
1891 - - -	1,000	40	334	255	173	98	100

definitely ascribed to alcoholism has fallen to about the same level as that of the general population. In 1890-92 there was a rather greater excess of mortality from diseases of the nervous system among medical men than there had been in 1873-82, but the excess of cancer fatality which had characterised the earlier period, is not indicated by the figures relating to the more recent period. It is possible that the diseases of the general population are now diagnosed more accurately than they were in former years; in that case the cause suggested by Dr. Ogle for the apparently special prevalence of cancer among medical men in former years, is no longer operative.

Schoolmaster, Teacher, &c. (5).—At the 1891 census the number of males above 15 years of age engaged in education was 49,072, being an increase of 4,891 or 11.1 per cent. on the number enumerated at the previous census. This class includes schoolmasters, professors, tutors, and pupil teachers, but excludes teachers of music, who are classed with musicians. It should be remembered that in some few cases schoolmasters who are also in Holy Orders, may be classed in the one group at the census and in the other in the death-register. The mortality of school teachers is low; at ages under 35 years it is below even that of clergymen, but at ages from 35 to 55 years school teachers die more rapidly than do the clergy. The comparative mortality figure of school teachers is 604, and is therefore much lower than that of any other profession except the clerical: compared with that of all occupied males as a standard their mortality figure is in defect by more than a third part.

Table IV. shows that the mortality of school teachers from influenza is less than that of occupied males generally, and very much less than that of the clerical profession. They suffer more heavily than do the clergy from pulmonary consumption, although their mortality from this disease is still much lower than that of most other occupations; their mortality from respiratory diseases is scarcely more than one-third of the standard, and is not much greater than that among the clergy. School teachers succumb in about the average proportion to diabetes, but their mortality figure from this disease is less than half of what it is among clergymen. In common with other professional men, schoolmasters and teachers suffer much more severely from diseases of the heart than they do from diseases of the respiratory system; but whereas among the other professions it is heart disease which is numerically the most prevalent cause of death, among schoolmasters phthisis is rather more fatal than heart disease. It has repeatedly been advanced that many members of this section are certified teachers, and are therefore carefully picked men; this is especially true at the present time, when the section contains a larger proportion than ever of certified teachers, and the fact goes far to account for the low mortality of the scholastic profession. The death-rate of school teachers has decreased considerably since the year 1871, and this is equally true, whether reference be made to the vicennial age-groups of Table VII. or to the decennial groups of Table I. At ages 25-45 the rate of death has diminished to scarcely more than half of what it had been in 1871, and at ages 45-65 also the decline has been considerable: for some reason, however, the decrease has been relatively smaller at the age-group 45-55 than at other ages. The mortality figure of schoolmasters and teachers in 1891, modified for comparison with the figures in the earlier periods, was 571, against 893 and 677 in 1871 and 1881 respectively. See Table VIII.

Artist, Engraver, Architect, &c. (6).—This section includes architects, sculptors, painters, and engravers, in addition to the ill-defined body of men termed "artists." Under this heading there were included at the last census 16,944 males above 15 years of age, the number having increased since 1881 by nearly seven per cent. The mortality of this group is below that of occupied males as a standard, at all ages included in the main working period of life, and also at ages above 65 years, but at ages 20-25 it is considerably in excess. The comparative mortality figure in this group of occupations is 778, which is considerably lower than the average. From alcoholism the mortality figure of artists, &c., is below the average, although they suffer more severely than the average from diseases of the liver. They die more than twice as fast as do occupied males from diabetes, but more slowly from phthisis, and also more slowly from diseases of the circulatory and respiratory systems. In the period of 1891 the mortality figure of artists, modified for comparative purposes, was 777, as against 955 and 868 in the 1871 and 1881 periods.

Musician, Music Master (7).—The returns of the last census showed, under this heading, 19,262 males above 15 years of age, as compared with 13,977 in the year 1881; the number has therefore increased by 38 per cent. The mortality of men thus classified continues to be very high; at all ages in the main working period of life it greatly exceeds that of occupied males taken as a standard. At ages 20-25 the death-rate of musicians is higher than the standard rate by 8 per cent., but at ages above 65 it is considerably below it. The comparative mortality figure of musicians stands at 1,214, as against 953 for occupied males. Compared with the standard, musicians die more than twice as rapidly from alcoholism, and very much more rapidly from diseases of the liver: their mortality figure due to phthisis is enormous, being 322, as against 185 for all occupied males. Musicians experience unusually heavy mortality from diseases of the nervous, circulatory, digestive, and urinary systems, and their mortality figure from suicide is 23, as against an average of 14 for occupied males. It is clear, therefore, that many of those who are engaged in this occupation are sadly addicted to intemperance. The mortality of musicians has been very considerably reduced within the last 20 years, and this is seen to be the case whether the first or the second vicennium of the working period is examined. The mortality figure for musicians in the 1891 period, modified for purposes of comparison, was 1,185, as compared with 1,495 and 1,238 respectively in 1871 and 1881 (Tables VII. and VIII.).

Domestic Indoor Servant (8).—Under this heading 51,636 males aged 15 years and upwards were returned in the year 1891, a number almost identical with that returned at the previous census. At each of the age groups of the main working period of life (25-65) the mortality of male domestic servants is much lower than that of other occupied males of similar age, whilst at ages under 25 years and also at ages over 65 years, their mortality is below even that of males in the selected healthy districts (Table I.). The comparative mortality figure of domestic servants aged 25-65 years is only 757, and is therefore lower than the standard by more than one-fifth part. Table VI. shows that male domestic servants as a class are abnormally constituted with respect to age, very nearly half of them being between the ages of 15 and 25 years, while among occupied males generally less than one-third part are under 25 years old. Therefore the comparative mortality figure

in this occupation applies only to those who remain in domestic service after reaching maturity, and takes no account of the large numbers who relinquish that service for other occupations.

From almost all the diseases in Table IV. male domestic servants experience a mortality which is considerably below that of occupied males generally. Under the heads of alcoholism and diseases of the liver, however, their mortality is somewhat in excess of that standard. From phthisis and from diseases of the kidneys the mortality of domestic servants differs little from the average in other occupations. They die less rapidly than the average from influenza, cancer, and diseases of the nervous system, and much less rapidly from diseases of the heart and lungs, and also from accident. The mortality from diabetes is not far short of twice as great among domestic servants as it is among occupied males in the aggregate, and they are much more addicted than the last-mentioned class to the commission of suicide.

Commercial Traveller (9).—At the census of 1891 there were enumerated under this heading 43,867 males above 15 years of age, being an increase of 24 per cent. on the number returned in 1881. The rate of increase during the last intercensal period has been very much less than it had been between 1871 and 1881, during which interval commercial travellers had almost doubled in number. The mortality of commercial travellers is high, considering the nature of their employment, and the large proportion of time they spend in the open air. Their death-rates at the several ages from 20 to 35 years are below the standard for occupied males, but after that age they show an excess. Their comparative mortality figure at ages from 25 to 65 years is 961, as against 953 which is the standard figure. Table IV. shows that commercial travellers succumb in undue proportion to alcoholism and to diseases of the liver, their mortality figures from these diseases being 23 and 47 respectively, as against averages for occupied males of 13 and 27. Commercial travellers die from diabetes almost as fast again as the average, and from cancer faster than the average by 43 per cent.; they also suffer exceptionally from Bright's disease; their mortality from phthisis and from diseases of the respiratory system is, however, below the average. At the age-group 25-45 their mortality has decreased, but not steadily, since 1871. At the age-group 45-65 the rate fell considerably between 1871 and 1881, but it has risen again somewhat since the year last mentioned. The mortality figure in 1891, modified for comparison with the figures for 1871 and 1881, was 926, against 1,106 and 893 in the first and second periods respectively. Table IX. shows that although the mortality of this class from alcoholism has scarcely altered since 1881, their mortality from gout and from disease of the liver has very considerably declined; their mortality from phthisis and from diseases of the nervous system has also declined. The mortality of commercial travellers caused by suicide is now lower than it was in the 1881 period by 47 per cent. On the other hand, they now die more rapidly than they formerly did from diseases of the circulatory, respiratory, and urinary systems, and their mortality from "other causes" has increased by three-fifths as compared with the previous record.

Commercial Clerk, Insurance Service (10); *Railway Clerk, Official* (13).—Under the style of commercial clerks, &c., there were enumerated in 1891 251,767 males above 15 years of age; the increase being equal to 37 per cent. as compared with the number returned at the previous census. Railway clerks and officials numbered 42,264 in 1891. In consequence of changes in classification this number cannot be compared

with the number similarly returned at the preceding census. The death-rates of commercial clerks at the several groups of ages up to the 45th year differ but slightly from those of occupied males generally, but at all subsequent ages they are much below the average. Railway clerks are subject to higher rates of death than are commercial clerks up to the age of 25 years; from 25 to 35 the rates for both classes are nearly equal, but at the remaining age-groups of the chief working period (or from the 35th to the 65th year) railway clerks have the advantage very decidedly (Table I.). The comparative mortality figure of commercial clerks is much higher than is that of their fellows on the railway, the figures being 915 and 781 respectively. The mortality figure for alcoholism does not exceed 5 among railway clerks, whilst among commercial clerks it stands at 14, or one more than the standard figure: phthisis appears to be considerably more fatal than the average for occupied males in both these occupations, whilst respiratory diseases are in each case less fatal. Among both classes of clerks, and especially among commercial clerks, urinary diseases are more fatal than the average. The data are not available for comparing with previous records the recent death-rates among railway officials and clerks; but the mortality figure of commercial clerks, modified for comparative purposes, has gradually declined throughout the last 20 years, having stood at 1,183, at 938, and at 872 in the first, second, and third periods respectively.

TRANSPORT SERVICE.

Under this description are included those workers who are engaged in the conveyance of persons or of goods, either by railway, by road, or by water. In this service, which is represented by the occupations numbered 11 and 12 and from 14 to 19 inclusive, more than three-quarters of a million men above 15 years of age are employed.

The following table which is calculated from Table I. shows, for the years 1890-92, the mortality of the transport service as a whole, and also that of its constituent industries, at several groups of ages, as compared with the standard mortality at the same ages among occupied males—the latter being taken as 100.

	15-	20-	25-	35-	45-	55-	65 and upwards.
Occupied Males -	100	100	100	100	100	100	100
Transport Service -	131	120	127	128	129	127	123
Railway Engine Driver -	175	97	75	58	78	116	149
Railway Guard, &c. -	202	107	88	74	84	97	87
Cabmen, &c. -	99	88	107	126	124	122	122
Carmen, Carrier -	130	115	128	135	136	138	145
Bargeman -	277	151	136	134	118	120	126
Seaman -	264	206	179	152	134	122	141
Dock Labourer -	180	145	211	193	197	176	134
Messenger, Porter -	76	102	135	143	129	114	89

Within the limits of age which have been taken to represent the main working period of life, the excess of mortality in the transport service at the several ages is remarkably constant, being a little above one-fourth part of the standard rate among occupied males in each of the decennial age-groups therein included; whilst, in the age-groups which

are outside the limits of the main working period, the extreme variations lie between 20 per cent. and 31 per cent. above the average.

The several occupations in the transport service fall naturally into three main divisions, according as the workmen are employed respectively on railways, on water, or on the road. Among these three sections of workers, the men employed on railways compare most favourably with the class of occupied males in regard to their general mortality: next in order come the workers on roads, who show an excess as compared with the same standard about equal to that shown by the transport service as a whole; whilst the least favourable position is that of the men engaged in transport by water, whose mortality exhibits the greatest excess, as compared with the average mortality among occupied males.

In the appended table, which is calculated from Table IV., the mortality from the several causes among occupied males in the aggregate has in each case been taken as 100, and the mortality of the several groups of workers in the transport service has been reduced to a figure comparable with that standard.

	Occupied Males.	Transport Service.	Railway Engine Driver, &c.	Railway Guard, &c.	Cabman, &c.	Carman, Carrier.	Bargeman, &c.	Seaman.	Dock Labourer, &c.	Messenger, Porter.
All Causes	100	128	85	87	121	135	126	142	192	128
Influenza	100	109	124	97	115	136	97	70	115	103
Alcoholism	100	162	15	38	215	131	131	162	400	115
Rheumatic Fever	100	100	100	86	114	129	57	57	86	71
Gout	100	150	50	100	300	50	—	100	150	150
Cancer	100	120	105	98	132	134	102	136	116	109
Phthisis	100	116	41	79	124	105	90	123	176	176
Diabetes	100	71	200	71	71	57	29	129	71	14
Diseases of Nervous System	100	113	139	80	100	113	120	143	139	112
Diseases of Circulatory System	100	130	110	79	117	132	150	156	187	135
Diseases of Respiratory System	100	147	71	71	128	170	112	102	255	128
Diseases of the Liver	100	100	74	67	122	100	93	144	96	59
Other Diseases of Digestive System	100	111	111	64	107	129	104	118	157	107
Diseases of Urinary System	100	120	83	80	132	100	98	139	166	124
Accident	100	214	139	240	109	225	393	354	286	93
Suicide	100	107	21	57	143	107	50	100	157	107
All other Causes	100	120	71	74	106	111	109	183	170	124

It thus appears that, in comparison with occupied males as a standard, the members of the transport service collectively sustain excessive mortality during the main working period of life, not only from all causes, but also from 13 out of the 16 specified causes in the table. Among constitutional diseases they suffer more severely than the average—from gout by 50 per cent., from cancer by 20 per cent.,

and from phthisis by 16 per cent. Their mortality from diseases of the nervous, circulatory, respiratory, digestive, and urinary systems is also in each case above the average. From accidents of various kinds these workers suffer more than twice as heavily as do males in other occupations; this, however, is not more than what might have been expected from the dangerous character of their employment.

Railway Engine Driver, Stoker (11); Guard, Porter, Pointsman (12).—At the last census there were enumerated 39,816 railway engine drivers and stokers, being an increase of 74 per cent. on the number enumerated in 1881. Of guards, porters, and pointsmen, there were returned 101,644 in the year 1891, the number so returned in 1881 not having been separately ascertained. The railway service, if we exclude directing officials and clerks, consists of two fairly definite sections, which exhibit considerable differences in mortality. At each of the five age-groups up to the 55th year, engine drivers and stokers die less rapidly than do guards, porters, and pointsmen, but after the 55th year they die much more rapidly. The comparative mortality figure of the first-mentioned section stands at 810, and that of the second section at 825. Table IV. shows the distribution of the respective mortality figures among several of the principal causes of death; thus the mortality from alcoholism among engine drivers and stokers is the same as that among the clergy, ministers, &c., namely, 2 only; whilst among guards, porters, and pointsmen it stands at 5, which is still considerably less than half the standard figure for occupied males. The mortality of both grades of workers, from liver disease and from diseases of the urinary organs, is also considerably below the standard. The two latter facts go far to show that the members of the railway service generally are a temperate body of men. As the numbers engaged in these two occupations are considerable, it may be worth while to examine further their respective mortalities. For this purpose the percentages in the Table on page xxviii will be found convenient. From phthisis the mortality of engine drivers and stokers is only 41 per cent., and that of guards, porters, &c., is 79 per cent., of the mortality of males of all occupations. Both these classes of men show notable immunity from respiratory diseases, their mortality from these causes being in each case below the average by 29 per cent. From diseases of the nervous and circulatory systems, and of the digestive organs other than the liver, engine drivers suffer more and guards suffer less than do other occupied males. The mortality from accident is of course high, both for engine drivers and for guards; for the former it is 139 per cent. and for the latter 240 per cent. of the mortality among occupied males. On the other hand, both engine drivers and guards appear to be remarkably free from tendency to suicide, the mortality of the former from this cause being about one-fifth, and that of the latter little more than half, of the average.

Coach and Cab Service (14); Carman, Carrier (15).—Under the heading "Coach and Cab Service" are included coach and cab proprietors, as well as coachmen, cabmen, grooms, &c. In the aggregate, 183,742 males above 15 years of age were returned as thus occupied at the last census. The data are not available for comparing this figure with the number enumerated in 1881. Carmen, carriers, hauliers, carters, and waggoners numbered 164,698 at the census of 1891, the total having increased since 1881 by 35 per cent., which is exactly half the rate of increase that had taken place in the intercensal period immediately preceding. At ages under 35 years the mortality

of cabmen is below the average for the transport service as a whole, while that of carmen is about equal to that average; at ages above 35 years the mortality of cabmen is somewhat below, while that of carmen considerably exceeds, the average for the transport service. The comparative mortality figure at ages 25-65 is 1,153 for cabmen and 1,284 for carmen; these figures are respectively 21 per cent. and 35 per cent. in excess of the standard figure for all occupied males. Carmen, however, suffer very heavily from accident, and if the extra deaths due to this cause were eliminated, their mortality figure would be reduced to 1,213. From phthisis, alcoholism, liver diseases, diseases of the urinary system, and suicide, the mortality of carmen exceeds, and that of cabmen exceeds, considerably the standard for occupied males. Among other causes of death which are of numerical importance, influenza and diseases of the circulatory and respiratory organs show excessive fatality among men of both these occupations, more especially among carmen, whose mortality from respiratory diseases is 70 per cent. above the average. From cancer the mortality of both cabmen and carmen is about one-third greater than that of occupied males in general. An alteration effected in the constitution of this section at the census of 1891 prevents comparison of the recent mortality among cabmen with that of previous years, but among carmen, carriers, &c., the mortality figure has somewhat risen since 1881 (Table VIII.).

Bargeman, Lighterman, Waterman (16); *Seaman, Pilot, &c.* (17); *Dock Labourer, Wharf Labourer* (18).—Bargemen, watermen, &c., above 15 years of age numbered 30,016 at the last census, having increased by 908 or 3.1 per cent. since 1881. Seamen, pilots, and others of the merchant service numbered 105,904 in the year 1891, having increased by only a few hundreds since the previous census. Dock and wharf labourers numbered 54,746 at the last census: the number similarly classed in 1881 is not available for comparison. These three occupations have this in common, that the workers severally are engaged in the conveyance of goods by water. At ages from 15 to 20 years the death-rate of bargemen and seamen is much more than double, and that of dock labourers is nearly double, the standard rate among occupied males; the rate in all the three occupations is also greatly in excess at every one of the subsequent age-groups. At each of the decennial age-groups from 25 to 65 years the death-rate of seamen exceeds that of bargemen, while the rate of dock labourers is still higher. The comparative mortality figure at ages 25-65 for all causes, is 1,199 among bargemen, 1,352 among seamen, and 1,829 among dock labourers; but the shares of the total mortality contributed by accident are in each case excessive, amounting to 224, 202, and 163 in the three industries respectively. The mortality figures for alcoholism are 17, 21, and 52, and those for phthisis are 167, 228, and 325 respectively. Nervous diseases are much more fatal than the average to seamen and to dock labourers, and slightly more so to bargemen. Circulatory diseases are half as fatal again to bargemen and to seamen, and twice as fatal to dock labourers as they are to occupied males generally. From respiratory diseases bargemen and seamen suffer only a little more heavily than the average, but the mortality figure of dock labourers for these diseases reaches 564, which is two and half times as high as the corresponding figure among occupied males, whilst it exceeds the mortality figures for all causes among clergymen, farmers, and gardeners. Bargemen are the only labourers in the present section whose recent mortality can be compared with that of previous years. Table VII. shows that at ages under 45 years the death-rate of these

workers has decreased slightly during the last three periods, but that at ages over 45 it has increased. The mortality figure of bargemen at ages 25-65, modified for purposes of comparison, has fallen from 1,253 in the 1871 period to 1,194 in 1891 (Table VIII.).

Messenger, Porter, Watchman (neither Railway nor Government) (19).—There were enumerated at the last census 97,384 men above the age of 15 years who were classed as messengers, porters, &c., being an increase of 15.4 per cent. on the number returned in 1881. The comparative mortality figure among these men is high: it is 1,222, and approximates closely to that of carmen, carriers, &c., which is 1,284. At ages under 25 and over 45, messengers, &c., die less rapidly than carmen do, but at the intervening ages the last-mentioned workers have a slight advantage. Messengers suffer more severely than do carmen from gout and phthisis among constitutional maladies, and also from diseases of the urinary system; whereas they suffer less severely from rheumatic fever, cancer, and diabetes, and also less severely from alcoholism and from diseases of the digestive and respiratory systems. The mortality of messengers, porters, &c., has fallen very considerably since the previous record, their modified figure being lower than that of 1881 by 17 per cent. The death-rate has fallen, not only at all ages, but also at each of the divisions constituting the main working period of life, and the fall at both ages has been considerable. (Tables VII. and VIII.)

AGRICULTURISTS.

According to the census returns of 1891 more than a million males above 15 years of age were engaged at that time in the pursuit of agriculture. This population may therefore be considered large enough to furnish statistics which shall be fairly representative of the agricultural class. The following table shows the annual rates of mortality at specified ages among the several grades of agriculturists in the years 1890-92, compared with those of all occupied males taken as 100, with those of occupied males in the specially agricultural districts, and also with those of males in the selected healthy districts:—

	15-	20-	25-	35-	45-	55-	65 and upwards.
All occupied males - - -	100	100	100	100	100	100	100
Do. in agricultural districts	82	92	82	72	67	71	92
Males in healthy districts - -	124	97	82	68	66	72	91
Agricultural class - - -	65	69	66	62	59	66	90
Do. in agricultural districts	70	78	70	66	60	64	93
Farmer, grazier, &c. - - -	51	47	59	57	54	65	86
Do. in agricultural districts	63	50	56	51	49	56	81
Farm labourer - - -	67	77	71	67	62	67	96
Labourer in agricultural districts	71	85	76	74	66	68	101
Gardener, nurseryman, seedsman	65	55	57	53	56	64	74

The death-rates of agriculturists throughout England and Wales are very low at all the age-groups specified in this table: they are not only below the rates at corresponding ages of all occupied males, and of occupied males in agricultural districts, but they are also below the

rates in the selected healthy districts.* The comparative mortality figure of agriculturists as a class is 602, which is lower by 77 than that of males in the selected healthy districts; the standard figure for occupied males being 953.

The following table, which is deduced from Table IV., shows the mortality from certain specified causes in the agricultural class as a whole, and in its several divisions, as compared with the standard mortality among all occupied males, the latter being taken as 100.

	All Occupied Males.	Occupied Males in Agricultural Districts.	Agricultural Class.	Agriculturists in Agricultural Districts.	Farmer, Grazier, &c.	Farmer, Grazier, &c. in Agricultural Districts.	Farm Labourer.	Labourer in Agricultural Districts.	Gardener, Nurseryman.
All Causes - - - -	100	72	63	64	59	53	66	70	58
Influenza - - - -	100	100	109	112	115	112	112	118	82
Alcoholism - - - -	100	54	31	31	46	1	31	31	31
Rheumatic Fever - - -	100	86	86	71	86	71	71	57	100
Gout - - - -	100	100	50	50	50	100	50	50	50
Cancer - - - -	100	91	82	84	82	77	82	86	82
Phthisis - - - -	100	73	57	63	43	44	62	70	61
Diabetes - - - -	100	100	86	86	143	157	71	71	57
Diseases of Nervous System -	100	77	62	63	62	50	65	71	57
" Circulatory System -	100	75	66	68	61	52	71	75	61
" Respiratory System -	100	51	52	49	41	29	58	57	48
" the Liver - - - -	100	89	63	59	96	81	43	56	63
Other Diseases of Digestive System	100	82	82	75	96	75	79	75	64
Diseases of Urinary System -	100	73	59	59	71	68	51	56	63
Accident - - - -	100	79	63	68	53	54	74	77	39
Suicide - - - -	100	86	71	71	100	129	57	50	71
All other Causes - - - -	100	76	73	76	65	61	79	86	61

Out of the 16 causes specified in this table, there is only one in which the mortality of agriculturists, as a class, exceeds that of occupied males generally. The exception is influenza, the mortality from which disease shows an excess equal to 9 per cent. The chief excess under this heading probably occurred in the first quarter of the year 1892, which was marked by a severe outbreak of influenza specially affecting the country districts. The mortality among agriculturists from phthisis does not exceed 57 per cent., and that from diseases of the respiratory system does not exceed 52 per cent. of the standard mortality among occupied males, and their mortality from all other diseases of the local class is considerably below the same standard.

Farmer, Grazier, Farmer's Son (20, 20a); Farm Labourer (21); Labourer in Agricultural Districts (21a); Gardener, Nurseryman,

* It should however be borne in mind that the death-rate in the selected healthy districts is that of *all males*, and not that of *occupied males*, which latter would probably be lower.

Seedsman (22).—The number of farmers and graziers above 15 years of age enumerated in 1891 was 268,994, as compared with 278,350 at the preceding census. Their number has declined considerably in the course of the last twenty years, although the rate of decline has not been constant throughout that period. Between the years 1871 and 1881, the decrease had been equal to 7.4 per cent., whilst between 1881 and 1891, it has been only 3.4 per cent. Farm labourers also have declined in number during the same interval. In the year 1881 the number was 740,554, but it fell to 646,015 in the year 1891, the decrease in that decennium being equal to 12.8 per cent., as against a decrease of 7.7 per cent. between the years 1871 and 1881.

In arranging the statistics with respect both to farmers and graziers and to farm labourers, sub-divisions have been employed to show separately their death-rates in a group of counties, and portions of counties, which have been designated "agricultural districts" for the purpose of the present investigation. A definition of these agricultural districts and a list of the constituent areas have already been given in the footnote on page v. As there explained, all labourers in these agricultural districts have been counted for present purposes as farm labourers: their inclusion raises the number of "farm labourers" in England and Wales in 1891 to 728,404. It is probable that this total contains a small proportion of "general labourers," who experience a higher rate of mortality than do farm labourers; and that the mortality attributed to the latter is in consequence somewhat too high. There were returned at the last census 169,174 gardeners and nurserymen above 15 years of age, as against 141,956 in the year 1881; their rate of increase having been equal to 21 per cent. in the earlier intercensal period, and to 19 per cent. in the later.

On reference to the table on page xxxi, it will be seen that, as might have been expected, the death-rates of farmers and graziers given in Table I. are lower at the several ages than the corresponding standard rates. It is worth notice, however, that although in the agricultural districts the death-rates at every group of ages are lower among farmers than they are among occupied males, nevertheless, at the age-groups 15-20 and 20-25 the death-rates of this division of farmers are in excess of those of the entire class of farmers at the same ages. Among farm labourers and farm servants, irrespective of locality, the death-rates at the several ages are higher than those of farmers and graziers, and among labourers in agricultural districts the rates at all age-groups are higher than those of farm labourers generally. The death-rates among gardeners, nurserymen, &c., do not differ widely from those of farmers in the aggregate. At ages under 25 the rates of gardeners are slightly higher than those of farmers; from 25 to 45 years they are somewhat lower; they are higher at ages 45-55, and again lower at subsequent ages.

The comparative mortality figure from all causes among farmers and graziers generally is 563, and among the same class in the agricultural districts it is 506, or considerably lower than that of the clergy. Gardeners and nurserymen come next with a mortality figure of 553, or rather less than that of farmers in the aggregate; the entire class of farm labourers follow next with a figure of 632, and labourers in the agricultural districts come last with a mortality figure of 666 (*see Table IV.*). Labourers in the agricultural districts suffer a higher mortality than do other members of the agricultural class, not only from all causes, but also from phthisis, and from diseases of the nervous and circulatory systems; their mortality figures for phthisis and for the two groups of diseases last specified being severally 129, 58, and 95, which

figures are, however, below the standard figures for these diseases by 30, 29, and 25 per cent. respectively. On the other hand, farmers and graziers in the agricultural districts suffer less severely than do other grades of agriculturists, from the two groups of diseases above named, and also from cancer and from diseases of the respiratory system.

The lowest mortality from phthisis in the agricultural class occurs among farmers and graziers generally, the next lowest occurring among farmers and graziers in the agricultural districts. Gardeners suffer least heavily and labourers in agricultural districts most heavily from influenza; the mortality of occupied males from this malady being taken as 100, that of gardeners would be represented by 82, and that of labourers in agricultural districts by 118.

The mortality caused by intemperance throughout the agricultural class is low. Taking together the deaths caused by alcoholism and by diseases of the liver as approximately representing the mischief thus caused, the mortality figure in any division of this class does not approach the standard for occupied males. The highest mortality from alcoholism and liver diseases together occurs among farmers and graziers generally, whose figure amounts to 32, which is lower than the standard figure for occupied males by 20 per cent. The lowest mortality caused by intemperance occurs among farm labourers generally, among whom the figure does not exceed 17, which is nearly 60 per cent. below the standard.

The main points regarding the causes of mortality among the three grades of agriculturists may thus be briefly contrasted. The excess of mortality among farm labourers as compared with farmers is due mainly to phthisis, to diseases of the circulatory and respiratory systems, and to accident; and the same diseases, with the addition of influenza and diseases of the nervous and digestive systems, but with the exception of phthisis, are more fatal among farm labourers than among gardeners. On the other hand, farm labourers suffer less severely than do either farmers or gardeners from diseases resulting from intemperance in the use of alcohol. Were it not for this fact, the differences between the mortality of these respective workers would be more pronounced than they are. If it be desired to compare the mortality of any given division of the agricultural class in the specially agricultural districts with the mortality of occupied males in the same districts, the table on page xxxii will be found serviceable. That table indicates the direction in which the rates should be modified, in order to allow for the difference between the mortality of occupied males in the agricultural districts, and the standard mortality among occupied males in the whole country. Thus, for example:—among farmers and graziers generally, the mortality from respiratory diseases is 41 per cent. of the standard mortality among all occupied males: but among farmers and graziers in the agricultural districts, the mortality from this cause is only 29 per cent. of the corresponding standard mortality: this fact, however, must be considered in connection with another fact which is disclosed by the table, namely, that the mortality from these diseases among males of all occupations in agricultural districts is only 51 per cent. of the standard mortality among all occupied males.

The figures in Table VIII., modified for purposes of comparison, show that the mortality from all causes taken together has increased among labourers in agricultural counties, but has remained practically stationary among farmers and gardeners. If, however, allowance had been made for the influenza epidemic which prevailed exceptionally in 1891-92, the mortality in each of the occupations in the agricultural class would have shown a progressive and considerable decrease since the earliest of

the three periods. Phthisis mortality has decreased by nearly one-third since 1881 among farmers, and also slightly among gardeners, but among farm labourers it has somewhat increased. Diseases of the nervous system have also proved less fatal since the previous record among all the members of the present class, and the mortality due to suicide has decreased among gardeners and among labourers in agricultural districts, whilst it has been stationary among farmers and graziers in the aggregate; on the other hand, diseases of the circulatory system have become more fatal in all of these occupations. Since the previous record the mortality definitely ascribed to alcoholism has been stationary among farmers and graziers generally; among gardeners and nurserymen it has doubled itself, and among labourers in agricultural districts* it has increased threefold. Liver diseases have become less fatal than they were among farmers and agricultural labourers, especially among the former; but among gardeners there has been no change. The deaths, however, in both periods among gardeners and among labourers in agricultural districts were so few that it would be unsafe to infer, from the foregoing figures alone, an increase of intemperance among these workers. If the deaths from alcoholism and diseases of the liver combined be taken to represent the effect of intemperance, farmers show an improvement since the former record in the mortality figure, from 44 to 32, and labourers in the agricultural districts, an improvement from 20 to 18; whilst on the contrary, the mortality of gardeners from these causes has increased from 19 to 21 (Table IX.).

Fisherman (23).—At the last census there were enumerated 24,338 fishermen above 15 years of age, as compared with 28,595, the number enumerated in 1881. Between 1871 and 1881 the tribe of fishermen had increased by not less than 44 per cent., but between 1881 and 1891 it has, on the contrary, decreased by 15 per cent. In dealing with the mortality of fishermen, in his Decennial Supplement for 1871-80, Dr. Ogle pointed out the need of caution in accepting the figures relating to the living as well as to the dead in that sub-order. I would repeat the same caution now. The occupation of "fisherman" is by no means well defined. In addition to fishermen properly so called, who have been trained from childhood to that employment, the tribe includes a considerable proportion of sailors, who for various reasons have left the Naval or the Mercantile Service: men of the two latter types are for the most part industrious, well-conducted, and healthy. But the tribe also contains an uncertain number of labouring men who are untrained to the work, and who adopt the fisherman's calling temporarily when other work is scarce: men of this description are by no means so healthy or so well conducted as are those previously referred to, and their mortality is doubtless much higher. The Board of Trade estimates that of the total number of fishermen employed in registered fishing boats in 1891 about one-fifth consisted of persons employed intermittently. It follows, therefore, that in this occupation perhaps more than in others, there is uncertainty as to whether the same persons are classified alike in the census returns and in the death registers. At the last census the number of fishermen returned above the age of 15 years was less by 4,257 than the number so returned at the previous census. On reference to the Census Report it is found that at the 1881 census, not only all fishermen present in England and Wales at the date of the census, but also those who came into port during the succeeding

* The 1881 supplement contains no statistics for the entire class of farm labourers.
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14 days, were taken into account; whereas at the census of 1891 only those fishermen were counted who had been actually present on the night of the census or who came into port next day, having presumably been in English waters on the census night. Very occasionally it happens that the bodies of fishermen are not recovered after drowning; in these cases it is possible that the deaths may escape registration.

With occupied males as a standard, fishermen compare favourably as regards their liability to death by ordinary diseases; but they are made to appear less healthy than they really are by the circumstance that their occupation exceptionally exposes them to violent death. Their mortality figure due to accident amounts to 148, of which drowning accounts for about three-fourths. If deaths by violence be excluded, the mortality of fishermen from disease alone will be represented by the figure 685, which is 22 per cent. below the corresponding figure for occupied males.

As the members of this tribe agree with those of the agricultural class in this respect, that the lives of both are spent for the most part in the open air, it will be instructive to examine their respective rates of mortality. At every age-group in the tables, the rate of death among fishermen is in excess of that among agriculturists. At the earlier ages the rates are about double. Their comparative mortality figure stands at 845, or 40 per cent. above that of agriculturists.

Fishermen succumb to cancer more rapidly than do agriculturists, the respective mortality figures being 46 and 36. From phthisis and also from respiratory diseases the mortality in the two occupations is about the same, and is lower in both cases than that of occupied males generally. The mortality due to diseases of the nervous and circulatory systems is much higher among fishermen than it is among agriculturists, whilst both occupations suffer about equally from Bright's disease and from other diseases of the urinary system.

The mortality of fishermen would appear by the tables to have increased considerably since the previous record. The reasons have just been given for the belief that the constitution of this tribe of labourers is very unstable: consequently, inasmuch as no correction of the census figures for the inaccuracies referred to has been practicable, it is clear that comparison cannot validly be made between the rates of mortality for fishermen at the two last periods.

THE LIQUOR TRADES.

For the purposes of the present report, the class of men connected with the supply of spirituous liquors has been constituted thus:—*Maltster* (24); *Brewer* (25); *Inn or Hotel Keeper*; *Dealer in Spirits, Wine, or Beer* (26); and *Inn or Hotel Servant* (27).—Although maltsters are included in this class, it is obvious that their connection with the purveyance of beer is indirect only; and, accordingly, their mortality will be found to resemble that of occupied males as a class, much more closely than it resembles that of innkeepers.

At the last census there were enumerated 9,003 maltsters above the age of 15 years, the number having decreased by 4·5 per cent. since the year 1881. 25,627 brewers above 15 years of age were returned at the last census, the number having increased since 1881 by 6·6 per cent.; during the previous intercensal period there had been a decrease of 5·2 per cent. in the number of brewers in the population. The number of innkeepers declined from 77,630 at the census of 1881 to 74,264 at the succeeding census; the decline was therefore equal to

4·3 per cent., as against a decline of 8·5 per cent. in the preceding intercensal period. At the last census there were enumerated 45,216 inn servants, as against 34,785 in the year 1881: the rate of increase was, therefore, equal to 30 per cent., as compared with 26·3 per cent. in the previous intercensal period.

Examination of Table VI. reveals a peculiarity in the age-constitution of inn servants as compared with that of innkeepers. The decrease in the number of inn servants, on passing from one age-group to another, is far too rapid to be accounted for by the prevailing rates of mortality, high as they are. On the other hand, the number of innkeepers rises to a maximum at the age-group 35-45; and at subsequent ages the decrease is much slower than their high rates of mortality would account for. These anomalies suggest a more or less steady transfer of inn servants, as they grow older, to the class of innkeepers, and possibly also some confusion as between employers and employed in these sections of the liquor trade. For this reason a distinction between masters and men has seldom been attempted in the accompanying remarks, the two grades having been generally treated of together under the short title "publican." In Tables I.-IX., however, separate statistics have been given for innkeepers and for inn servants.

In Table I. will be found particulars as to the mortality, at seven age-groups, of each of the occupations concerned in the supply of spirituous liquors; and in the table here appended, the death-rates in Table I. are compared with those of all occupied males at corresponding ages, the latter being, in each case, taken as 100.

—	15-	20-	25-	35-	45-	55-	65 and upwards.
Occupied Males - - -	100	100	100	100	100	100	100
Maltster - - - - -	84	37	63	90	88	115	143
Brewer - - - - -	105	110	149	153	149	148	126
Publican (Innkeeper, Inn Servant)	94	135	207	197	171	144	101
" London - - - - -	101	128	201	220	199	164	116
" Industrial Districts -	71	122	247	221	209	166	113
" Agricultural Districts -	75	71	156	160	135	127	99

The mortality of maltsters from all causes is lower than that of occupied males, taken as a standard, at all ages below the 55th year, but during the remainder of life it is higher. Their comparative mortality figure is 884, and is, therefore, below the standard by 7·2 per cent. Although the mortality of maltsters, definitely referred to alcoholism, scarcely exceeds that of occupied males in the aggregate, maltsters nevertheless succumb much faster than the average to diseases of the liver; their mortality from diseases of the heart and of the lungs is also in excess. Among constitutional diseases, cancer appears to be more fatal than the average to maltsters, and phthisis to be considerably less fatal.

The mortality of persons directly engaged in the supply of spirituous liquors still continues to be enormous. Up to the age of 25 years, brewers experience little more than the average mortality, but after that age the baneful influence of their employment rapidly becomes apparent. Their mortality throughout the main working period of life exceeds that of occupied males by about 50 per cent. At all ages after the 20th year, publicans are subject to a death-rate which is much higher than the average among occupied males, while at the age-groups

25-35 and 35-45 years the rates are just double the average. At ages 25-65, publicans die somewhat faster in the industrial districts than they do in London, and at all the groups of ages, those in the agricultural districts die less fast. The comparative mortality figure of brewers is 1,427; that of publicans is 1,838 in London, 1,948 in the industrial districts, and 1,348 in the agricultural districts, as against 953, the standard figure for occupied males.

The mortality of publicans is higher than that of occupied males from all the causes, or groups of causes, included in Table IV., with the one exception of accident. The following figures, which are calculated from that table, represent the mortality figures of publicans, &c., from several causes, as compared with those of all occupied males, the latter taken as 100:—

-----	Occupied Males.	Maltster.	Brewer.	Publican (Innkeeper, Servant).			
				England and Wales.	London.	Industrial Districts.	Agricultural Districts.
All Causes - - -	100	93	150	174	193	204	141
Influenza - - -	100	91	139	139	158	130	161
Alcoholism - - -	100	108	315	723	977	715	531
Rheumatic Fever - - -	100	129	186	229	243	314	114
Gout - - -	100	150	500	600	550	500	750
Cancer - - -	100	139	159	120	152	134	107
Phthisis - - -	100	74	148	168	242	170	124
Diabetes - - -	100	86	243	271	343	300	114
Diseases of Nervous System	100	54	152	181	137	222	179
Diseases of Circulatory System - - -	100	103	155	151	163	175	132
Diseases of Respiratory System - - -	100	112	143	135	174	193	75
Diseases of the Liver - - -	100	144	219	644	378	804	626
Other Diseases of Digestive System - - -	100	93	168	168	136	261	139
Diseases of Urinary System	100	73	190	210	224	207	222
Accident - - -	100	46	88	82	93	82	89
Suicide - - -	100	57	121	207	243	193	150
All other Causes - - -	100	112	108	135	109	164	105

Taking, for example, publicans without distinction of locality, the table shows that they die 7 times as fast as do occupied males from alcoholism, $6\frac{1}{2}$ times as fast from diseases of the liver, 6 times as fast from gout, and more than double as fast from diseases of the urinary system, from rheumatic fever, from diabetes, and from suicide.

Among publicans in London, the case is in some respects, worse. Their mortality from all causes is nearly double that of all occupied males taken as a standard. They die nearly 10 times as fast from alcoholism, $3\frac{3}{4}$ times as fast from diseases of the liver, and more than twice as fast from affections of the urinary organs and from suicide. Among London publicans the mortality from phthisis, from rheumatic fever, and from suicide is $2\frac{1}{2}$ times, that from diabetes is $3\frac{1}{2}$ times, and that from gout is $5\frac{1}{2}$ times, as great as it is among occupied males. The excess of mortality in these several cases must not, however, be taken as the result of occupation solely. Some part of it is doubtless due to locality; for the mortality of occupied males in London is considerably

greater than that of occupied males generally.* From all causes the excess is 20 per cent., from alcoholism it is 38 per cent., from diseases of the liver 11 per cent., from diseases of the urinary system 37 per cent., from gout 200 per cent., from phthisis 50 per cent., from diabetes 14 per cent., and from suicide 29 per cent.

In the industrial districts publicans die from all causes more than twice as fast as do occupied males generally. From alcoholism they die 7 times as fast, from diseases of the liver 8 times as fast, and from diseases of the urinary system twice as fast. From phthisis and from diseases of the nervous, circulatory, respiratory and digestive systems, their mortality ranges from $1\frac{3}{4}$ times to $2\frac{1}{2}$ times the average. From suicide it is nearly double the average, and from rheumatic fever, diabetes, and gout the excess is proportionally even greater. As in the case of London publicans, the excessive mortality among publicans in industrial districts must be considered as in some part due to local conditions. The effect of such conditions may be roughly estimated by comparing the mortality among occupied males in industrial districts with that among all occupied males. This comparison shows that in the industrial districts the excess from all causes amounts to 31 per cent., from alcoholism to 46 per cent., from diseases of the liver to 19 per cent., from urinary diseases to 22 per cent., from rheumatic fever to 14 per cent., from cancer to 9 per cent., from phthisis to 21 per cent., and from suicide to 14 per cent.

In the agricultural districts publicans die from all causes faster by rather more than one-third part than do occupied males generally. From alcoholism their mortality is more than five times, from liver disease more than six times, from gout more than seven times, and from urinary diseases more than double the standard mortality from these causes respectively; from suicide their mortality is half as high again as it is among occupied males in the aggregate. There are only two headings in the table, namely, lung diseases and accident, under which the mortality of publicans in the agricultural districts is below that of all occupied males. These figures, however, considerably understate the mortality specially incidental to publicans in the agricultural districts; for the influence of locality is greatly in their favour, as is shown by the low mortality of occupied males generally in these parts of the country. For example, the mortality from all causes among occupied males in the agricultural districts is 28 per cent. below that of occupied males throughout the country, while the mortality of publicans in those districts is 41 per cent. in excess of the same standard. Similarly, the influence of locality in the agricultural districts represents an advantage of 46 per cent. in the mortality from alcoholism, of 11 per cent. in that from diseases of the liver, of 22 per cent. in that from urinary diseases, of 27 per cent. in that from phthisis, and of 49 per cent. in that from respiratory diseases.

Among publicans respiratory diseases (and especially pneumonia) are much more fatal in the industrial districts than in London; they are least fatal in the agricultural districts, where the mortality is even lower than the standard among occupied males generally. All sections of the present class are shown by the tables to have suffered from influenza more severely than the standard. The highest mortality from that disease among publicans occurred in the agricultural districts, which are mainly situate in the southern parts of England and Wales, and the lowest mortality among the same class

* See Table on page xviii.

occurred in the industrial districts, which mostly lie in the northern parts of the country. In the agricultural districts the mortality of publicans was 61 per cent. and in the industrial districts it was 30 per cent. above that of the corresponding group of occupied males.

Both alcoholism and liver disease are less fatal to brewers than to innkeepers and wine and spirit dealers, probably because the latter consume ardent spirits in larger quantities than do the former. Brewers resemble publicans in this respect, that they succumb much faster than the average to alcoholism and to diseases of the liver, as well as to constitutional diseases, especially rheumatic fever, gout, and diabetes. The mortality of brewers from alcoholism and gout is more than three times as high, and that from diabetes, liver diseases, and Bright's disease is fully twice as high as the mortality of occupied males.

Table IX., which furnishes the means of comparing the recent mortality under several headings with that in former years, shows that among brewers the mortality from all causes has increased considerably between the periods 1881 and 1891. Their mortality from alcoholism has now become three-fourths as high again as it was in 1881, that from circulatory diseases has increased by one-fifth, that from respiratory diseases by two-fifths, and that from urinary diseases by rather more than two-fifths, whilst their mortality due to suicide has now become half as high again as it was in 1881. On the other hand, their mortality from phthisis, from diseases of the nervous system, and from diseases of the liver has in each case declined. The decrease in the mortality from the two diseases last mentioned, may partly explain the increase under the heading alcoholism; for, in cases of death from nervous and from liver diseases resulting from intemperance, the primary cause is more frequently stated at the present time than was formerly the case.

Among innkeepers alone the mortality from all causes has increased enormously since the previous record.* The mortality from alcoholism has increased by three-fifths of the former figure, that from heart disease by nearly the same proportion, and that from lung disease by about one-half, whilst the mortality due to suicide has increased by one-fourth. Under each of the three headings, phthisis, diseases of the nervous system, and diseases of the liver, there has, on the other hand, been a decrease since the previous record; although, as in the case of brewers, the decrease may perhaps be only apparent.

SHOPKEEPING CLASS.

For the sake of uniformity this class has been limited to the eleven occupations numbered 28 to 38 in the tables. These eleven occupations were selected in 1881 by Dr. Ogle, as representing the shopkeeping class at that time, and all but two of them had been grouped together by Dr. Farr, as similarly representative in 1860-61, 71. Consequently we have now the means of comparing the mortality in each of the eleven occupations during the last two periods, and also of comparing the mortality in nine of the eleven occupations with corresponding data for the 1871 period (Tables VII., VIII.).

Considerably more than one-third of a million males above the age of 15 years were enumerated under these eleven headings at the last census; but the use of the collective term "shopkeeper" must not be taken to imply that the several groups of men which it includes are similar,

* In the former Supplement the causes of death of inn servants were not given.

either socially or with respect to their hygienic surroundings. For example, occupational group 28, which is made up of publishers, librarians, booksellers, &c., includes a certain although probably not large proportion of literary men, who under most other systems of classification would assuredly be ranked among the professions.

Again, group 29 consists of 20,194 chemists and druggists, who are included in the present category only because they are incidentally obliged to keep open shop for the convenience of their customers; but that this circumstance is in itself no bar to their being considered worthy of a higher position may be shown by the fact that a large number of apothecaries likewise keep open shop, and yet these are recognised members of the medical profession, and are classified accordingly. As a matter of fact, pharmaceutical chemists are in these days educated men who have passed through the ordeal of a fair examination in the elements of general knowledge as well as in pharmacy, and in the sciences ancillary thereto. I have it on the authority of the Secretary of the Pharmaceutical Society of Great Britain that since the year 1868, when the Pharmacy Act first came into operation, no one who was not so engaged at that date has been registered as a pharmaceutical chemist, or as a chemist and druggist, otherwise than after examination and approval by that society, and in many cases, after a pupilage and course of study satisfactory to the examiners.

Table I. shows the rates of mortality from all causes in the aggregate among the several occupations of the shopkeeping class at each of seven ætal periods. In the following table the mortality of occupied males at each age-period has been taken as 100, and the corresponding rates for the several occupations have been reduced to figures proportional thereto.

	15-	20-	25-	35-	45-	55-	65 and up-wards.
Occupied Males -	100	100	100	100	100	100	100
Shopkeeping Class -	84	98	94	90	89	90	76
Publisher, Bookseller, &c. -	115	126	95	76	83	95	62
Chemist, Druggist -	123	123	96	98	111	85	96
Tobacconist, &c. -	139	122	124	96	105	102	71
Milkseller, Cheesemonger, &c. -	76	80	93	92	120	125	107
Fishmonger, Poulterer -	92	108	107	104	97	99	76
Fruiterer, Greengrocer -	67	140	96	96	98	105	87
Grocer, &c. -	73	78	74	69	69	68	61
Draper, Manchester Ware- houseman -	95	122	117	112	100	103	87
Coal Merchant, &c. -	53	94	82	86	77	90	89
Ironmonger -	64	65	81	79	73	101	89
General Shopkeeper -	82	78	122	113	96	89	70

It thus appears that at every one of the seven age-groups the mortality of shopkeepers in the aggregate is lower, and in some cases considerably lower, than that of other occupations. In Table IV. is shown the share of the total mortality which has been caused by each of the several diseases enumerated therein. In the following table the figures of Table IV. have been compared with the mortality of occupied males from the several causes, and have been reduced in every case to percentages of the latter mortality.

	Occupied Males.	Shopkeeping Class.	Publisher, Bookseller, Stationer, &c.	Chemist, Druggist.	Tobacconist, &c.	Milk-seller, Cheese-monger, &c.	Fishmonger, Poulterer.
All Causes - - -	100	90	87	97	105	111	101
Influenza - - -	100	91	73	112	73	182	94
Alcoholism - - -	100	103	77	138	192	123	215
Rheumatic Fever - - -	100	114	86	186	129	100	143
Gout - - -	100	100	300	450	100	200	150
Cancer - - -	100	95	116	125	116	132	95
Phthisis - - -	100	93	111	97	151	90	86
Diabetes - - -	100	143	186	129	200	143	100
Diseases of Nervous System	100	100	101	148	100	87	109
Diseases of Circulatory System	100	93	90	87	87	117	110
Diseases of Respiratory System	100	81	70	59	82	113	107
Diseases of the Liver	100	115	119	133	156	122	144
Other diseases of Digestive System	100	96	57	68	100	114	79
Diseases of Urinary System	100	107	78	137	124	122	120
Accident - - -	100	44	19	63	35	107	53
Suicide - - -	100	121	64	221	114	200	150
Other causes - - -	100	91	100	100	103	103	86

	Occupied Males.	Fruiterer, Green-grocer.	Grocer, &c.	Draper, Manchester Warehouseman.	Coal Merchant, &c.	Ironmonger.	General Shopkeeper.
All Causes - - -	100	99	70	106	84	85	102
Influenza - - -	100	82	73	133	94	70	58
Alcoholism - - -	100	138	62	108	100	92	108
Rheumatic Fever - - -	100	100	129	157	57	114	86
Gout - - -	100	100	50	—	50	200	350
Cancer - - -	100	86	77	111	102	93	93
Phthisis - - -	100	83	71	141	51	65	126
Diabetes - - -	100	143	143	171	129	157	114
Diseases of Nervous System	100	116	80	124	95	121	102
Diseases of Circulatory System	100	102	75	107	88	88	101
Diseases of Respiratory System	100	105	55	82	93	65	101
Diseases of the Liver	100	137	96	122	115	211	107
Other diseases of Digestive System	100	114	93	104	111	118	121
Diseases of Urinary System	100	127	98	88	112	120	112
Accident - - -	100	56	28	33	44	19	49
Suicide - - -	100	100	86	107	171	107	121
Other Causes - - -	100	103	70	112	80	106	85

From this table it will be seen that, as compared with the mortality of occupied males in the aggregate, the mortality of the class of shopkeepers is lower in the case of eight of the diseases in the list, equal in two cases, and higher in the remaining six.

Table VIII. shows that, if we compare the period of 1891 with that of 1871, there has been a decline in the mortality of all but one of the nine occupations for which the data are available, and that in this solitary exception, the increase is so trifling as scarcely to deserve mention. If, however, the 1891 period be compared with that of 1881, it appears that the mortality has increased since the earlier date in not fewer than seven of the eleven occupations, in some cases not inconsiderably.

The mortality of shopkeepers varies, as does that of men in other occupations, with locality; but its variations appear to lie within a narrower range. And this might reasonably have been expected; for whilst in manufacturing towns shopkeepers are subject to less unfavourable conditions of life than are the bulk of the population, in rural districts they do not enjoy the advantages of open air life to the same extent as do agriculturists. This is clearly indicated by the respective mortality figures, which are as follows:—

	England and Wales.	Industrial Districts.	Agricultural Districts.
Males of all occupations - - -	953	1,248	687
Shopkeeping class - - -	859	1,012	728

Thus, the mortality of all occupied males is 31 per cent. greater in industrial, and 28 per cent. less in agricultural districts than it is in the country as a whole; but the mortality of shopkeepers ranges only between 18 per cent. above its average in the industrial, and 15 per cent. below its average in the agricultural districts. In the former districts it is considerably below, while in the latter it is somewhat above the mortality of other occupied males living in the same localities.

Publisher, Bookseller, Librarian, Stationer (28).—At the last census 23,274 males above the age of 15 years were returned under this heading, being an increase of 21·9 per cent. on the number enumerated in 1881. Compared with the mortality of occupied males as a standard, that of publishers, &c., is low at all ages over 25 years. At each of the age-groups under 35 years, and also at the ages 55–65, publishers are subject to a mortality which is above that of shopkeepers generally; but from age 35 to age 55, and again at ages above 65 years, they die less rapidly than do shopkeepers on the average. The comparative mortality figure of publishers, &c., from all causes, at ages 25–65 years, is 833; and if the mortality of occupied males be taken as 100, that of publishers will be represented by 87, the corresponding figure for the entire shopkeeping class being 90.

The mortality of publishers, &c., in 1890–92 from most of the causes of death in the table was considerably below the standard for occupied males. The principal exceptions were phthisis, cancer, diseases of the nervous system, and diseases of the liver; gout and diabetes were also proportionally much more fatal than among occupied males generally. The figure for respiratory diseases was 30 per cent., and that for diseases of the digestive organs other than the liver was 43 per cent.

below the average. Publishers are remarkably free from fatal accidents, and their tendency to suicide is less than two-thirds that of occupied males generally. Their mortality from alcoholism is 23 per cent. below the average, but this is counterbalanced by an excess of 19 per cent. from liver diseases. According to Tables VII. and VIII., the mortality figure of publishers during the main working period of life compares unfavourably with the previous record; this, however, is entirely due to an increase in the death-rate at ages above 45 years, for the rate at ages 25-45 years shows a decrease in 1890-92.

Chemist, Druggist (29).—According to the last census report, there were enumerated 20,194 chemists and druggists, with their apprentices and assistants above the age of 15 years, showing an increase of 12 per cent. on the number returned at the previous census.

The comparative mortality figure of chemists and druggists is above the average for shopkeepers, and approximates more nearly to that of occupied males generally. As compared with the last-mentioned class, chemists and druggists sustain excessive mortality at ages below 25 years, but at all other age-groups except 45-55 years their mortality is below the standard. Chemists and druggists would appear to have suffered more severely than occupied males generally from influenza during the recent epidemic. Their mortality from alcoholism and from liver disease is considerably in excess, as is also that from diseases of the nervous system. Their mortality from suicide is more than double that among occupied males in the aggregate. Chemists die nearly twice as rapidly from rheumatic fever and $4\frac{1}{2}$ times as rapidly from gout as do occupied males generally; their mortality from diabetes and from diseases of the urinary system is also excessive, but their mortality from diseases of the heart, of the lungs, and of the digestive organs other than the liver is notably below the average.

Tables VII. and VIII. show that within the last 20 years the mortality of chemists and druggists has steadily declined. The mortality figure, modified for purposes of comparison, was 1,057 in the earliest period, in the second period it fell to 957, and in the most recent period to 916. As in the case of many other occupations, it is in the earlier life stages alone that the reduction has taken place, the rates at ages over 45 years having increased since the previous records.

Tobacconist, Manufacturer of Tobacco (30).—Under this designation 12,544 males above 15 years of age were enumerated in 1891, being an increase of 16 per cent. on the number returned at the previous census. At all age-groups below 35 years, and again at the two age-groups between 45 and 65 years, the death-rates of tobacconists are above the standard rates of occupied males; at both of the other age-groups the rates in this industry are slightly below the standard. The comparative mortality figure of tobacconists is 1,002; the standard figure being taken at 100, that of tobacconists is represented by 105, against 90 for shopkeepers as a class. The table on page xlii shows that the mortality of tobacconists from influenza and from diseases of the heart and lungs is below the standard. Their mortality from accident is only one-third of that among occupied males. From all the other diseases in the table, however, their mortality is in excess; thus alcoholism shows an excess of 92 per cent. and liver disease an excess of 56 per cent. Among tobacconists the mortality from diabetes is double as high as it is among occupied males generally, and higher than it is in any other occupation of the shopkeeping class. Table VIII. shows

that the modified mortality figure of tobacconists, which had fallen considerably between the 1871 and 1881 periods, has since risen; it was higher in 1891 than it had been in the period first mentioned. Table VII. shows that from the 1871 period onwards there has been a steady decline in the mortality of tobacconists during the first half of the main working period of life, and an equally steady increase during the second half of that period. This is now known to hold good with respect to many other occupations in which the aggregate mortality has shown an increase in recent years; it is probably due in part to the unique prevalence in 1890-92 of epidemic influenza, which specially affected persons beyond the meridian of life.

Milkseller, Dairyman, Cheesemonger, Butterman (31).—Under the above descriptions there were enumerated 32,379 males above 15 years of age at the last census, being an increase of 34 per cent. on the number so returned in 1881. At all age-groups up to the 45th year, the death-rates of milksellers are lower than the standard for occupied males generally, and this is so at the earlier ages especially; at all subsequent ages the death-rates are higher than the average. The comparative mortality figure in this industry from all causes at ages 25-65 years is 1,061; it is higher than the mortality figure in any other industry of the present class, and exceeds that of occupied males by 11 per cent. The mortality figure of milksellers for phthisis is lower by 10 per cent., and that for nervous diseases is lower by 13 per cent., as compared with the standard figure for occupied males; but with these two exceptions the mortality under all the headings in the table is in excess of the standard; their mortality from alcoholism and from liver disease exceeds the standard by 23 per cent. and by 22 per cent. respectively. Milksellers die from gout twice as fast as the average, and their mortality from cancer and diabetes and from urinary diseases is greatly in excess; they also fall victims to suicide twice as rapidly as do occupied males generally. The modified mortality figure in 1890-92 was much higher than it had been in 1880-82, the increased mortality having been limited exclusively to the last half of the working period of life.

Fishmonger, Poulterer, Game-dealer (32).—At the last census there were enumerated under this heading 25,027 males above the age of 15 years, being an increase of 38 per cent. on the number similarly returned in 1881. At each of the age-groups covering the period from the 20th to the 45th year, the death-rates of fishmongers are slightly above the standard rates for occupied males, but at all other ages they are below the average. The comparative mortality figure for this industry at ages 25-65 years is 963, and exceeds the standard figure by only 1 per cent. Fishmongers die more than twice as fast as do other occupied males from alcoholism, and nearly half as fast again from diseases of the liver. Among constitutional diseases the figures for cancer and for phthisis are 5 per cent. and 14 per cent. respectively below the average, while rheumatic fever and gout show a considerable excess. The mortality of fishmongers from diseases of the nervous, circulatory, and respiratory systems shows, in each case, but little departure from the average, but the figure for suicide is half as high again as the standard. The mortality figure of fishmongers, modified for purposes of comparison, fell by one-fourth part between the 1871 and the 1881 period, whilst it has increased again between the last-mentioned date and 1891. As in the case of many other industries, the increased death-rate in the recent decennium has been confined to the latter half of the main working period of life.

Fruiterer, Greengrocer (33).—Under this description there were enumerated at the last census 29,554 males above 15 years of age, the number having increased since 1881 by 33 per cent. The death-rate of fruiterers considerably exceeds the standard for occupied males at ages 20–25, and also slightly exceeds it at ages 55–65, but at all other ages it is below the standard. From all causes together, the comparative mortality figure of fruiterers at ages 25–65 years scarcely differs from that of occupied males generally, but their mortality caused by diseases of the urinary system exceeds the average by more than one-fourth part, while that caused by alcoholism and by diseases of the liver is more than one-third part in excess. Among constitutional diseases diabetes is more fatal to fruiterers than to occupied males generally by 43 per cent., whilst phthisis and cancer are considerably less fatal than the average. Diseases of the nervous system are considerably more fatal, and diseases of the circulatory and respiratory systems are somewhat more fatal to fruiterers than to occupied males in the aggregate. Table VIII. shows that the mortality figures for this occupation have steadily decreased from the 1871 period to the present time; but from Table VII. we learn that there has been an uninterrupted increase throughout that interval, in the death-rate at the higher ages of the main working period.

Grocer: Tea, Coffee, Chocolate Dealer (34).—At the last census 129,627 males above 15 years of age were thus returned, the number having increased by 30 per cent. since 1881.

Of all the occupations in the class of shopkeepers, grocers are apparently by far the healthiest. At every age-group in the table they experience a low rate of mortality, and at all ages above 25 years their death-rates are lower than those of any other occupation in this class. Their comparative mortality figure from all causes at ages 25–65 years is only 664, which is almost the same as that of labourers in the agricultural districts, and is lower than that of occupied males generally by 30 per cent. As compared with the standard mortality among occupied males, the mortality among grocers is below the average from all the causes specified in the table on page xlii, with the exception of rheumatic fever and diabetes, in both of which cases there is an excess. The mortality of grocers from phthisis is below that of occupied males by 29 per cent., and that from lung diseases other than phthisis is below the same standard by 45 per cent. Their mortality from diseases of the nervous and circulatory systems, and also from cancer and from alcoholism, is low, and they are remarkably free from liability to fatal accident. The mortality figure of grocers, modified for purposes of comparison, has steadily decreased ever since the 1871 period; the death-rate at ages 25–45 years has decreased rapidly throughout the three periods, but the rate at ages 45–65 in 1891, although it was lower than it had been in 1881, nevertheless still showed an excess over the rate in the 1871 period. Table IX. shows that, as compared with the previous record (1880–82), the mortality of grocers in 1890–92 from alcoholism, liver disease, and gout, as well as from phthisis, from diseases of the circulatory, urinary, and nervous systems, and from suicide, has in each case declined. The only headings under which an increase appears, are those of respiratory diseases, accident, and other causes of death not classified.

Draper, Manchester Warehouseman (35).—Under this heading there were returned at the last census 59,873 males above the age of 15 years, the number having increased, since 1881, by 10·9 per cent.

The death-rate of drapers is below that of all occupied males, as a standard, at ages under 20 and over 65 years: it is equal to that standard at ages 45–55, and above it at ages 20–45 and 55–65. The comparative mortality figure of drapers aged 25–65 is 1,014, which is considerably higher than the standard figure; it is also higher than the mortality figure of any other group except milk-sellers in the entire class of shopkeepers. As compared with the mortality of occupied males, that of drapers from phthisis is in excess by 41 per cent., but their mortality from diseases of the respiratory system is in defect by 18 per cent. They die faster than the average from influenza, rheumatic fever, and diabetes, by proportions ranging between 33 and 71 per cent.; they also die somewhat faster than the average from alcoholism and from diseases of the liver, as well as from diseases of the nervous system and from suicide. According to Tables VII. and VIII., the mortality figure of drapers aged 25–65 years, modified for purposes of comparison, has on the whole decreased since the earliest record; the death-rate in the first half of this age-period has fallen since 1871, whilst the rate in the second half, although it had fallen considerably in 1881, has since returned to its former level. Table IX. shows that the mortality of drapers from all causes has increased since 1881 by 18 per cent. Between 1881 and 1891 their mortality from phthisis has remained stationary, whilst that from diseases of the respiratory and circulatory systems has shown a considerable increase; their mortality by suicide has increased threefold since 1881, and that due to alcoholism, by nearly two-thirds. On the other hand, their mortality from diseases of the nervous, digestive, and urinary systems, as well as from accident, has somewhat decreased.

Coal Merchant (36).—According to the returns of the last census there were enumerated 27,787 coal merchants above 15 years of age in the year 1891, the number having increased since the previous record by 14·6 per cent. At all ages specified in the tables, the death-rate in this industry is considerably below the standard for occupied males. The comparative mortality figure of coal merchants aged 25–65 years is 803, and is therefore below the standard figure by 16 per cent. Their mortality from phthisis is only about half that of occupied males, and their mortality from diseases of the circulatory, respiratory, and nervous systems is below that standard by 12, 7, and 5 per cent. respectively. There is, however, an excess of more than 10 per cent. in their mortality from digestive and urinary diseases, and of 71 per cent. in that from suicide. The mortality figure of coal merchants, modified for purposes of comparison, was slightly lower in the 1891 period than it had been in 1871, but considerably higher than it had been in 1881. Since the earliest record there has been a slight fall in their death-rate at ages 25–45, but an increase at the remaining ages of the main working period of life.

Ironmonger (37).—At the census of 1891, there were enumerated 19,530 ironmongers above the age of 15 years, being an increase of 31 per cent. on the number enumerated in 1881. With one trifling exception the death-rates of ironmongers at the several age-groups specified in the tables are below the standard rates of occupied males, and at ages 20–25 the rate is lower than that of any other occupation in the shopkeeping class. The comparative mortality figure of ironmongers at ages 25–65 years is 807, and is therefore below the standard figure by 15 per cent. Under each of the important headings phthisis and respiratory diseases, the mortality of ironmongers is below the standard figure by no less than 35 per cent. Ironmongers suffer less than

do occupied males from circulatory diseases, from cancer, from influenza, and from alcoholism, and their mortality from accident is exceptionally low. Under all the other headings in the table, their mortality is above the average, that from liver diseases being notably in excess. If the deaths which are attributed to alcoholism and liver disease in the aggregate be taken as a measure of intemperance, the mortality from this cause among ironmongers is 73 per cent. above the standard. Tables VII. and VIII. show that since 1871 the mortality figure of ironmongers has decreased steadily; but, as in the case of many other occupations, the decrease has been limited to the first half of the main working period.

General Shopkeeper (38).—At the census of 1891, there were enumerated under this heading 27,184 males above the age of 15 years, the number having decreased since the previous census by 4.3 per cent. At all age-groups except 25-35 and 35-45, the death-rates of general shopkeepers are below the standard. Their comparative mortality figure at ages 25-65 years is 973, and therefore scarcely exceeds the standard figure for occupied males. From all the causes specified in the table, except influenza, rheumatic fever, cancer, and accident, the mortality of this group is above the standard. According to Tables VII. and VIII. it appears that the mortality of general shopkeepers during the main working period of life has increased considerably since 1881, the increase having affected both divisions of that period.

Bookbinder (39).—At the census of 1891 there were enumerated under this heading 11,014 males above 15 years of age; the increase since the preceding census having been equal to 20.5 per cent. The deaths recorded in this occupation are few in number; they would, however, appear to justify the following general remarks. The death-rates of bookbinders are above those of occupied males at each of the age-groups, except 45-55 years, and 65 years and upwards. Their mortality figure is 1,060, as compared with 953 for occupied males. Bookbinders die very rapidly from pulmonary consumption, their mortality figure from that disease being not less than 325, and exceeding that of occupied males by 76 per cent. Their mortality from cancer, and from diseases of the urinary system, also shows excess; on the other hand, their mortality from diseases of the nervous, circulatory, respiratory, and digestive systems is below the standard. The mortality of bookbinders from suicide is represented by 26, against 14 in the case of occupied males generally. The mortality figure of bookbinders, modified for purposes of comparison, has decreased slightly but steadily since 1871, and Table VII. shows that there has been a fall in the death-rates at both the age-groups of the main working period of life, although since 1881 the fall has been greatest at ages above 45 years.

Printer (40).—At the last census 75,962 males over 15 years of age were returned as printers. Since the 1881 census the number of printers has increased by nearly 39 per cent. The mortality of printers is above the standard at all the age-groups dealt with in these tables. Their mortality figure is 1,096, which is higher than that of occupied males by 15 per cent. Like bookbinders, printers die very rapidly from phthisis, and probably for a similar reason, namely, because of the excessively unhealthy conditions under which their work is carried on; their mortality from diseases of the respiratory organs, other than phthisis, is, however, below the average, as is also their mortality from alcoholism. From diseases of the nervous, circulatory, digestive, and urinary systems, their mortality is in excess of the standard. Printers

suffer only about one-third as much from fatal accident as do occupied males, but they are somewhat more addicted to suicide; their mortality figure for lead-poisoning is 3.

The mortality of printers has decreased considerably in the course of the last 20 years, although the fall was slightly interrupted in 1881. Both the age-groups in the main working period of life have shared in the fall, but in unequal proportions. As compared with that of 1881 the mortality caused by alcoholism in 1891 has more than trebled, and that caused by suicide has more than doubled. The mortality due to lead-poisoning has fallen to half of the earlier figure, but that from diseases of the urinary system has seriously increased. Diseases of the heart and lungs also show an increase as compared with the previous record. The most important decrease occurs in the case of phthisis, the mortality from which has decreased since 1891 by one-sixth part of the former rate.

Watch, Clock—Maker, Scientific Instrument Maker, Jeweller (41, 41a).—The male population above 15 years of age thus described at the census of 1891 numbered 61,202, or one-fifth part more than at the preceding census. The increase, however, has been exclusively among the electrical and other scientific instrument makers, among whom, taken together, it has been equal to 138 per cent. The workers at all the other occupations in this group have decreased considerably since the previous record.

The death-rates in this group at ages under 35 years are below the standard, but from 35 up to the end of the main working period of life occupied males have a slight advantage. The comparative mortality figure in the whole group is 977, and differs little from that of occupied males as a standard. Turning to Table IV., we find that these workers suffer more severely than do occupied males as a class from phthisis, from diseases of the nervous, digestive, and urinary systems, from rheumatic fever, gout, and diabetes, and from suicide; whilst their mortality from diseases of the heart and lungs, from influenza, from alcoholism, and from accident is below the average. The comparative mortality figure of watch and clock-makers (41a), taken separately, is only 936, or 41 below the figure for the entire group. This difference is due mainly to the lower mortality among these workers than among other members of the group from phthisis, from diseases of the heart and lungs, and from accident. The mortality figure for suicide, however, which stands at 25 in the whole class, against 14 among all occupied males, is no less than 29 among watch and clock-makers. Tables VII. and VIII. show that the mortality, both of watch and clock-makers separately and of the large class of which they form a part, has increased since the previous record. At ages under 45 the death-rates in 1881 and 1891 were nearly equal, but at the higher ages the 1891 rate shows considerable increase.

Saddler, Harness Maker (42).—Under this heading 23,600 males above 15 years of age were found to be living in 1891, being an increase of 11 per cent. on the number enumerated at the preceding census. The death-rates of saddlers correspond closely with those of occupied males at all age groups under 55 years; after that age they are below the average. The comparative mortality figure in this occupation is 924. Compared with that of occupied males, saddlers have a mortality figure from phthisis which is greatly in excess; on the other hand, their mortality from respiratory diseases is much below the average. Under most of the other causes of death in Table IV. the mortality of saddlers

differs little from the standard. They are, however, much less liable to accident, but more addicted to suicide than are occupied males generally. The mortality figure of saddlers, modified as before explained, has decreased considerably during the last 20 years. In the course of the last 10 years, whilst there has been a decrease in the mortality at ages 45-65, the rates at ages 25-45 have shown an increase.

Butcher (43).—The census returns show that 90,944 butchers above 15 years of age were enumerated in England and Wales in the year 1891, the number having increased by nearly one-fifth part since the previous census. The mortality in this occupation at ages under 25 years is remarkably low, being below even that of males in the selected healthy districts,* but throughout the main working period of life the death-rates are in excess of those of occupied males. The comparative mortality figure is 1,096, and is therefore higher than that of occupied males generally by 15 per cent. The mortality figure of butchers exceeds that of occupied males under almost every heading in Table IV. Their mortality due, both directly and indirectly, to intemperance is appalling; the figure for alcoholism being 35, and that for disease of the liver 56, against 13 and 27 respectively in the case of occupied males. Among butchers, Bright's disease and diseases of the nervous system are considerably more fatal than the average. Their mortality figure from suicide is 23, or 9 more than that of occupied males. Butchers die much faster than the average from rheumatic fever, as well as from gout, diabetes, and cancer. The mortality of butchers is above the average from phthisis and also from diseases of the heart, but from diseases of the lungs it is below that of occupied males generally. Referring to Tables VII. and VIII., it is seen that the modified mortality figure of butchers has fallen in the course of the last 20 years; but that, as is so commonly the case, the fall has been exclusively confined to the earlier ages, the mortality at ages 45-65 having increased steadily since the year 1871. Table IX. shows that the mortality of butchers under the head of alcoholism has increased by more than half since 1881, although their mortality from diseases of the liver and kidneys has decreased. Their mortality from phthisis and from diseases of the nervous system has also fallen considerably, whilst that from diseases of the circulatory system has increased.

Corn Miller (44).—There were enumerated 21,951 corn millers above 15 years of age at the census of 1891, the number having decreased since the previous census by about 3 per cent. The comparative mortality figure of corn millers is 845, and is therefore considerably lower than that of occupied males. Compared with occupied males, corn millers die less rapidly at the several age-groups from the 20th to the 55th year, and more rapidly at other ages (Table I.). They suffer more severely than the average from influenza and from rheumatic fever, and very much more so from diabetes, their mortality figure from the latter disease being 19, against 7 for occupied males. Their mortality from alcoholism and from diseases of the liver and kidneys is below, and that from phthisis, from accident and from suicide is very considerably below, the average. The modified mortality figure of corn millers has fallen steadily throughout the last 20 years. The death-rate at the higher ages has been nearly stationary, but at the age-groups 25-45 there has been a considerable saving of life.

* Reference to page cix of the preceding Supplement shows that the same was true in 1881.

Baker, Confectioner (45).—There were 88,243 bakers above 15 years of age according to the last census returns, the number having increased by rather more than one-fifth part since 1881. Their death-rates at the several age-groups of the main working period of life do not materially differ from those of occupied males generally. Their comparative mortality figure is 920, which is but little below the standard. The mortality of bakers from phthisis and from diseases of the heart corresponds closely with that of occupied males generally, and they suffer less severely than that class from diseases of the respiratory organs. Bakers die somewhat less rapidly than do occupied males generally from alcoholism, but much more rapidly from diseases of the liver; their mortality from rheumatic fever, diabetes, and urinary diseases is also considerably above that standard; their mortality from accident is less than half the average, but that from suicide is in excess. The modified mortality figure among bakers has not changed since the year 1881, but in 1871 the figure had been somewhat higher than it now is. As in many other cases, there has been in recent years a steady decline in the death-rate of these workers at ages 25-45, although a slight increase has been observed at the higher ages. From Table IX. we learn that the mortality of bakers from alcoholism and from diseases of the liver has decreased since the previous record, and that a reduction to one-half has taken place in the mortality ascribed to diseases of the nervous system, whilst their mortality from diseases of the respiratory and urinary systems has somewhat increased. Bakers and confectioners are now much less addicted to suicide than was formerly the case, their mortality figure under that heading having fallen by more than a fourth part since 1881.

Hatter (46).—At the 1891 census 15,583 males were enumerated under this heading, being an increase on the previous record equal to 19 per cent. The death-rates of hatters scarcely differ from the average at ages under 35 years, but at all subsequent ages they are considerably above it. Their comparative mortality figure is 1,109, and is therefore above that of occupied males as a standard by 16 per cent. Hatters appear to be much addicted to intemperance, their mortality figure from alcoholism and also from liver disease showing serious excess. Their mortality figure from phthisis is also very high, being 301, or 63 per cent. above the standard figure. Hatters suffer much less severely than the average from influenza and from rheumatic fever, but their figure for diseases of the urinary system is considerably above the average. The mortality figure attributed to suicide is 28 among hatters, or exactly double that of occupied males as a class. Among hatters under the age of 45 years there has been a decline in the rate of death throughout the last 20 years, but at ages 45-65 the rate is now very nearly as high as it had been in 1871. Table VIII. shows that although between the last-mentioned date and 1881 the modified mortality figure had fallen considerably, it has since risen, although not to its former amount.

Tailor (47).—The number of tailors above the age of 15 years enumerated in the year 1891 was 116,278, and exceeded the number so returned in 1881 by nearly 10 per cent. The death-rates of tailors at the several age-groups accord nearly with those of occupied males as a class; their comparative mortality figure is 989, and exceeds the standard figure by 3.8 per cent. Whatever may have been the case formerly, the figures now at our disposal do not warrant the statement that tailors are an intemperate class of men. Table IV. shows

that their mortality figure for alcoholism is below that of occupied males generally, whilst the figures for diseases of the liver and other digestive organs are scarcely above the same standard. Tailors die much faster than the average from phthisis, probably because of the unwholesome conditions under which their work is often carried on. Their mortality from diseases of the nervous system is also considerably in excess; on the other hand, their mortality from influenza, from diseases of the circulatory and respiratory systems, and also from accident, is below that of occupied males. The modified mortality figure in this occupation was practically the same in 1891 as it had been in 1881, but the figures for both these years are somewhat below the figure for 1871. Throughout the last 20 years there has been a substantial increase in the mortality of tailors at ages 45-65, and a corresponding decrease at ages 25-45. Although the mortality directly ascribed to alcoholism is now slightly greater than that of the previous record, Table IX. shows that the figure for diseases of the liver and other digestive organs has undergone a more than equivalent reduction, so that the total mortality really due to intemperance may be inferred with much probability to have decreased since 1881. The mortality figures under the headings gout, phthisis, and diseases of the nervous system have fallen since the previous record; the figure representing suicide has also fallen slightly.

Shoemaker (48).—There were 193,308 shoemakers above 15 years of age at the census of 1891, the number having increased since the previous census by 5.6 per cent. The death-rates of shoemakers are higher than the average at all age-groups up to the 35th year, and lower at subsequent ages. Their comparative mortality figure is 920, and is accordingly but slightly lower than the standard for occupied males. The figures for diseases of the respiratory system and for accident are 18 and 63 per cent. respectively below the same standard; the mortality of these workers from alcoholism and from diseases of the liver is also markedly low. The only numerically important causes of death which show an excess among shoemakers are phthisis and cancer; the mortality from the former being 38 per cent. and from the latter being 14 per cent. above that of occupied males. Throughout the three periods dealt with in Tables VII. and VIII., the mortality of shoemakers above the age of 45 years has increased, whilst their mortality at ages under 45 has decreased; the net result of these changes being a slight increase in the mortality figure. Table IX. shows that the mortality of shoemakers under the head of alcoholism has increased since the previous record, although that from diseases of the liver has decreased. The high mortality from phthisis has remained stationary since 1881, but the mortality from diseases of the circulatory and respiratory systems has shown an increase, whilst that from diseases of the nervous system has fallen more than 20 per cent. Shoemakers appear to be less addicted than formerly to suicide.

Hairdresser (49).—There were enumerated 22,554 hairdressers above 15 years of age at the census of 1891, being an increase on the number living at the preceding census equal to 67 per cent. The death-rate of hairdressers is higher than that of occupied males at each of the several groups except at 15-20 and at ages above 65. Their mortality figure at ages from 25 to 65 is 1,099, and therefore exceeds that of occupied males in the aggregate by 15 per cent. The mortality figures due to alcoholism, liver diseases, gout, and phthisis show serious excess among hairdressers; it therefore appears that, as had been the case in 1881, hairdressers are still excessively addicted to

intemperance. Their mortality from suicide is among the highest in the list of occupations. Heart diseases are more fatal and lung diseases less fatal to hairdressers than to occupied males generally; their liability to death by accident is much less than the average. Turning to the modified figures in Table VIII., we find that hairdressers had experienced almost exactly the same mortality throughout the 1871 and 1881 periods, but that between the last mentioned period and 1891 there has been a fall in the mortality exceeding 14 per cent. In this instance the fall has affected the ages above as well as those below the 45th year.

Tallow, Soap, Glue, Manure, &c., Manufacture (50 and 50a).—Under this heading there were enumerated at the last census, 6,421 males above 15 years of age, showing a slight decrease as compared with the number returned in 1881. The death-rates of these workers exceed those of occupied males at all groups of ages except 20-25 and 35-45; their comparative mortality figure is also considerably in excess of the standard. If the teaching of the few facts that are available may be accepted, this excess would appear to depend on abnormal fatality among workers in glue, size, and manure; for, in section 50a of the present group of occupations from which the workers last referred to are excluded, both the death-rates and the comparative mortality figure are considerably below the average for occupied males. The deaths in this industrial group are too few in number to warrant a detailed analysis of their causes. No death among these workers has been directly attributed to alcoholism, but Table IV. shows that the mortality under the head of liver disease, as well as that from cancer, and from diseases of the nervous and respiratory systems, is in excess as compared with the standard. The mortality figure in this occupational group has considerably increased since the previous record, and Table VII. shows that the increase has affected both age-groups of the working period of life.

Tanner, Fellmonger (51).—The number of males above 15 years of age thus returned at the census of 1891 was 10,114, or about 1 per cent. more than the number enumerated in 1881. The deaths recorded under this heading are few in number; consequently only general remarks will be offered with respect to them. At all ages from 20 to 65 years the mortality of tanners and fellmongers is considerably below the standard of occupied males. Their comparative figure at ages 25-65 is 756, or lower than that of occupied males as a standard by about one-fifth. The mortality of these workers from phthisis and from diseases of the circulatory and urinary systems is less than two-thirds, and that from diseases of the nervous system is only about three-fourths, of the average. Their mortality from alcoholism is much lower than the standard, but that attributed to disease of the liver and to other diseases of the digestive system is considerably higher. They suffer but little from fatal accident, and their mortality from suicide stands at a very low figure. Tables VII. and VIII. show that the mortality of tanners has decreased steadily and very considerably during the last 20 years, the decrease being common to both divisions of the chief working period of life.

Carrier, &c. (52).—Leather carriers above 15 years of age numbered 21,808 at the last census, or 48 per cent. more than in 1881. As in the case of saddlers and harness makers also (No. 42) the death-rates of carriers differ but little from the standard at ages up to 55 years. After this age the death-rates of saddlers fall somewhat below the average; whereas those of carriers rise above it. Their mortality

figure is 998; it is 5 per cent. higher than the standard mortality figure for all occupied males, and 8 per cent. higher than the figure for saddlers. As compared with occupied males as a standard, carriers sustain a mortality from phthisis which is considerably in excess, and which nearly approaches the high rate among saddlers; they also suffer more than the average from diseases of the respiratory system, from which, however, saddlers are comparatively free. From alcoholism, carriers die less rapidly and saddlers more rapidly than the standard, whilst both carriers and saddlers die more rapidly from cancer, from diseases of the digestive and urinary systems, and also from diabetes. Both these classes of workers are specially free from fatal accident, but they are slightly more addicted to suicide than are occupied males generally. The modified mortality figure among carriers is scarcely less than it was 20 years ago. Between the 1871 and 1881 periods it fell very considerably, but since the latter date it has again increased to almost its former amount. There has been a fall since 1871 in the death-rate of carriers at ages 25-45, but at the higher ages of the working period the rate has increased considerably.

WORKERS IN METAL.

Metal workers are represented for the purposes of the present report by the several groups of operatives numbered 53 to 59 in Table I. At the census of 1891 they numbered in the aggregate 699,999 males above the age of 15 years; since the previous census the number has increased by 13.5 per cent. In the appended table the death-rates at several ages among the various groups of workers in this class are compared with the standard rates among occupied males, the latter being in each case taken as 100.

	15-	20-	25-	35-	45-	55-	65 and upwards.
Occupied Males - - -	100	100	100	100	100	100	100
Metal-Worker - - -	105	106	103	111	122	129	128
Engine, Machine-Maker, Fitter; Millwright - - -	118	107	99	101	117	128	143
Boiler-Maker - - -	94	88	91	96	106	120	122
Cutler, Scissors-Maker - - -	93	107	117	168	172	164	134
File-Maker - - -	65	136	152	210	194	193	144
Gunsmith - - -	90	98	140	121	128	129	102
Locksmith, Bellhanger, Gas-fitter - - -	88	76	89	97	108	92	89
Blacksmith, Whitesmith - - -	69	84	80	87	100	108	118
Nail, Anchor, Chain, and other Iron and Steel Manufactures - - -	126	121	121	127	138	151	153
Copper Worker - - -	103	157	152	130	135	160	165
Tin, Tin Plate-Worker - - -	109	104	94	98	97	121	112
Zinc Worker - - -	106	101	137	87	142	132	134
Lead Worker - - -	174	232	167	183	182	205	275
Brass, Bronze-Worker - - -	113	117	100	114	126	112	91

It thus appears that the mortality of the class of metal workers compares unfavourably with that of occupied males. At all the age-

	Occupied Males.	Metal Worker.	Engine, Machine-Maker, Fitter, Millwright.	Boiler-Maker.	Cutler, Scissors-Maker.	File-Maker.	Gunsmith.	Locksmith, Bellhanger, Gasfitter.
All Causes - - -	100	118	114	106	159	190	129	97
Influenza - - -	100	106	88	61	73	121	121	48
Alcoholism - - -	100	85	85	77	138	31	223	69
Rheumatic Fever - - -	100	100	143	100	100	—	100	43
Gout - - -	100	100	150	100	—	200	500	250
Cancer - - -	100	107	109	102	130	89	130	102
Phthisis - - -	100	111	110	91	206	217	175	121
Diabetes - - -	100	100	114	29	100	171	100	43
Dis. of Nervous System - - -	100	124	128	109	111	259	128	132
Diseases of Circulatory System - - -	100	117	121	106	133	162	121	83
Diseases of Respiratory System - - -	100	148	119	132	234	191	147	93
Diseases of Liver - - -	100	107	122	89	100	133	111	81
Other Diseases of Digestive System - - -	100	111	118	125	111	129	118	82
Dis. of Urinary System - - -	100	117	129	107	137	254	20	122
Accident - - -	100	82	89	112	61	200	35	63
Suicide - - -	100	93	57	71	207	221	107	64
All other Causes - - -	100	106	114	92	102	226	98	97

	Occupied Males.	Blacksmith, Whitesmith.	Nail, Anchor, Chain, and other Iron and Steel Manufactures.	Copper Worker.	Tin, Tin Plate-Worker.	Zinc Worker.	Lead Worker.	Brass, Bronze-Worker.
All Causes - - -	100	96	137	145	104	126	187	114
Influenza - - -	100	91	145	76	82	82	97	94
Alcoholism - - -	100	77	92	31	69	146	—	69
Rheumatic Fever - - -	100	114	100	—	129	129	—	29
Gout - - -	100	100	50	—	100	—	—	100
Cancer - - -	100	102	105	109	118	105	61	118
Phthisis - - -	100	86	105	159	117	130	80	151
Diabetes - - -	100	71	100	43	143	—	—	71
Dis. of Nervous System - - -	100	104	138	104	133	41	283	127
Diseases of Circulatory System - - -	100	108	129	148	98	100	216	100
Diseases of Respiratory System - - -	100	105	204	184	106	157	180	124
Diseases of Liver - - -	100	96	111	148	100	130	296	74
Other Diseases of Digestive System - - -	100	100	107	129	100	104	239	107
Dis. of Urinary System - - -	100	98	115	146	110	210	393	115
Accident - - -	100	58	93	114	47	146	449	47
Suicide - - -	100	93	100	29	114	557	93	129
All other Causes - - -	100	91	130	189	88	59	148	95

groups in the tables they die more rapidly than do occupied males generally; and their comparative mortality figure at ages 25-65 is higher than the standard by 18 per cent. The table on page lv shows the proportion which the mortality figure for each cause in the several industries bears to the corresponding figure for occupied males, the latter taken in every case as 100. Under all the headings, except alcoholism, rheumatic fever, gout, diabetes, accident, and suicide, the comparative mortality figure of metal workers is higher than that of occupied males.

Engine, Machine, Boiler—Maker, Fitter; Millwright (53), Engine-Fitter, &c. (53a), Boiler-Maker (53b).—Under the first heading there were enumerated 173,396 males above 15 years of age in 1891, the number having increased since the preceding census by 30 per cent. As compared with the standard, the death-rates in this group of occupations show no great difference from the 25th to the 45th year, but at ages under 25 and over 45 there is an excess. The comparative mortality figure stands at 1,070, which is slightly lower than that of metal workers as a class, but is higher by 12 per cent. than the corresponding figure for occupied males. Taking separately the two occupations composing the present group, we find that engine-makers, fitters, &c., numbered 137,613 at the last census, and boiler makers 35,783, the former having increased by 27 per cent. and the latter by 40 per cent. since 1881. It appears that boiler-makers experience a lower mortality than do engine fitters at every age-group in Table I. The comparative mortality figure is 1,006 for the former occupation and 1,087 for the latter.

Compared with the mortality of occupied males, that of engine-fitters is excessive from all causes in the table on page lv, except influenza, alcoholism, accident, and suicide. The mortality of boiler-makers seriously exceeds the standard, and also exceeds that of engine-fitters, under the following headings—accident, diseases of the respiratory system, and diseases of the digestive organs other than the liver. Among the other headings in the table, the mortality of boiler-makers slightly exceeds the standard from cancer, and from diseases of the nervous, circulatory, and urinary systems. From rheumatic fever and from gout the mortality of boiler-makers is equal to the standard, while that of engine-fitters is considerably above it. Engine-fitters die faster than boiler-makers from diseases of the nervous, circulatory, and urinary systems, and also from phthisis, and from diseases of the liver; on the other hand, the latter workers are more addicted than the former to suicide. From Tables VII. and VIII. it appears that in this group of occupations as a whole, there has been increased mortality since the 1881 period, the increase affecting both the age-groups making up the chief working period of life. Judging by the modified figures in Table VIII., there had been a considerable fall in the mortality at ages 25-65 in the 1881 period as compared with that of 1871. The mortality of engine-fitters at ages 25-65 increased very seriously between 1881 and 1891, the increase affecting both divisions of the main working period of life. Among boiler-makers also there was an increase during the above-mentioned interval, but the increase was limited in their case to the later division of the main working period.

Tool, Scissors, File, Saw, Needle—Maker (54), Cutler, Scissors-Maker (54a), File-Maker (54b).—The above-mentioned industries employ in the aggregate 39,880 males over 15 years of age, of whom 17,059 are returned as cutlers and 7,225 as file-makers; the former workers have increased since the census of 1881 by 7 per cent., whilst

the latter have decreased by 4 per cent. At each of the age-groups in the main working period of life the mortality both of cutlers and of file-makers is enormous; and this is especially marked at ages between 35 and 65 years, when the mortality of cutlers is above the standard by from 64 to 72 per cent., and that of file-makers by from 93 to 110 per cent. The comparative mortality figure of cutlers at age 25-65 years is 1,516, and that of file-makers is 1810, the latter figure being the highest in the list of occupations with the exception of the figures for publicans in London and in the industrial districts, and for dock labourers. As compared with the standard mortality figure of occupied males, that of cutlers is in excess by 59 per cent., and that of file-makers by not less than 90 per cent.

The most striking point in connection with the vital statistics of these operatives is their exceptional liability to death by phthisis and diseases of the respiratory system. Among cutlers the mortality figure for phthisis is 382, and that for respiratory diseases is 518, whilst among file-makers the figures are 402 and 423 respectively. Taking phthisis and respiratory diseases together under the title of "pulmonary diseases," after Dr. Headlam Greenhow's example, cutlers sustain a mortality in excess of the standard figure for occupied males by 122 per cent., and file-cutters a mortality in excess of the same standard by 103 per cent. There is no doubt that, as Dr. Headlam Greenhow has said, "the great mortality amongst cutlers and grinders arises from the irritation caused by the mechanical particles produced during the process of manufacture and received into the lungs with the air, in respiration."*

In both these occupations the workers are liable to suffer from chronic lead poisoning, although not to the same extent, the mortality from plumbism among file-makers being represented by 75 and that among cutlers by 3 only. The occurrence of lead poisoning among cutlers is a novel feature in the mortality returns for 1890-92, Dr. Ogle having found no deaths from lead poisoning in the sample of these workers which he examined when preparing the previous supplement. In the case of cutlers, opinions differ as to the mode by which lead gets absorbed into the system; but as regards file-makers it is known, on the authority of Dr. Headlam Greenhow, among others, that their mortality from lead poisoning is mainly due to the practice of cutting files on blocks of lead.

In the mortality figure for diseases of the urinary system, there is among file-makers an excess of 154 per cent., and among cutlers an excess of 37 per cent., as compared with the standard among occupied males. From diseases of the nervous system the excess of mortality among these workers respectively, as compared with the same standard, is equal to 159 and to 11 per cent.

Taking together the mortality ascribed to alcoholism and to liver diseases as representing the mischief caused by intemperance, there was a slight excess among cutlers during the three years under notice, whilst among file-makers the mortality was exactly equal to the standard. Both among cutlers and among file-makers the mortality due to suicide was more than double the standard, but that from forms of accident other than lead-poisoning among both classes of workers was lower than it was in other occupations collectively.

* Papers relating to the sanitary state of the people of England, 1858, page 72.

The mortality of cutlers has increased by nearly 22 per cent. since the previous record, and this not only at the higher ages, as appears to have been the rule in most other occupations, but also among men under 45 years of age: Table IX. shows the headings under which this increase has taken place. Their mortality ascribed to alcoholism, which had been much below the average in 1881, has risen above the average in 1891, but there has been no corresponding increase under the head of liver diseases. Their mortality from diseases of the heart has increased since 1881 by 58 per cent., that from diseases of the lungs by 38 per cent., and that from phthisis by 9 per cent. Among file-makers the mortality figure has increased considerably ever since 1871, the increase having been relatively greater since 1881. At the age-group 45-65 years the increase in the death-rate has been steady throughout the entire period of 20 years, but at ages under 45 there had been a fall in 1881, which has since been followed by a rise of considerably greater amount. Table IX. shows that among file-makers the mortality from phthisis, which had been 407 in 1881, has still further increased to 414 in 1891. File-makers die even more rapidly than they did in 1881 from diseases of the circulatory and respiratory systems, and their mortality from accident (excluding lead-poisoning) has increased considerably. The modified mortality figure from lead-poisoning, which had been 39 in 1881, has increased to 72, but the excessive mortality ascribed to diseases of the urinary system, and perhaps partially caused by lead-poisoning, has decreased somewhat since the previous record.

Gunsmith (55).—At the census of 1891 there were enumerated 8,995 gunsmiths above the age of 15 years, the number having increased since the preceding census by 23 per cent. The deaths in this occupation are but few in number, consequently only general remarks will be made with regard to them. Gunsmiths die more rapidly than the average of metal workers at ages from 25 to 55, but less rapidly both before and after that interval. Compared with occupied males as a standard, they die more rapidly at all ages of the main working period of life, and less rapidly at the earlier ages. The comparative mortality figure of gunsmiths is 1,228, and is exactly 100 above that of metal workers as a class, whilst it exceeds the standard figure for occupied males by not less than 29 per cent. The mortality figure of gunsmiths from alcoholism is more than 2½ times that of metal workers generally; their mortality figure from phthisis stands at 324, against 206 for the class of metal workers, and 185 the standard figure for all occupied males. From diseases of the heart and of the lungs, gunsmiths experience a mortality which is in excess of the standard for occupied males by 21 and by 47 per cent. respectively. The modified mortality figure of gunsmiths has increased in the course of the last 20 years, the increase having been especially perceptible since 1881, and having affected both divisions of the working period of life.

Locksmith, Bellhanger, Gasfitter (56).—There were enumerated under this heading 19,169 males above 15 years of age at the last census, the number having decreased but very slightly since 1881. Locksmiths experience a lower rate of death than do metal workers in the aggregate at all the age-groups dealt with in the tables; their death-rate is also below the standard for occupied males at all age-groups save one. The comparative mortality figure for these workers is 925, or 3 per cent. below the standard figure; it is only slightly higher than that of blacksmiths, and with this single exception it is lower than that

of any other section of workers in metals. Phthisis and diseases of the nervous and urinary systems are more fatal to locksmiths than to metal workers generally, or to occupied males. On the other hand, the mortality of locksmiths from alcoholism, from diseases of the liver, and from all the other causes of death which are enumerated in the table, with the single exception of cancer, is less than that either of metal workers or of occupied males. The modified mortality figure of locksmiths has scarcely changed since the previous record, but between 1871 and 1881 there had been a considerable fall. Table VII. shows that at ages under 45 years there has been a steady decline in the mortality of locksmiths throughout the last 20 years, whilst at ages above 45 years there was a decline in 1881, but a slight rise in 1891.

Blacksmith, Whitesmith (57).—According to the census returns 136,542 males above 15 years of age were engaged as blacksmiths or as whitesmiths in 1891, the number having increased since the previous census by 16 per cent. At ages under 45 years the death-rates of blacksmiths are below those of occupied males, whilst at subsequent ages they are in excess. They are, however, below the averages for metal-workers at all the age-groups in the table. The comparative mortality figure of blacksmiths is 914; it is below the standard figure for occupied males by 4 per cent., and is likewise below that of any other section of metal workers. From all the causes of death specified in the table on page lv, with the exception of diseases of the nervous, circulatory, and respiratory systems, and of cancer and rheumatic fever, blacksmiths experience a mortality which is either equal to or lower than the standard for occupied males. In no case does the excess from any of the causes named exceed 14 per cent. The mortality of blacksmiths from phthisis and from intemperance is considerably below the standard; and they die by accident scarcely more than half as rapidly as do occupied males generally. The decline in the mortality figure of blacksmiths, although small, has been continuous ever since 1871. As has been shown to be the case in many other occupations, the decrease has been exclusively limited to the first half of the working period of life, the rates having increased at ages above 45 years. Table IX. shows that the mortality figure of blacksmiths for alcoholism has increased since the previous record, although the figure for diseases of the liver has decreased. Their mortality from phthisis has decreased by nearly one-fourth part since 1881, whilst that from diseases of the heart and lungs has increased considerably.

Nail, Anchor, Chain, and other Iron and Steel Manufactures (58).—Under the above designation 202,539 workers in iron or steel above 15 years of age were enumerated in 1891, the number having decreased since the previous census by about 2 per cent. The death-rates of iron workers are higher than the corresponding rates among occupied males, and are also higher than the rates of other metal workers, at all age-groups in the tables. Iron and steel workers have a mortality figure of 1,301, which is higher than that of metal workers in the aggregate, and is also higher by 37 per cent. than that of occupied males as a standard. Iron workers suffer more severely than do occupied males from influenza and from diseases of the nervous, circulatory, respiratory, digestive, and urinary systems, their mortality figure for diseases of the lungs being more than double the standard figure; they succumb to accident rather less rapidly than the average. Since 1881 there has been a considerable increase in the mortality figure of iron and steel workers. The increase has affected both

divisions of the working period of life, but is by far the greatest among men over 45 years of age.

Copper, Tin, Zinc, Lead, Brass, &c., Worker, Dealer (59).—Under this heading there were enumerated at the last census, 119,478 male workers above the age of 15 years, the number having increased since 1881 by 25 per cent. Their mortality at all age-groups is very high, the death-rates at the several ages given in Table I. being in excess of the corresponding standard rates. Their comparative mortality figure is 1,111, and is therefore in excess of the standard figure for occupied males by 17 per cent. The mortality of the several sections of this group, from the several diseases, or groups of diseases, will be dealt with in the five succeeding paragraphs.

Copper Worker (59a).—The males engaged in copper manufacture numbered 8,252 at the last census, or 16 per cent. more than in 1881. The deaths in this industry are but few in number, consequently only general remarks will be made concerning them. At all ages the mortality of copper workers exceeds that of occupied males as a standard. Their comparative mortality figure is 1,381; it is therefore considerably above the figure for metal workers generally, and is above the standard figure for occupied males by 45 per cent. Copper workers die much more rapidly than the standard from diseases of the circulatory, respiratory, digestive, and urinary systems; their mortality figure from phthisis is higher than the standard by 59 per cent. From all these diseases the mortality among copper workers is also in excess of that among metal workers generally.

Tin, Tin Plate—Worker (59b).—The number of males above 15 years of age enumerated under this heading at the last census was 36,917, and showed an increase of 20 per cent. on the number so returned in 1881. The death-rates of tin workers do not differ considerably from the corresponding standard rates; they are somewhat lower at ages from 25 to 55, and rather higher at the remaining groups of ages. The rates of death of these men at all age-groups above 20 years are below those of the class of metal workers, but the rate from 15 to 20 is slightly above that of the same class. The comparative mortality figure of tin workers is 994, and is therefore much below that of metal workers as a class, whilst it does not greatly differ from the standard for occupied males. Although the total mortality of tin workers is relatively not excessive, they die faster than the average from cancer, phthisis, and diseases of the nervous system, and also slightly faster from diseases of the respiratory and urinary systems. Their mortality figures for rheumatic fever, diabetes, and suicide are also in excess; while those for influenza, alcoholism, and accident are relatively low. The above comparisons, with the exception of those relating to diseases of the respiratory and urinary systems, also hold good as between tin workers and metal workers generally. The mortality figure of tin workers is higher now than it had been either in 1871 or in 1881; since the latter date the increase has been very considerable. There has been since the previous record an increase in the death-rate at both age-groups of the working period of life.

Zinc Worker (59c).—At the last census there were 3,298 male workers in zinc above 15 years of age, being an increase of 50 per cent. on the number enumerated in 1881. The deaths registered as occurring amongst workers in zinc during the three years 1890-92 numbered 140 only, and are therefore too few to form the basis of detailed statistical investigation. Taking the figures, however, for what they are

worth, it may be mentioned that the comparative mortality figure of these workers at ages 25-65 is 1,198, and is somewhat higher than that of metal workers in the aggregate; as compared with the mortality figure of occupied males as a standard, the figure for zinc workers shows an excess of more than a fourth part. They would appear to be more addicted to suicide than are occupied males in the aggregate, for no less than 6 of the 140 deaths are referable to this cause.

Lead Worker (59d).—Only 2,072 male lead workers above 15 years of age were enumerated at the last census, the number having decreased since 1881 by almost 10 per cent. The deaths among lead workers in the three years 1890-92 amounted to 196—a number which is far too small to form a safe basis for the calculation of detailed rates of mortality. Nevertheless, having regard to the well-known unhealthiness of this occupation, it will be prudent to examine the general teaching of the figures. The comparative mortality figure for lead workers at ages 25-65 amounts to not less than 1,783, or 87 per cent. above that for occupied males. Of the total deaths among lead workers at these ages about one-third part are from pulmonary disease, *i.e.*, from phthisis and other diseases of the lungs taken together, and one-eighth part are from lead poisoning. Without going minutely into detail, it may be stated that, as compared with the standard of occupied males, the mortality among lead workers is in excess from diseases of the urinary, nervous, circulatory, and digestive systems as well as from the causes already mentioned.

Brass, Bronze—Worker, Brazier (59e).—At the last census 33,078 men above 15 years of age were returned under this heading, the increase being equal to 28 per cent. on the number so returned in 1881. There is no inordinate excess in the death-rate of brass workers as compared with workers in metal generally, at any of the age-groups in the tables, and at ages above 55 years the figures are decidedly favourable to workers in this particular metal. The only age-group of the seven, however, at which the death-rate in this occupation is lower than the standard for occupied males is the group 65 years and upwards. The comparative mortality figure among workers in brass is 1,088, and is therefore below that of most other metal workers; it, however, exceeds the standard figure for occupied males by 14 per cent. The workers grouped under this heading suffer more heavily than do metal workers generally from phthisis and from suicide, and slightly more so from cancer and from diseases of the nervous system; but with these exceptions their mortality figures under the various headings in Table IV. are below the averages for metal workers. Compared with occupied males as a standard, brass workers experience a mortality from phthisis which is in excess by 51 per cent. From suicide and from diseases of the nervous, respiratory, and urinary systems their mortality is in excess by 29, 27, 24, and 15 per cent. respectively; but from diseases other than those above mentioned, their mortality is either below the average among occupied males, or it barely exceeds that average.

BUILDING TRADES.

Under this heading I have grouped the occupations numbered from 60 to 66 in the tables. According to the last census returns, the entire group includes a population of 767,107 men above 15 years of age, the number having increased since the previous census by 3 per cent. only. The following table, which is calculated from Table I., shows for the years 1890-92 the mortality at several ages in each of the trades

thus grouped, as compared with the standard mortality of occupied males at the same ages, the latter being taken as 100:—

	15-	20-	25-	35-	45-	55-	65 and upwards.
Occupied males - - -	100	100	100	100	100	100	100
Building trades - - -	86	83	89	101	102	105	103
Bricklayer, Mason, Builder - -	90	75	90	108	107	110	105
Carpenter, Joiner - - -	65	78	79	75	83	88	100
Slater, Tiler - - -	182	105	151	138	133	137	125
Plasterer, Whitewasher, Paper-hanger - - -	122	76	95	111	107	132	88
Plumber, Painter, Glazier - -	90	91	97	119	122	124	105
Cabinet Maker, &c. - - -	96	94	95	105	102	106	99
Sawyer - - -	126	98	66	77	75	96	124

At the three age-groups below the 35th year the death-rates in the building trades are lower than those of occupied males, but at each of the succeeding age-groups the latter have a slight advantage. The comparative mortality figure in the building trades collectively is 957, which is almost identical with the standard figure for occupied males. In the appended table, which is calculated from Table IV., the mortality of occupied males from each of the separate causes is taken as 100, and the mortality among the several workers has in each case been reduced to a figure comparable with that standard:—

	Occupied Males.	Building Trades.	Bricklayer, Mason, Builder.	Carpenter, Joiner.	Slater, Tiler.	Plasterer, Whitewasher, Paperhanger.	Plumber, Painter, Glazier.	Cabinet Maker, &c.	Sawyer.
All Causes - - -	100	100	105	82	139	114	118	103	81
Influenza - - -	100	88	97	79	97	103	88	88	70
Alcoholism - - -	100	85	77	62	123	115	100	108	85
Rheumatic Fever - - -	100	100	86	129	171	43	129	100	57
Gout - - -	100	200	150	100	250	100	500	100	—
Cancer - - -	100	107	102	100	143	141	120	100	132
Phthisis - - -	100	111	122	93	138	104	117	134	66
Diabetes - - -	100	100	100	114	129	114	86	86	57
Diseases of Nervous System -	100	110	101	87	98	123	160	110	94
" Circulatory System -	100	100	103	84	142	107	113	107	98
" Respiratory System -	100	96	114	70	143	123	101	98	70
" Liver - - -	100	85	85	78	96	96	81	89	78
Other Diseases of Digestive System	100	86	79	86	68	118	111	75	79
Diseases of Urinary System -	100	112	90	83	200	129	205	105	80
Accident - - -	100	89	95	68	233	111	125	40	61
Suicide - - -	100	93	71	86	107	143	114	107	93
All Other Causes - - -	100	91	95	80	123	103	94	92	100

From this table it appears that, in comparison, with occupied males, the building trades collectively suffer excessively from phthisis, cancer, and gout among constitutional diseases, and also from diseases of the urinary and nervous systems. They die less rapidly, however, from alcoholism and from diseases of the digestive system. Their mortality from accident and from suicide is also below the standard.

Bricklayer, Mason, Builder (60).—Under this heading there were enumerated at the last census 249,205 males above 15 years of age, being a few hundreds below the number enumerated in 1881. At each age-group up to the 35th year, the death-rate of bricklayers is below the standard, and differs but little from the corresponding rate for the group of building trades. At all ages above 35 years, the death-rates of bricklayers exceed both these averages. The comparative mortality figure of bricklayers and masons is 1,001, which is higher by 5 per cent. than the standard for occupied males. Bricklayers die less rapidly than do occupied males from diseases of the digestive and urinary systems, and from influenza, alcoholism, rheumatic fever, accident, and suicide. They, however, suffer a heavier mortality from phthisis and from diseases of the respiratory system. The modified mortality figure for bricklayers, masons, &c., is lower according to recent experience than it had been in 1871, but higher than in 1881, and the same statement is true of the death-rate at the age-group 25-45; at ages 45-65, however, the death-rate was higher in 1891 than it had been in either of the earlier periods (Tables VII. and VIII.).

Carpenter, Joiner (61); Sawyer (66); Cabinet Maker (65).—Carpenters and joiners above 15 years of age numbered 217,103, sawyers 22,759, and cabinet makers 76,367 at the last census, showing a decrease in each of the first two occupations of about $6\frac{1}{2}$ per cent., and an increase of 20 per cent. in the case of the third occupation, as compared with the numbers enumerated in 1881. The death-rates of carpenters at the several age-groups are in every case below the rates for occupied males at corresponding ages, and the death-rates of sawyers are below the same standard at all ages from the 20th to the 65th year. Among cabinet makers, on the other hand, the death-rates at the several ages from 35 to 65 years are slightly above the standard. The mortality figures for carpenters and sawyers are relatively low, being 783 and 768 respectively, and are in both cases considerably below the standard figure. The comparative mortality figure of cabinet makers is 979, which slightly exceeds the standard.

As compared with all occupied males, carpenters are not subject to excessive mortality from any disease of numerical importance; the same may be said of sawyers, with the one exception that in their case there is an excess of 32 per cent. under the heading cancer. Cabinet makers, however, suffer one-third more than do occupied males from phthisis, and their mortality from diseases of the nervous, circulatory, and urinary systems, from alcoholism and from suicide, ranges from 5 to 10 per cent. above the standard. Speaking generally, these remarks also apply to a comparison of the mortality figures of the three occupations now under notice with those for the building trades as a whole. The only notable exceptions are that, when considered from this point of view, the excess in the mortality of cabinet makers from alcoholism and from suicide is somewhat more, and that from phthisis is somewhat less marked; while the mortality of the same workers from nervous and digestive diseases is practically equal to the average, and that from urinary diseases falls below it. Among carpenters, sawyers, and cabinet-makers.

alike the death-rate at ages over 45 years has increased steadily throughout the last 20 years, whilst, if the last period be compared with the first, a decrease is observable in the death-rate under 45 years of age.

Slater, Tiler (62).—Only 6,689 slaters and tilers were enumerated at the last census, the number having fallen since 1881 by more than 9 per cent. The number of men engaged in this occupation being small, the following remarks respecting their mortality must be understood in a general sense only. At all age-groups in the tables the death-rates of slaters and tilers are considerably above both those of occupied males, and those of the building trades generally; their comparative mortality figure reaches 1,322, or 39 per cent. above the standard. The high mortality among slaters is largely due to accident, their mortality figure from that cause being not less than 133, or $2\frac{1}{3}$ times as high as that of all occupied males, and more than $2\frac{1}{2}$ times the average in the building trades as a whole. As compared with the standard figures for occupied males, their excess of mortality from phthisis, cancer, and diseases of the circulatory and respiratory systems is in practically the same proportion as that from all causes. Their mortality from alcoholism is in excess of the standard by 23 per cent., and that from diseases of the urinary system is double the standard. From Tables VII. and VIII. it appears that there has been among slaters, a great increase in mortality at each of the age-groups representing the main working period of life; between 1871 and 1881 there had been a fall in the mortality figure, but this has been much more than counterbalanced by the subsequent rise.

Plasterer, Whitewasher, Paperhanger (63).—At the last census 28,849 males above 15 years of age were returned under the above heading, the number having decreased since 1881 by 11 per cent. The death-rates of plasterers, at different ages, are somewhat irregular. At ages 20–25 and again at ages over 65 years, they are low as compared either with those of all occupied males or with those of the building trades as a whole; the rate at ages 25–35 is intermediate between these standards, and in each of the four other age-groups the rates are in excess—notably so at ages 55–65. The comparative mortality figure in this group of occupations is 1,087, and is therefore considerably higher than that of the larger group representing the building trades collectively, whilst, as compared with the standard figure for occupied males, it is in excess by 14 per cent. The mortality of plasterers from cancer, from diseases of the nervous, respiratory, and urinary systems, and also from suicide is considerably higher than the average, either for occupied males or for the building trades. Both these averages are exceeded under the headings alcoholism, diseases of the circulatory and digestive systems, diabetes, and accident. The mortality of plasterers from phthisis, is, however, below that of the building trades as a whole, although it is slightly in excess of the standard rate for all occupied males. As has already been shown to be the case with regard to slaters, the mortality among plasterers is higher than it was 20 years ago at each of the two vicennial divisions of the working period of life; both age-groups have, however, shown reduced mortality in the period 1880–82.

Plumber, Painter, Glazier (64).—Not fewer than 166,135 males above 15 years of age were returned under this heading at the last census, the number having increased since 1881 by nearly 24 per cent. At the earlier age-groups the death-rates of plumbers compare favour-

ably with the corresponding standard rates, but after their 35th year of age plumbers die much more rapidly than do occupied males generally; as compared with the building trades as a whole, they suffer a mortality which is in excess at every age-group. The comparative mortality figure in this group of occupations is 1,120, and is therefore much above the figure for the building trades taken together, it also exceeds the standard figure for occupied males by 18 per cent. From lead poisoning these workers suffer severely, the deaths which are definitely returned under that head giving a mortality figure which is not less than 19. It is true that this is small when compared with the enormous mortality of lead workers and file-makers from the same cause; but the two latter are the only occupations in which the mortality from this disease exceeds that of plumbers, painters, and glaziers. Separate examination of the returns relating to plumbers on the one hand, and to painters and glaziers on the other, shows very little difference in the liability of these workers to lead poisoning. The difference, such as it is, is slightly unfavourable to plumbers; but there are so many workers who follow both occupations, that any comparison between the respective death-rates would be of doubtful utility. Lead-poisoning is probably the primary cause of much of the excessive mortality of plumbers, painters, and glaziers from diseases of the nervous and urinary systems, and from gout. From phthisis, from cancer, and from rheumatic fever, plumbers die very rapidly, and their mortality from diseases of the circulatory system is also in excess of the standard for occupied males. According to Tables VII. and VIII. the mortality figure of plumbers has fallen steadily and considerably since 1871, the fall having affected both divisions of the working period of life.

As compared with the 1881 period, the mortality of plumbers from lead-poisoning shows no change, whilst that from gout and from diseases of the urinary and nervous systems shows a considerable decrease. From diseases of the liver, as well as from suicide and from accident, there has likewise been a decrease since the previous record.

Wood-turner, Cooper, &c. (67).—At the last census 28,727 males above 15 years of age were enumerated under the above heading, being a few hundreds less than the number enumerated in 1881. The death-rates of wood-turners at ages under 25 are lower than those of occupied males, the rates at all other age-groups being above the average. Their comparative mortality figure is 1,088, and is therefore considerably higher than that of occupied males as a standard. On reference to Table IV., it appears that the excessive mortality of wood-turners and coopers, as compared with the standard mortality, is fully accounted for under the heads of phthisis, diseases of the nervous, circulatory, and respiratory systems, and alcoholism, the mortality under the remaining headings being either below the average or very little above it. Between the years 1871 and 1881 there had been a slight fall in the death-rate of wood turners at ages 25–45 years, but this has not been continued since 1881; throughout the three periods there has, however, been a steady increase in their mortality at ages 45–65 years. The figures in Table VIII., modified for purposes of comparison, show a continuous though small rise in the mortality of these workers during the last 20 years.

Coach, Carriage-Maker (68).—Under this heading 37,243 males above 15 years of age were enumerated at the last census, the number having increased by 21 per cent. since 1881. In the 1891 census report

railway carriage and waggon builders were included in this group for the first time. The necessary addition of these workers has therefore been made to the group in 1881, in order to render the two populations fairly comparable. The death-rates of coachmakers do not greatly differ from the standard at any age-group up to the 45th year, but after that age the rates become more and more excessive as age advances. Coachmakers have a comparative mortality figure of 1,040, which is higher than that of occupied males, as a standard, by 9 per cent. The mortality figure for plumbism in the whole group of coachmakers amounts to 7; it is well known that many of these men, who are engaged in timber or in iron work only, seldom come in contact with lead in the course of their occupation, and it may therefore be inferred that coach and carriage painters who form part of this occupational group suffer severely from lead-poisoning. Coachmakers die much more rapidly than the average from diseases of the urinary and nervous systems and from gout, and this excess is doubtless in great part due to the secondary effects of poisoning by lead upon those of the workers who are exposed to its influence. Among other maladies, coachmakers suffer more than the average from diseases of the respiratory system, from cancer and from phthisis. The mortality among coachmakers has slightly decreased during the last 20 years. There had been a considerable fall in the mortality figure of 1881, as compared with that of 1871, but the figure has since risen to nearly its former level. Among men in this occupation who are over 45 years of age there has been a slight increase in the mortality since 1871, but in the first half of the working period of life there has been a decrease. From what has already been stated concerning the composition of this group, it will be apparent that the validity of this comparison of the death-rates at different periods must depend on the existence of similarity between the mortality of the added section of railway carriage-makers and that of carriage-makers in the aggregate.

Wheelwright (69).—At the last census 27,345 men above 15 years of age were returned as wheelwrights, being a decrease of 3.1 per cent. from the number enumerated in 1881. At all the age-groups in the tables the death-rates of wheelwrights are lower than those of coachmakers; and with the exception of the age-group 65 years and upwards, the death-rates of wheelwrights are likewise lower at all the specified ages than are those of occupied males in the aggregate. The comparative mortality figure of wheelwrights is low, being only 778, against 1,040 for coachmakers; it is below the standard for occupied males by 18 per cent. By the help of Table IV. it will be readily seen that this wide contrast in the mortality of two occupations—apparently similar in many respects—may be partly accounted for by the fact already mentioned, that a certain section of the coachmakers are subject to the baneful effects of lead-poisoning, whilst wheelwrights, on the contrary, are not more liable than are other occupied males to this form of disease. This view is supported by the fact that the mortality among wheelwrights from nervous and urinary diseases, is considerably below that among coachmakers. Wheelwrights suffer more severely than do other occupied males from gout and also from diseases of the nervous system, but with these exceptions, their mortality figures under the several headings in the table and especially those from pulmonary phthisis and from diseases of the circulatory system are generally below the corresponding figures for occupied males as a standard. Tables VII. and VIII. show that, although the mortality of wheelwrights had fallen considerably between 1871 and 1881, there has been since the latter

date an almost equivalent rise. As in the case of many other industries, there has been a fall in the death-rates at the earlier ages, and a rise at ages over 45 years.

Shipwright (70).—Under this designation there were enumerated 61,371 males above 15 years of age at the last census, being an increase of 37 per cent. on the number so returned in 1881. At the several age-groups in Table I. the death-rates of shipwrights are notably lower than those of occupied males as a standard. The comparative mortality figure of shipwrights is 713, which is 25 per cent. below the figure for occupied males. Shipwrights experience a low mortality from alcoholism as well as from diseases of the liver and other digestive organs. Their mortality from diseases of the circulatory, respiratory, and urinary systems is greatly below the standard, as also is that from all the diseases of the constitutional class, the figure for phthisis being less than two-thirds of the average; their mortality by accident, however, exceeds that of occupied males in the aggregate. There has been a marked reduction in the mortality of shipwrights since 1871, although the reduction had been greater between that year and 1881 than it has been since 1881. With one insignificant exception the death-rates of shipwrights have fallen since 1871 at both the divisions of the main working period of life.

Manufacturing Chemist (71).—This class, which is numerically about equal to the class of chemists and druggists (No. 29), contained 19,392 men above 15 years of age at the census of 1891; the number being higher than it had been in 1881 by 31 per cent. The class is mixed in this respect, that it includes men who are exposed in very different degrees to the noxious influences of their calling. In addition to a considerable number of wholesale chemists and druggists who are in the position of proprietors and managers, the class includes workers who are engaged in the grinding and manufacturing of drugs, and in the preparation of chemical products used in the processes of printing and dyeing wool, cotton, and other fabrics. As the mortality of the whole class designated “manufacturing chemists” is very high, that of the operatives, if it could be ascertained separately, must be higher; for there is no reason to suspect that the proprietors and managers engaged in the wholesale drug trade are less healthy than other merchants and business men of similar rank.

Examination of Table I. shows that, in regard to their general mortality at the several ages, manufacturing chemists are more nearly allied to dyers (No. 77) than they are to chemists and druggists. This will appear more readily from the following table, in which the death-rates among occupied males at the specified age-groups are taken as 100, and the corresponding rates in the three occupations, severally, are reduced to figures comparable with that standard.

	15-	20-	25-	35-	45-	55-	65 and upwards.
Occupied Males	100	100	100	100	100	100	100
Chemist and druggist	123	123	96	98	111	85	96
Manufacturing chemist	177	132	116	134	147	171	115
Wool, silk, cotton, &c.—dyer, printer	186	143	150	130	136	158	166

From this table it appears that, whereas the death-rates of both manufacturing chemists and dyers exceed the standard rate at every one

of the specified age-groups by proportions ranging from 15 to 86 per cent., the rates of chemists and druggists, on the other hand, exceed that standard at three age-groups only, at none of which does the excess amount to more than 23 per cent.

The comparative mortality figure of manufacturing chemists is 1,392 and that of dyers is 1,370, the former showing an excess of 46 per cent., and the latter an excess of 44 per cent. above the standard.

Although the work of a certain proportion of the class of manufacturing chemists approximates very nearly in character to that of chemists and druggists, inasmuch as both classes are engaged in the preparation of drugs and other medicines, nevertheless a much larger proportion would appear to be engaged in the manufacture of mineral acids, alkalies, and other chemical products used in the preparation of dyes, mordants, &c., which are employed on a large scale by dyers and others in the course of their business.

Turning now to Table IV., we find that manufacturing chemists and dyers differ extremely in their degrees of liability to death from several important diseases. This will appear from the following table, in which the mortality from each of several causes in both the specified occupations is shown as a percentage of the mortality among occupied males.

	Occupied Males.	Manufacturing Chemist.	Wool, Silk, Cotton, &c.—Dyer, Printer.
All Causes	100	146	144
Influenza	100	170	136
Alcoholism	100	54	77
Rheumatic fever	100	100	157
Gout	100	—	50
Cancer	100	123	118
Phthisis	100	88	141
Diabetes	100	100	229
Diseases of Nervous system	100	120	156
" Circulatory system	100	133	154
" Respiratory system	100	227	164
" Liver	100	85	141
Other diseases of Digestive system	100	161	129
Diseases of Urinary system	100	127	137
Accident	100	174	70
Suicide	100	93	121
All other causes	100	150	155

Both manufacturing chemists and dyers suffer severely from diseases of the nervous, circulatory, and urinary systems, and from diseases of the digestive organs other than the liver, and even more severely from respiratory diseases; but whereas the mortality of dyers under the first three of these headings exceeds that of manufacturing chemists, the reverse is true in the case of digestive and respiratory diseases; the mortality figure of dyers from the last-mentioned group of causes exceeding the standard by 64 per cent., and that of manufacturing chemists exceeding it by not less than 127 per cent. Manufacturing chemists die less rapidly than do occupied males generally from phthisis, and dyers much more rapidly, the mortality figure of the latter exceeding the standard by 41 per cent. Both manufacturing chemists and dyers suffer from influenza more severely than the average; the mortality from alcoholism is much below the average in both cases.

TEXTILE MANUFACTURE.

More than one-third of a million males above 15 years of age are engaged in the manufacture of the under-mentioned textile fabrics in England and Wales, the numbers employed in the several industries being thus distributed:—

Wool, worsted manufacture	85,754
Silk, satin	14,372
Cotton, linen	179,359
Lace	12,393
Rope, twine	6,979
Wool, silk, cotton—dyer, printer	36,570
Carpet, rug manufacture	8,532
Hosiery	17,365
Total of the above	361,324

The aggregate number of males above 15 years of age returned as following these occupations in 1881 was 340,117, so that the number in 1891 shows an increase of 6.2 per cent. on the number at the previous census.

Of the total males engaged in woollen manufacture, more than four-fifths reside in the West Riding of Yorkshire, and about the same proportion of the cotton and flax operatives reside in Lancashire, whilst nine-tenths of the males engaged in the manufacture of hosiery live either in Leicestershire or in Nottinghamshire.

The following table, which is calculated from Table I., shows the mortality of textile workers in 1890-92 at several groups of ages, as compared with the corresponding mortality of all occupied males, the latter being taken as 100:—

	15-	20-	25-	35-	45-	55-	65 and upwards.
Occupied Males	100	100	100	100	100	100	100
Textile Workers	133	116	103	99	108	126	136
Wool, Worsted Manufacture	115	110	96	96	99	118	140
Do. (West Riding)	116	107	96	96	100	119	142
Silk, Satin, Crape, &c., Manufacture	133	114	95	84	94	110	127
Cotton, Flax, Linen Manufacture	139	117	98	103	119	143	155
Do. (Lancashire)	146	118	98	108	122	150	165
Lace Manufacture	107	100	94	48	73	84	88
Rope, Twine, Cord Maker	34	115	113	91	98	94	95
Wool, Silk, Cotton, &c., Dyer, Printer, &c.	186	143	150	130	136	158	166
Carpet, Rug, Manufacture	104	82	111	63	78	113	106
Hosiery Manufacture	122	101	89	68	59	81	109
Do. (Leicestershire and Nottinghamshire)	121	98	86	68	56	85	109

At ages 15-20 the average mortality of textile workers is 33 per cent. above the standard; the proportion then falls by decreasing steps

until the age-group 35-45, when the mortality of textile workers is slightly below that of other occupied males. In the following age-groups, however, the excess reappears, showing a steady increase, and reaching 36 per cent. at ages over 65 years. The proportional decrease of the death-rates towards middle age, and their subsequent increase affect not only the whole class of textile workers, but also the principal groups of workers in the class taken separately. In the cotton manufacture the minimum occurs at the age-group 25-35, and in the hosiery manufacture at the age-group 45-55, while in the comparatively small groups of rope-workers and carpet-workers the figures are somewhat irregular; but it may be stated as a general fact that the health of textile workers compares with that of other occupied males most favourably about middle age, and least favourably among the younger and the older men.

The comparative mortality of textile workers at ages between 25 and 65 years is represented by the figure 1,054, which exceeds the figure for all occupied males by 11 per cent. In the appended table the mortality of this class of workers from all causes and from several separate causes and groups of causes is shown in comparison with the corresponding mortality for all occupied males, the latter being in each case taken as 100. Textile workers die much more rapidly than do occupied males generally from rheumatic fever, from diseases of the nervous and respiratory systems, and from affections of the digestive organs other than the liver; there is also an excess under the headings phthisis, heart disease, and suicide, which is proportionally about equal to that from all causes. The mortality of textile workers from alcoholism is scarcely more than half that of occupied males in the aggregate, and their mortality from liver disease is also low: from accident, their mortality is less than half the standard.

	Occupied Males.	Textile Workers.	Wool, Worsted Manufacture.	Wool, Manufacture (West Riding).	Silk, Sain, Crape, &c., Manufacture.	Cotton, Flax, Linen, Manufacture.	Cotton, Flax, Linen, Manufacture (Lancashire.)
All Causes - - -	100	111	104	105	97	120	123
Influenza - - -	100	103	88	79	64	112	115
Alcoholism - - -	100	54	23	23	69	77	69
Rheumatic Fever - - -	100	171	186	200	200	171	143
Gout - - -	100	50	50	100	-	-	-
Cancer - - -	100	98	111	114	98	89	80
Phthisis - - -	100	110	103	103	105	109	108
Diabetes - - -	100	129	100	100	129	129	114
Diseases of Nervous System	100	126	122	122	105	139	150
" Circulatory "	100	113	104	104	100	121	119
" Respiratory "	100	129	116	119	103	153	165
" Liver - - -	100	85	78	78	59	93	100
Other Diseases of Digestive System - - -	100	132	150	136	121	139	143
Diseases of Urinary System	100	100	110	107	107	102	102
*Accident - - -	100	46	42	44	28	46	46
Suicide - - -	100	114	86	93	100	129	136
Other Causes - - -	100	109	102	102	103	118	127

	Occupied Males.	Lace Manufacture.	Rope, Twine, Cord-Maker.	Wool, Silk, Cotton, &c.—Dyer, Printer, &c.	Carpet, Rug, Manufacture.	Hosiery Manufacture.	Hosiery Manufacture (Leicestershire and Nottinghamshire).
All Causes - - -	100	74	97	144	92	73	73
Influenza - - -	100	73	115	136	127	55	48
Alcoholism - - -	100	15	38	77	-	54	62
Rheumatic Fever - - -	100	71	100	157	157	57	29
Gout - - -	100	150	-	50	200	150	150
Cancer - - -	100	64	125	118	102	68	66
Phthisis - - -	100	86	118	141	122	103	100
Diabetes - - -	100	214	43	229	114	57	57
Diseases of Nervous System	100	120	55	156	94	88	87
" Circulatory "	100	86	94	154	69	94	98
" Respiratory "	100	47	121	164	111	57	58
" Liver - - -	100	33	52	141	70	48	44
Other Diseases of Digestive System - - -	100	71	100	129	39	50	46
Diseases of Urinary System	100	78	110	137	63	54	61
Accident - - -	100	47	67	70	16	33	33
Suicide - - -	100	171	71	121	29	150	143
Other Causes - - -	100	76	55	155	89	58	56

Wool, Worsted, &c., Manufacture (72, 72a).—The 85,754 males above 15 years of age who were engaged in this industry in 1891 were 6·8 per cent. more numerous than those similarly employed in 1881. Their average mortality in the three years 1890-92 compares favourably with that of other textile workers at all ages under 65 years; above that limit it is slightly in excess. Placed in comparison with the mortality of all occupied males, that of workers in wool is below the average at ages 25-55, but is above it at all other age-groups. Their comparative mortality figure is 991, which is 4 per cent. above that of occupied males, but is considerably below the figure for textile workers generally. From alcoholism workers in wool appear to be remarkably free, their mortality being less than one-fourth of the average among occupied males; their mortality from diseases of the liver is also much below the average. From other diseases of the digestive system, however, wool workers die half as fast again as do occupied males; whilst from diseases of the nervous, respiratory, and urinary systems, and from cancer, the mortality of these workers is from 10 to 22 per cent. in excess of that standard; as is the case among most other groups of textile workers, they also suffer severely from rheumatic fever. Workers in wool enjoy relative immunity from fatal accident; they are less addicted to suicide than are occupied males in general.

As the wool workers of the West Riding constitute more than four-fifths of the total workers in that industry it is not surprising that their mortality corresponds generally with that of the group of which they form so large a part. The comparative mortality figure of Yorkshire wool workers is, however, slightly higher than that of wool workers in the aggregate, and so likewise is their mortality from diseases of the respiratory system, whilst they have a somewhat lower mortality from influenza and from diseases of the digestive system.

Yorkshire workers in wool and worsted die somewhat faster than they did ten years ago; and, as has been observed with respect to many other industries, the excess of mortality obtains at the higher ages exclusively, for the death-rate at ages below 45 years has declined. Their mortality from alcoholism and from liver disease has fallen since the previous record, the former by one-fourth part and the latter by more than one-third. Phthisis and diseases of the nervous system have also become less fatal by about one-fifth in each case. On the other hand, the mortality from diseases of the respiratory and urinary systems has increased by about one-third.

Silk, Satin, Crape, Velvet, Ribbon Manufacture (73).—At the last census 14,372 males above 15 years of age were returned under this heading, the number having decreased since 1881 by 16 per cent. Below the age of 25 years the death-rates of these workers scarcely differ from those of the textile group generally, but throughout the main working period of life as well as beyond that period the rates are below this average. Compared with the rates for occupied males as a standard, the death-rates of these workers are somewhat in excess at ages under 25, and also at ages over 55 years, but at ages from 25 to 55 years they are lower than the standard. The comparative mortality figure of silk manufacturers is 921, which is slightly below the standard figure, and considerably below the figure for textile workers generally. Their mortality from phthisis and from diseases of the nervous, circulatory, and respiratory systems, scarcely differs from the standard, but they die somewhat faster from diseases of the digestive organs other than the liver and from diabetes, and their mortality from rheumatic fever is double that of occupied males.

Between 1871 and 1881 the mortality figure of workers in silk and satin materials had fallen slightly, but between the latter date and 1891 it has increased by about one-fifth part. The rise since 1881 has affected the mortality at both age-groups but has been greatest at ages above 45 years.

Cotton, Flax, Linen Manufacture (74, 74a).—At the last census male cotton and flax operatives above the age of 15 years numbered 179,359 in the aggregate, having increased since 1881 by 11 per cent. At ages below 45 years the mortality of cotton operatives scarcely differs from the average among textile workers, but at each group of ages above 45 the rates are considerably in excess of that average. Compared with the standard for occupied males the death-rates are excessive at all ages under 25 years and over 45 years. The comparative mortality figure of these workers from all causes at ages 25–65 is 1,141, considerably exceeding that of textile workers generally; while compared with that of occupied males it is in excess by 20 per cent. Cotton operatives die half as fast again as the standard from diseases of the respiratory system; their mortality also shows an excess of two-fifths from diseases of the nervous system, and of the digestive organs other than the liver, and an excess of one-fifth from circulatory diseases. They also suffer more than the average from phthisis, influenza, diabetes, and suicide; whilst, in common with textile workers generally, their mortality from alcoholism and from liver disease is below, but that from rheumatic fever is above, the average.

At ages below 35 years the death-rates of Lancashire cotton operatives scarcely differ from those of cotton operatives in the aggregate, but at all subsequent ages the rates are higher. The mortality from all causes among cotton operatives in Lancashire exceeds that prevailing in this

industry generally, and so also does their mortality from diseases of the nervous and respiratory systems.

The mortality of Lancashire cotton operatives from all causes has increased considerably since the previous record; the excess, however, is entirely limited to ages over 45 years, at which ages the death-rate has increased by nearly one-fifth. The modified figures in Table IX. show that, as compared with 1881, the mortality of Lancashire cotton operatives from diseases of the circulatory, respiratory, and urinary systems and from those of the digestive organs other than the liver has increased by proportions varying from 27 to 30 per cent.; their mortality from phthisis has decreased by about one-seventh, and that from alcoholism and diseases of the liver together has decreased by one-fourth.

Lace Manufacture (75).—Except in Nottinghamshire and Derbyshire, which are the chief centres of English lace manufacture, lace is made almost exclusively by women and girls; and even in Nottinghamshire the females engaged in this industry outnumber the males by more than 40 per cent. The total number of males above 15 years of age who were returned as lace-makers in 1891 was 12,393, showing an increase of 17 per cent. on the number at the previous census. Their mortality at every age-group is lower than that of textile workers in the aggregate; at ages 15–20 it is slightly above, and at ages 20–25 it is equal to, the mortality of occupied males, but at all other age-groups it compares favourably with this standard. Between 25 and 65 years of age the comparative mortality figure of male lace workers is 709, which is only 74 per cent. of the figure for occupied males. Whether this figure fully represents the mortality due to lace making is open to doubt, for reference to Table VI. shows that to every 620 lace-makers between 15 and 35 years of age there are only 380 above 35 years; whereas, among occupied males in general, to every 551 between 15 and 35 years of age there are 449 above 35 years. The death-rates of lace-makers at the earlier ages negative the idea of such a low rate of survival as would be indicated by these proportions. It appears probable, therefore, that many of them drift into other occupations before reaching middle age; and this change of occupation may to some extent be determined by conditions of health. The total deaths in this industry are only 253 in number; they are therefore too few to warrant other than very general inferences; as far, however, as can be judged from the figures as they stand, these workers suffer less than do other occupied males from all the numerically important causes of death, except diseases of the nervous system; and even under that heading the excess is not serious. Their mortality from phthisis is considerably below the standard. This fact is important, as bearing upon the general belief that lace-makers are peculiarly liable to phthisis; which belief, however, is probably based on what is known of the mortality of female lace-workers. It may be that the special immunity from phthisis apparently enjoyed by male lace-makers is due to their working under conditions that are more favourable than those under which females perform their task. Whether or not this is the case can be determined only with the help of fuller information than that which is at present available.

Rope, Twine, Cord Manufacture (76).—Not more than 6,979 males above 15 years of age were returned under this heading at the last census. Any remarks on their mortality as a class must, therefore, be of a very general character. Leaving out of account the age-group 15–20, in which the basis of facts is too narrow for any useful purpose,

the mortality of men in this occupation is generally below that of textile workers as a class, and does not differ greatly from that of all occupied males. Their comparative mortality figure is 928, which is slightly below the standard. The figures do not disclose any special liability among rope-makers to any of the diseases in the tables. Such departures from the standard as are shown may well be due to accidental fluctuations in the small numbers under notice.

Wool, Silk, Cotton—Dyer, Printer (77).—Printers and dyers of woollen, silk, and cotton goods, at ages 15 years and upwards, numbered 36,570 at the last census, showing an increase of less than 1 per cent. on the number returned ten years earlier. The mortality of these men is excessive at all age-groups, whether compared with that of all occupied males as a standard, with that of the entire class of textile workers, or with that of any division of the class for which separate figures are shown in this report. The comparative mortality figure at ages 25-65 is as high as 1,370, which is 44 per cent. above the standard figure for occupied males. The only causes of death in the tables which are less fatal to dyers than to other occupied males are alcoholism, gout, and accident. From phthisis and from liver diseases the excess is 41 per cent., and from diseases of the circulatory, nervous, and respiratory systems, it reaches 54, 56, and 64 per cent. respectively. The mortality of these workers has already been discussed in some detail, in connection with that of manufacturing chemists (No. 71).

Carpet, Rug—Manufacture (78).—At the census of 1891, 8,532 males above 15 years of age were returned as engaged in the manufacture of carpets and rugs; the number is 4 per cent. greater than it had been in 1881. As in the case of rope-makers, the small basis of fact available precludes any detailed discussion of the mortality of carpet and rug makers. In general terms it may be said that their death-rates at the various age-groups compare favourably, not only with those of other textile workers, but also with those of all occupied males. Their comparative mortality figure is 873, which is 8 per cent. below the standard. Among those causes of death which are of numerical importance, phthisis shows an excess of 22 per cent., and diseases of the respiratory system show an excess of 11 per cent. in this industry. The mortality of carpet-makers from diseases of the nervous, circulatory, digestive, and urinary systems appears to be below the average.

Tables VII. and VIII. show that the mortality among these workers has been fairly constant during the last 20 years; the variations in the death-rates having followed the general rule, namely, that of a reduction at the earlier ages and an increase at ages above 45.

Hosiery Manufacture (79).—The number of males aged 15 and upwards returned under this heading at the last census was 17,365, or about 5 per cent. less than the number in 1881. As was indicated in the Census Report, this decrease has been accompanied by a large increase in the number of females employed in the present industry. The men engaged in the manufacture of hosiery appear to be healthier than are any other members of the textile class. At all ages they die less rapidly, and at the several age-groups after 35 much less rapidly, than do textile workers generally; whilst in the four decennial groups between the ages 25 and 65 the rates are below those of occupied males. Their comparative mortality figure at these ages is only 698, which is below the standard by 27 per cent.

From phthisis and from diseases of the circulatory system the mortality of males engaged in hosiery manufacture corresponds nearly with that of occupied males; from suicide their mortality shows an excess

of 50 per cent. The figures under most of the other headings in the table are remarkably favourable to these workers, their mortality from digestive diseases being about half, and that from alcoholism, and from respiratory and urinary diseases being little more than half, of the average for occupied males. The liability of workers in hosiery to fatal accident is only one-third of the average.

By far the greater part of the hosiery manufacture of England and Wales is carried on in Leicestershire and Nottinghamshire. The death-rates of hosiery workers in these counties, at the several ages, therefore approximate closely to those incidental to this occupation as a whole. Their comparative mortality figure is 696, showing a slight variation in favour of these counties, as compared with the country generally. The mortality of hosiery workers from the separate causes is also nearly the same in Leicestershire and Nottinghamshire as it is throughout England and Wales. The deaths occurring among hosiery workers outside these two counties are too few in number to warrant a separate discussion concerning them. Among hosiery workers in Leicestershire and Nottinghamshire, heart diseases, phthisis, and other diseases of the lungs show increased mortality since the 1881 period, whilst diseases of the nervous, digestive, and urinary systems show diminished mortality. Under the head of accident, the mortality of these workers shows a considerable increase since the previous record.

Paper Manufacture (80).—Under this heading there were enumerated at the last census 11,151 males above the age of 15 years, showing an increase of about 15 per cent. since 1881. The deaths in this industry are too few to justify more than a general analysis. At ages below 25 years, and also at ages above 55 years, paper-makers die more rapidly than do other occupied males, but at ages from 25 to 55 years, less rapidly. Their comparative mortality figure is 904, and is therefore somewhat lower than the standard. Paper-makers suffer less severely than the average from alcoholism, whilst their mortality from diseases of the lungs and of the liver, is in excess. Cancer is only half as fatal to paper-makers as it is to occupied males generally, and phthisis is less fatal by 22 per cent.

Potter, Earthenware Manufacturer (81).—At the last census 31,881 males above 15 years of age were enumerated as engaged in earthenware manufacture, an increase of 21 per cent. on the number so engaged in 1881. The chief centre of earthenware manufacture is Staffordshire, which county contains about three-fourths of the total male workers in this industry. At all age-groups in Table I. the death-rates of these workers are above the standard, and at the age-groups 45-55 and 55-65 they are more than double the standard. The comparative mortality figure of potters is enormous; it amounts to 1,706, and is exceeded only by the figures of publicans in London and in the industrial districts, and by those of dock labourers, lead-workers, and file-makers. Compared with the standard figure for occupied males, the mortality figure of potters at ages 25-65 years is in excess by 79 per cent. The excessive mortality of these workers is mainly due to phthisis and to diseases of the heart and of the lungs. Of the entire mortality figure from all causes, which has been already given as 1,706, not less than 1,001 is contributed by phthisis and other diseases of the lungs. The mortality of potters from bronchitis is more than four times as high, and that from respiratory

diseases in the aggregate is three times as high, as the standard mortality of occupied males generally. Potters do not appear to be an intemperate class of men; their mortality figure for alcoholism is 9, as against an average of 13 among occupied males, and their mortality from diseases of the liver shows no serious excess. The mortality figure of potters for lead poisoning is 17, and stands next to that of plumbers, &c., as fourth highest in the list of industries liable to plumbism. Their mortality figures for diseases of the nervous and urinary systems exceed the standard figures among occupied males by 54 and by 50 per cent. respectively. Table VIII. shows that the mortality from all causes among manufacturers of earthenware has scarcely altered since 1881. Their mortality from phthisis, high though it still remains, is much lower than it was ten years ago, but they have experienced no corresponding fall in the mortality from diseases of the respiratory system. On the other hand their mortality from lead poisoning has doubled in amount, since the previous record, and diseases both of the circulatory and of the urinary systems have seriously increased in fatality.

Glass Manufacture (82).—Under this heading were enumerated at the last census 21,865 males aged 15 years and upwards, being an increase of 17 per cent. on the number returned in 1881. The death-rates of glass workers are higher than the average among occupied males at all the age-groups in Table I., but throughout the main working period of life, and also at ages beyond 65, the excess is remarkable. The comparative mortality figure in this industry stands at 1,487 and is therefore in excess of that among occupied males by 56 per cent. It is to phthisis and to diseases of the respiratory organs that the excessive mortality of glass workers is chiefly due, but in addition to these their mortality is nearly double that of occupied males under the heads of alcoholism and nervous diseases. Their mortality figure for lead-poisoning stands at 12, or sixth highest in the list of industries subject to this complaint, and the figures for diseases of the circulatory, digestive, and urinary systems, and for cancer are considerably in excess. Tables VII. and VIII. show that the mortality of glass workers has increased since the previous record at both the age-groups making up the chief working period of life.

Mining Industry.

The males above the age of 15 years, engaged in mining in England and Wales, numbered 524,390 in the year 1891, having increased since the previous census by 28 per cent. The subjoined figures show the rates of increase or of decrease which have taken place in the respective classes of miners since the previous census:—

Miners in	1881.	1891.	Difference per cent.
Coal - - - - -	355,363	482,525	+ 35·8
Ironstone - - - - -	25,153	17,823	- 29·1
Copper - - - - -	3,601	1,086	- 69·8
Tin - - - - -	9,528	9,055	- 5·0
Lead - - - - -	10,599	5,609	- 47·1
Other minerals - - - - -	1,982	2,342	+ 18·2
Mine Service - - - - -	3,562	5,950	+ 67·0

In the course of their labour these men encounter in various degrees hazard to health and life, which, to them at any rate, is unavoidable. Respecting the various grades of miners, however, there is this peculiarity in common, that as most of their daytime is spent underground, their work has to be carried on under conditions which are exceptionally artificial. It would therefore appear desirable that the vital statistics of miners should be examined with especial reference to the foregoing consideration.

Table I. shows the death-rates at seven groups of ages, for the various divisions of miners separately, as well as for the mining industry in the aggregate. In the following table these rates are compared with the corresponding rates for all occupied males. The figures in each column represent proportions of the standard figure, which is in each case taken as 100.

	15-	20-	25-	35-	45-	55-	65 and upwards.
Occupied Males - - -	100	100	100	100	100	100	100
Mining Industry - - -	148	112	87	78	95	121	147
Coal Miner - - - - -	150	111	86	77	94	119	143
Do. (Durham and Northumberland) }	154	111	75	66	79	97	152
Do. (Lancashire) - - -	163	107	88	94	110	140	150
Do. (West Riding) - - -	115	92	76	77	89	126	138
Do. (Derbyshire and Nottinghamshire) }	93	68	69	59	73	96	118
Do. (Staffordshire) - - -	95	109	82	70	95	135	180
Do. (Monmouthshire and South Wales) }	227	141	118	97	117	140	129
Ironstone Miner - - - - -	134	90	82	66	83	91	144
Copper Miner - - - - -	-	158	129	146	118	127	170
Tin Miner - - - - -	116	139	111	115	161	180	178
Lead Miner - - - - -	118	127	130	109	116	182	240
Mine Service - - - - -	127	264	129	98	95	113	155

It thus appears that at ages under 25 years, and also at ages over 55 years, miners in the aggregate die more rapidly than do occupied males generally, whilst at the intervening age-groups they die less rapidly. Their comparative mortality figure is 935, or slightly below that of occupied males. It should, however, be mentioned here that miners are a picked class in a more especial sense than are the men in most other industries. Their labour is so arduous that only those who possess more than average physical strength are able to continue it: consequently, those miners whose powers have become seriously impaired are compelled to seek less exacting employment. The tables deal only with the mortality of those men who at a given time were included in the ranks of miners; but the mortality of men who, having formerly worked as miners, are now otherwise employed, is probably much higher.

The following table shows the mortality from certain causes among miners as a whole, and also among their several divisions, in comparison with the corresponding figures among occupied males, the latter being taken in each case as 100.

	Occupied Males.	Mining Industry.	Coal Miner.	Coal Miner (Durham and Northumberland).	Coal Miner (Lancashire).	Coal Miner (West Riding).	Coal Miner (Derbyshire and Nottinghamshire).
All Causes	100	98	97	81	112	96	76
Influenza	100	103	100	70	82	79	124
Alcoholism	100	31	31	38	38	31	15
Rheumatic Fever	100	100	100	86	114	86	114
Gout	100	0	0	—	50	—	—
Cancer	100	84	82	91	82	73	102
Phthisis	100	59	52	51	55	66	37
Diabetes	100	71	57	57	57	71	43
Diseases of Nervous System	100	82	82	90	85	63	80
Diseases of Circulatory System	100	95	95	99	90	90	90
Diseases of Respiratory System	100	121	122	71	176	130	72
Diseases of Liver	100	67	63	85	63	59	67
Other Diseases of Digestive System	100	93	93	104	89	79	54
Diseases of Urinary System	100	76	73	66	73	56	49
Accident	100	237	247	168	272	200	156
Suicide	100	64	64	57	93	100	86
Other Causes	100	100	98	97	111	111	102

	Occupied Males.	Coal Miner (Staffordshire).	Coal Miner (Monmouthshire and South Wales).	Ironstone Miner.	Copper Miner.	Tin Miner.	Lead Miner.	Mine Service.
All Causes	100	100	120	81	129	148	137	107
Influenza	100	106	152	161	—	36	133	191
Alcoholism	100	15	54	31	—	31	38	46
Rheumatic Fever	100	71	143	71	400	57	71	357
Gout	100	50	0	—	—	—	—	—
Cancer	100	84	59	89	195	114	109	125
Phthisis	100	45	58	49	179	275	205	62
Diabetes	100	100	29	57	—	114	214	357
Diseases of Nervous System	100	79	83	76	22	121	76	101
Diseases of Circulatory System	100	103	105	67	96	75	113	115
Diseases of Respiratory System	100	144	156	92	157	171	147	98
Diseases of Liver	100	30	59	74	104	104	126	156
Other Diseases of Digestive System	100	71	107	68	143	79	196	136
Diseases of Urinary System	100	88	100	76	166	110	100	63
Accident	100	237	428	151	61	84	84	139
Suicide	100	43	36	93	—	—	36	71
Other Causes	100	95	94	91	194	165	153	142

From constitutional diseases generally miners suffer less severely than the average, their mortality from phthisis being lower than the standard by 41 per cent., that from cancer by 16 per cent., and that from diabetes by 29 per cent. Among miners, diseases of the nervous, circulatory, and urinary systems are less fatal than the average, but these men succumb in exceptional numbers to respiratory diseases.

Miners in general are a temperate body of men; their mortality from alcoholism is less than one-third, whilst that from liver disease does not exceed two-thirds of the standard. As might have been expected, miners are very liable to accident, their mortality under this heading being not less than $2\frac{1}{3}$ times that of occupied males generally. As a class they are not specially addicted to suicide, their mortality therefrom being less than two-thirds of the standard.

Coal Miner (83, 83a—83f).—At the last census coal miners above 15 years of age numbered 482,525, having increased since 1881 by 36 per cent. Of the aggregate mining population, coal miners constitute more than nine-tenths. In 1891 they were distributed over several counties as follows:—

Durham and Northumberland	-	-	-	101,059
Lancashire	-	-	-	72,890
Yorkshire, West Riding	-	-	-	70,711
Derbyshire and Nottinghamshire	-	-	-	48,716
Staffordshire	-	-	-	43,506
Monmouthshire and South Wales	-	-	-	100,659
Other counties	-	-	-	44,984

Among colliers generally the death-rates are below the standard at ages 25-55, but are above it at the other age-groups. The principal local exceptions are furnished by Monmouthshire and South Wales, where the rates are in excess at all age-groups except 35-45 years, and by Derbyshire and Nottinghamshire, where the rates are below the standard at all age-groups under 65 years. The comparative mortality figure of colliers in England and Wales is 925, which is slightly below the figure in the entire mining industry, and is below that of occupied males by 3 per cent.

The colliers both of Monmouthshire and South Wales and of Lancashire are shown by the tables to die more rapidly, whilst those of Derbyshire, Nottinghamshire, and Durham, die less rapidly than do colliers generally. The comparative mortality figure from all causes among colliers in Monmouthshire and South Wales is 1,145, or 20 per cent. above the standard for occupied males, and that among those in Lancashire is 1,069 or 12 per cent. above the standard. The colliers of Derbyshire and Nottinghamshire have the lowest, and those of Durham and Northumberland have the next lowest mortality among colliers generally, their mortality figures being 727 and 774 respectively, or 24 per cent. and 19 per cent. below the standard. The colliers of Staffordshire and of the West Riding of Yorkshire occupy intermediate positions, their mortality figures being 952 and 912 respectively, the former of which is practically equal to, whilst the latter is 4 per cent. below, the standard figure for occupied males.

The following table shows the portions of the total mortality figure which are contributed by disease and by accident respectively.

	Total Mortality.	Disease.	Accident.
Colliers in Monmouthshire and South Wales	1,145	902	243
„ Lancashire - - - -	1,069	914	155
„ Staffordshire - - - -	952	817	135
„ West Riding - - - -	912	798	114
„ Durham and Northumberland -	774	678	96
„ Derbyshire and Nottinghamshire	727	638	89

It will thus be seen that in the years 1890-92, the colliers of Monmouthshire and South Wales suffered much more severely from accident than did their fellows in any other county in the table. It should, however, be mentioned that of 1,031 deaths from accident among colliers in these counties during the three years, not fewer than 163 resulted from an explosion at Llanerch Colliery, within the district of Pontypool, in the first quarter of 1890. The table further shows that in Lancashire, as well as in Monmouthshire and South Wales, the colliers sustained a higher mortality from *disease*, than did the workers in other colliery districts.

Coal miners as a class do not suffer excessively from pulmonary consumption, their mortality being scarcely more than half the standard among occupied males. Nevertheless they succumb to this disease very unequally in different parts of the country; in none of the counties, however, does the mortality of colliers from phthisis even approach the standard figure for occupied males, which is 185. The highest mortality figures for phthisis among colliers are 123 in the West Riding, and 107 in Monmouthshire, whilst the figures do not exceed 83 in Staffordshire, and 69 in Derbyshire. With a few unimportant exceptions in Staffordshire, Derbyshire, and Monmouthshire, the mortality of colliers from cancer and diabetes, and from diseases of the nervous, circulatory, digestive, and urinary systems is below the average. Colliers appear to be remarkably free from alcoholism; their general mortality from this cause is 31 per cent. of the average, the proportions in the several county groups ranging from 15 per cent. in Derbyshire and in Staffordshire, to 54 per cent. in Monmouthshire. Diseases of the respiratory system are very fatal to the colliers of Monmouthshire, and still more so to those of Lancashire, where the mortality figure is 76 per cent. above the standard, or more than double of what it is among the colliers of Durham, Northumberland, Derbyshire, and Nottinghamshire. Among colliers in 1890-92 the mortality from influenza was above the standard in Staffordshire, Derbyshire, and Monmouthshire, the excess in the last case reaching 52 per cent.

Reference to the table on page lxxviii shows that among the several mining counties great disparity exists in regard to the mortality of colliers from accident or negligence. For example, in Derbyshire and

Nottinghamshire the excess above the standard is 56 per cent. only, whilst in Staffordshire it is 137 per cent., in Lancashire it is 172 per cent., and in Monmouthshire it is as high as 328 per cent.; had it not been, however, for the explosion above referred to, the excess in the last-mentioned county would have been reduced to about 260 per cent.

The figures in Table VIII., modified for purposes of comparison, show that the general mortality among coal miners as a class has increased somewhat since the previous record. In the counties of Derby and Nottingham the mortality figure in this occupation has been stationary since 1881, and in Durham and Northumberland it has decreased by 8 per cent. In the other groups of counties there has been an increase; amounting, in Lancashire, and in the West Riding, to 17 per cent., in Monmouthshire and South Wales to 8 per cent., and in Staffordshire to 6 per cent.

Table IX. shows that since 1881 the mortality from alcoholism and liver disease taken together has slightly increased among the coal miners of Lancashire, but has decreased in all the other counties respecting which comparison is possible.

In the West Riding the mortality of colliers from phthisis has increased since the previous record by 21 per cent., but among the other groups of counties it has decreased by proportions varying from 6 to 32 per cent. Respiratory diseases also show a considerably increased fatality in all the mining districts: the increase, among the colliers of Durham, being equal to more than one-fourth; among those of the West Riding, to one-half; and among those of Lancashire, to two-thirds. In all the mining counties except Monmouthshire and South Wales colliers die less rapidly than was the case in 1881 from diseases of the nervous system: in Staffordshire, in Durham and Northumberland, and in the West Riding, they die less rapidly by nearly one-fifth; in Monmouthshire and South Wales, however, they die more rapidly, by about 7 per cent.

Diseases of the circulatory system are notably more fatal than they were in 1881 in each of the mining districts of England and Wales. In Durham and Northumberland, and also in the West Riding, the increase amounts to one-fifth; in Staffordshire to a little more than one-fourth; and in Derbyshire and Nottinghamshire to almost four-fifths. Diseases of the urinary organs have increased in fatality since the previous record in three of the mining districts, but, except in the cases of Lancashire and Monmouthshire, not in a very serious degree.

The mortality attributed to accident has declined since 1880-82 in five of the mining districts—in Durham and Northumberland by nearly one-half, and in Derbyshire and Nottinghamshire by more than one-third part. In Lancashire and in Staffordshire the decline since the previous record has been equal to 10 per cent. and in the West Riding of Yorkshire it has been equal to 19 per cent. The increase in the mortality from accident in Monmouthshire and South Wales has been equal to 24 per cent. It is strange that the mortality of colliers by suicide should have increased as it has done since the previous record in all the mining districts respecting which comparison can be made; in Staffordshire their mortality has doubled since 1881, whilst in the West Riding of Yorkshire, in Derbyshire, and in Nottinghamshire it has more than doubled.

The following table, which has been compiled from the successive annual reports of the Registrar-General for 1881-90, gives the numbers of deaths from mine accidents of various kinds among colliers, at certain groups of ages, in the decennial period above mentioned.

—	Under 15.	15-	20-	25-	35-	45-	55-	65 and upwards.	All Ages.	Per 1,000 Accidental Deaths.
Crushing, Fall of Coal, Stone, &c. }	200	492	511	1,034	957	697	403	97	4,391	496
Fall in Shaft, Pit - }	39	65	53	94	96	88	36	17	488	55
Machinery, Explosion of Boiler - }	23	30	11	19	23	19	7	6	143	16
Waggon, Tram, Tub -	318	412	150	160	150	141	114	63	1,508	170
Drowning - - -	6	6	7	14	7	8	8	1	57	6
Blasting - - -	1	15	25	67	51	34	13	2	208	23
Fire-damp - - -	81	205	205	357	243	163	60	18	1,337	151
Choke-damp, Suffocation - }	18	51	38	70	54	32	29	9	301	34
Otherwise or not stated	39	90	42	74	63	63	48	19	433	49
	780	1,366	1,042	1,889	1,649	1,245	718	232	8,871	1,000

The figures in this table differ in some important respects from those for the period 1871-80, which were collected by Dr. Ogle and published in his Decennial Supplement. Although the number of men employed has increased, the number of deaths has decreased, and this decrease has been mainly under the head of fire-damp.

The table shows that (as had also been the case in 1871-80) a greater proportion of the mortality from fire-damp than of the mortality from other forms of mine accidents in the aggregate falls on colliers who are under middle age. The reduction under the former heading has therefore specially affected the death-rates of the younger men.

The following table shows the mortality of colliers from mine accidents, per 1,000 living, in groups of ages, during the two decennial periods 1871-80 and 1881-90 :—

—	Under 15 Years.	15-	20-	25-	45-	65 and upwards.
1871-80 - - -	3.7	2.6	2.6	3.0	3.6	3.1
1881-90 - - -	2.7	1.7	1.4	1.9	2.8	2.9

It will be seen by the above table that the mortality of colliers from accident has fallen at all ages, but that the fall has been most marked at ages under 45 years.

Ironstone Miner (84).—At the census of 1891 there were in England and Wales 17,823 ironstone miners above the age of 15 years; the number engaged in this occupation having decreased by 29 per cent. since 1881. Considerably more than half of these miners are to be found either in the county of Cumberland or in the North Riding of Yorkshire, and about one-eighth part in the counties of Stafford and Northampton taken together. The rates of death of ironstone miners are lower than those of occupied males at all age-groups between 20 and 65 years. Ironstone miners have a mortality figure of 77.4, which is much lower than that of miners generally, and is below the standard figure for occupied males by 19 per cent. Table IV. shows that ironstone miners suffer much more severely than the standard from influenza, and from accident, but that under all the other headings their mortality is below the standard; as compared with miners

generally the only headings under which they show an excess of mortality are influenza, cancer, diseases of the liver, and suicide. The mortality figure of ironstone miners has decreased since 1881, but, as in the case of many other occupations, the improvement is limited to the lower ages, the rate having slightly increased at ages above 45 years. Table IX. shows that their mortality figure for alcoholism has decreased by more than half since the previous record. There has also been a material decrease in their mortality from phthisis, and a slight decrease in that from diseases of the respiratory organs. On the other hand, ironstone miners die faster than they formerly did from diseases of the nervous, circulatory, digestive, and urinary systems, and their mortality figure from suicide has increased considerably. The work of ironstone miners is arduous, and exposes them to risk of accident; their mortality due to this cause has, however, diminished to less than half of what it had been in 1880-82.

Copper Miner (85).—At the census of 1891 only 1,086 copper miners above the age of 15 years were enumerated; the number of men thus engaged having diminished to less than one-third of what it had been at the previous census. Their comparative mortality figure is 1,230, as against 935 for miners generally. The mortality of copper miners from phthisis and from lung diseases appears to be excessive. The number of men engaged in this occupation is, however, so small that detailed remarks concerning their mortality in a period of three years only, would be of very doubtful value.

Tin Miner (86).—At the census of 1891 there were in England and Wales 9,055 tin miners above the age of 15 years, or fewer by 5 per cent. than at the preceding census. Tin mining is confined almost exclusively to the counties of Cornwall and Devonshire. In preparing the present statistics I have been struck with the exceptional age constitution of the tin mining population. According to the census of 1891, to every 100 male tin miners under 25 years of age, there were only 111 at ages over 25; whilst among coal, copper, iron, and lead miners respectively there were 146, 190, 253, and 269 over 25 years of age to 100 under 25. A similar anomaly is shown to have obtained in 1871 and 1881 according to the census reports of those years. Among the possible causes of such an abnormal age constitution may be mentioned the following :—

- (1.) The mortality may have been so high as to seriously modify the age-constitution of the population.
- (2.) A local custom may have prevailed in the tin-mining districts for youths who had begun life as tin miners to change their occupation subsequently.
- (3.) There may have been exceptional emigration from tin-mining districts, and this, principally among men over 25 years of age.

Examination of the census returns and of the mortality statistics lending no support to the first of these hypotheses, I have applied to Mr. Llewellyn Smith, the Labour Commissioner of the Board of Trade, for information with regard to emigration in the south-west district of England. From the reports supplied to the Labour Department by the local correspondents for the above-mentioned district Mr. Llewellyn Smith finds that there has been a continuous stream of emigration of tin miners from that district to South Africa and elsewhere. The Labour Department possesses, however, no information leading to the supposition that there has been any similar emigration of colliers or of other miners.

It appears therefore that the exceptional age-constitution of tin miners is largely due to emigration.

The deaths in this occupation during 1890-92 did not exceed 336 in number; the following general remarks, however, would appear to be justified.

As compared with those of occupied males, the death-rates of tin miners are excessive at all ages, and give a mortality figure of 1,409, or 48 per cent. above the standard. Tin miners die $2\frac{3}{4}$ times as fast from phthisis, and $1\frac{3}{4}$ times as fast from diseases of the respiratory system, as do occupied males generally; their mortality also shows an excess from cancer, and from diseases of the nervous and urinary systems.

In comparing the rates of 1891 with those of previous years, it is necessary to bear in mind that in 1871 and also in 1881 the mortality figures related, not as do the figures for 1891, to tin miners exclusively, but to all miners in Cornwall; inasmuch, however, as tin miners constituted in 1881 about 79 per cent. of the Cornish miners in the aggregate, no serious error will probably arise from comparing the figures. The mortality figure among tin miners increased between 1871 and 1881 by nearly one-third part, and fell again to about the former amount in 1891. Their mortality figure from alcoholism and liver disease taken together has decreased in 1891, as compared with the previous record, but that from diseases of the urinary system has somewhat increased; with these exceptions, however, their mortality under all the headings in Table IX. has decreased, in most cases very considerably. Thus their mortality from phthisis has fallen by more than one-fifth, and that from respiratory diseases by one-eighth; their mortality from diseases of the digestive organs other than the liver, and from accident has been reduced to less than half of that which had been recorded in 1881.

Lead Miner (87).—At the last census 5,609 lead miners above the age of 15 years were enumerated in England and Wales, the number having fallen since 1881 by not less than 47 per cent. Of the lead miners nearly one-half reside in Monmouthshire and Wales, and about one-third in the Northern Counties of England, chiefly in Durham and Cumberland. At ages under 25 years lead miners do not appear to experience unusually heavy mortality, but at all ages after that year they die much more rapidly than do miners generally. Their mortality figure is 1,310, or 37 per cent. above the standard among occupied males. Their mortality figures for phthisis and for diseases of digestive organs other than the liver are double the standard, and greatly above the averages among miners as a class. Diseases of the liver also show an excess, but alcoholism is much below the average among lead miners, as it is also among miners of other metals. The comparative mortality figure of lead miners from plumbism is 5, which compares very favourably with that of lead workers. The mortality of lead miners from accident is less than the standard, and is only one-third of that among miners in the aggregate. Lead miners die more rapidly than do miners generally from diseases of the circulatory and respiratory systems. In this industry the facts are too few to justify a more minute analysis.

Mine Service (88).—Under this heading there were returned at the last census 5,950 males above 15 years of age, being an increase of 67 per cent. on the number so returned in 1881. The men thus described are not miners in the usual sense of the term: many of them are ordinary labourers who work at the pit's mouth; their number is, insufficient to

justify more than general remarks on their mortality. At ages under 35 and over 55 years, their death-rates are higher than those of occupied males, but at ages 35-55 they agree closely with that standard. The comparative mortality figure of these workers is 1,021, and is, therefore, somewhat in excess of the standard. In this occupation the mortality from alcoholism is low and that from diseases of the liver high as compared with the standard. Among constitutional diseases, phthisis is less fatal than the average, whilst rheumatic fever and diabetes are more fatal. The mortality figure from the latter disease is among the highest in the entire list of occupations, and is only exceeded by that of the legal profession.

Stone, Slate Quarrier (89).—The number of men above 15 years of age thus returned in 1891 was 49,285, being 3 per cent. less than the number in 1881. At all age-groups specified in the tables, the death-rates of these labourers exceed the standard. The comparative mortality figure of quarriers is 1,176, which as compared with the standard mortality for occupied males is in excess by 23 per cent. The mortality of quarriers from alcoholism and from liver disease is below the average. Their mortality from phthisis is represented by 269, as against 185 among occupied males. From respiratory diseases and also from accident their mortality is excessive, and they suffer more than the average from heart diseases, from cancer, and from rheumatic fever.

The mortality of quarriers from all causes had increased very slightly between 1871 and 1881, but since the latter date there has been a more serious increase. At ages 25-45 years their death-rate has been variable during the last 20 years, but at ages 45-65 years it has steadily increased throughout that period. Since 1881 the increase has been chiefly from diseases of the circulatory and respiratory systems, and under the heading "all other causes." Their mortality from phthisis and from diseases of the digestive system, as well as that from alcoholism and liver disease together, has decreased considerably since the previous record, and so likewise has their mortality from accident.

Coal-Heaver (90).—Under the heading coal-heaver, coal-porter, coal-labourer, there were included at the last census 17,998 males above the age of 15 years. These men experience a mortality which is greatly in excess at every age-group in Table I.; their comparative mortality figure amounts to 1,528, which is above the standard figure by 60 per cent. It is higher by one-fourth than that of general labourers, and approximates nearly to the mortality among costermongers, hawkers, &c. As compared with the class of occupied males, coal-heavers suffer excessive mortality under most of the headings in Table IV. Pulmonary consumption, however, shows less excess among these labourers than might perhaps have been expected, but this may be accounted for to some extent by the circumstance that they are employed, for the most part, in the open air. Their mortality figure for accident is not less than 144, as against 56 among occupied males.

In attempting to compare the recent mortality of coal-heavers with that according to the previous record, we encounter difficulties. In the earlier period, their mortality scarcely differed from the standard among occupied males, whereas in the later period it was greatly in excess. Reference to the two Census Reports shows that the number of workers in this class has increased enormously since 1881, namely, from 13,376

to 17,998, and that the relative increase has been vastly greater than that which has taken place among other labourers. Available statistics are insufficient to determine whether or not the increase of mortality can be accounted for by changes in the composition of the class under consideration.

Gasworks Service (91).—In this service 30,627 males above the age of 15 years were employed at the date of the last census. Compared with occupied males, gasworkers are liable to excessive mortality from 15 to 25 years, and also at ages over 45, but during the intervening ages their rates are below the standard. They have a comparative mortality figure of 1,077, which is higher than the standard by 13 per cent. They suffer more severely than do occupied males generally from influenza, from cancer, and from diseases of the circulatory and respiratory systems. Their mortality from alcoholism and from diseases of the liver is considerably below the average. Rheumatic fever, gout, and diabetes are also less fatal to this class than they are to occupied males in the aggregate.

Railway Platelayer; Railway, Road, Clay, Sand, &c.—Labourer (92).—At the last census 100,120 males above 15 years of age were returned as following one or other of the above mentioned employments, the number having increased since 1881 by 25 per cent. The death-rates of this set of labourers compare unfavourably with those of occupied males, being higher at all age-groups up to 65 years. Their comparative mortality figure at ages 25–65 is 1,055, which is therefore above the standard figure by 11 per cent. On reference to Table IV., however, it is at once apparent that the excess of mortality among these labourers is mainly caused by accident, from which they suffer $2\frac{1}{2}$ times as severely as do occupied males generally. Compared with the same standard they experience a low mortality from phthisis, alcoholism, and liver diseases, and from diseases of the nervous and urinary systems. They die faster, however, than do occupied males from diseases of the circulatory and respiratory systems, and especially from pneumonia. Their mortality caused by suicide is below the standard.

Brick, Tile—Maker, Burner (93).—More than 38,000 males over 15 years of age were enumerated under this heading at the last census. Their death-rates are considerably below the average for occupied males at all ages up to 65 years, and their comparative mortality figure is only 741, which is 22 per cent. below the standard. Their mortality from phthisis is less than half that of occupied males; they die less rapidly than the last-mentioned class from diseases of the circulatory, respiratory, digestive, and urinary systems, as well as from influenza, alcoholism, rheumatic fever, and diabetes.

Costermonger, Hawker (94).—There are nearly 40,000 costermongers and hawkers in England and Wales, and they are shown by the tables to be a very unhealthy body of men. Their death-rate is greatly above the standard, and even above the rate of general labourers in London and in the industrial districts, at each group of ages up to the 55th year, although at the higher ages London labourers die more rapidly. The mortality figure of costermongers is 1,652, and is therefore above the figures of coal-heavers and general labourers. Continuing the comparison between costermongers and London labourers, it appears that the mortality from phthisis and from diseases of the respiratory system is

excessive in each case. Costermongers die very rapidly from diseases of the nervous system, and both sets of workers succumb exceptionally to circulatory and urinary diseases. The mortality of London labourers from alcoholism scarcely reaches the average, while that of costermongers is nearly thrice the average. The mortality of costermongers at ages under 45 years has scarcely altered during the last 20 years; at ages above 45 the rates had increased greatly between 1871 and 1881, whilst they have shown some decline since the latter date. Table IX. shows that the mortality of costermongers from alcoholism has exactly doubled since the previous record, although their mortality from diseases of the liver and other digestive organs has considerably decreased. They died less rapidly from phthisis and from diseases of the nervous system in 1891 than they had done in 1881, but more rapidly from diseases of the circulatory and respiratory systems. Their comparative mortality figure for accident has increased considerably since the previous record, whilst their figure for suicide has decreased by almost two-thirds.

General Labourer (95); General Labourer—London (95a); General Labourer—Industrial Districts (95b).—At the last census the class of general labourers, exclusive of labourers employed in specially agricultural districts,* consisted of 498,658 males above the age of 15 years. Of these labourers 78,920 were employed in London, 114,413 in the industrial districts, and the remainder in other parts of England and Wales. The mortality of general labourers in the aggregate compares unfavourably with that of occupied males. At all the ages specified in Table I., their death-rates exceed the standard, and this is especially the case in each of the four age-groups of the main working period of life. The comparative mortality figure of general labourers is 1,221, and is therefore in excess of the standard by not less than 28 per cent. Their mortality figure for pulmonary consumption is 253, that for diseases of the respiratory system is 337, and that for circulatory diseases is 159, exceeding the standard for occupied males by 37, by 52, and by 26 per cent. respectively. To these three causes is attributable much of the excess in the mortality of general labourers as compared with the standard; but these labourers also die faster than do other occupied males from urinary diseases, and from diseases of the nervous system. They fall victims to accident likewise in much greater numbers than the average.

The general labourers of London are, like costermongers, an unhealthy body of men. At all age-groups in the tables, their death-rates are in excess of those of occupied males in London, and are therefore much more in excess of the standard rates. The comparative mortality figure of London labourers is 1,413, and exceeds the average among occupied males in London by 23 per cent. When compared with the standard figure for occupied males generally, the excess among London labourers is, of course, greater; it is as much as 48 per cent. General labourers in the industrial districts appear to be even more unhealthy than are their fellows in the metropolis; their death-rates being higher at each group of ages up to 65 years. Their comparative mortality figure amounts to 1,509, which is above that of occupied males in the same districts by 21 per cent., and above that of all occupied males by 58 per cent.

The mortality of labourers in agricultural districts has been already treated of in detail at pages xxxii–xxxv. They are by far the healthiest

* Classed with farm labourers (No. 21).

of all the divisions of labourers, and for this reason they have been selected as a special standard with which other labourers may be compared, so as to show their relative degrees of healthiness.

In the following table the death-rates of labourers in agricultural districts at four of the age-groups shown in Table I. are taken in each case as 100, and the rates for the several other classes of labourers are stated as proportions of those rates.

	25-	35-	45-	55-65
Labourer in Agricultural Districts	100	100	100	100
Railway Labourer	150	143	168	168
Factory Labourer	136	143	169	186
General Labourer	174	184	204	171
" " (London)	197	213	235	202
" " (Industrial Districts)	199	234	259	209

From this table it appears that at every group of ages included in the main working period of life, the death-rate of labourers in agricultural districts is lower than that of either of the other five divisions of labourers; the workers in the industrial districts, for example, sustaining rates of death which are either double, or more than double, the rates that affect agricultural labourers. In the appended table the mortality figures of labourers in agricultural districts (as given in Table IV.), are taken as 100 in the case of several important causes of death, and the corresponding figures for the other divisions of labourers are shown proportionally thereto.

	All Causes.	Alcoholism.	Phthisis.	Diseases of Nervous System.	Diseases of Circulatory System.	Diseases of Respiratory System.	Bright's Disease.	Accident.
Labourer in Agricultural Districts	100	100	100	100	100	100	100	100
Railway Labourer	158	250	100	122	144	250	146	320
Factory Labourer	162	275	166	153	149	216	269	182
General Labourer	183	350	196	164	167	267	231	166
" " (London)	212	300	298	153	164	331	323	125
" " (Industrial Districts)	227	600	243	176	182	412	246	150

It thus appears that, under every heading but one in this table, the mortality not only in each group of general labourers, but also among railway labourers and among factory labourers, exceeds that of labourers in agricultural districts; the excess varying in the case of phthisis from 66 to 198 per cent., in that of diseases of the respiratory system from 116 to 312 per cent., in that of diseases of the nervous system from

22 to 76 per cent., and in the case of alcoholism varying from 150 to 500 per cent.

Engine Driver, Stoker, Fireman—neither railway, marine, nor agricultural (96).—Under this heading 81,268 men above 15 years of age were returned at the last census, the number having increased since 1881 by 24 per cent. Their death-rates are below the standard, at all age-groups from 20 to 65 years, and their comparative mortality figure is 786, which is somewhat below that of railway engine drivers and stokers, and is lower than the standard figure for occupied males by 18 per cent. The contrast between the causes of death of engine drivers on the railway and of those otherwise employed is very marked. For example, the latter die more rapidly than do the former from pulmonary consumption and from diseases of the respiratory system, as well as from Bright's disease; their mortality figures for accident and suicide are also higher. On the other hand they die less rapidly from diseases of the heart, liver, and nervous system. The mortality of both these classes of workers from phthisis and from diseases of the respiratory system, and also from alcoholism is much below that of occupied males.

Artizan, Mechanic—undefined (97).—At the last census 49,638 males above 15 years were returned under this heading. For further remarks, see "Other Occupied Males" (100).

Factory Labourer—undefined (98).—Under this heading there were enumerated at the last census 26,063 males above the age of 15 years, being an increase of 69 per cent. on the number so returned in 1881. At the several groups of ages below the 45th year, the death-rates of these workers do not greatly differ from those of occupied males as a standard, but at all subsequent age-groups the rates are in excess. The comparative mortality figure of factory labourers is 1,078 and is therefore above the standard figure by 13 per cent. These workmen die faster than do occupied males generally from phthisis, from diseases of the circulatory and respiratory systems, and from Bright's disease; their mortality figure for accident is also considerably in excess. From the diseases caused by intemperance, however, their mortality figure is below the standard.

Chimney Sweep, Soot Merchant (99).—There were returned at the last census, 7,648 chimney sweeps above the age of 15 years, the number having increased by 15 per cent. since 1881. The deaths in this occupation number only 378, but the following remarks with respect to them, would seem appropriate. Compared with those of occupied males the death-rates of chimney sweeps at all ages below the 65th year are excessive. Their comparative mortality figure amounts to 1,311, and is therefore more than one-third higher than the standard. Their figure for alcoholism is 59, against 13 among occupied males, although their mortality from diseases of the liver is below the average. Chimney sweeps die more rapidly than do occupied males from phthisis and from diseases of the heart, lungs, and kidneys; their mortality from suicide is also more than double the average. But it is with respect to their exceptional liability to malignant disease that chimney sweeps are deserving of special notice. Their mortality figure for cancer amounts to 156, as compared with 44 among occupied males. There is no other occupation in the list in which the ravages of cancer at all approach the former figure.

The following table indicates the headings under which the deaths of chimney sweeps from malignant diseases were returned, the parts of the body affected, and likewise their ages at death:—

Part affected.	Car- cinoma, Cancer, Malig- nant Disease.	Epi- the- lioma.	Scir- rhus.	Sar- coma.	Age at Death.			
					35-	45-	55-	65 and up- wards.
Face, nose, jaw - -	4	--	--	1	1	--	2	2
Mouth, tongue, lip, throat, œsophagus -	3	3	1	--	--	2	2	3
Neck - - - - -	1	--	--	--	--	1	--	--
Lungs - - - - -	--	--	--	1	--	--	1	--
Liver - - - - -	3	--	--	--	--	3	--	--
Stomach, intestines, rectum - - - - -	11	--	--	--	1	3	3	4
"Sweep's cancer": cancer of penis, testes, scrotum, groin, or thigh -	18	8	--	--	5	10	7	4
Part not stated - -	2	3	1	1	--	2	2	3
Total - - - - -	42	14	2	3	7	21	17	16

The mortality among chimney sweeps has decreased considerably and steadily in the course of the last 20 years. Between 1871 and 1881 their mortality figure, modified for purposes of comparison, had fallen by 11 per cent., the fall in the death-rate having been common to both divisions of the main working period of life, but much greater at ages under than at ages over 45. In the interval between the two last censuses, however, the fall in the mortality of chimney sweeps has been greater at ages 45-65 than it has been at ages under 45 years. Although chimney sweeps still die with terrible rapidity from cancer, there has happily been a great abatement in the fatality from this disease since the previous record. In 1880-82 the mortality figure had been 290, whilst in 1890-92, the figure, modified to allow of comparison, was 157, showing a reduction of nearly half.

Other Occupied Males (100).—Under this head must be included 1,069,622 males above the age of 15 years, for whom it has not been possible to find a place in any of the foregoing occupational groups. With respect to these persons, as well as with respect to the 49,638 artizans and mechanics who form the indefinite group numbered 97 in this category, it may be said that the statistics are very unsatisfactory. I have, therefore, simply inserted in the tables, without comment, the figures as to populations, deaths, &c.

EFFECTS OF ALCOHOLIC EXCESS.

It requires but little study of the statistics of occupations to convince one that the mortality directly ascribed in the registers to intemperance forms but an imperfect measure of the mischief accruing from the abuse of alcohol. In certifying the cause of death of inebriates it is the habit of some medical men to state only the pathological condition of the organ or organs chiefly affected. The experience of this Office

shows that cirrhosis of the liver, for instance, is frequently returned as the sole cause of death in such circumstances, the fact that abuse of alcohol had induced the cirrhosis or other morbid condition being omitted from the certificate. This is especially noticeable in regard to the deaths of relatively well-to-do persons. Among inn-keepers in the years 1890-92, for example, due allowance having been made for differences of age-constitution, only 31 per cent. of the total deaths referred to alcoholism and liver disease combined were attributed directly to the first-mentioned cause, whilst among inn servants, presumably a less important class of men socially, not less than 63 per cent. were so returned (see Table IV.). It is familiar knowledge that the persistent excessive use of alcohol results in damage to most of the important organs of the body: accordingly, in the following table I have deemed it advisable to give, for each occupation in which the effects of alcoholic excess are conspicuous, not only the mortality which is stated to be directly due to alcoholism, but also that which is attributed to certain other causes that are known to be often associated with alcoholic excess. On no account, however, must it be inferred that the excess of mortality from the tabulated causes, other than alcoholism, is entirely and in every case the result of intemperance. Experience proves that the liver is the organ which more than any other is affected prejudicially by intemperance: consequently, in arranging the groups of occupations for the subjoined table, the order adopted has been that of the combined mortality referred to alcoholism and to diseases of the liver; but the mortality from these and from the other diseases above alluded to is given separately in consecutive columns. The mortality of occupied males in 1890-92 at ages 25-65 years, from each cause of death, has been expressed as 100; and the mortality in each several industry, as extracted from Table IV., has been reduced to a figure proportional to that standard.

	Alcoholism and Diseases of Liver.	Alcoholism.	Diseases of Liver.	Gout.	Diseases of Nervous System.	Suicide.	Phtisis.	Diseases of Urinary Organs.
Occupied Males -	100	100	100	100	100	100	100	100
Coachman, Cabman -	153	215	122	300	100	143	124	132
Costermonger - -	163	277	107	150	170	100	239	171
Coal Heaver - - -	165	223	137	--	120	50	116	122
Fishmonger - - -	168	215	144	150	109	150	86	120
Musician - - - -	168	223	141	450	135	164	174	141
Hairdresser - - -	175	269	130	400	100	250	149	78
Dock Labourer - -	195	400	96	150	139	157	176	166
Chimney Sweep - -	200	454	78	--	100	221	141	144
Butcher - - - - -	223	269	207	300	128	164	105	117
Brewer - - - - -	250	315	219	500	152	121	148	190
Inn Servant - - -	420	315	230	550	132	179	257	188
Inn Keeper - - -	733	708	744	600	195	229	140	220

As might have been anticipated from what has been stated at page xxxviii, publicans stand at the bottom of the list of occupations; their mortality from alcoholism and diseases of the liver together being

very much greater than that of any other body of men. Of the two divisions of the publican class, innkeepers die more rapidly from these causes in the aggregate than their servants do; the mortality figure of the former being more than 7 times, and that of the latter being more than 4 times, the figure for occupied males. Reference to Table IV. will show that from these diseases the mortality among publicans varies widely according to the locality in which they trade: they die most rapidly in the industrial districts and least rapidly in London. Brewers and butchers stand next in the list of occupations with mortality figures which are respectively $2\frac{1}{2}$ times and $2\frac{1}{4}$ times as high as the standard. Among other occupations in the table on page xci, chimney sweeps and dock labourers suffer most from these diseases, their mortality figures being about double the standard; whilst coachmen and cabmen suffer least, their mortality exceeding the standard by about one-half.

The foregoing remarks respecting the distribution of mortality under the two headings Alcoholism and Diseases of the Liver are further illustrated by the second column of figures in the table. If the order of the several occupations had been determined according to their mortality directly ascribed to alcoholism, instead of by their mortality from that cause and from diseases of the liver combined, fishmongers, musicians, hairdressers, butchers, brewers, and innkeepers would have occupied more favourable positions than those which they occupy at present, whilst costermongers, dock labourers, chimney sweeps, and inn-servants would have occupied less favourable positions.

The mortality from diseases of the nervous system varies, as between one occupation and another, less widely than does that from most other diseases; the extreme variation from the standard occurs among innkeepers, who suffer an excess of mortality equal to 95 per cent. From suicide the mortality ranges between half that of occupied males among coal heavers, and $2\frac{1}{2}$ times the same standard among hairdressers. Phthisis also shows considerable variation; among fishmongers the mortality from this disease is only 86 per cent. of that among occupied males, whilst among costermongers it is 239 per cent., and among inn-servants it is 257 per cent., of the same standard. Diseases of the urinary system also exhibit a considerable range of mortality; among hairdressers the mortality from this group of diseases is lower than the standard by 22 per cent., whilst among brewers it is in excess by 90 per cent., and among innkeepers, in excess by 120 per cent. The mortality attributed to gout differs widely in the several occupations; among chimney sweeps and coal heavers no deaths whatever were referred to this disease in 1890-92, but among hairdressers, musicians, brewers, and publicans the proportion ranges between 4 times and 6 times the standard.

Diseases of the respiratory organs (which are not shown in the table) cause heavy mortality among most of the classes of men who are addicted to the excessive use of alcohol; but the general tendency of the figures is to suggest that special liability to these diseases is caused by exposure to wet and cold, and that such exposure is followed by fatal results more often among intemperate than among temperate men.

The combined mortality from alcoholism and diseases of the liver among innkeepers and also among costermongers shows a slight increase in 1890-92 as compared with 1880-82, whilst that among brewers shows a slight decrease and that among butchers a substantial decrease. In the mortality from gout, no change is shown since the previous record in either of the four occupations concerning which the needful statistics are available; the figures, however, from which the mortality from gout is calculated are very small. From phthisis and also from diseases of

the nervous system, brewers, innkeepers, costermongers, and butchers die less rapidly than they did ten years ago. According to the most trustworthy evidence procurable, brewers, innkeepers, and butchers are more addicted to suicide, and costermongers very much less so than they were in 1880-82. Since the previous record the mortality from diseases of the urinary system has increased considerably among brewers, and has slightly increased among innkeepers and costermongers, whilst it has slightly decreased among butchers.

RESULTS OF BREATHING DUST-LADEN OR OTHERWISE CONTAMINATED AIR.

In Dr. Ogle's decennial supplement two instructive sections occur, in which he has contrasted the effects of fresh air with those of foul and of dusty air on the mortality of men employed in certain industries, his illustrations having been drawn from the records of 1880-1-2. The subject is so important from a public health point of view, that I have decided to revert to it in considerable detail on the present occasion. I have also endeavoured to show in what respects the statistics of the 1891 period agree with, and in what respects they differ from, those of the earlier record.

Before proceeding to estimate, by means of statistics of mortality alone, the amount of injury to health that is experienced by workmen in the course of their employment, it is necessary to determine the diseases or groups of diseases, the inordinate fatality of which is to be accepted as proof of the mischief done; but in forming a judgment on this point, due weight must be given to the well-known tendency of certain accessory conditions to aggravate the baneful effects of occupation. In the case of those occupations—and they are many in number—which are unhealthy because of the presence in the atmosphere either of irritating substances, or of respiratory or other organic impurities, we naturally turn to the organs of respiration as being those which will probably exhibit the earliest if not the chief indications of injury. But it is at this point that the difficulty begins. If the national death returns furnished the means of accurately discriminating between various forms of disease the statistician's task would be simplified. Unfortunately, however, this is far from being the case. It must be remembered, in the first place, that the deaths are not in all cases certified as to cause by medical men; many of them are attested by coroners, and a certain though happily diminishing proportion are registered without formal certificate of either kind. In the second place, medical experience shows that under circumstances sometimes existing it is difficult to distinguish one kind of lung disease from another; and there is reason to believe that a considerable number of deaths which had resulted from non-tubercular maladies are erroneously returned in the registers, and consequently in the classified tables, as due to phthisis. In many remote country districts, where a considerable proportion of the population are unprovided with medical attendance, there is a tendency to attribute to what is locally termed consumption or decline all cases of illness that are accompanied by cough, expectoration, or difficulty of breathing. This is exceptionally the case in certain parts of Wales where the mortality ascribed to phthisis is relatively high, and where the proportion of uncertified deaths is likewise excessive.

Having regard to the foregoing considerations, it is probable that the most reliable testimony which the facts are capable of yielding as to the evil effects of irritating dust and of organically impure air will be

secured if the example of Dr. Headlam Greenhow be followed, and the deaths returned as from phthisis, and also those returned as from diseases of the respiratory system, be collected under one heading. This plan has accordingly been adopted in the present section, and in the accompanying tables the order of occupations has been determined by their combined mortality from these diseases. Nevertheless, the mortality figures for phthisis as well as those for diseases of the respiratory and circulatory systems, are separately shown in adjoining columns.

Before leaving this branch of the subject a few observations may appropriately be made on the varying incidence of phthisis and of respiratory diseases (as recorded in the death registers) on certain classes of workers employed in different parts of the country. Among occupied males as a class, between the ages of 25 and 65 years, the mortality figure for respiratory diseases exceeds that for phthisis by about one-fifth part; among unoccupied males, on the contrary, the mortality from phthisis greatly exceeds that from respiratory diseases. The main causes of this difference are probably: (1) that occupied males who are attacked by phthisis are especially prone to drift into the unoccupied class, and (2) that certain portions of the unoccupied class—the insane, for example—suffer very high mortality from phthisis. The normally prevalent excess of mortality from respiratory diseases over that from phthisis does not obtain among occupied males in all parts of the country. In the industrial districts that excess is very clearly marked, but London and the agricultural districts are exceptions to the rule, their mortality from phthisis being greater than that from respiratory diseases. In London the mortality attributed to respiratory diseases is high, but that attributed to phthisis is higher still; in the agricultural districts, on the other hand, the mortality ascribed to phthisis is low, but that ascribed to respiratory diseases is still lower. Turning to the separate groups of occupations, it appears that about one-third part of these groups, containing about the same proportion of the occupied male population at ages above 15 years, differ from occupied males in the aggregate, in that they experience higher mortality from phthisis than they do from respiratory diseases. This third part of the occupational groups may be arranged in two sections; the first section comprising those occupations which deviate from the general rule because of a special tendency among the workers to succumb to phthisis; the second section comprising those occupations which deviate from the rule for the reason that the workers enjoy unusual immunity from death by respiratory diseases.

The first section may be sub-divided thus:—

(a) Occupations which are carried on in close and confined air:—commercial clerks, bookbinders, tailors, and tin miners afford examples of this kind.

(b) Occupations in which excessive mortality from phthisis appears to be associated with alcoholic intemperance—as in the case of law clerks, inn servants, and costermongers.

The second section may be sub-divided as follows:—

(c) Occupations in which relative immunity from respiratory mortality appears to depend on the circumstance that the workers are protected from inclemency of the weather:—instances of this kind are furnished by barristers, schoolmasters, and domestic servants.

(d) Healthy outdoor occupations characterised by low mortality from both descriptions of lung disease:—this sub-section consists of farmers and labourers in agricultural districts, and of gardeners; it is probable, however, that the excess of mortality from phthisis above that

from respiratory diseases among these workers is, wholly or in part, only apparent.

The above remarks must be understood to apply only to such occupations as depart from the general rule, which is that the mortality from respiratory diseases exceeds that from phthisis. Among the occupations which conform to the rule there are some in which impure or dust-laden air is one of the conditions of working; and there are others in which either alcoholic excess or exposure to weather is accompanied by enormous mortality from respiratory diseases. On the other hand, there are also included some occupations in which the workers experience low mortality from respiratory diseases, and still lower mortality from phthisis.

With respect to the criterion by which the healthfulness or the reverse of the several industries is to be judged, something must be said at this stage. The men engaged in agricultural pursuits form a class numbering more than a million, and consisting of farmers, graziers, gardeners, and farm labourers. They are for the most part a hard-working and healthy body of men who spend the greater part of the daytime in the open air of the country; they may therefore be considered typical of that section of the population which suffers injury in the least degree from the inhalation either of dust-laden air or of air vitiated in other ways. For these reasons agriculturists have been selected as the class with which the several occupations presently to be specified shall be contrasted, in order to bring into adequate prominence the enormous waste of life which, although largely preventable, is still sustained by the workers in several important industries.*

In any comparisons that may be instituted between 1891 and 1881, as regards the mortality in those periods, it is important to take into account the far-reaching effects of the influenza epidemic which exceptionally prevailed throughout the more recent period. It is unquestionable that the fatality of diseases, not only of the respiratory, but of the nervous and of the circulatory system also, has been seriously increased by this complication; and that, as a consequence, the value of any comparison between the mortality statistics of the two periods has been considerably reduced.

Effects of breathing dust-laden air.—In the table on page xevi, which relates to 1890-92, will be found a list of those occupations in which the workmen show exceptional liability to injury from the presence of dust, or of some other irritating substance, in the air breathed. It is not suggested that the whole of the difference between the mortality of the several dust-producing occupations and that of agriculturists is due to this cause. There may be, and probably there are, other adverse conditions also at work, the effects of which it is impossible to exhibit separately; nevertheless there is no doubt that an atmosphere which is laden with dust or with other irritating substances, is a potent factor of the difference referred to.

This table shows the mortality figures for phthisis and diseases of the respiratory system, combined; and also those for phthisis and for diseases of the respiratory and circulatory systems, separately. In an additional column the figures for phthisis and respiratory diseases

* The agricultural class has on the present occasion been selected in preference to fishermen, as typical of a healthy occupation, mainly because of the consideration referred to at page xxxv concerning the unstable composition of the fisherman tribe.

together are compared, the mortality among agriculturists being taken as 100, and that among the other occupations being shown proportionally to this standard.

Occupation.	Phthisis and Diseases of the Respiratory System.		Phthisis.	Diseases of Respiratory System.	Diseases of Circulatory System.
	Mortality Figure.	Ratio.			
Agriculturist	221	100	106	115	83
Ironstone Miner	294	133	90	204	84
Carpenter	326	148	172	154	106
Coal Miner	366	166	97	269	120
Corn Miller	366	166	143	223	112
Baker, Confectioner	392	177	185	207	130
Blacksmith	392	177	159	233	136
Locksmith	423	194	223	205	104
Wool Manufacture	447	202	191	256	131
Tin Worker	451	204	217	234	124
Carpet, Rug Manufacture	471	213	226	245	87
Bricklayer, Mason, Builder	473	215	225	251	130
Rope Maker	486	220	219	267	118
Cooper, Wood-turner	526	238	250	276	137
Cotton Manufacture	540	244	202	338	152
Lead Worker	545	247	148	397	272
Chimney-sweep	551	249	260	291	142
Brass Worker	552	250	279	273	126
Stone Quarrier	576	261	269	307	137
Zinc Worker	587	266	240	347	126
Iron and Steel Manufacture	645	292	195	450	162
Gunsmith	649	294	324	325	153
Copper Miner	678	307	331	347	121
Copper Worker	700	317	294	406	186
Lead Miner	705	319	380	325	142
Glass Manufacture	740	335	295	445	157
File Maker	825	373	402	423	204
Tin Miner	885	400	508	377	95
Cutler, Scissors Maker	900	407	382	518	167
Potter, Earthenware Manufacturer	1,001	453	333	668	227

One is not surprised to find from this table that the combined mortality from phthisis and diseases of the respiratory system is higher in each of the 29 specified occupations than it is among the class of agriculturists; but it is important to observe that the table includes 22

occupations in each of which the mortality from these diseases is more than double that of agriculturists, and, further, that these 22 occupations include 8 (giving employment to nearly 102,000 men), in which the mortality from phthisis and respiratory diseases together ranges from three times to four and a half times that of the agricultural class.

According to the experience of 1890-92, potters (or earthenware manufacturers) sustain a mortality from phthisis and respiratory diseases together which is far in excess of that experienced by any other group of workers in the list. The table indicates that potters succumb to non-tubercular disease of the lungs much more rapidly than they do to phthisis; and it is certain that much of the so-called "potters' phthisis" ought properly to be designated non-tubercular cirrhosis of the lungs. Deaths from this affection should on no account be included under the head of phthisis, which term, according to the classification here in use, relates exclusively to the tubercular malady of that name.

The figures in the table indicate that colliers perish much more rapidly than do ironstone miners from phthisis and respiratory diseases taken together. From phthisis alone the mortality of ironstone miners differs little from that of colliers, and according to the entries in the death registers, both these groups of labourers suffer from phthisis less severely than do agriculturists. On the other hand, the mortality of colliers from diseases of the respiratory system other than phthisis greatly exceeds that of ironstone miners. From the table it is found that tin miners suffer more severely from tubercular phthisis than do other groups of workers in the list, their mortality figure amounting to not less than 508, or little short of five times the figure for agriculturists. They consequently appear to die from phthisis alone rather more rapidly than farmers in the agricultural districts die from all causes together. File cutters, cutlers, and lead miners also suffer inordinately from phthisis, their mortality figures being 402, 382, and 380 respectively, as compared with 106, the figure for agriculturists. From diseases of the lungs other than phthisis potters suffer more severely than do any other workers in the list, their mortality figure being 668, as against 115 among agriculturists. Among cutlers the mortality figure for respiratory diseases is 518; among iron and steel workers it is 450, and among glass makers and file cutters the figures are 445 and 423 respectively. The numbers of men engaged in knife grinding and file cutting, as well as in tin and lead mining, are small, and therefore the figures must not be taken as indicating their exact proportional mortality from the several causes; nevertheless there is no reason to doubt that the mortality from respiratory diseases is abnormally high among all these workers.

At page xciv the mortality experienced by specified sections of the population, from tubercular and from non-tubercular lung diseases respectively, was discussed, and it was there stated that a minority (about one-third part) of the occupied male population die more rapidly from phthisis than they do from respiratory diseases exclusive of phthisis. The table on page xcvi indicates that tin miners, lead miners, brass workers, locksmiths, and carpenters form part of the minority here referred to; their mortality from phthisis being higher than that from diseases of the respiratory system, by proportions ranging from 2 per cent. among brass workers to 35 per cent. among tin miners. The experience of the other groups of workers in the table agrees with that of the majority of the English population in this respect, that respiratory diseases are more fatal among them than is phthisis. Diseases of the circulatory system are more fatal to the workers in each of the dust-producing occupations in the table than they are to

agriculturists: in a few of these occupational groups, however, the excess is but small, and in only 17 out of the 29 groups is the mortality from these diseases greater than it is among occupied males generally. The influence of atmospheric dust in producing or in aggravating mortality from heart disease is, of course, only indirect; and it is therefore difficult to determine how much of the excess in such mortality should be attributed to that cause, even in these 17 groups. Lead workers, file cutters, and potters, who die faster from heart disease than do other workers in the dust-producing trades, also suffer severely from lead poisoning: as will be shown at a subsequent page, there appears to be some connection, in regard to cause, between these two forms of malady.*

Among the 29 dust-producing occupations under notice, there are 13 concerning which particulars exist of their mortality from various causes in 1880-82, either in the whole country or in some considerable parts of it. In a few of these trades the numbers of men employed are small, and in such cases the figures must be regarded as approximate only. With this reservation, however, the following comparisons will be instructive. From phthisis alone, the mortality in 1890-92 has declined since the previous record among colliers, tin miners, potters, blacksmiths, wool workers, ironstone miners, and cotton spinners, by proportions ranging from 12 per cent. to 29 per cent., and among bakers, carpenters, stone quarriers, and bricklayers it has declined by percentages ranging between 2 and 10. On the other hand, there has been an increase since 1880-82 in the mortality of file makers equal to 2 per cent., and in that of cutlers an increase equal to 9 per cent.

The mortality from diseases of the respiratory system has fallen since the previous record in two cases only; among ironstone miners the fall has been 3 per cent., and among tin miners it has been 13 per cent. In all the other cases there has been a rise; among bakers, stone quarriers, blacksmiths, carpenters, and file makers the increase of mortality has ranged between 15 and 25 per cent.; and among colliers, bricklayers, wool workers, cotton spinners, and cutlers it has ranged from 32 to 38 per cent. The mortality of potters from respiratory diseases shows little change, the figure for 1891 being only about 2 per cent. higher than that for 1881; in both periods, however, potters suffered far more severely from these diseases than did the workers in any other dust-producing occupation.

Dr. Ogle summarised his remarks concerning the effects of dust on the lungs in 1880-82, by pointing out that the dust of coal, and that of the varieties of wood which are used by carpenters and joiners, appeared to be the least injurious, whilst the dust of metals and of stone appeared to be the most injurious, kinds of dust: flour dust, and the filaments that are given off and inhaled in textile factories, occupied an intermediate position as regards injury to health.

The figures for 1890-92 on the whole confirm this generalization, the occupations on which my predecessor based his summary having maintained nearly the same order in 1890-92 as that which they had occupied ten years previously, with respect to their mortality from phthisis and lung disease. In the earlier period colliers and carpenters occupied the most favourable positions in the list, the first-mentioned occupation having a slight advantage; in the later period, however, the positions of these two occupations relatively to each other have been reversed. From the more extended list of occupations in the present work, it

* See remarks on lead-poisoning, page cii.

appears that ironstone miners suffer even less than do carpenters and colliers, and that blacksmiths, locksmiths, and tin workers are less liable to injury from dust than are other workers in metals.

The mortality from diseases of the circulatory system has been higher recently than it had been in 1880-82 among carpenters, ironstone miners, colliers, blacksmiths, bricklayers, cotton spinners, file cutters, stone quarriers, cutlers, and potters, especially among the last three groups of workers. Among tin miners and wool workers, on the other hand, the mortality in 1890-92 has been below that which had been previously recorded.

Effects of breathing foul air.—I have now to consider the case of those workers whose occupations are not, in themselves, necessarily unhealthy, but who are the victims of unwholesome conditions of labour either self-inflicted, or else caused by the ignorance or the parsimony of persons in authority. The evils here alluded to are the result partly of the accumulation of respiratory and other organic impurities in the air breathed, and partly of the cramped posture adopted in some cases by workmen engaged in sedentary indoor labour.

In the appended table, which refers to the period 1890-92, is given a list of the occupations that have been selected as those in which the workers are liable in various degrees to damage by the inhalation of impure although not necessarily dust-laden air in the course of their employment. For each of these occupations the figures indicating the mortality from phthisis and from diseases of the respiratory and circulatory systems are separately shown: and in the third column the figures representing the mortality from phthisis and respiratory diseases together are compared with the figure for agriculturists, the latter being taken as 100. The occupations in the list have been arranged in the ascending order of their mortalities from phthisis and respiratory diseases combined.

Occupation.	Phthisis and Diseases of Respiratory System.		Phthisis.	Diseases of Respiratory System.	Diseases of Circulatory System.
	Mortality Figure.	Ratio.			
Agriculturist - - - -	221	100	106	115	83
Engraver—Artist - - - -	279	126	146	133	96
Shopkeeper (Class) - - - -	350	158	172	178	117
Commercial Clerk - - - -	390	176	218	172	115
Butcher - - - - -	404	183	195	209	137
Saddler - - - - -	417	189	248	169	133
Watchmaker - - - - -	427	193	234	193	94
Shoemaker - - - - -	437	198	256	181	121
Draper - - - - -	441	200	260	181	135
Tobacco Manufacturer - - - -	461	209	280	181	109
Tailor - - - - -	466	211	271	195	121
Hairdresser - - - - -	489	221	276	213	179
Hatter - - - - -	511	231	301	210	141
Musician - - - - -	522	236	322	200	191
Printer - - - - -	540	244	326	214	133
Bookbinder - - - - -	543	246	325	218	115

From this table it appears that whereas engravers and artists experience a mortality from phthisis and diseases of the respiratory system together, which is not greatly above that of agriculturists, there are at the bottom of the list eight occupations in which the mortality from these causes varies from twice to two and half times that of agriculturists. The workers in four of these eight occupations die from phthisis and respiratory diseases together more rapidly than farmers in agricultural districts die from diseases of every kind. In addition to the occupations in the above table, there are included in Table IV. at least three industries, all of which are concerned in the purveyance of food, namely, fruiterers, fishmongers, and milk sellers, in which the mortality from the above-mentioned combination of diseases is much higher than it is among agriculturists, although the workers lead an open-air life, and are not known to be exposed to unwholesome conditions of labour.

Contrary to the experience of two-thirds of the occupied male population of England and Wales, phthisis is more fatal than are diseases of the respiratory organs other than phthisis to 13 out of the 15 groups of workers in the table on page xcix. Printers, bookbinders, and musicians sustain a mortality from phthisis which is more than three times that prevailing among the agricultural class. These three occupations are subject to excessive mortality from diseases of the respiratory system also; with one exception, this is true likewise respecting all the other workers in the list. From diseases of the circulatory system the highest mortality in the table is that which is experienced by musicians and hairdressers, and the lowest that which is experienced by watchmakers.

Comparison of the mortality from "pulmonary diseases" in the 1881 and 1891 periods, can be made regarding five only of the occupations in the table, namely butchers, shoemakers, drapers, tailors, and printers; and of these five, printers suffered most severely in both periods. From phthisis alone the mortality in 1891 was much lower among printers and butchers, and somewhat lower among tailors, than it had been in 1881, whilst among drapers and shoemakers it remained practically unaltered. From diseases of the respiratory system other than phthisis, the mortality in the 1891 period increased very considerably as compared with 1881 in the case of drapers, shoemakers, printers, and tailors, and also increased to a less degree in the case of butchers. In the 1891 period the workers in all five of these occupations died from diseases of the circulatory system more rapidly than had been the case ten years previously.

EFFECTS OF CHRONIC LEAD-POISONING.

A list of 13 occupations in which, according to the returns for 1890-92, there is unmistakable evidence of poisoning by lead will be found in the following table. For each occupation the mortality is shown, not only from "Plumbism," the mortality directly attributed to which cause forms by itself but an imperfect measure of the injury resulting from the absorption of lead into the system, but also from gout and from phthisis, as well as from diseases of the urinary, nervous, circulatory, and respiratory systems. The inclusion, however, of the six last-named diseases or groups of diseases must not be held to imply the belief that the excessive mortality which either of them may inflict on a given occupation is the result of lead-poisoning, exclusively. Nevertheless the figures as they stand in the table will be found instructive in connection with the present subject.

In the lowest line but one of the table the mean mortality figures have been inserted for the 13 occupational groups taken together; these figures have been calculated in order to supply an average with which the mortality figures from various causes in the several occupations may be compared.

	Plumbism.	Diseases of Urinary System.	Diseases of Nervous System.	Gout.	Phthisis.	Circulatory Diseases.	Respiratory Diseases.
Lead worker - - - -	211	161	232	—	148	272	—
File maker - - - -	75	104	212	4	402	204	423
Plumber - - - -	21	81	131	13	165	123	218
Painter and Glazier - - -	18	83	132	9	232	147	225
Potter - - - -	17	63	123	1	333	227	668
Glass maker - - - -	12	63	155	9	295	157	445
Copper worker - - - -	8	60	85	—	294	186	406
Coach maker - - - -	7	68	105	7	189	134	250
Gasfitter, locksmith - - -	6	50	108	5	223	104	205
Lead miner - - - -	5	41	62	—	380	142	325
Printer - - - -	3	52	98	4	326	133	214
Cutler - - - -	3	56	91	—	382	167	518
Wool manufacturer - - -	3	45	100	1	191	131	256
Mean of the above - - -	13	66	117	5	248	146	287
Occupied Males - - - -	1	41	82	2	185	126	221

On examining this table it at once becomes evident that exposure to the risk of lead-poisoning is associated with increased liability to disorders of the urinary and nervous systems. This is true of all those occupations which are specially exposed to that particular risk; and further, it is found that those occupations which show the greatest excess of mortality from plumbism also show the greatest excess of mortality from diseases of the urinary and nervous systems. Among lead workers the combined mortality under these two headings is represented by 393, and that among file makers by 316, as against 123 only among occupied males in general. Among plumbers, painters, and glaziers the mortality ascribed to these causes, although less conspicuous, is still 75 per cent. above that among occupied males. These figures leave no room for doubt that the deaths which are definitely certified as due to poisoning by lead among workers who are exposed to its influence. Careful study of the mortality from diseases of the nervous system among the large class of plumbers, painters, and glaziers tends to the conclusion that the excess under this heading is very largely due to cerebral hæmorrhage.

In several of the occupations subject to lead-poisoning there is evidence of unusual mortality from gout also; in other occupations, however (lead workers, for example), no death was ascribed to gout in the three years 1890-91-92.

The combined mortality from phthisis and respiratory diseases is on the whole excessive among the occupations now under notice, but its

relative incidence suggests that it is mainly due to conditions of labour unconnected with the presence of lead. For instance, the workers who suffer most severely from these causes in the aggregate are potters or earthenware manufacturers, the next in order being cutlers, file makers, and glass makers. In all these cases, as has been shown in a previous section, the mechanical effects of inhalation of dust constitute a potent cause of the excessive mortality from lung affections. A further reason for doubting whether lead-poisoning has commonly any great effect in increasing the mortality from diseases of the lungs is, that some occupations in which an appreciable or even a large proportion of the deaths are due to the former malady are affected comparatively little by the latter kind of disease. For example, plumbers, who stand third in the list as regards their mortality from lead-poisoning, are less liable to phthisis and to respiratory diseases than are occupied males in general; and painters, coachmakers, and wool manufacturers, all of whom appear in the list of trades subject to lead-poisoning, sustain a mortality from phthisis and respiratory diseases combined which is in one case below that standard, and which in no case exceeds it by more than 13 per cent.

The circulatory organs, on the other hand, seem to be more directly influenced by the effects of lead-poisoning; the mortality from diseases of these organs being above the standard by 62 per cent. among file makers, by 80 per cent. among earthenware makers, and by 116 per cent. among lead workers. The connection between the two causes of death is not, however, invariable; inasmuch as plumbers and gasfitters suffer less severely, and coachmakers, painters, and wool manufacturers suffer only a little more severely, than the standard, from diseases of the circulatory system.

A NEW HEALTHY DISTRICT LIFE-TABLE.

The first volume of this Supplement contains a life-table based on the mortality in England and Wales during the ten years 1881-90. Placed in comparison with previous life-tables for the whole country, this table furnishes a valuable indication of sanitary progress in recent years. From the very nature of its construction it is evident, however, that a life-table of the general population can represent nothing more than the numerical result of blending a series of widely different conditions of existence; but, for certain statistical purposes, a more delicate standard of comparison is needed. The general death-rate of England and Wales in 1881-90 was almost exactly 19 per 1,000. After allowing for differences of age and sex constitution, about one-sixth part of the population were subject to death-rates differing from the mean rates by not more than 1 per 1,000, either in excess or in defect, one-third were subject to death-rates ranging from 17 to 21 per 1,000 (within 2 per 1,000 of the mean), and rather more than one-half were subject to death-rates ranging from 16 to 22 (within 3 per 1,000 of the mean). The death-rates of nearly one-fourth of the population ranged from 12 to 16 per 1,000, and those of an almost equal number ranged from 22 to 36.

Speaking generally, districts with low rates of mortality may be called "healthy," while those with high rates must be considered "unhealthy." For the present it will be advisable to designate as healthy only those districts with the lowest death-rates, and to regard all other districts as more or less unhealthy, the excess in the death-rates over those of healthy districts constituting the measure of unhealthiness. But in any case only comparative healthiness can be dealt with, and the

line dividing districts which are to be taken as healthy from those which are to be taken as unhealthy must always be an arbitrary one.

In a paper read before the Royal Society in 1859, Dr. Farr introduced a "Life-Table of the Sixty-three Healthiest English Districts." These were the districts (with one exception) the average death-rates of which in the decennium 1841-50, taken to the nearest whole number, had not exceeded 17 per 1,000. In terms of the notation now in use, they were the districts with crude death-rates below 17.50 per 1,000. They contained a population of nearly a million in 1851, and, "for the sake of convenience were called healthy districts." The life-table was based on the population in these sixty-three districts at the census of 1851, and on their mortality in the five years 1849 to 1853.

Continued improvement in the public health since 1850 has made it possible to adopt a more exclusive standard of selection for the purposes of a new healthy district life-table, and at the same time to place the table on a basis much wider than that which had been available for its predecessor; for, whereas in 1841-50 less than 6 per cent. of the total population lived in districts the crude death-rates in which were below 17.5 per 1,000: in 1881-90, on the other hand, no less than 25 per cent. of the population lived in districts the crude death-rates in which fell below 17.0 per 1,000, and 4½ per cent. in districts the crude death-rates in which did not reach 15.0 per 1,000. Moreover, the "death-rates in standard population" for all the registration districts of England and Wales, which appeared for the first time in Part I. of this Supplement, afford a far more trustworthy means of selection than that which was at the disposal of Dr. Farr forty years ago. By these death-rates in standard population, differences of age and sex constitution in the several districts are allowed for; but for purposes of exact comparison a further correction, based on the decennial rate whether of increase or of decrease of population in each district, must be made. The nature of this further correction is fully explained on pages xlii-xlvi of Part I., where also a table is given by which the amount of the correction for any district can be ascertained. Table R. in Part I. is a summary of the registration districts after this additional correction has been applied. The table shows that, after every care has been used to secure an accurate presentation of the facts, 263 districts with a mean aggregate population of 4,606,503 persons, or about one-sixth of the whole population, had death-rates below 15 per 1,000 in 1881-90.* The new healthy district life-table has been constructed on the mortality experience of these 263 districts through the decennium. This table is therefore calculated on 46 million years of life, a basis more than nine times as great as that of the older table. Had the line been drawn at districts with corrected rates under 14 per 1,000 in 1881-90, an aggregate of 122 districts, with more than 17 million years of life, would have been obtained; but on full consideration it was thought better to adopt the wider basis. The new healthy district life-table, then, is a record of that sixth part of the population of the country which in 1881-90 experienced the lowest rates of mortality.

As might have been anticipated, the districts selected are either mainly rural, or are such as consist of small towns with rural surroundings. London itself is, however, represented by the district of Lewisham, while considerable portions of the second, third, fourth, and fifth registration divisions constituting the southern part of the country are included. In the midland counties the healthy districts are more scattered, and further north, Lancashire contributes only Garstang and Lunesdale. Fifteen districts in Yorkshire, three in Northumberland, two in Cumberland, the whole of Westmorland, and ten districts in the Welsh

* See Note at foot of page clxxxii.

registration division are included in the list. The following table shows the position of each county with respect to the healthy districts:—

County.	Proportion per Cent. of Mean Population, 1881-90.	
	Living in Selected Healthy Districts.	Living in remainder of County.
ENGLAND AND WALES	16.8	83.2
London	2.1	97.9
Surrey	18.8	81.2
Kent	35.2	64.8
Sussex	55.4	44.6
Hampshire	48.6	51.4
Berkshire	53.0	46.1
Middlesex	—	100.0
Hertfordshire	48.5	51.5
Buckinghamshire	50.4	49.6
Oxfordshire	54.9	45.1
Northamptonshire	31.3	68.7
Huntingdonshire	100.0	—
Bedfordshire	35.5	64.5
Cambridgeshire	53.9	46.1
Essex	36.6	63.4
Suffolk	59.6	40.4
Norfolk	56.2	43.8
Wiltshire	53.0	47.0
Dorsetshire	69.1	30.9
Devonshire	38.5	61.5
Cornwall	7.2	92.8
Somersetshire	43.0	57.0
Gloucestershire	29.9	70.1
Herefordshire	63.3	36.7
Shropshire	45.8	54.2
Staffordshire	—	100.0
Worcestershire	18.7	81.3
Warwickshire	17.4	82.6
Leicestershire	18.5	81.5
Rutlandshire	100.0	—
Lincolnshire	35.4	64.6
Nottinghamshire	12.2	87.8
Derbyshire	4.9	95.1
Cheshire	5.1	94.9
Lancashire	0.5	99.5
West Riding	2.1	97.9
East Riding	9.2	90.8
North Riding	24.7	75.3
Darham	—	100.0
Northumberland	4.6	95.4
Cumberland	18.0	82.0
Westmorland	100.0	—
Monmouthshire	11.5	88.5
South Wales	8.2	91.8
North Wales	8.5	91.5

Table X. shows the names of all the districts which have a place in either healthy district table. The names are arranged in three sections—the first showing those districts, 20 in number, which were included in the first table only; the second those districts, 43 in number,

which have a place in both tables; and the third showing 220 districts, which now appear for the first time in a healthy district life-table. The changes in sanitary condition are roughly indicated by the differences in the crude death-rates in 1841-50 and in 1881-90, which are inserted against the names of the districts. The *corrected* rates of all districts in the first section were above 15 per 1,000, and those of all but one of the districts in the second and third sections were below 15 per 1,000, in 1881-90, whatever may have been their *crude* rates. The mortality of 7 among the 20 districts in the first section was lower in 1881-90 than it had been in 1841-50; but even after due correction for age-constitution, it was not low enough to come within the present definition of "healthiness." The increased death-rates in certain of the 13 other districts were due to the local establishment of public institutions in the interval between the two periods. Among the 43 districts in the second section, 36 showed still lower crude death-rates in 1881-90 than they had shown in 1841-50; of the seven districts in which the death-rates had increased, six are situated in the counties of Devonshire and Cornwall. Among the 220 districts in the third section, five had not yet been formed in 1850, and their mortality in 1841-50 cannot be ascertained; among the 215 districts of which the death-rates in the two decennia can be compared, only one (Newcastle-in-Emlyn) shows a higher rate in 1881-90 than it had shown in 1841-50, and this district would probably have been included among the healthy districts in the earlier period had a correction for age-constitution been practicable at that time, for the crude death-rate of the district now overstates the mortality by no less than 20 per cent.

The arithmetical mean of the census populations of England and Wales in 1881 and in 1891 is 27,488,482, and the corresponding figure for the 263 selected healthy districts is 4,606,503. These figures have the advantage of being easily obtained, and, for general purposes, may be taken as approximately representing the mean populations in the decennium 1881-90. The nature and the amount of error involved in so taking them were considered, and a table of corrections was given, in Part I. (pp. xlii-xlvi). After necessary correction, the true mean populations are found to be 27,385,056 for England and Wales, and 4,603,055 for the healthy districts, which are respectively 0.38 per cent. and 0.07 per cent. below the arithmetical means of the census populations. For life-table purposes it is necessary to use the more accurate numbers. These, together with the deaths, are given in groups of ages, in Table XI., and constitute the basis of facts on which both the new English life-table in Part I. and the healthy district life-table in the present volume have been constructed.

The death-rates at the several ages are shown in Table XI. for convenience of comparison, but they have not been directly used in the construction of the life-table. In order to avoid risking the assumption that the death-rate in any age-group is exactly equal to the death-rate at the central age of that group, the population and deaths in a number of separate years of age (25-26, 35-36, &c.) were calculated by interpolation; the probability (p_x) of living through each of these years of age was next ascertained, and the probabilities for intermediate years were then calculated by interpolation. The construction of that part of a life-table which relates to the first quinquennium of life presents special difficulties. In the first place, the population figures as enumerated for the separate ages, although they are published in the Census Reports, are excessively untrustworthy;* and in the second place, the method of interpolation is inapplicable, because of the wide

* Census Report for 1891, Vol. IV., page 27.

variations of mortality during this part of life. Recourse has therefore been had to the statistics of births, and of deaths of young children, in the years 1876-90; by the help of these figures the mean age constitution of the group 0-5 years in the decennium 1881-90 has been calculated.

The new English life-table is printed in detail, and in comparison with the English life-tables of 1838-54 and 1871-80, on pages x-xix of Part I., and is accompanied by a short comment in which the main features of the three tables are indicated. The new healthy district life-table is printed in Tables XII.-XIV., on pages clxxxiv-clxxxix of this volume, and is followed by four Tables (XV.-XVIII.) in which the principal results of six life-tables are brought together. These six life-tables include the three English tables mentioned above, and the healthy district life-tables of 1849-53 and 1881-90. The sixth life-table requires a few words of explanation; in the year 1892 I took steps to test the value of life-tables as a means of measuring and of registering the influence of sanitary conditions on health in certain districts of Manchester, of which city I was, at that time, Medical Officer of Health. By the help of information, for which I was indebted to the courtesy of the Registrar-General, I was enabled before the end of that year to present to the Town Council of Manchester a life-table of that city, based on the experience of the decennium 1881-90; and in the next year I was able to supplement this by two other life-tables, in which the older and more crowded part of the city was compared with those parts which are more modern and more favourably circumstanced. The former part—the old township of Manchester—has unhappily experienced rates of mortality which, although they are not the highest in the country, are yet in strong contrast to the rates prevailing in the selected healthy districts of England and Wales. Taking into consideration the fact that a life-table of the township of Manchester in 1881-90 has been constructed by precisely the same methods as those which have since been used both for the new English life-table and for the healthy district life-table, I feel that on the present occasion I ought not to neglect an opportunity which the public spirit of the Manchester Corporation has afforded me of comparing the expectations of life in communities subject to widely-differing health conditions.

The most striking differences between the several life-tables are seen in the figures relating to young children; this is illustrated by the subjoined table, which shows the numbers, out of 100,000 of each sex born, who die at ages under 5 years:—

	England and Wales.			Manchester Township, 1881-90.	Selected Healthy Districts.	
	1838-54.	1871-80.	1881-90.		1849-53.	1881-90.
Males . . .	27,628	26,593	24,851	37,674	13,590	17,314
Females . . .	24,945	23,738	21,676	33,677	16,444	14,483

Using as a standard the deaths in the healthy districts in 1881-90, the mortality of males at these ages during the same period in England and Wales as a whole* was 44 per cent. in excess, and in Manchester

* In all comparisons of England and Wales with the healthy districts it must be remembered that England and Wales *includes* these districts, and that if a life-table had been constructed of England and Wales *less* the selected healthy districts, such a table would have differed considerably more from the healthy district table than does the English table.

township it was 118 per cent. in excess. In the case of females the excess was still greater, being 50 per cent. in England and Wales, and 133 per cent. in Manchester township.

According to the experience of the English life-table, it appears that 100,000 males born are reduced by death to 75,149 by the end of the fifth year, and that 100,000 females born are reduced by death to 78,324 at the same age. It appears, further, that in the healthy districts the same amounts of reduction are not reached until the age of 29 years among males, and until the age of 27 years among females. In Manchester township 100,000 males born are reduced to 62,326, and 100,000 females born are reduced to 66,323, at 5 years of age; but in the healthy districts these amounts of reduction are not reached until age 50 among males and age 48 among females.

This saving of the lives of children in healthy districts is shown in another way by the expectations of life (Tables XV., XVI.). In all the life-tables the expectation increases from birth until from 2 to 4 years of age, after which it decreases more or less steadily year by year. The cause of this is to be found in the comparatively heavy mortality in the earlier years of life. Thus, in the healthy districts, about 12 per cent. of the male children born die under one year of age, having lived an average of about one-third of a year each; the 88 per cent. who survive at one year of age live on an average nearly $57\frac{1}{2}$ years more; that is to say, they die at a mean age of nearly $58\frac{1}{2}$ years. The mean age at death of 100 persons of whom 12 live one-third of a year each, and 88 live $58\frac{1}{2}$ years each, is easily found to be $51\frac{1}{2}$ years, which is the expectation of life of males in the healthy districts, at the moment of birth.

As a general rule the expectation of life decreases as age advances. An increase of the expectation in passing from one age to a subsequent age indicates special risks of mortality in the interval. Persons who escape those risks thereby gain improved chances of future lifetime. The only example which the life-tables present of an expectation of life increasing as age advances is in the case of young children. From birth onwards the expectation of life at first increases, and afterwards decreases year by year through the remainder of life; but, the better the health conditions represented by the life-table are, the less is the increase of the expectation, the sooner is the age of maximum expectation attained, and the sooner also is an age reached at which the expectation falls below that at birth. These points are illustrated by the following table:—

	England and Wales.			Manchester Township, 1881-90.	Selected Healthy Districts.	
	1838-54.	1871-80.	1881-90.		1849-53.	1881-90.
MALES.						
Expectation of life at birth . . .	39'91	41'35	43'66	28'78	48'56	51'48
Age of maximum expectation . . .	4	4	3	4	3	2
Increase of expectation, from birth to age of maximum . . .	9'90	9'66	9'66	12'02	6'28	6'87
Year of life during which the expectation first falls below that at birth . . .	24'8	23'4	22'1	41'8	12'0	13'3
FEMALES.						
Expectation of life at birth . . .	41'85	44'62	47'18	32'67	49'45	54'04
Age of maximum expectation . . .	4	4	3	4	3	2
Increase of expectation, from birth to age of maximum . . .	8'58	8'58	8'23	11'14	4'96	5'32
Year of life during which the expectation first falls below that at birth . . .	20'5	19'2	17'6	34'1	10'0	9'8

An example from this table will illustrate the rule stated above: In 1881-90 the expectation of life of males in England and Wales was 43.66 years at birth, increasing to a maximum at 3 years of age, by which time it had received an increment of 9.66 years, or 22.1 per cent. of the expectation at birth; after age 3 the expectation decreased, but did not fall below its original level until the 16th year of age. In the healthy districts the expectation was 51.48 years at birth, increasing to a maximum at 2 years of age, by which time it had received an increment of 6.87 years, or 13.3 per cent only; after age 2 the expectation decreased, and fell below its original level in the 12th year of age.

Even under the most favourable circumstances the mortality of infants under one year of age is very high. Reference to several life-tables shows that the same rate of death is not again experienced, until the age of about 80 years. But the mortality in the first year of life is by no means evenly spread over that year—about half of it occurs in the first three months. The following table shows the survivors at three months, six months, and one year, out of 100,000 of each sex born in 1881-90; the deaths in the intervals are likewise shown:—

	Born and Surviving at each Age.			Dying in each interval of Age.		
	England and Wales.	Manchester Township.	Selected Healthy Districts.	England and Wales.	Manchester Township.	Selected Healthy Districts.
MALES.						
Born	100,000	100,000	100,000	7,880	10,519	6,394
3 months	92,120	89,481	93,606	3,225	4,894	2,161
6 months	88,895	84,587	91,445	4,999	7,661	3,359
12 months	83,893	76,926	88,086	—	—	—
FEMALES.						
Born	100,000	100,000	100,000	6,203	8,199	4,903
3 months	93,791	91,801	95,097	2,653	4,315	1,718
6 months	91,138	87,486	93,379	4,251	6,645	2,729
12 months	86,887	80,941	90,650	—	—	—

The figures in the last three columns show that, as measured by the ratio of deaths, the advantage of being born in a healthy district, great as it is in the first three months of life, is greater still in the remainder of the first year. As compared with the selected healthy districts, the whole country shows an excess of about one-fourth part, and Manchester township shows an excess of about two-thirds, in the mortality during the first three months of life; whilst, during the remainder of the first year of life, the proportional excess is in each case about doubled. These results curiously confirm some remarks in the Registrar-General's 54th Annual Report. In that report two life-tables for the first year of life were given, the one being based on the mortality in 1889-90-91 in three rural counties—Hertfordshire, Wiltshire, and Dorsetshire; and the other, on the mortality in three towns—Preston, Leicester, and

Blackburn—which towns were selected on account of their high infantile mortality. The ages at death of all children under one year of age in these counties and towns respectively were abstracted in separate days up to one week, in separate weeks up to one month, and in separate months up to one year. From these facts the numbers of survivors out of 100,000 born were calculated at 1, 2, 3, &c., days, at 1, 2, 3, and 4 weeks, and at 1, 2, 3, &c., months. The tables are so interesting in connection with the present subject that it has been thought well to reprint them here:—

Age.	Of 100,000 born the Numbers surviving at each Age.		Deaths in each successive Interval of Age.		Annual Death-rates per 1,000 living in each successive Interval of Age.		Death-rates in Towns to Death-rates in Counties taken as 100.
	Three Rural Counties.	Three Selected Towns.	Three Rural Counties.	Three Selected Towns.	Three Rural Counties.	Three Selected Towns.	
Days.							
0	100,000	100,000	1,002	1,198	3,674	4,399	120
1	98,998	98,802	296	485	1,094	1,797	164
2	98,702	98,317	281	344	1,042	1,279	123
3	98,421	97,973	232	236	859	879	102
4	98,189	97,737	152	144	565	539	95
5	98,037	97,593	120	130	448	488	109
6	97,917	97,463	89	109	297	405	136
7	97,837	97,354	—	—	—	—	—
Weeks.							
0	100,000	100,000	2,163	2,646	1,145	1,406	123
1	97,837	97,354	473	773	253	416	164
2	97,364	96,581	462	832	247	451	183
3	96,902	95,749	331	646	179	353	197
4	96,571	95,103	—	—	—	—	—
Months.							
0	100,000	100,000	3,488	4,917	804	1,021	127
1	96,512	95,053	985	2,130	123	272	221
2	95,527	92,923	707	2,049	89	268	301
3	94,820	90,874	673	1,967	85	232	308
4	94,147	88,907	618	1,749	79	239	303
5	93,529	87,158	461	1,584	59	220	373
6	93,068	85,574	483	1,475	62	209	337
7	92,585	84,099	483	1,226	63	176	279
8	92,102	82,873	454	1,317	59	192	325
9	91,648	81,556	476	1,220	62	181	292
10	91,172	80,336	455	1,110	60	167	278
11	90,717	79,226	431	1,029	57	157	276
12	90,283	78,197	—	—	—	—	—

Although males and females are not separately dealt with in these tables, it will be seen that in the three age-groups 0-3 months, 3 months-6 months, and 6 months-1 year, the mortality in the three rural counties corresponds very closely with that in the healthy districts, while the mortality in the three towns is a little greater than that in Manchester township. The points of contrast between the rural and the town table are thus set forth in the report referred to* :—

“In the first place, the aggregate infantile mortality is more than twice as high in the three towns as it is in the three rural counties, the exact figures being 21,803 deaths in the former to 9,717 in the latter, in each case out of 100,000 births.

“Secondly, the town rate is higher than the rural rate, not only in the aggregate for the year, but for each fraction of the year, with the exception—possibly but not certainly due to the insufficiently large basis of calculation—of the fourth, fifth, and sixth days of the first week, when the rates are practically equal.

“Thirdly, the periods when the town rates are most in excess of the rural rates are not the earliest weeks or months of infancy but the later months. In the first week of life the town rate exceeds the rural rate by 23 per cent., in the second week by 64 per cent., in the third week by 83 per cent., and in the fourth week by 97 per cent., showing a progressive or accumulative increase in the deleterious effects of town conditions as compared with rural conditions upon infantile life. The same result comes out when the rates for successive months in the counties and towns are examined. In the first month the town mortality is 27 per cent. above the rural rate, in the second month 121 per cent. above it; and the excess then goes on increasing until in the sixth month it amounts to no less than 273 per cent. This is the month in which the difference is greatest, though it remains throughout the rest of the year at a not very much lower point.

“The conditions of life, then, in such towns as Preston, Leicester, and Blackburn, extremely destructive as they are throughout to infants in the first year of life, are much less so in the earliest periods of that year than later on, and are especially destructive after the second month is over.”

The close agreement, at ages where comparison is possible, of the figures from which the above deductions were drawn, with the figures now obtained on a larger basis, is remarkable. Each set of facts independently strengthens the other; and there is little room for doubt that they represent with substantial accuracy the variations in infant mortality under favourable and under unfavourable conditions.

Tables XVII. and XVIII. have been constructed with the object of exhibiting in a shortened form the course of a generation through life according to each of the six life-tables. They show at each quinquennial age the number surviving out of 100,000 born. The following table is calculated from Tables XVII. and XVIII.; it shows the number, out of 1,000 living at each of several ages, who will live through the next 5 years, according to each life-table.

* Registrar-General's 54th Annual Report, p. xiii.

Age.	England and Wales.			Manchester Township, 1881-90.	Selected Healthy Districts.	
	1888-54.	1871-80.	1881-90.		1849-53.	1881-90.
MALES.						
0	724	734	751	623	814	827
5	953	966	976	952	965	982
10	975	982	990	970	981	989
15	969	977	981	967	974	983
20	958	966	974	951	964	977
25	953	959	965	928	961	971
30	948	950	956	903	959	966
35	942	940	946	880	956	961
40	933	928	933	854	952	954
45	919	913	917	813	943	944
50	899	890	894	764	930	928
55	870	860	861	723	910	903
60	827	814	809	677	865	861
65	759	747	740	596	800	798
70	663	653	645	482	710	708
75	543	534	520	374	593	566
80	411	398	373	297	454	397
85	283	260	227	241	313	229
FEMALES.						
0	751	763	783	663	836	855
5	954	968	973	948	964	982
10	974	982	991	972	977	987
15	967	977	981	971	968	981
20	956	967	974	958	961	975
25	951	961	966	943	958	970
30	946	955	958	927	955	966
35	941	948	952	908	953	963
40	935	940	945	886	949	960
45	927	930	934	858	944	953
50	916	917	915	821	937	939
55	886	886	886	767	919	916
60	844	842	842	699	874	878
65	781	778	776	628	815	818
70	691	687	682	557	732	728
75	574	572	561	483	618	601
80	442	437	420	404	479	447
85	311	299	279	320	334	283

The ratios of the numbers in the table to 1,000 give the several chances of surviving 5 years; thus in England and Wales the average chance that a man aged 25 years would survive to age 30 has improved from .953 in 1838-54 to .959 in 1871-80, and to .965 in 1881-90; in the healthy districts of 1849-53 the chance was .961, while in those of 1881-90 it stood at .971; in the old township of Manchester in 1881-90 it was .928.

Another method of comparing the numbers of survivors according to different life-tables is shown below. The new healthy district life-table being taken as a standard, the table gives the numbers of survivors at several ages by the English and by the Manchester township life-table respectively, to 1,000 survivors by the standard life-table. This table has been limited to the three life-tables for 1881-90.

Age.	MALES.			FEMALES.		
	England and Wales.	Manchester Township.	Healthy Districts.	England and Wales.	Manchester Township.	Healthy Districts.
0	1,000	1,000	1,000	1,000	1,000	1,000
5	909	754	1,000	916	776	1,000
10	904	731	1,000	912	748	1,000
15	904	717	1,000	915	737	1,000
20	903	705	1,000	915	730	1,000
25	899	686	1,000	914	717	1,000
30	894	656	1,000	910	697	1,000
35	884	612	1,000	903	668	1,000
40	889	560	1,000	893	631	1,000
45	850	502	1,000	830	582	1,000
50	826	432	1,000	863	525	1,000
55	796	356	1,000	841	459	1,000
60	769	285	1,000	813	384	1,000
65	713	224	1,000	780	306	1,000
70	661	167	1,000	740	234	1,000
75	607	115	1,000	694	179	1,000
80	558	76	1,000	648	144	1,000
85	524	57	1,000	608	130	1,000

The table may be read thus: "The number of births of males that would give 1,000 survivors at 15 years of age in the healthy districts would give 904 survivors at the same age in England and Wales as a whole, and 717 in Manchester township; the number of births of females that would give 1,000 survivors at 15 years of age in the healthy districts would give 915 survivors at the same age in England and Wales as a whole, and 737 in Manchester township." The columns for England and for Manchester township trace the cumulative effect of the *excess of mortality* above the healthy district

standard. The figures for England are practically constant between ages 10 and 25 for males, and between ages 15 and 30 for females, indicating that at those ages the effect of the mortality on the number of survivors is practically the same in the country as a whole as it is in the selected districts.

Passing reference has already been made to the columns in the life-table which show the "expectation of life," but this branch of the subject is important enough to demand more detailed treatment. In Tables XV. and XVI. the expectation of life at each age is given for each of six life-tables. Among males the expectation at birth—in other words, the mean lifetime of all who are born—has ranged from 39.91 years to 43.66 years in England and Wales within the period from 1838 to 1890; in the last ten years of this period it was as low as 28.78 years in Manchester township, while it stood at 51.48 in the selected healthy districts. A pertinent and useful inquiry is, "At what ages are these years of life lived?" At first sight a contradiction in terms may appear to be involved in asking how many of the 28.78 years average lifetime of males in Manchester township, or of the 43.66 years average lifetime of males in England, or of the 51.48 years average lifetime of males in the healthy districts are lived after the age 65; but a moment's reference to a life-table shows that the question is perfectly reasonable. Turning to the healthy district life-table on page clxxxiv, as an example, it is seen that of 509,023 males born 60,648 die during the first year of life, whilst 448,375 are alive at the end of the year; 14,890 of these die during the second year, whilst 433,485 survive to the end of that year, and so on. The 60,648 males who die in the first year live, on an average, rather more than one-third of a year, or 21,509 years in all; thus the "years of life" lived between birth and 1 year of age, by 509,023 males born, are given by 448,375 + 21,509 = 469,884. Again, of 323,079 who complete their forty-ninth year, 319,023 live throughout the fiftieth year, while 4,056 die in the course of that year, living on an average about half a year in the interval; thus the years of life lived between 49 and 50 years of age, by the same 509,023 males born are given by 319,023 + 2,028 = 321,051. These "years of life" are printed in the column headed P_x . The sum of them for all ages represents the aggregate years of life lived by 509,023 males from birth to extreme old age; and the sum of any group of them represents the aggregate years of life lived at the ages indicated by the group. For example, the sum of the first five numbers in the column is 2,189,691, showing that the 509,023 males born live 2,189,691 years in all (or an average of 4.30 years each) between birth and 5 years of age. Again, the sum of all the numbers in the column from age 65 upwards is 2,669,913, showing that the 509,023 males born live an aggregate of 2,669,913 years (or an average of 5.25 years each) after 65 years of age. The column headed Q_x affords a ready means of obtaining these sums, since the number in this column opposite any age is the total of the numbers in the P_x column from that age onwards. So Q_0 , the sum of all the numbers in the P_x column, is the total years of life lived by the 509,023 males born; Q_5 is the total lived after five years of age; $Q_x - Q_y$ the number between birth and five years of age. The following table has been constructed to show how the average years of life (denoted in the tables by the terms "expectation of life at birth," and "mean lifetime") are distributed over several life periods in the six tables.

Life Period.	Age-limits of Period.	Length of Period in Years.	England and Wales.			Man-chester Township, 1881-90.	Selected Healthy Districts.	
			1838-54.	1871-80.	1881-90.		1849-53.	1881-90.
MALES.								
Infancy	0-5	5	3.94	4.01	4.02	3.51	4.29	4.30
School age	5-15	10	6.92	7.11	7.35	5.95	7.88	8.13
Adolescence	15-25	10	6.51	6.79	7.12	5.55	7.50	7.89
	25-35	10	5.95	6.29	6.69	4.90	6.95	7.49
Maturity	35-45	10	5.31	5.62	6.04	3.89	6.37	6.95
	45-55	10	4.54	4.76	5.16	2.71	5.72	6.25
	55-65	10	3.55	3.63	3.96	1.51	4.82	5.22
Decline	65 and upwards	—	3.19	3.14	3.32	0.76	5.03	5.25
Total	All ages.	—	39.91	41.35	43.66	28.78	48.56	51.48
FEMALES.								
Infancy	0-5	5	4.07	4.14	4.17	3.71	4.39	4.43
School age	5-15	10	7.19	7.40	7.68	6.32	8.07	8.41
Adolescence	15-25	10	6.73	7.07	7.44	5.92	7.61	8.12
	25-35	10	6.12	6.58	6.99	5.35	7.00	7.69
Maturity	35-45	10	5.46	5.95	6.38	4.50	6.37	7.15
	45-55	10	4.73	5.20	5.63	3.42	5.71	6.53
	55-65	10	3.82	4.21	4.55	2.16	4.89	5.60
Decline	65 and upwards	—	3.73	4.07	4.34	1.29	5.41	6.11
Total	All ages.	—	41.85	44.62	47.18	32.67	49.45	54.04

With two unimportant exceptions, the advantage incidental to the healthier periods or localities is shared by each sex at every age-group. On comparison of the three English life-tables with one another, or of the two healthy district tables with each other, the advantage in the healthier periods appears to increase up to, or a little beyond, middle age and then to decrease. On the other hand, in comparing life-tables of different localities but for the same period, the advantage of the healthier localities is found to increase steadily until old age. If the 50 years of age between 15 and 65 be taken to represent the effective or working period of life*, the average length of the working period in years, and its proportion to the whole period of 50 years, by the six life-tables, for every child born, will be as follows:—

* In the earlier part of this volume, the 40 years of age between 25 and 65 are taken to represent that part of the working period of life in which the varying influence of occupations on mortality is most distinctly felt; for reasons which were stated on page vii, the age-group 15-25 was excluded. The present inquiry relates to the entire period of working life; the age-group 15-25 is therefore properly included.

		England and Wales.			Man-chester Township, 1881-90.	Selected Healthy Districts.	
		1838-54.	1871-80.	1881-90.		1849-53.	1881-90.
Average lifetime between 15 and 65 years of age	Males	25.86	27.09	28.97	18.56	31.36	33.80
	Females	26.86	29.01	30.99	21.35	31.58	35.09
Percentage of the entire age period of 50 years, 15-65	Males	52	54	58	37	63	68
	Females	54	58	62	43	63	70

The varying distribution of the mean life-time over groups of ages may be further compared by eliminating the actual numbers of years, taking into account only the proportions of the entire lifetime that are lived at the several age-groups. The following table has been constructed on this plan; the mean life-time according to each life table being taken as 100, and the proportions lived within the several age-groups being shown relatively to this total.

Life Period.	Age-limits of Period.	Length of Period in Years.	England and Wales.			Man-chester Township, 1881-90.	Selected Healthy Districts.	
			1838-54.	1871-80.	1881-90.		1849-53	1881-90.
MALES.								
Infancy	0-5	5	9.9	9.7	9.2	12.2	8.8	8.4
School age	5-15	10	17.3	17.2	16.9	20.7	16.2	15.8
Adolescence	15-25	10	16.3	16.4	16.3	19.3	15.5	15.3
	25-35	10	14.9	15.2	15.3	17.0	14.3	14.6
Maturity	35-45	10	13.3	13.6	13.8	13.5	13.1	13.5
	45-55	10	11.4	11.5	11.8	9.4	11.8	12.1
	55-65	10	8.9	8.8	9.1	5.3	9.9	10.1
Decline	65 and upwards	—	8.0	7.6	7.6	2.6	10.4	10.2
Total	All ages	—	100.0	100.0	100.0	100.0	100.0	100.0
FEMALES.								
Infancy	0-5	5	9.7	9.3	8.8	11.4	8.9	8.2
School age	5-15	10	17.2	16.6	16.3	19.3	16.3	15.6
Adolescence	15-25	10	16.1	15.9	15.8	18.1	15.4	15.0
	25-35	10	14.6	14.7	14.8	16.4	14.2	14.2
Maturity	35-45	10	13.1	13.3	13.5	13.8	12.9	13.2
	45-55	10	11.3	11.7	11.9	10.5	11.5	12.1
	55-65	10	9.1	9.4	9.7	6.6	9.9	10.4
Decline	65 and upwards	—	8.9	9.1	9.2	3.9	10.9	11.3
Total	All ages	—	100.0	100.0	100.0	100.0	100.0	100.0

Detailed comment is needless, but one peculiarity which is presented by the figures deserves notice. Examination shows that the proportion of the total lifetime which is lived between the ages 25 and 55 differs very little from 40 per cent. in any of the life-tables. For males the proportions in the six life-tables all lie between 39·2 and 40·9, and the average is exactly 40 per cent.; for females the proportions all lie between 38·6 and 40·7, and the average is 39·6 per cent. It follows that in each of these six life-tables about 60 per cent. of the average lifetime is lived partly before 25 years of age, and partly after 55 years of age; and the distribution of this 60 per cent. between the earlier and the later ages would therefore enable us to distinguish between life-tables for healthy and for unhealthy districts or periods without referring to the respective mean lifetimes.

The designations "infancy," "school age," "adolescence," "maturity," "decline," "working period" have been used above as roughly but conveniently representing the several periods of life, and not as having any claims to scientific precision. Obviously the period of decline must begin earlier in an unhealthy than in a healthy population; but, in order to determine how much earlier, it would be necessary to formulate a definition of "decline," which should bear some specified relation to figures in the life-table. For example, the expectation of life of males at age 65 by the latest English life-table is 10·31 years, and that of females is 11·26 years. If "decline" be arbitrarily defined for males as "the ages at which the expectation of life does not exceed 10·31 years," and for females as "the ages at which the expectation of life does not exceed 11·26 years," then by the three life-tables for 1881-90 decline begins at 65 for each sex in England, at about 57 in Manchester township, and at about 67 in the selected healthy districts. The following table shows the distribution of the mean life-time on this assumption according to the three life tables for 1881-90.

	Number of Years Lived.			Per cent. of Total Lifetime.		
	England and Wales.	Manchester Township.	Selected Healthy Districts.	England and Wales.	Manchester Township.	Selected Healthy Districts.
MALES.						
Infancy and school age -	11·37	9·46	12·43	26·1	32·9	24·2
Adolescence and maturity	28·97	17·44	34·68	66·3	60·6	67·3
Decline - - -	3·32	1·88	4·37	7·6	6·5	8·5
Total - - -	43·66	28·78	51·48	100·0	100·0	100·0
FEMALES.						
Infancy and school age -	11·85	10·03	12·84	25·1	30·7	23·8
Adolescence and maturity	30·99	19·73	36·05	65·7	60·4	66·7
Decline - - -	4·34	2·91	5·15	9·2	8·9	9·5
Total - - -	47·18	32·67	54·04	100·0	100·0	100·0

Reckoned in this way the proportion of "decline" to total lifetime differs but little in the three life-tables; but the healthier districts have

this double advantage; that not only is their average lifetime longer in itself, but a greater proportion of it belongs to what may be considered the effective working period of life.

In concluding the present volume, which completes the decennial supplement, I desire to return my thanks to those who, in various ways, have aided me in its production. To my predecessor, Dr. Ogle, I am primarily indebted for the mass of statistical material which he confided to my charge on his retirement from office, and without which the present work could not have been accomplished. To Mr. H. Llewellyn Smith, of the Board of Trade, and to Dr. Whitelegge, H.M. Chief Inspector of Factories, my thanks are due for official information, and for other help courteously given at my request. In the actual preparation of this volume I have been ably seconded by several members of my staff, and to these individually I desire to express my acknowledgments. Among these, Mr. A. C. Waters has rendered me valuable aid in connection with the work generally, and especially in regard to the preparation of the New Healthy District Life Table. Mr. J. Hampden Shoveller has undertaken the supervision of the supernumerary staff employed in the earlier processes of this work; he has also in other ways given me much valuable help. Mr. Frank Finch also has rendered me able and continuous assistance throughout the work, especially in making and checking the numerous calculations which it contains.

I have the honour to be,

Sir,

Your obedient Servant,

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

JOHN TATHAM.