ON THE
LIFE-TABLE FOR ENGLAND AND WALES, 1881-90,
AS MODIFIED BY THE
SUPPOSED EXCLUSION OF CERTAIN DISEASES
AS CAUSES OF MORTALITY.*

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The first duty before me is to express to the members of the North-Western Branch of the Incorporated Society of Medical Officers of Health my sense of the honour done to me by their having chosen me to fill the office of President for the forthcoming year. However, I would not regard this altogether as a personal honour, but rather as one done by those distinguished members of our Branch who are specialists in the department of public health (or, as we term it, "whole-time" men) to those of our number collectively who have to fulfil, as best we may, among the distracting claims of general practice, the duties of medical officers of health, and to follow at a distance, more or less remote, those who are able to devote their whole attention to so absorbing and important a department of medical work as that of preventive medicine.

I may here take occasion to remark that I am far from believing that the existing arrangements by which we hold these appointments come up to the highest ideal. Personally I should hail the time, which probably sooner or later must come, when the sanitary supervision of groups of small districts shall be under the control of specialists with "fixity of tenure" in so far that they cannot be displaced from their offices without the sanction of the Local Government Board, and in each district there shall be a properly trained and qualified sanitary inspector working under the direction of his superior officer.

Any exalted position has its drawbacks and penalties; and one of those associated with the position in which I have been placed by your favour is, that I have to present to you some sort of Inaugural Address. The choice of a subject for such an address I have found to be by no means an easy matter.

A general practitioner holding the post of medical officer of health to but a small sanitary district can scarcely be in a position

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to deal, either as a teacher or as a critic, with matters relating to sanitary administration. With but rare exceptions, too, of which I cannot claim to be one, he will not have had the opportunity to speak at first hand with regard to those scientific problems which are to be investigated and worked out in a bacteriological laboratory.

An attractive theme would be in the direction of comparing the former days with these, and showing in a general review from what we have emerged, and to what we have as yet attained in practical sanitation. But some of my predecessors in this chair have with conspicuous ability and with ample detail sufficiently covered this ground.

It will be within the knowledge of those present that I have already, only so recently as last year, in a paper contributed to this Branch, very considerably exhausted one subject at which I have been working, and the subject is not, I fear, a very alluring one. Shortly after I had been chosen as president-elect, one of my friends belonging to this Branch said to me, in view of a prospective address: "Do not give us any more figures; let us have a fairy-tale." I began to think whether I could weave together such a tale by letting imagination run on into the future and trying to depict an ideal condition of sanitation with its beneficent results in lessened sickness and lengthened life. Having, however, since then read the address entitled "A City of Health," given by the late (then) Dr. B. W. Richardson twenty-four years ago at the Social Science Congress held at Brighton, I cannot but feel that in that marvelously interesting address the field of thought in the direction indicated has been so completely reaped as to leave but very scanty gleanings even to-day. Therefore by the method of exclusion I have been reluctantly driven back upon figures; but the idea has occurred to me as to whether even dry figures might not be made to tell some sort of "fairy-tale."

We are engaged in combating disease generally, in endeavouring to remove its causes, and in promoting the conditions favouring health; but our general efforts are largely made up of, and associated with, work along certain lines against particular and special diseases. We cannot do altogether without figures in such work. Each disease is exacting its own toll of mortality, and in a crude way we seek to measure the effects of those diseases by determining the ratio of deaths to the living at all ages. A more elaborate, and of course better, method is to measure the mortality for each sex at different age-periods. However, the most exact and vivid way, as it appears to me, of bringing into view the effects produced by any

one disease is to construct a life-table based on the supposition that this particular disease has been altogether eliminated.

I am bringing before you some work which I have done on these lines in the hope that it may not be altogether unworthy of the occasion. I do not wish to claim any originality in this, as the same kind of work has already been done by others. Dr. Price, I believe, made some calculations, based on the supposition that small-pox was eliminated as a cause of mortality. More especially, however, the statistical genius and untiring labours of the late Dr. William Farr were employed in the same direction. The work done by him is to be found embodied in that rich mine of information, the Supplement to the Thirty-fifth Annual Report of the Registrar-General. It was based on the mortality of the decennium 1861-70. I am not aware that any work of this kind has been done dealing with the mortality of the two succeeding decennia.

Even Dr. Farr, however, was not equal to the task of calculating a series of such life-tables by the complete or extended method. He used instead the short method which he had devised, and stated his belief that the results obtained by it are sufficiently accurate for the purpose in view.

In the paper which I read before this Branch in May of last year,* I described a simple modification of Dr. Farr's short method, and showed that it gave results remarkably approximating to those obtained by the much more laborious and elaborate method, even to the later ages of life.

This modified short method I have since further described in a paper read last May before the Royal Statistical Society, and printed in the September number of the Journal of that Society. By the additional work done in the preparation of the paper last mentioned, I have been able to explain and remove the discrepancies in the values of E_x , or mean expectation of life, for the earlier ages, obtained by the short method, as compared with the corresponding values of the complete life-table, which discrepancies in the earlier paper had perplexed me. I am therefore able to advance this method with even more confidence than before, as being adapted for arriving at approximately exact results.

Into further details regarding the general methods of calculation I need not now enter. Something must be said, however, as to the special mode of calculation required in order to exclude separate diseases, and this resolves itself into a consideration of how the number of deaths to be taken into account is to be arrived at, for the foundation numbers of population will remain the same.

* See PUBLIC HEALTH, vol. xi., page 330, July, 1898.

In supposing that some particular disease is entirely abolished, a certain number of persons will be saved from dying from this disease, but those thus saved will be, of course, exposed in some degree to the remaining causes of mortality.

What would really happen if some disease, say phthisis, were entirely abolished, it is difficult to say, for in nature the destruction of one kind of pest, whether animal or vegetable, sometimes leaves the ground free for the more active development of other species. However, as a working hypothesis, we must consider that, if one cause of mortality be done away with, the remaining causes would continue to act with proportionate intensity on those saved from the action of the cause eliminated.

In life-table calculations it is assumed that for every year of life, except the first, the number of deaths is evenly distributed throughout the year, that is, that they occur at equal intervals of time. For the first year of life it is difficult to make an exact calculation, but an approximation to the truth may be made by a similar assumption for the three age-periods of 0-3 months, 3-6 months, and 6-12 months.

With regard to all the age-periods dealt with, a little consideration will show that on the assumption of equal intervals, or even distribution, of deaths, those saved from dying from one disease supposed to be eliminated will be on the average exposed to the risk of dying from other diseases for *half* the period.

Therefore, if D be used to represent the total deaths *from all causes* for a year or age-period, and d to indicate the number of deaths which *would have occurred* from some special disease proposed to be eliminated, and if P denote the mean number living for the year of life or age-period being dealt with, then the number of deaths which will occur after eliminating the special disease will be $(D-d) + \frac{(D-d) \times d}{2P}$.

As Dr. Farr does not give an exact description of the method which he used, I am not clear as to whether the method just described is similar to his.

Having then worked out a life-table by the modified short method on the assumption that some disease, as, for example, phthisis, has ceased to exist, we shall be able to measure the effects of this disease by having answers to these three questions :

1. How much greater would be the chance of living from one year to the next at each age, supposing that there were no phthisis ?
2. How many more survivors would remain at each age out of a given number supposed to be born ?

3. How much longer would be the expectation of life or mean after-life time at each age?

When first I contemplated taking up this line of work for the special purpose of having something to give in this address, I only intended to deal with phthisis and infantile diarrhoea as diseases which have of late attracted a considerable degree of attention, and have come to be regarded as to a large extent preventable. However, in proceeding now to direct attention to the tables appended, it will be seen that the original design has been largely exceeded.

Since to be exactly comparable life-tables must be calculated by *exactly the same method*, I have given first in Table I. a life-table for England and Wales, based on the mortality from all causes during the decennium 1881-90, calculated by the modified short method already alluded to.

If must be borne in mind that the l_x numbers, that is, the numbers of survivors at each age as obtained by this method, especially at the later ages, will considerably exceed the corresponding numbers as obtained by the complete or extended method. Still, as all the tables have been worked out by the same method, the results, for what they are worth, are fairly comparable. This Table I., then, is the standard to which all the succeeding tables are referred as *differences* from it.

The remaining tables must be left to a large extent to tell their own tale. I regret that with the very limited time at my disposal for some months past I have not been able to prepare a series of diagrams to graphically represent the varying curves of the p_x , l_x , and E_x values indicated in the columns of figures. An inspection of the tables, however, will show that each disease dealt with has its own special curves, and that, with the exception of cancer, the curves of each disease for the two sexes have a close resemblance to each other.

These tables should be examined in comparison with the tables of death from various causes on pages 4 and 5 of the last decennial supplement of the Registrar-General. Special attention is directed to Table II., in which the effects of phthisis are set forth, and it will be seen, compared with these, how relatively insignificant are the effects of other more dreaded diseases.

The work done by Dr. Farr for the decennium 1861-70 was chiefly limited to a comparison of l_x values. Among the few E_x values which he gives is the following: that for males the extinction of phthisis would mean an increase of mean after-life time at birth of 3.28 years, as against the 2.58 in Table II. This, of

course, is in accordance with the greatly diminished mortality from phthisis in 1881-90, as compared with 1861-70.

In Table III. the whole group of tubercular diseases has been hypothetically eliminated, and thus we may see to some extent what would be the effect of the extermination of the tubercle bacillus.

I would not be understood as believing that the whole of the deaths classed under the term "tabes mesenterica" are really due to tubercular disease, but admitting the probable fallacy as applying to the first two years of life, this does not affect the E_x values at after-ages. The death-toll levied by this group of diseases exceeds that of all the seven principal zymotic diseases taken together.

Perhaps, as has been recently pointed out, we have, in concentrating our attention on the tubercle bacillus, come to think too little of predisposing and concurrent causes, but probably very few of us believe that without the tubercle bacillus there would be any tuberculosis.

Table IV., which shows the effects of abolishing cancer (or more accurately the group of malignant diseases), illustrates clearly the special age-distribution of this disease, as well as the very extreme degree in which the two sexes differ in their liability to it. Dr. Farr's calculation for 1861-70 was that the extinction of cancer among males would increase the expectation of life at birth by 0.20 years. The increased corresponding value 0.39 in Table IV. is in accordance with the greatly increased apparent mortality from cancer.

Tables V., VI., and VII., deal respectively with enteric fever (simple continued fever *not* included), scarlet fever, and diphtheria.

In Table VIII. diarrhœa (excluding cholera), measles, and whooping-cough has been supposed to be eliminated *for the first five years of life only*. As so large a proportion of the mortality from these diseases occurs within this age limit, it scarcely appeared worth while to carry out the eliminating calculations any further.

Special attention is also directed to the results of the supposed elimination of diarrhœa *for the first year of life only*. The deaths taken into account have been only those classified in the returns of the Registrar-General under the heading diarrhœa and dysentery. Those under the heading cholera have not been included.

I had had some thought of also dealing with small-pox in the same way, but partly from lack of time, and partly from its being evident that the results obtained for the decennium 1881-90 would be insignificant as compared with the other diseases which have

been taken into consideration, I have omitted this disease. The only practical result would have been to show in another way to what an extent small-pox has now been suppressed. Were it possible to produce a series of tables worked out on this plan, and dealing with small-pox for the past ten decennia, the results would be instructive; but even these could scarcely convince those who will not be persuaded.

With the present exception of cancer, the diseases which have been worked out for these tables are to be regarded as more or less preventable, and in our daily work as medical officers of health we are engaged in trying to prevent them. While it is at present a Utopian dream to imagine their entire extinction, as the whole is made up of separate parts, so whatever bettering may occur in the future in mortality statistics must be effected by a lessened prevalence and power of individual diseases.

It was at one time my idea to let my "fairy-tale" consist in constructing a Utopian life-table by reducing the mortality from each disease or group of diseases to the lowest conceivable limit, and then working out the results in expectation of life at different ages. But such an idea could not outlive calm reflection, for how little can we define disease as preventable or non-preventable!

I have contented myself with seeking to measure and define the effects of the chief diseases which we are individually grappling with, and I can only hope that some interest and, if possible, some practical use may be the result of the labour expended under difficult and wearisome conditions. We are all looking and working for such improved conditions as shall show themselves in succeeding decennia by progressively more and more favourable life-tables; but what the limit to which we can attain may be is at present undefinable.

(In this connection, although not strictly coming within the limits of the title of this paper, it may be of interest to direct attention to Tables IX. and X. The former relates to the "Selected Healthy Districts" of England and Wales, as being a concrete ideal, and the latter with the remainder of England and Wales, after excluding the "Selected Healthy Districts.")

When we are so constantly realizing how much sanitary improvement depends upon money, how difficult it is to secure such expenditure, and how easily millions are raised and squandered on the admittedly necessary naval and military armaments under existing conditions, we may look forward to a time, perhaps not so far distant, when by moral and spiritual development the human race may live on a higher plane, when "the nations shall

learn war no more," and those whose mission it is to prevent disease and save life shall be held in higher honour than those who can devise the most refined and fiendishly clever improvements upon the murderous club and hurled missile of primitive savagery.

It may be found impossible to utterly extinguish and destroy disease germs, but by gradually improved heredity and bettered conditions of environment, added to means to be yet made known of fortifying the human body against the assaults of those germs, disease and pain may be done away with to a degree which to us as yet may appear inconceivable, and thus the age of blessing foretold by prophets may be ultimately realized.

TABLE I.

Life-Table for England and Wales, 1881-90, calculated by the modified short method described in PUBLIC HEALTH, July, 1898. The Standard to which the succeeding Tables of differences are referred.

Age.	Chance of living one year in the interval from Age x .		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-life-time at Age x , expressed in years.	
x .	p_x .		l_x .		E_x .	
	Males.	Females.	Males.	Females.	Males.	Females.
0	·83896	·86887	1,000,000	1,000,000	43·32	46·67
1	·94270	·94729	838,964	868,874	50·56	52·66
2	·97617	·97700	790,891	823,072	52·61	54·56
3	·98461	·98487	772,046	804,142	52·88	54·83
4	·98859	·98898	760,167	791,973	52·70	54·66
5	·99467	·99475	751,494	783,244	52·30	54·27
10	·99705	·99689	731,669	762,910	48·65	50·65
15	·99504	·99504	720,942	751,135	44·33	46·40
25	·99226	·99265	685,947	714,724	36·34	38·51
35	·98768	·98946	634,654	663,880	28·87	31·08
45	·98080	·98500	560,634	597,164	22·04	24·01
55	·96587	·97192	461,836	513,384	15·71	17·12
65	·93190	·94132	326,327	386,134	10·24	11·17
75	·86328	·87726	161,189	210,907	6·06	6·62
85	·73462	·76126	37,056	56,934	3·32	3·69
95			1,696	3,721		

TABLE II.

Showing the differences from Table I. produced by excluding
PHTHISIS as a cause of mortality.

Age.	Chance of living one year in the interval from Age x .		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x , expressed in years.	
x .	p_x .		l_x .		E_x .	
	Males.	Females.	Males.	Females.	Males.	Females.
0	+·00088	+·00076			+2·58	+2·57
1	+·00074	+·00072	+ 874	+ 758	+3·02	+2·90
2	+·00039	+·00037	+ 1,442	+ 1,345	+3·15	+3·02
3	+·00030	+·00027	+ 1,710	+ 1,619	+3·21	+3·07
4	+·00023	+·00026	+ 1,883	+ 1,816	+3·24	+3·11
5	+·00025	+·00033	+ 2,039	+ 2,007	+3·27	+3·12
10	+·00034	+·00070	+ 2,912	+ 3,209	+3·29	+3·11
15	+·00177	+·00205	+ 4,113	+ 5,810	+3·26	+2·98
25	+·00301	+·00278	+16,284	+20,510	+2·58	+2·19
35	+·00352	+·00271	+35,065	+38,420	+1·75	+1·29
45	+·00342	+·00202	+52,430	+52,048	+0·96	+0·61
55	+·00278	+·00146	+61,072	+56,299	+0·41	+0·25
65	+·00164	+·00089	+53,939	+48,815	+0·12	+0·08
75	+·00059	+·00036	+29,988	+28,936	+0·02	+0·01
85	+·00018	+·00013	+ 7,195	+ 8,074	+0·01	±0·00
95			+ 334	+ 535		

TABLE III.

Showing the differences from Table I. produced by excluding THE WHOLE GROUP OF TUBERCULAR DISEASES (including Tuberculosis Mesenterica, Phthisis, and other Tubercular and Scrofulous diseases) as causes of mortality.

Age.	Chance of living one year in the interval from Age x .		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x , expressed in years.	
x .	Pr .		l_x .		E_x .	
	Males.	Females.	Males.	Females.	Males.	Females.
0	+·01007	+·00785			+3·86	+3·72
1	+·00639	+·00524	+10,062	+ 7,844	+3·94	+3·76
2	+·00274	+·00228	+14,910	+12,025	+3·79	+3·65
3	+·00156	+·00143	+16,762	+13,654	+3·72	+3·60
4	+·00123	+·00113	+17,734	+14,621	+3·69	+3·58
5	+·00081	+·00087	+18,486	+15,375	+3·66	+3·54
10	+·00063	+·00103	+21,062	+18,375	+3·54	+3·39
15	+·00196	+·00226	+23,092	+22,064	+3·44	+3·18
25	+·00314	+·00291	+36,087	+37,855	+2·73	+2·29
35	+·00363	+·00282	+54,825	+55,929	+1·81	+1·35
45	+·00352	+·00210	+71,201	+68,943	+0·99	+0·64
55	+·00288	+·00154	+77,658	+71,616	+0·42	+0·26
65	+·00173	+·00096	+66,416	+60,874	+0·12	+0·09
75	+·00063	+·00040	+36,432	+35,769	+0·02	+0·01
85	+·00019	+·00015	+ 8,706	+ 9,962	+0·01	±0·00
95			+ 404	+ 660		

TABLE IV.

Showing the differences from Table I. produced by excluding
CANCER as a cause of mortality.

Age.	Chance of living one year in the interval from Age x .		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x , expressed in years.	
x .	p_x .		l_x .		E_x .	
	Males.	Females.	Males.	Females.	Males.	Females.
0	+·00002	+·00001			+0·39	+0·83
1	+·00002	+·00002	+ 11	+ 9	+0·46	+0·95
2	+·00003	+·00002	+ 26	+ 29	+0·48	+1·01
3	+·00003	+·00002	+ 46	+ 45	+0·50	+1·03
4	+·00002	+·00002	+ 63	+ 63	+0·50	+1·05
5	+·00001	+·00001	+ 65	+ 78	+0·51	+1·05
10	+·00002	+·00002	+ 114	+ 108	+0·52	+1·08
15	+·00003	+·00004	+ 178	+ 145	+0·53	+1·10
25	+·00008	+·00017	+ 372	+ 320	+0·54	+1·14
35	+·00029	+·00085	+ 843	+ 1,447	+0·56	+1·17
45	+·00098	+·00201	+ 2,414	+ 6,426	+0·55	+1·03
55	+·00219	+·00325	+ 6,624	+ 16,209	+0·45	+0·73
65	+·00340	+·00416	+ 12,273	+ 25,715	+0·28	+0·40
75	+·00319	+·00390	+ 12,267	+ 24,187	+0·11	+0·15
85	+·00238	+·00261	+ 4,316	+ 9,405	+0·03	+0·03
95			+ 260	+ 766		

TABLE V.

Showing the differences from Table I. produced by excluding
ENTERIC FEVER as a cause of mortality.

Age.	Chance of living one year in the interval from Age x .		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x , expressed in years.	
x .	p_x .		l_x .		E_x .	
	Males.	Females.	Males.	Females.	Males.	Females.
0	+·00004	+·00004			+0·30	+0·29
1	+·00010	+·00010	+ 40	+ 36	+0·35	+0·33
2	+·00015	+·00013	+ 120	+ 121	+0·36	+0·34
3	+·00017	+·00017	+ 234	+ 224	+0·37	+0·35
4	+·00018	+·00020	+ 362	+ 361	+0·36	+0·35
5	+·00017	+·00019	+ 497	+ 516	+0·36	+0·33
10	+·00019	+·00023	+1,106	+1,224	+0·32	+0·29
15	+·00031	+·00026	+1,783	+2,057	+0·29	+0·25
25	+·00027	+·00019	+3,878	+3,803	+0·17	+0·15
35	+·00019	+·00017	+5,333	+4,842	+0·10	+0·09
45	+·00017	+·00013	+5,844	+5,346	+0·05	+0·04
55	+·00015	+·00012	+5,638	+5,292	+0·02	+0·02
65	+·00012	+·00008	+4,525	+4,465	+0·01	+0·01
75	+·00006	+·00005	+2,446	+2,639	±0·00	±0·00
85	+·00002	+·00001	+ 588	+ 748	±0·00	±0·00
95			+ 28	+ 50		

TABLE VI.

Showing the differences from Table I. produced by excluding
SCARLET FEVER as a cause of mortality.

Age.	Chance of living one year in the interval from Age x .		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x , expressed in years.	
x .	p_x .		l_x .		E_x .	
	Males.	Females.	Males.	Females.	Males.	Females.
0	+·00062	+·00052			+0·53	+0·57
1	+·00176	+·00166	+ 619	+ 516	+0·60	+0·62
2	+·00217	+·00204	+2,059	+1,937	+0·53	+0·56
3	+·00209	+·00208	+3,729	+3,577	+0·43	+0·46
4	+·00177	+·00172	+5,287	+5,203	+0·32	+0·36
5	+·00075	+·00076	+6,580	+6,521	+0·23	+0·26
10	+·00015	+·00016	+9,207	+9,301	+0·04	+0·06
15	+·00004	+·00004	+9,617	+9,758	+0·01	+0·03
25	+·00001	+·00003	+9,383	+9,535	±0·00	+0·01
35	±·00000	+·00002	+8,785	+9,045	±0·00	±0·00
45	+·00001	±·00000	+7,811	+8,224	±0·00	±0·00
55	±·00000	±·00000	+6,460	+7,084	±0·00	±0·00
65	±·00000	±·00000	+4,573	+5,351	±0·00	±0·00
75	±·00000	±·00000	+2,267	+2,927	±0·00	±0·00
85	+·00001	±·00000	+ 520	+ 793	±0·00	±0·00
95			+ 24	+ 52		

TABLE VII.

Showing the differences from Table I. produced by excluding
DIPHTHERIA as a cause of mortality.

Age.	Chance of living one year in the interval from Age x .		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x , expressed in years.	
x .	p_x .		l_x .		E_x .	
	Males.	Females.	Males.	Females.	Males.	Females.
0	+·00026	+·00022			+0·24	+0·28
1	+·00064	+·00060	+ 259	+ 213	+0·27	+0·31
2	+·00076	+·00078	+ 780	+ 728	+0·24	+0·29
3	+·00089	+·00093	+1,359	+1,358	+0·21	+0·26
4	+·00084	+·00090	+2,020	+2,092	+0·17	+0·22
5	+·00037	+·00048	+2,626	+2,781	+0·12	+0·16
10	+·00012	+·00012	+3,934	+4,527	+0·03	+0·04
15	+·00002	+·00003	+4,301	+4,894	+0·01	+0·02
25	+·00001	+·00002	+4,283	+4,868	±0·00	±0·00
35	+·00001	+·00002	+4,060	+4,648	±0·00	±0·00
45	+·00002	+·00001	+3,656	+4,294	±0·00	±0·00
55	+·00002	+·00002	+3,081	+3,757	±0·00	±0·00
65	+·00001	+·00001	+2,243	+2,900	±0·00	±0·00
75	+·00001	+·00001	+1,137	+1,613	±0·00	±0·00
85	+·00001	±·00000	+ 265	+ 443	±0·00	±0·00
95			+ 13	+ 30		

TABLE VIII.

Showing the differences from Table I. produced by excluding
(a) DIARRHŒA, (b) MEASLES, (c) WHOOPING COUGH as causes of
mortality UNDER FIVE YEARS OF AGE.

Age.	Chance of living one year in the interval from Age <i>x</i> .		Number of Survivors at Age <i>x</i> out of a million born.		Expectation of Life, or mean after-lifetime at Age <i>x</i> , expressed in years.	
<i>x</i> .	<i>p_x</i> .		<i>l_x</i> .		<i>E_x</i> .	
	Males.	Females.	Males.	Females.	Males.	Females.
(a) DIARRHŒA.*						
0	+·01455	+·01250			+0·95	+0·87
1	+·00342	+·00329	+ 14,544	+ 12,495	+0·24	+0·23
2	+·00057	+·00059	+ 16,634	+ 14,739	+0·06	+0·05
3	+·00022	+·00023	+ 16,700	+ 14,894	+0·03	+0·02
4	+·00013	+·00015	+ 16,615	+ 14,859	±0·00	+0·01
5			+ 16,527	+ 14,816		
(b) MEASLES.						
0	+·00314	+·00260			+0·68	+0·67
1	+·00634	+·00578	+ 3,137	+ 2,596	+0·62	+0·61
2	+·00290	+·00292	+ 8,298	+ 7,497	+0·29	+0·31
3	+·00170	+·00172	+ 10,414	+ 9,749	+0·14	+0·15
4	+·00106	+·00105	+ 11,585	+ 11,001	+0·05	+0·06
5			+ 12,269	+ 11,726		
(c) WHOOPING COUGH.						
0	+·00574	+·00638			+0·63	+0·82
1	+·00447	+·00550	+ 5,736	+ 6,375	+0·40	+0·54
2	+·00179	+·00253	+ 9,182	+ 10,852	+0·17	+0·26
3	+·00096	+·00145	+ 10,395	+ 12,710	+0·08	+0·12
4	+·00054	+·00077	+ 10,984	+ 13,702	+0·02	+0·05
5			+ 11,273	+ 14,175		

* If diarrhœa be excluded as a cause of mortality UNDER ONE YEAR OF AGE ONLY, the differences in Expectation of Life at Birth are : Males, +0·75; Females, +0·67.

TABLE IX.

Showing the differences from Table I. of a Life-Table for the
SELECTED HEALTHY DISTRICTS of England and Wales, 1881-90,
calculated by the same method.

Age.	Chance of living one year in the interval from Age x .		Number of Survivors at Age x out of a million born.		Expectation of Life, or mean after-lifetime at Age x expressed in years.	
x .	p_x .		l_x .		E_x .	
	Males.	Females.	Males.	Females.	Males.	Females.
0	+·04189	+·03763			+8·04	+7·16
1	+·02409	+·02287	+ 41,891	+ 37,623	+6·71	+5·69
2	+·01067	+·01043	+ 60,711	+ 56,376	+5·69	+4·57
3	+·00635	+·00650	+ 68,345	+ 64,255	+4·97	+4·04
4	+·00429	+·00436	+ 72,624	+ 68,931	+4·81	+3·72
5	+·00146	+·00140	+ 75,369	+ 71,924	+4·62	+3·50
10	+·00068	+·00040	+ 79,314	+ 75,936	+4·34	+3·19
15	+·00084	+·00024	+ 80,865	+ 76,410	+4·23	+3·14
25	+·00161	+·00116	+ 83,449	+ 74,553	+4·06	+3·19
35	+·00383	+·00261	+ 88,873	+ 77,851	+3·78	+2·98
45	+·00648	+·00436	+103,792	+ 87,834	+3·07	+2·46
55	+·01026	+·00723	+122,764	+102,125	+2·16	+1·78
65	+·01406	+·01013	+132,796	+112,457	+1·19	+1·02
75	+·01208	+·01071	+102,238	+ 92,217	+0·40	+0·41
85	+·00051	+·00323	+ 32,528	+ 35,456	+0·01	+0·04
95			+ 1,511	+ 2,579		

TABLE X.

Showing the differences from Table I. of a Life-Table for the
REMAINDER OF ENGLAND AND WALES AFTER EXCLUDING THE
SELECTED HEALTHY DISTRICTS (1881-90), calculated by the
same method.

Age.	Chance of living one year in the interval from Age <i>x</i> .		Number of Survivors at Age <i>x</i> out of a million born.		Expectation of Life, or mean after-lifetime at Age <i>x</i> , expressed in years.	
<i>x</i> .	<i>p_x</i> .		<i>l_x</i> .		<i>E_x</i> .	
	Males.	Females.	Males.	Females.	Males.	Females.
0	·00725	·00655			1·41	1·27
1	·00447	·00423	7,254	6,553	1·25	1·08
2	·00205	·00199	10,557	9,849	1·09	0·89
3	·00124	·00127	11,906	11,243	1·00	0·80
4	·00085	·00086	12,669	12,079	0·95	0·74
5	·00031	·00028	13,162	12,616	0·92	0·71
10	·00015	·00008	13,909	13,371	0·86	0·65
15	·00016	·00004	14,227	13,472	0·84	0·64
25	·00027	·00020	14,613	13,110	0·82	0·65
35	·00070	·00049	15,212	13,503	0·78	0·63
45	·00138	·00095	17,290	15,071	0·71	0·56
55	·00273	·00180	20,527	17,727	0·57	0·44
65	·00483	·00300	23,197	20,182	0·38	0·28
75	·00526	·00378	19,035	17,293	0·16	0·14
85	·00026	·00133	6,314	6,880	±0·00	0·02
95			294	506		

THE CONGLETON PEAT PAIL.—The pails are made of wood; each contains one-fifth its volume of finely-powdered and carefully-dried peat-dust, acidulated with 10 per cent. by weight of common sulphuric acid. The pails are in duplicate, and once a week a clean one is placed in position, and the partly filled one removed. The peat absorbs all moisture as fast as deposited, and the sulphuric acid fixes the ammonia given off by decomposing urine. The pail-contents are thus always dry, and almost inodorous (of course if the pail receive fair treatment), and when emptied at the central dépôt are found to have largely combined together into a kind of humus, which forms a valuable manure. For property which is not considered fit for water-closets, this system is the best with which I am acquainted; being superior to cesspools, privies, earth-closets, ordinary pails, or slop-water closets.—*T. W. H. Garstang, M.O.H. Biddulph U.D.C., A.R., 1898.*