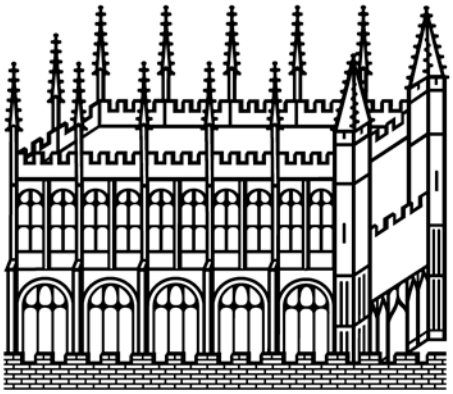

STATISTICS OF FAMILIES

IN THE UPPER AND PROFESSIONAL CLASSES

National Life Assurance Society,

2, KING WILLIAM STREET, LONDON, E.C.

ESTABLISHED in 1830.

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Vice-President—THOMAS CURTIS, Esq.

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ACTUARY.

CHARLES ANSELL, Jun., Esq.

The accumulated fund, now amounting to £633,000, is in the unusual proportion of more than 90 per cent. of the whole of the premiums which have been received in respect of existing Policies.

The Society is a purely mutual one, in which, consequently, all the profits belong to the Assurers, the mode of application being in reduction of premium.

The reserve made at the last valuation for bonus reductions of the premiums in future years was £250,000.

A distinguishing feature of the Society is that no Commission is paid to Agents or others for the introduction of business. The saving of expense thus effected, by increasing the margin for profit, tends materially to the advantage of the Assurers.

In addition to Life Assurances in all the usual forms, Endowments, and Endowment Annuities, with participation in profits, are now granted at premiums based upon the rate of mortality deduced from the data described in this pamphlet.

July, 1874.

ON THE

RATE OF MORTALITY

At Early Periods of Life,

THE AGE AT MARRIAGE,

THE NUMBER OF CHILDREN TO A MARRIAGE,

THE

LENGTH OF A GENERATION,

and other

STATISTICS OF FAMILIES

in the

UPPER AND PROFESSIONAL CLASSES.

BY CHARLES ANSELL, JUN.

LONDON:
NATIONAL LIFE ASSURANCE SOCIETY,
2, KING WILLIAM STREET, E.C.,
CHARLES AND EDWIN LAYTON,
150, FLEET STREET, E.C.

1874.

LONDON:

PRINTED BY BLADES, EAST & BLADES, 11, ABCHURCH LANE, E.C.

CONTENTS.

National Life Assurance Society,

2, King William Street,

London, *July, 1874.*

In the early part of the year 1871, the Directors of this Society were contemplating the formation of a more extended plan of Educational and other Endowments than had previously been attempted; but they were met by the difficulty that there were no available data as to the rate of mortality prevailing among children in the Upper and Professional Classes, sufficiently extensive and reliable to render it prudent to use them as the basis on which to found the necessary tables of premiums. What information there did exist upon the subject tended, however, to the conclusion that the rate of mortality in the classes in question was very different from that prevailing among the population at large, as indicated by the returns of the Registrar General of Births, Deaths, and Marriages.

Upon careful consideration, therefore, it was decided, as being the safest course, to endeavour to collect, by direct communication with a sufficient number of parents in the station of life alluded to, accurate particulars as to the dates of birth and death of their own children, and of their brothers and sisters, and from the information so obtained to construct a table of mortality; and I was accordingly instructed to take the necessary steps for carrying that decision into effect.

As was anticipated, the work thus undertaken has involved the expenditure of a large amount both of time and of labour. The ready, and frequently cordial co-operation, however, which was afforded by a great number of those gentlemen who were addressed, has enabled it to be carried to a successful conclusion by the collection of a large body of facts bearing upon the subject of the enquiry, which, there is good reason to believe, may be relied upon as perfectly authentic: perhaps not the less so from their having been in all cases voluntarily communicated.

As it is not improbable that some of those gentlemen who so courteously contributed the data, may feel desirous of knowing what results have been deduced therefrom, the following account of the investigation has been printed with a view to its being placed at their disposal.

CHARLES ANSELL, JUN.,
Actuary.

On the Rate of Mortality

PREVAILING AT EARLY PERIODS OF LIFE

Among the Upper & Professional Classes.

CHAPTER I.

THE DATA: HOW OBTAINED.

The investigation regarding the rate of mortality prevailing at early periods of life among the upper and professional classes, the results of which are stated in the following pages, is based upon data communicated by members of those classes in regard to the births and deaths principally of their own children; in a smaller number of cases, of the children of their parents; and, in comparatively few instances, of the children of their other relatives.

Applications, in the form of a lithographed letter, stating the object of the enquiry, were addressed to members of the Clerical, Medical, and Legal professions, and to a large number of other gentlemen and noblemen in England and Wales; and forms were attached which the persons addressed were requested to fill up and return. Those forms were two in number; the first adapted for information relative to the informant's own children, whether the issue of one or more marriages; the other for information respecting the issue of the marriage of his father and mother,

i.e., his brothers and sisters. Copies of the forms are annexed, the words and figures in italics indicating in a supposititious case the information supplied :—

Rank or Profession. C.

This page is for the Statistics of Informant's own Children.

(9873) Particulars as to the Parents of the Children.

Date of Return *6th Nov.*, 1871.	Date of Birth.	Date of Marriage.	Bachelor or Widower, Spinster or Widow, at date of Marriage.	Date (and cause*) of Death.
Father.				
(Informant)	*Mar.* 17, 1813.	*July* 20, 1843.	*Bachelor.*	
Mother. (1)	*Dec.* 18, 1815.		*Spinster.*	*July* 13, 1870. *Atrophy.*
(2)				
(3)				

Particulars as to the Children.

Order of Birth.	Sex. M. or F.	Date of Birth.	If now Alive.	Cause* of Death.	Date of Death.
1	*F*	*July* 27, 1844.	*No.*	*Phthisis.*	*Nov.* 27, 1869.
2	*F*	*May* 26, 1849.	*Yes.*		
3	*M*	*Nov.* 12, 1850.	*Yes.*		
4	*F*	*April* 16, 1852.	*Yes.*		
5	*F*	*May* 20, 1854.	*No.*	*Rheumatic Fever.*	*Dec.* 21, 1869.
6	*M*	*April* 7, 1858.	*Yes.*		
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

The Name and Address of Informant may be added here, if not objected to be given. — *The Rev. John Jones, M.A., Brookworth, Wilts.*

* Information as to the "Cause of Death" is considered desirable, but not essential.

Clergyman.

This page is for the Statistics of the Children of Informant's Parents, that is, of his Brothers and Sisters.

(9874) Particulars as to the Parents of the Children.

Date of Return *6th November*, 1871.	Date of Birth.	Date of Marriage.	Bachelor or Widower Spinster or Widow, at date of Marriage.	Date (and cause) of Death.
Father (of Informant)	*June* 15, 1785.	*Feb.* 14, 1809.	*Bachelor.*	1865, *Aug.* 16. *Bronchitis.*
Mother (of Informant)	*Sept.* 1, 1789.		*Spinster.*	1822, *April* 2. *Childbirth.*

Particulars as to the Children.

Order of Birth.	Sex M. or F.	Date of Birth.*	If now Alive.	Cause of Death.	Date of Death.
1	*F*	*June* 6, 1810	*Yes.*		
2	*M*	*Jan.* 1, 1812	*Yes.*		
3	*M*	*Mar.* 17, 1813	×		
4	*M*	*April* 12, 1815	*Yes.*		
5	*F*	*June* 27, 1817	*No.*	*Stillborn.*	
6	*M*	*June* 27, 1817	*No.*	*Hydrocephalus.*	*Feb.* 6, 1825.
7	*F*	*Dec.* 6, 1820	*Yes.*		
8	*F*	*April* 1, 1822	*No.*	*Consumption.*	*July* 15, 1842.

* Please indicate the date of Birth referring to yourself by a × in the column, "If now Alive."

For a short time however at the commencement of the enquiry only a single, and somewhat differently arranged, form was employed.

As nearly all those addressed upon the subject were total strangers, it was to be expected that a considerable proportion would decline to take upon themselves the trouble of affording any information, and such was found to be the case. A very large number however most readily and courteously complied with the request made to them, while many gentlemen were good enough not only to furnish the desired information themselves but to contribute their aid in obtaining similar information from their relatives and friends.

The letters were not sent out all at once, but at various dates from March to October, 1871, with the view of avoiding undue pressure in attending to the replies. The great majority of these were received within a few days after the despatch of the letters, although they continued arriving in smaller numbers for several weeks, and in a few instances nearly two years elapsed before they came to hand, the delay probably arising in most cases from the necessity of referring to family memoranda not immediately accessible.

Each return afforded, it will be observed, when complete, information on the following points, viz.:—

On the First Form.

The date when it was filled up.

The name of the person making it. (Informant).

His Rank or Profession: this being, as respects members of the Clerical, Medical, and Legal Professions, indicated by the letters C, M, or L, printed at the top of the form before it was sent out.

The date of his Birth.

The date of his Marriage.

If then a Bachelor or a Widower.

The date of Birth of his Wife.

If she was a Spinster or Widow at the time of Marriage.

If not alive, the date and cause of her death.

Similar information respecting any previous Marriage and Wife of Informant.

The number of Children.

The order of their Birth.

Their sex.

The dates of their Births.

Whether still alive; and if not,

The Date of Death and

The cause of Death.

On the Second Form.

The same particulars in regard to the family of the informant's father and mother as are given on the first form respecting his own family, except that they embrace only the one marriage of his father and mother and its issue, and that his own birth is indicated by a × in the column headed "if now alive."

When the returns were received, or as soon thereafter as practicable, they were carefully examined, and where any inconsistencies or important omissions were noticed further information was applied for, if, as was generally the case, the name and address were given; if not, the return was rejected as unavailable.

The most frequent omission was that of the date of the return, which in such cases was filled in as the day previous to that on which it came to hand.

In a great majority of the cases the particulars appear to have been stated with so much care and attention to accuracy, as to leave no reasonable doubt of their complete reliability as the basis for general deductions. The exceptions, moreover, were usually those of omission rather than of commission, and consequently were little liable to lead to error.

"There will be no more."
Hoorah!

One gentleman after stating, evidently with all due regard to correctness, the particulars of his somewhat numerous offspring, winds up with the accompanying graphical illustration of his satisfaction at there being no prospect of a further increase in their number.

In rare instances, perhaps half a dozen altogether, the persons addressed, who were possibly very young gentlemen, and may be somewhat at a loss for profitable occupation, have apparently endeavoured to amuse themselves by making fictitious returns; such, however, were of course readily detected.

The total number of * children of which particulars more or less complete were obtained, were as follow :—

Particulars complete regarding all children in each family, and so available in calculating the rate of mortality		49,099
3758 families in which the information was given, not by the father, but by one of the children themselves when grown up		3,758
145 families in respect to some or all of the children in which the particulars given were incomplete		1,181
Schedules returned too late to be included in the data for mortality, but still available for other branches of the enquiry		597
Total.....		54,635

Of the 49,099 children of which full particulars were given, there were born alive: Males	24,640	
Females	23,400	
		48,040
And born dead: Males	627	
Females	432	
		1,059
		49,099

The data thus collected, which, for the sake of brevity, will hereafter be distinguished as those of the "Upper Class," or " Upper Class experience," may fairly be deemed amply sufficient in extent to justify great confidence in the reliability of the results deducible from them ; but at the same time it is to be remarked that some irregularities which still present themselves at a few ages in the tables of mortality which have been calculated, seem to indicate that it would have been undesirable to have depended upon a much narrower basis. Several other tables of mortality have, however, been based upon considerably smaller numbers of observations, and among them are some which, from their frequent employment for purposes of calculation, may fairly be termed

* The term " Children " is, in addition to its ordinary signification, employed throughout this pamphlet to denote the issue of marriages, without any reference to age.

standard ones. Of these the tables generally known as the "Northampton," "Carlisle," and "Equitable experience," have probably been more extensively used as the basis of Life Assurance calculations in this country than any others, and it may therefore not be without interest to compare the numbers of lives upon which those tables were based with the number embraced in the observations now under consideration.

The "Northampton" table was deduced by Dr. Richard Price, from the number of deaths observed to have occurred in the forty-six years from 1735 to 1780 inclusive, in the town of Northampton, the population of which in the year 1746 was ascertained to have been 5136.

The "Carlisle" table was founded upon similar observations made by Dr. Heysham during eight years in the city of Carlisle, the population of which during the period averaged about 8177 persons, and published by the late Mr. Joshua Milne, in his treatise on Life Annuities and Assurances in 1815.

While the "Equitable Experience" is that of 21,398 persons assured in the Equitable Assurance Society.

CHAPTER II.

Arrangement of the Data.

The first step towards arranging the data was to transfer the particulars respecting each family to a separate card. A facsimile of the form used is given on the following page, the particulars relating to the family in the return at page 3 being inserted in italics. The dates, it will be observed, are not expressed in years, months, and days, but in years and decimal parts, or, to speak more precisely, in hundredths, of a year. This was readily done by means of a table showing, in a concise form, the decimal fraction corresponding to each day of every month, counting from the beginning of the year. Thus the first number on the top of the card, 1871·85, indicates the date of the return, viz., 6th November, 1871;

·85, or $\frac{85}{100}$ being the fractional part of a whole year that the period from 1st January to 6th November inclusive is equal to.

The other number at the top of the card, viz. 9874, is the reference number of the card, and of the return to which it relates; and the letter "C" at the right hand indicates that the father of the family was a clergyman.

1871·85. No. 9874. C.

	Dates of Marriage and Birth.	Age at Marriage.	Date of Death.	Age at Death	Cause of Death.
Marriage ...	1809·12				
Father, *B* ...	1785·45	23·67	1865·62	80·17	*Bronchitis.*
Mother, *S* ...	1789·67	19·45	1822·25	32·58	*Childbirth.*

Order of Birth.	Sex. M.	Sex. F.	Date of Birth.	Date of Death.	Age at Death or observation.	If Dead.	Cause of Death.	Birth after Marriage.
1		F	1810·43	...	61·42			1·31
2	*M*		1812·00	...	59·85			2·88
3	*M*		1813·21	...	×			4·09
4	*M*		1815·28	...	56·57			
5		F	1817·49	1817·49	0·00	*D*	*Stillborn.*	8·37
6	*M*		1817·49	1825·10	7·61	*D*	*Hydrocephalus.*	8·37
7		F	1820·93	...	50·92			
8		F	1822·25	1842·54	20·29	*D*	*Consumption.*	
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								

Jones.

In the upper part of the card the letters " B " and " S " after father and mother respectively, show that the former was a bachelor and the latter a spinster at the time of marriage. The 1st column contains the dates of their marriage and births, from which are deduced, and entered in the 2nd column, their ages at marriage. The 3rd column shows the dates of their deaths, if not living; from whence, and from the dates in the 1st column, their ages at death are deduced and entered in the 4th column. The 5th column contains the cause of death.

In the lower part of the card, which refers exclusively to the children, the headings of the different columns will sufficiently explain the entries in them, with the exception perhaps of column 6, " age at death or observation." In that column the age at death of those dead, is deduced by subtracting the date of birth in column 4 from the date of death in column 5; and the age at date of observation, of those alive, by subtracting the date of birth in column 4 from the date of the return at the top of the card.

The last column, headed " Birth after Marriage," has been calculated only for the 1st, 2nd, 3rd, 5th, 8th, 11th, 14th, and 17th children. It will be observed that in the 3rd line, in column 6, there is a × inserted instead of an age, which indicates that the return was made by the person thus denoted, and consequently that the particulars referring to him must not be included in the data for calculating the rate of mortality. The necessity for this course will be obvious when it is considered that the rate of mortality is to be deduced from the mutual relation to each other of two elements, viz., the number of persons born alive, and the number of deaths occurring among them; and, therefore, that if the lives of persons who themselves made returns were included, we should have only one element, the living, to the entire exclusion of the other, *i.e.*, those cases in which death had occurred.

The cards were next all arranged alphabetically, so that any duplicate relating to the same family might be found and eliminated. Of these there were many instances;

arising sometimes from a Father and a Son having both given particulars of the family of the Father, and at others from two brothers each having given particulars of his Father's family. Where no name was given the duplicates were eliminated by other modes of comparison.

The cards were then sorted into 4 parcels according to the rank or profession of the Father of the children, viz. :—

1st. Clergy.

2nd. Legal.

3rd. Medical.

4th. General, *i.e.*, members of the Aristocracy, Merchants, Bankers, Manufacturers and all others not included in the first 3 classes,

and each class was subdivided so as to place families consisting of the same number of children together.

Large sheets were now prepared, ruled vertically and headed with each year of age from 3 upwards, but for shorter intervals than a year under that age ; a separate set of sheets being devoted to the males and females respectively among the first children, second children, third children, fourth, fifth and sixth children, and seventh and younger children in each class, thus making 40 subdivisions altogether.

The age of each child was then recorded in the appropriate sheet by writing under the heading corresponding with the age last birthday the decimal fraction of the age of the child if alive, or the letter D if dead, the sheets containing 50 horizontal lines for that purpose.

By adding together, firstly the entries in each sheet, and next the totals of each set of sheets, there was shown the number of children in each subdivision who attained each age, the sum of the fractions of a year passed through by them since their last birthdays, and the number that died at each age.

CLERGY. SECOND CHILDREN. MALES.

Age.	6	7	8	9	10	11	12	13
	·27	·98	·47	·55	·41	D	·24	·07
	·05	D	·39	·71	·58	·16	·42	·26
	·19	·89	·91	·82	·63	·41	·40	·18
	·88	D	·87	·27	·58	D	·83	·90
	·73	·07	·76	·31	·57	·07	·76	·62
	D	·13	·66	·39	·37	·82	·35	·15
	·43	·45	·43	·09	·02	·43	D	·88
	·92	·42	·16	·19	·91	·22	·12	...
	·17	·99	·25	D	·08	·19	·36	...
	...	·00	...	·66	...	D	...	...
Sum of fractions of a year	3·64	3·93	4·90	3·99	4·15	2·30	3·48	3·06
Total numbers Alive...	8	8	9	9	9	7	8	7
Total numbers Dead...	1	2	0	1	0	3	1	0

The above copy of part of one of the sheets, shows the manner in which the entries were made.

The subdivisions were now brought together so as to show the results of the following 12 Classifications, viz. :—

				Number born.
1.	Males	in all classes		25,267
2.	Females	ditto		23,832
3.	Males and Females	ditto		49,099
4.	Clergy	Males and Females		16,981
5.	Legal	ditto	ditto	5,710
6.	Medical	ditto	ditto	6,477
7.	General	ditto	ditto	19,931
		Total		49,099
8.	1st Children	Males and Females		8,158
9.	2nd Children	ditto	ditto	7,682
10.	3rd Children	ditto	ditto	6,947
11.	4th, 5th & 6th Children	ditto	ditto	15,334
12.	7th & younger Children	ditto	ditto	10,722
	Order not stated	ditto	ditto	256
		Total		49.099

CHAPTER III.

Mode of Deducing the Rate of Mortality.

Table I., page 69 shows the summary for classification No. 3 (males and females in all classes), and the mode in which the results are deduced ; the facts being stated in Columns A, B and C, and the deductions therefrom in the other columns.

Column A contains the number of children who were alive at each age at the dates when the returns were made.

*Column B, the sum of the decimal fractions of a year passed through by those in column A, between their respective last birthdays and the dates of the returns ; and

Column C the number of children who had died at each age.

Thus at age 4 last birthday there were 849 children alive, who in the aggregate had lived $423\frac{71}{106}$ years since their fourth birthdays ; and 286 children had died between 4 and 5 years of age.

The sum of the numbers in columns A and C will therefore be the total number of children embraced in the observations, and that, viz. 49099, is the first number in column D. Of these, however, 1059 were still-born, which leaves 48040 born alive.

In the first interval of age in the table, birth to ·01, 778 had died, and 13 were alive at that age; and deducting these (791) from 48040 there remain 47249, who entered upon the next interval of age, ·02 to ·09. In like manner

*In arranging data for the construction of mortality tables it is usual, with a view to avoid having to deal with fractions of a year of age, to assume that the lives, one with another, pass out of observation half way between their last and next birthdays, which in most cases no doubt ensures a sufficiently close approximation to accuracy. In the present table, if that hypothesis were rigorously correct, we should have the sum of the numbers in Column B equal to the sum of those in Column A $\times$ (·5— ·005) = 35243 $\times$ ·495 = 17445.3; but it is actually only 16845.5 ; so that the hypothesis in question, if acted upon, would have here given an excess of 600 years of life, or about 6 days for each person. Such a difference however would scarcely have been sufficient to have exercised any appreciable influence on the results deduced.

the other numbers in column D were successively determined.

Before proceeding further, however, in the process of calculating the rate of mortality from the data thus far arranged, a correction was required on account of some of the children who entered upon each age having passed out of observation alive before attaining the next age. Thus, in column D, it appears that 38,892 completed their fourth year of age, but of these, as shown in column A, 849 were living between the ages 4 and 5 when the returns were made, and so instead of coming under observation for 849 years of life among them between those ages, as they would have done if the returns relating to them had been made at a later period, and they had all lived, they were under observation, as shown in column B, for 423·71 years collectively only. The real number of lives exposed to mortality for a whole year between the ages of 4 and 5 was therefore equal to 38,892, minus the difference between 849 and 423·71, viz. 38,466·71, or 38,466·7, as appears in column E, which is carried to one place of decimals only.

The number opposite any age in column E, therefore, is the number at the same age in column D, plus the number in column B, minus the number in column A, except at the beginning of the table, where the intervals of age are fractional,* and a modification of the process of correction becomes on that account necessary. There were thus obtained the two elements essential for deducing the rate of mortality; that is to say, the numbers that were under observation during each interval of age, column E, and the number of deaths that occurred among them in the same interval, column C. The division of the latter by the former will express the probability (in relation to certainty

* The following formula was used for fractional ages under one year :—

$$E = D - A + \frac{B - (A, x)}{x - , x} \quad \text{in which}$$

x represesents the end of the fractional period of age.
,x ,, ,, preceding fractional period.
A, B, D, E ,, numbers opposite age x in the columns headed with those letters.

considered as unity) that a single life entering upon any age will die before attaining the next age. Continuing to take age 4 for example, we have 286 divided by 38,466·7, the result of which is ·00744, as appears in column F, the other numbers in which column have been derived in a similar manner.

The final stage in the construction of the table of mortality was to calculate, from the probabilities of dying, as shown in column F, the numbers stated in columns G and H, that, out of 100,000 born alive, respectively survive, and die in, each interval of age. Thus 87,925 reach their 4th birthdays, of which number 654 die between 4 and 5 years of age, leaving 87,271 to complete their 5th year of age.

This starting number of 100,000 is of course entirely arbitrary, but it, or some multiple or division of it by 10, is usually selected for the sake of convenience in working, as well as to facilitate comparison with other tables.

In a similar manner mortality tables have been constructed from the data yielded by the various classifications before mentioned, (*vide* page 11), viz., 12 in all ; but as no useful object would be served by detailing the preliminary steps for all of them, only the final results are given.

CHAPTER IV.

Rate of Mortality shown by the "Upper Class" Data compared with other Mortality Tables. Adjustment of the Tables.

In table II. column G of table I. is repeated, viz., the numbers out of 100,000 males and females born alive that survive each year of age ; and there are added for comparison therewith, the corresponding numbers indicated by some other tables of mortality. These are :—

1st. The " Carlisle " table, alluded to at page 7.

2nd. The " English Life " tables.

3rd. The " Clergy Children (1830) " experience.
4th. The " Peerage families " experience.

The " English Life " tables were deduced by Dr. Farr, the Assistant Registrar General of Births, Deaths, and Marriages, from the number of deaths registered in England and Wales in the 17 years 1838 to 1854 inclusive, as compared with the census returns of the population in that part of the kingdom in the years 1841 and 1851.*

The " Clergy Children (1830) " experience was arranged by Mr. Ansell, senior, actuary of the Atlas Assurance Company, Her Majesty's Customs Fund, &c., from data, collected under the sanction of the then Archbishop of Canterbury, relating to between one and two thousand children of Clergymen, principally in the diocese of that prelate. This table, as will be observed, does not extend beyond early periods of life.

The " Peerage families " experience was calculated in the year 1861, jointly by Mr. A. H. Bailey, actuary of the London Assurance Corporation, and Mr. A. Day, of the Scottish Widows Fund Assurance Society, from the deaths, as recorded in the peerages, of British peers, of their children, and of the children of their eldest sons, between the years 1800 and 1855, and relate to 7473 persons.†

It may be desirable to observe that the " Clergy Children experience (1830)," like the " Upper Class" experience, is based entirely upon records of facts, without the introduction of any hypotheses whatever; and the same remark will

* By the courtesy of Dr. Farr I am enabled to add that the rate of mortality in England and Wales from 1855 to 1871 agrees as closely as possible with that of the period 1838 to 1854; so that the " English Life " tables may be taken to represent, in effect, the rate of mortality in that part of the Kingdom for the thirty-four years 1838 to 1871 inclusive.—*C. A.*

† Other observers have made public the results of their enquiries in the same field; among whom may be mentioned the late Dr. T. Wigglesworth (in 1847), in respect to 10,076 children, chiefly of tradesmen and artizans, and 5952 inmates of charitable institutions; the late Rev. John Hodgson (in 1865), in reference to 1087 children of Clergymen, 1839 children of his parishioners in the Isle of Thanet, and 705 upon whose lives endowments had been effected; and Mr. W. A. Bowser (in 1872), regarding 1653 children of Protestant Dissenting Ministers in Great Britain.

apply to the " Peerage families " experience if it be assumed that the records in the peerages may be relied upon as in all cases correct, and that no births or deaths, even of young infants, are omitted.

In the other two tables mentioned, viz., the " Carlisle " and the " English Life," the case is different; as the data on which they are founded not having been collected with primary object of constructing tables of mortality from them, it became necessary, in order to adapt them to that purpose, to resort to modes of treatment which, however admirably conceived, were necessarily to a certain extent hypothetical.

The progressive diminutions in the numbers left alive at each age up to 45 by the tables referred to, are shown pictorially in diagram A, which will, perhaps, convey a clearer impression of the differences in the tables than would be derived from a cursory examination of the figures from which it is constructed.

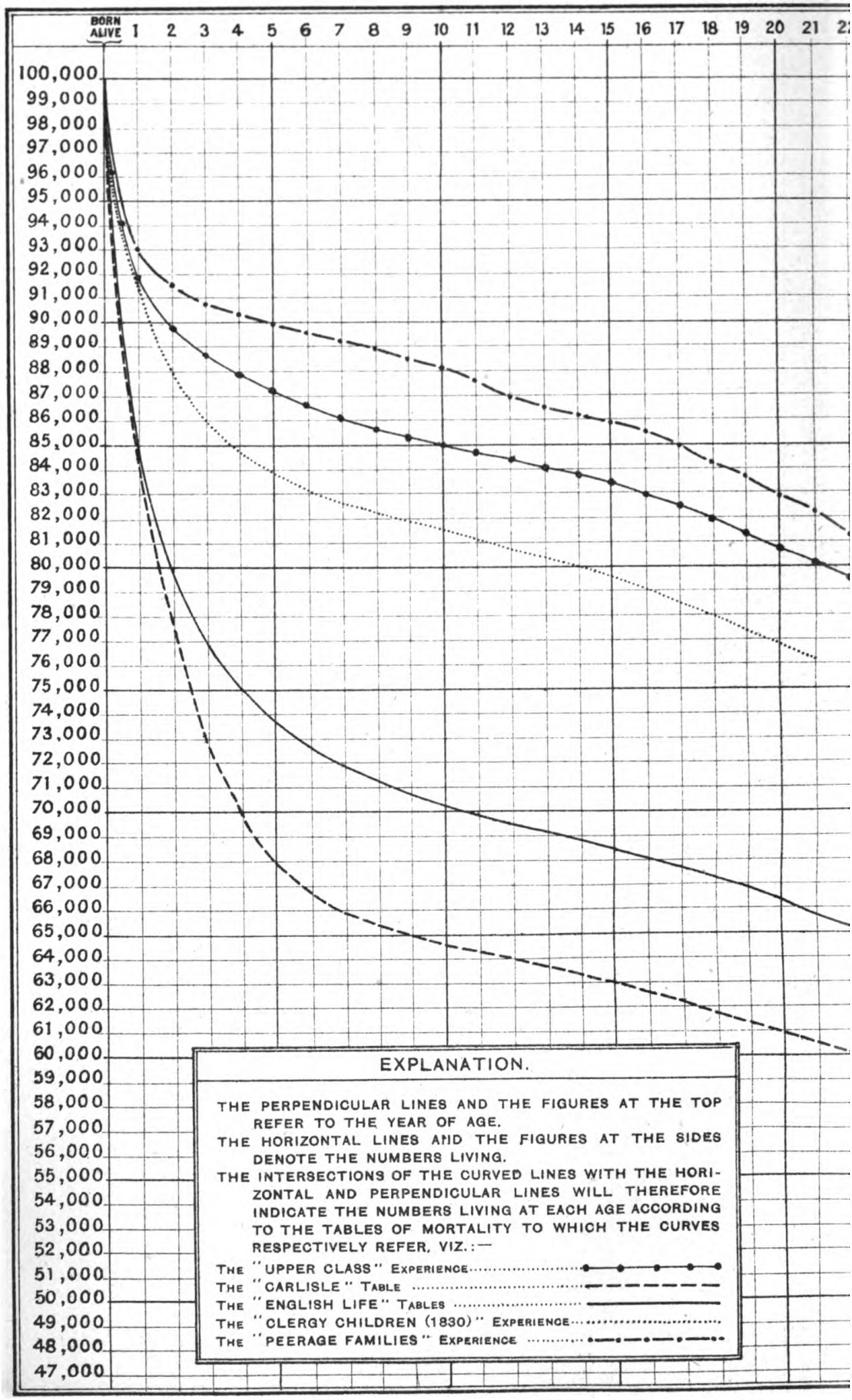
In this diagram it will be noticed that the curves representing the numbers left alive at each age according to the various tables form two very distinct groups; one of them, comprising the " Upper Class," the " Peerage families," and the " Clergy Children (1830) " experiences, indicating a much smaller aggregate mortality from birth than the other group, which includes the " Carlisle," and " English Life " tables.

That the mortality among children of parents in the upper classes of life should prove to be less than among those of the general population, either of a town, as Carlisle, or of the country at large, as expressed by the " English Life " tables, is what might reasonably have been anticipated, and it will not be difficult to suggest the probable causes of this difference.

Any large community, whether town or country, it must be borne in mind, is mainly composed of the lower classes, including under that term all those whose social position does not place them above the necessity of earning their livelihood by manual labour; and, consequently, the rate of

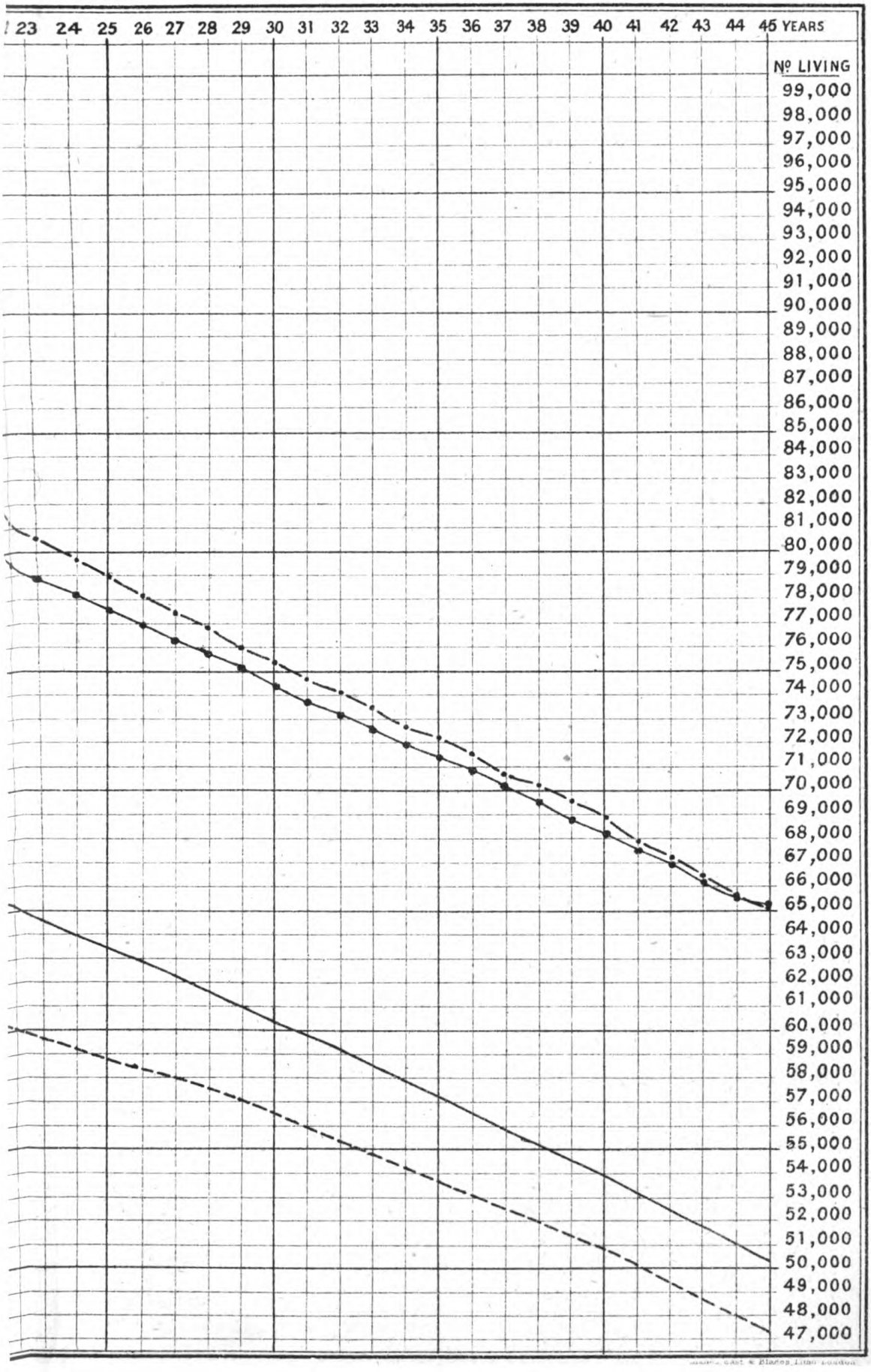
DIAGR

SHOWING, OUT OF 100,000 CHILDREN BORN ALIVE, THE NUMB



AM A:

ER THAT SURVIVE TO EACH OF THE UNDERMENTIONED AGES.



mortality in such community as a whole, must necessarily approximate more closely to the rate of mortality among the lower classes in it, than to that of any other class. In seeking, therefore, for an explanation of the difference in the rates of mortality indicated by the " Upper Class " data, and the " Carlisle " or " English Life " tables, it will be sufficient to consider the influences which may induce a higher rate of mortality among the lower classes, than is here shown to prevail in the upper classes.

Such influences may be ranged under two heads, physical and moral.

Among the former may be enumerated :—

Food, insufficient in quantity, and improper as to kind.

Deficiency of warm clothing.

Want or delay of medical attendance in illness.

Crowded and unhealthy dwellings, and

Neglect on the part of parents.

This last, though it cannot be considered to prevail generally, is still of such frequent occurrence, especially in some of the manufacturing districts, where it is common for young married women to pass the day working in the mills instead of attending to their home duties, that it must not be lost sight of.

Among the moral influences there may be mentioned :—

Illegitimacy.

Children being a burden upon, or considered as such, by their parents.

Parents having a direct pecuniary interest in the death of their children.

The mortality among illegitimate children is well known to be very large as compared with legitimate children ; and there can be no question that the proportion of illegitimate to legitimate births is vastly greater in the lower than in the upper classes.

It cannot be doubted that when, as sometimes is unfortunately the case, the dominant feeling with parents in regard to their offspring is that they are a burden to them, the chances of the latter succumbing to the perils of infancy and childhood are seriously increased. Without necessarily assuming the intervention of any active criminal intent, it is enough that all, or nearly all, the physical mal-influences just alluded to will be rendered more likely to be called into play.

In a large number of cases parents in the lower classes have a direct pecuniary interest in the death of their children, through the operation of a system which prevails extensively, especially in towns, of insuring their lives with Friendly Societies, or Insurance Offices which cultivate what is termed " industrial " business.

The ostensible object of such insurances is to make provision for the funeral expenses of the children should they die. The sum insured is, however, frequently far in excess of any legitimate requirement for that purpose ; and although, of course, it is not suggested that in most, or even in a large proportion, of such cases there exists any improper motive, there is much reason to fear that in not a few instances the lives of children so insured are thereby exposed to additional hazard.

That, indeed, would almost appear to be recognized by those who conduct such institutions, for the rates of premium for children's assuranes charged by one of the largest of them, are 300 per cent. in excess of what would be required by the actual risk as shown by the " English Life " tables, while for ordinary Life Assurances an addition of 25 per cent. would be considered ample.

Each of the causes of increased mortality thus referred to, although perhaps not exclusively confined to the lower classes, is yet likely to prevail more extensively among them than in the classes above them ; and the combined

operation of the whole may probably account for the comparatively favorable rate of mortality indicated by the "Upper Class" data. The question, nevertheless, presented itself whether there was anything in the mode in which the data were obtained, which could interfere with their affording a correct expression of the law of mortality prevailing among the classes which furnished them. After much careful reflection, however, the only possible source of error that suggests itself is, that a feeling might in some cases exist in the minds of parents who have had many of their children die, which, rendering it painful to them to write anything that would recall their loss, might deter them from making a return, and thus cause the data to include less than the normal proportion of unhealthy families. So far though as can be judged from the returns themselves, or from the correspondence in connection therewith, there is little, if any, trace of the operation of such a feeling; but, on the contrary, much that militates against the probability of its having exercised any perceptible influence on the results. Moreover such a feeling would seem to be more likely to be excited by the deaths of children partly or altogether grown up, than by the loss of very young children or infants. But it may be observed that it is especially in the earliest years of life that the "Upper Class" tables exhibit the greatest divergence from the "English Life" and "Carlisle" tables, as the following comparison with the one last named will show.

The mortality deduced from the "Upper Class" data is to that of the "Carlisle" table in the proportion of—

52	to	100	under	1	year	of age.
26	„	100	between	1 and	5	years of age.
61	„	100	„	5 „	15	„
104	„	100	„	15 „	25	„
91	„	100	„	25 „	35	„
73	„	100	„	35 „	45	„
77	„	100	„	45 „	55	„
71	„	100	„	55 „	65	„
81	„	100	„	65 „	75	„

Looking then at this possible source of error from all points of view, it will be safe to conclude that it has not exercised any effect, or, if any, not an appreciable one, in preventing the new tables representing correctly the rate of mortality among the classes which furnished the data ; and consequently, that the rate of mortality in those classes, particularly at early periods of life, is in reality materially less than that which has been found to exist among the general population of the country.

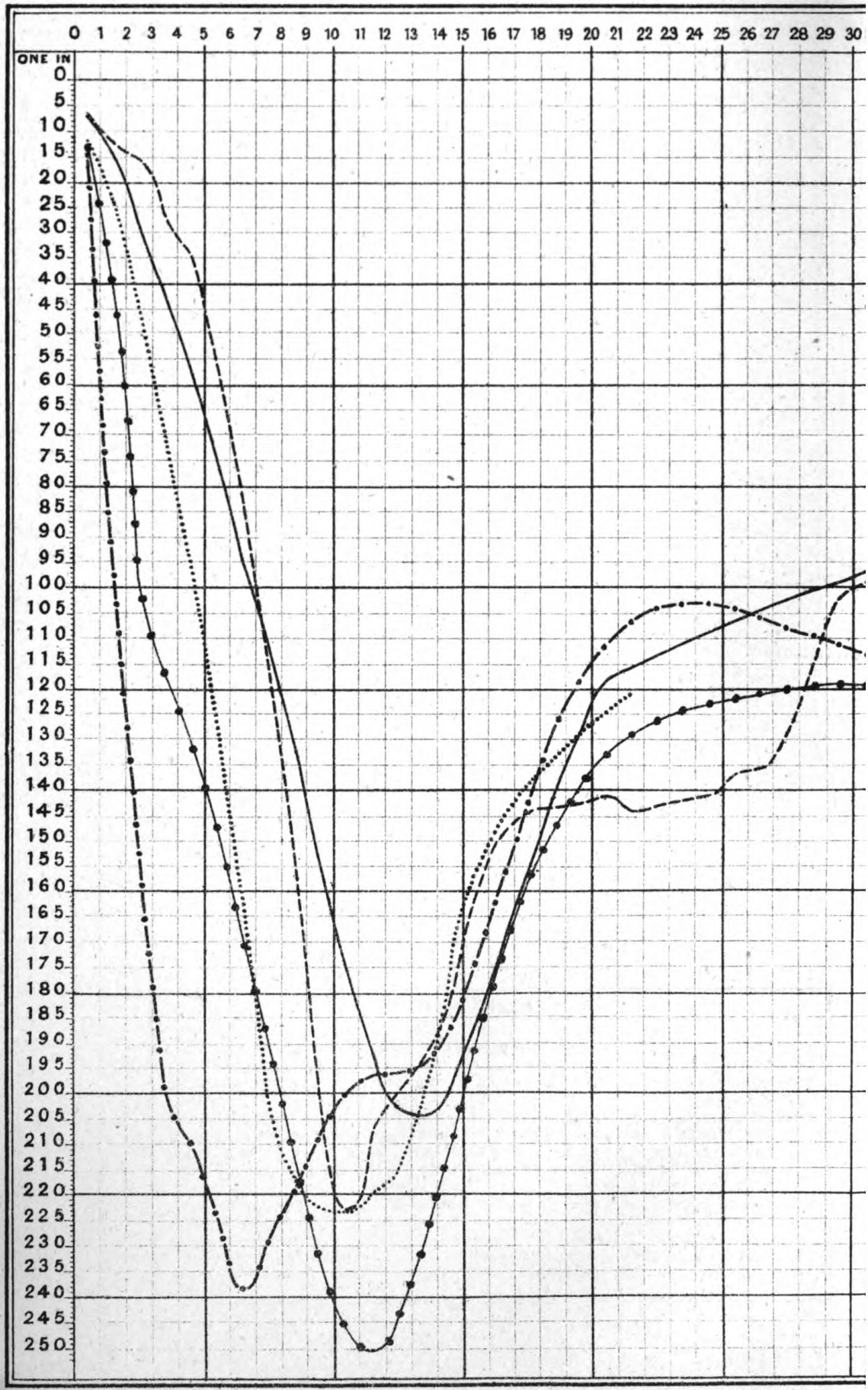
Diagram B shows the numbers living at the commencement of each age up to 60, out of which one death will take place in one year (unity divided by column F table I.), according to the same tables that diagram A refers to, and thus illustrates the relative rates of mortality at different periods of life.

The numbers indicated in this diagram are the "adjusted" numbers ; that is to say the actual numbers are so modified as to make the differences between the results shown at successive ages more regular in their progression than would be the case if the numbers were employed in their original state.

The propriety of introducing such modification rests upon the assumption, apparently well grounded, that the irregularities noticeable in all tables of mortality in their original state, if based upon precise observations, do not result from the operation of any natural law, but are due simply to the observations not extending over numbers sufficiently large to ensure a correct average. With regard to what is the best mode of effecting the adjustment, or "graduation" as the process is sometimes termed, there have been diverse opinions ; some authorities holding that it is essential to treat uniformly all the numbers in a table in accordance with some given formula, while others have considered that as such formulæ are in themselves purely arbitrary, it is permissable, within certain limits, to deal with the numbers in any way which will produce the best practical result.

DIAGRA

SHOWING THE NUMBERS LIVING AT ANY AGE UNDER 60. OU



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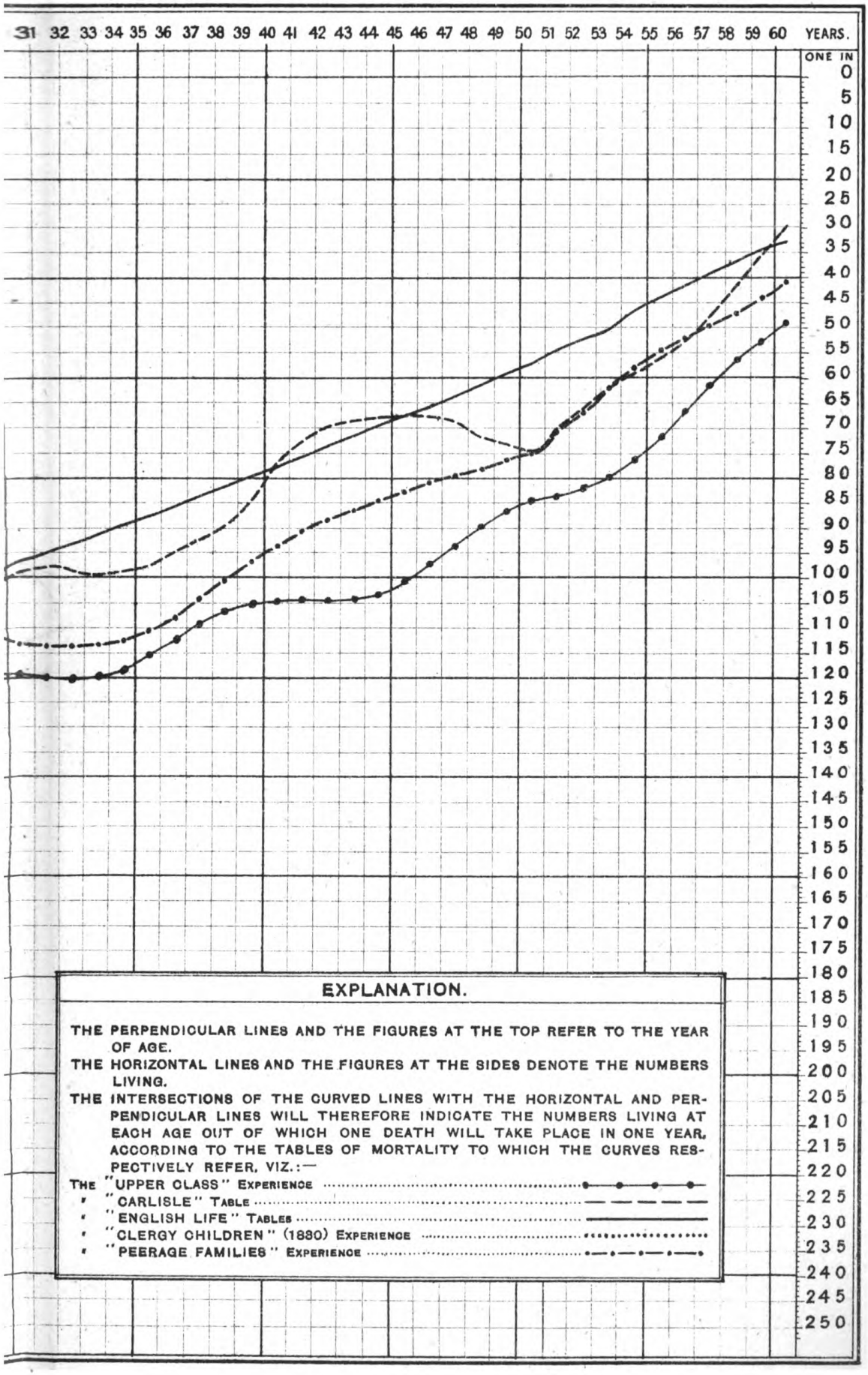
NB:
T OF WHICH ONE DEATH WILL TAKE PLACE IN ONE YEAR.



It will, however, perhaps be safe to assume that the appropriateness of any particular method must, to some extent, depend both upon the special features of the table and the uses to which the latter is to be applied.

Mr. W. S. B. WOOLHOUSE, a gentleman of distinguished mathematical abilities, has recently devised, and applied to the adjustment of some important mortality tables, a formula, the effect of which is to cause the adjusted number dying at any given age to be composed of the following percentages of the unadjusted numbers dying, (column H, table I.) at that and contiguous ages, viz. :—

	At each age.	Total.
At the given age.....	20.0 %	20.0 %
+ ages 1 year older and 1 year younger	19.2 „	38.4 „
+ „ 2 „ „ „ 2 „ „	16.8 „	33.6 „
+ „ 3 „ „ „ 3 „ „	5.6 „	11.2 „
+ „ 4 „ „ „ 4 „ „	2.4 „	4.8 „
		108.0 „
— „ 6 „ „ „ 6 „ „	1.6 „	3.2 „
— „ 7 „ „ „ 7 „ „	2.4 „	4.8 „
Total.....		100.0 „

This formula yields results the progressive differences in which are sufficiently regular, and, except at the beginning and end of the table to which it may be applied, it has the advantage of maintaining exactly the aggregate mortality indicated by the unadjusted numbers, only altering its distribution at various ages.

It has the disadvantage, however, of making the result for any age dependent on the observed mortality of so long a period of life as 7 years before and 7 years after that age, or 15 years altogether. In the case of the tables for which the formula was devised, which did not reach below the age of 10 years, this was perhaps of little importance ; but it appeared to be a grave objection to its application to the

present tables, in which at early ages there is a rapid radical alteration in the rate of mortality.

After careful consideration the following formula was constructed, and used for the adjustment of the "Upper Class" tables, as being apparently best adapted to meet the various requirements of the case.

In this formula the adjusted probability of dying in one year at any given age is composed of the undermentioned percentages of the unadjusted probabilities of dying in one year (column F table I), at that and contiguous ages, viz. :—

	At each age.	Total.
At the given age	$17\frac{1}{3}$ %	$17\frac{1}{3}$ %
+ at ages 1 year older and 1 year younger	16 „	32 „
+ „ „ 2 „ „ „ 2 „ „	12 „	24 „
+ „ „ 3 „ „ „ 3 „ „	8 „	16 „
+ „ „ 4 „ „ „ 4 „ „	4 „	8 „
+ „ „ 5 „ „ „ 5 „ „	$1\frac{1}{3}$ „	$2\frac{2}{3}$ „
Total.....	100 „	

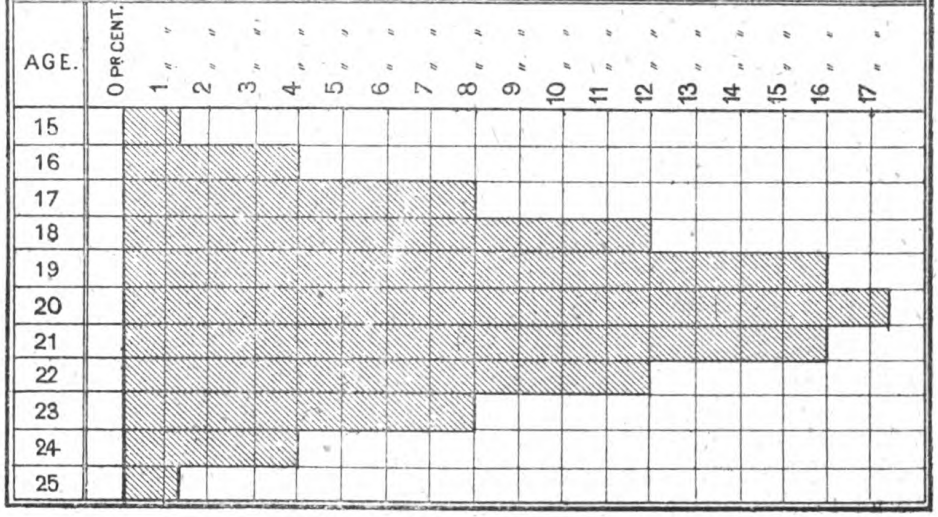
As, however, there is a rapid diminution in the rate of mortality for a few years after birth, the adjustment was not applied at all under the age of 2 years, and between that age and age 9 it was gradually brought into operation, not arbitrarily, but in such a way as still to maintain in the adjusted probabilities of dying exactly the same aggregate mortality as is indicated by the unadjusted probabilities.

The successive differences in the results obtained by the use of this formula were found on trial to be even more regular in their progression, than those yielded by the other one, and it is moreover easy of application, which is a consideration not immaterial when, as was the case here, many tables had to be dealt with.

The following are graphical illustrations of the construction of the two formula respectively:—

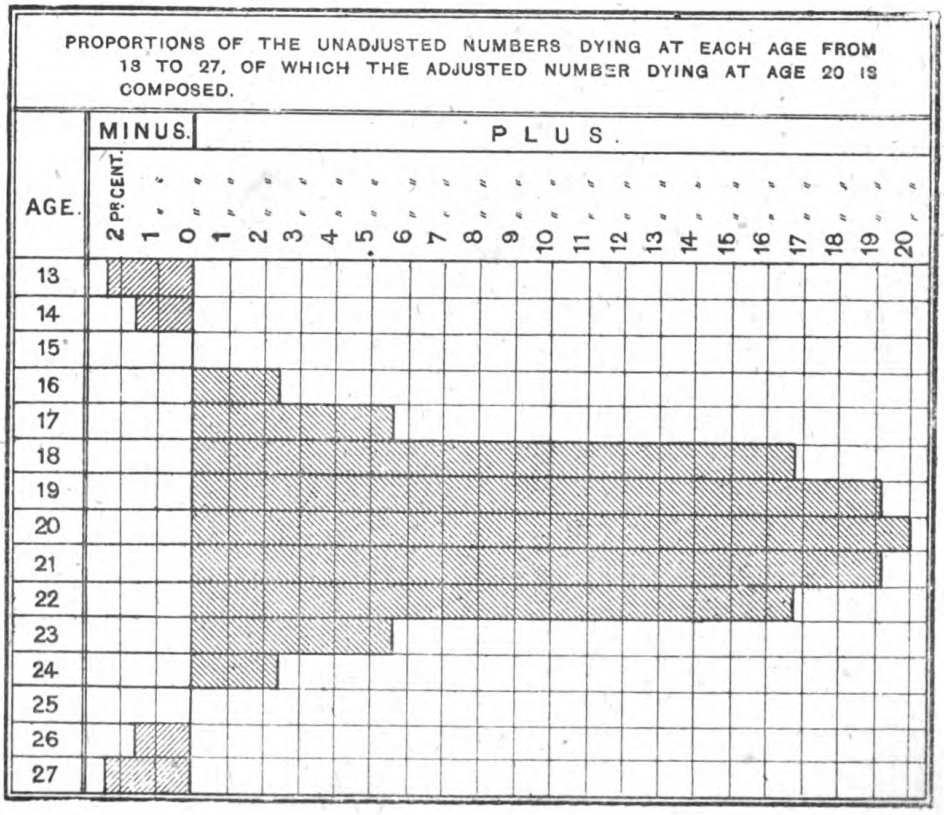
FORMULA
USED FOR THE ADJUSTMENT OF THE "UPPER CLASS" TABLES.

PROPORTIONS OF THE UNADJUSTED PROBABILITIES OF DYING IN ONE YEAR AT EACH AGE FROM 15 TO 25, OF WHICH THE ADJUSTED PROBABILITY OF DYING IN ONE YEAR AT AGE 20 IS COMPOSED.



MR. WOOLHOUSE'S FORMULA.

PROPORTIONS OF THE UNADJUSTED NUMBERS DYING AT EACH AGE FROM 18 TO 27, OF WHICH THE ADJUSTED NUMBER DYING AT AGE 20 IS COMPOSED.



The " Peerage Families " experience was, for the sake of uniformity, adjusted by the same formula as the " Upper Class." The " Clergy Children, 1830," experience was already adjusted by another formula. The " Carlisle " and " English Life " tables do not exist in any other than an adjusted state, or what is tantamount thereto.

Reverting after this somewhat lengthened, but necessary digression, to the diagram (B) under consideration, it will be seen that all the tables there represented have three features in common, viz. :—

1st. A rapid and continuous decrease in the rate of mortality from birth up to a period of childhood, varying from 10 to 13 years of age in four out of the five tables, but stopping at 6 years of age in the case of the " Peerage Families; "

2nd. A rapid and nearly sudden increase of mortality again up to ages varying in the different tables from 17 to 21 years ;

3rd. And after those ages a much slower rate of increase.

It may also be observed that the " Upper Class " experience shows but a very slight increase in the rate of mortality after 22 years of age up to age 33, while the " Peerage Families " experience even exhibits a decrease between those ages. The " Carlisle " table also exhibits a similar feature, though at a period of life 6 or 7 years earlier.

In infancy and early childhood the " Peerage Families " experience indicates a lower rate of mortality than any of the other tables ; but at all higher ages the " Upper Class " experience is the most favourable, with the exception of one short period between ages 19 and 28, where the " Carlisle " holds the first position.

It may not be uninteresting to trace by means of the diagram and tables the parallels of equal mortality in early and declining life. Thus, the rate of mortality is about the same :—

By the "Upper Class" Experience.				By the "English Life" Tables.			
At Age	1	as at Age	69	At Age	1	as at Age	72
,,	2	,,	56	,,	2	,,	65
,,	3	,,	36	,,	3	,,	59
,,	4	,,	21	,,	4	,,	53
,,	5	,,	19	,,	5	,,	46
,,	6	,,	17	,,	6	,,	37
,,	7	,,	16	,,	7	,,	28

CHAPTER V.

Mortality among Males and Females separately.

In table III. are given the numbers of males and females respectively that survive every year of age up to age 70 out of 100,000 of each born alive, according to the "Upper Class" experience and the "English Life" tables; and these are graphically illustrated by diagram C.

It is here observable that at every age the aggregate mortality from birth up to such age is greater among males than among females, or, in other words, that out of the same numbers of each sex born alive, fewer males than females survive to any given age.

Diagram D shows the numbers of males and females respectively living at each age up to 60, out of which one death would take place in one year, according to the same tables that diagram C refers to, and it thus illustrates the relative rates of mortality of the two sexes at different periods of life.

Here both the male and female curves exhibit features the same in the main as are observable in diagram B, which

relates to the two sexes combined; viz., a rapid decrease in the rate of mortality from birth up to an age varying in the different curves from 10 to 13 years; next a nearly equally rapid increase for a few years, terminating in both the male curves and in the "English Life" female curve at age 20; and then a sudden change to a much slower and tolerably uniform rate of increase.

Comparing the mortality of the two sexes as shown by the "Upper Class" experience, it will be seen that, with the exception of a short interval at about age 2, the female mortality is less than that among males from birth up to 10 years of age; that from then up to age 17 the male is considerably less than the female mortality, and that after the last mentioned age the mortality among females is materially lower than among males.

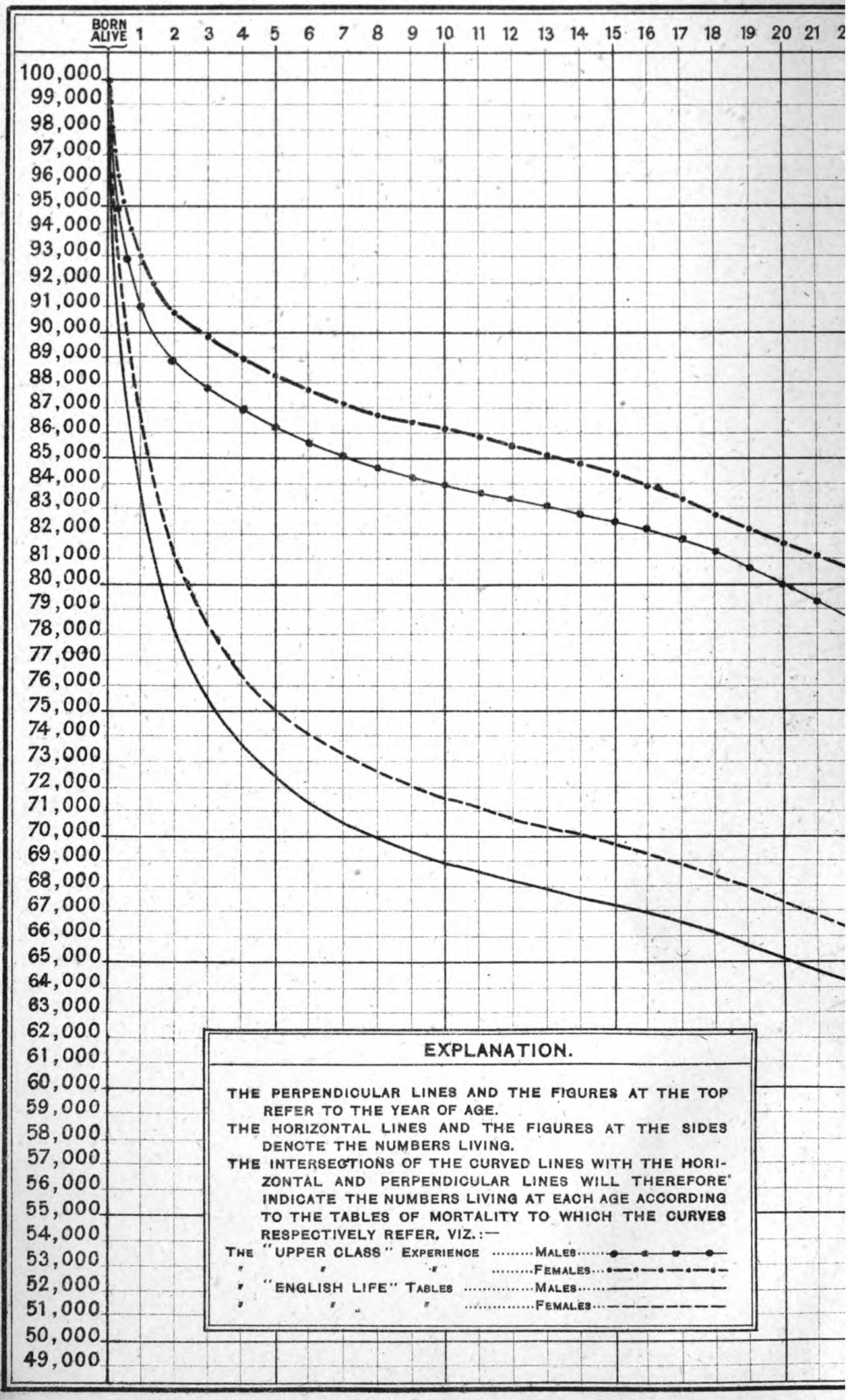
By the "English Life" tables, however, the relation between the respective rates of mortality of the two sexes is different. There the excess of male over female mortality is not, at any period of life within the range of the diagram, nearly so marked as in the "Upper Class" experience, and indeed at all ages between 9 and 38 the mortality among the females somewhat exceeds that among males.

In the period of life between age 18, when adolescence may be considered to be established, and age 50, by which time the physical powers have generally begun to show symptoms of decline, there die, of those alive at the commencement of the period, according to the "Upper Class" experience, 21·30 per cent. of the females, and 28·17 per cent. of the males, being in the proportion of 1000 to 1323. But by the "English Life" tables the percentages are 30·85 females to 31·10 males, or in the proportion of 1000 to 1008.

The great difference between the two tables here exhibited is probably traceable to women in the upper classes living under conditions more favorable to health than the men do, while in the lower classes that is not the case.

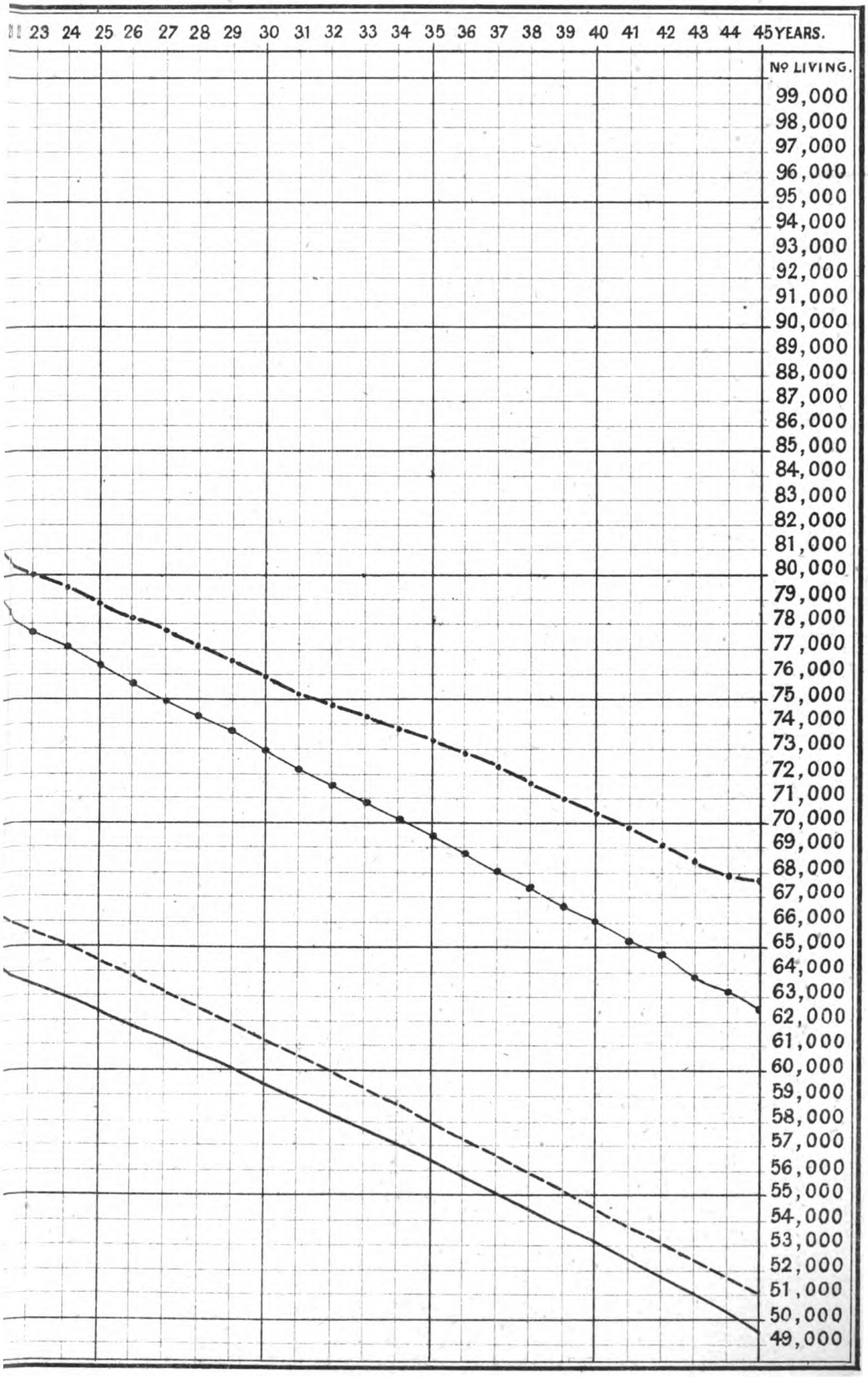
DIAG

SHOWING, OUT OF 100,000 CHILDREN BORN ALIVE, THE NUM



AGRAM C:

UMBER THAT SURVIVE TO EACH OF THE UNDERMENTIONED AGES.



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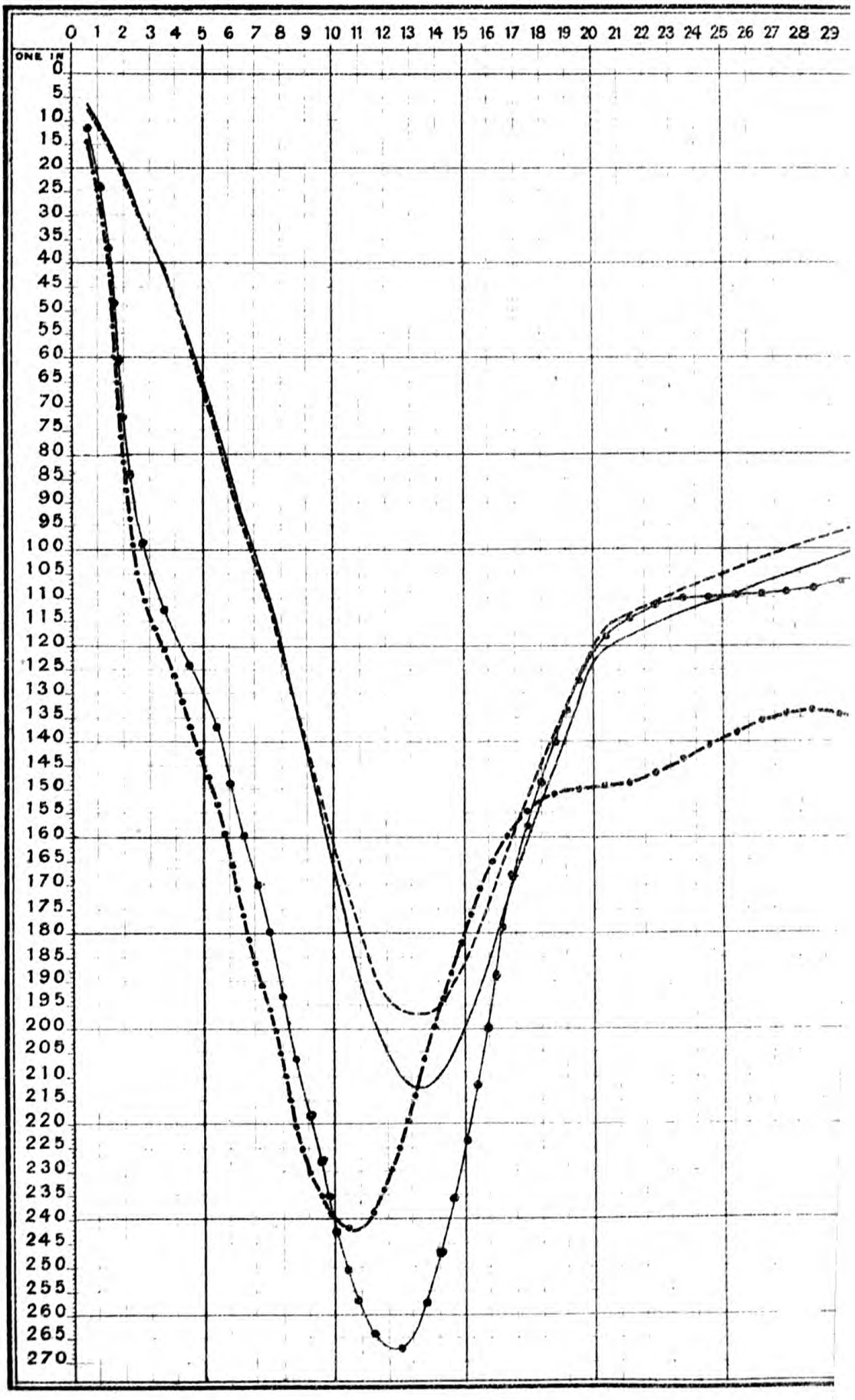
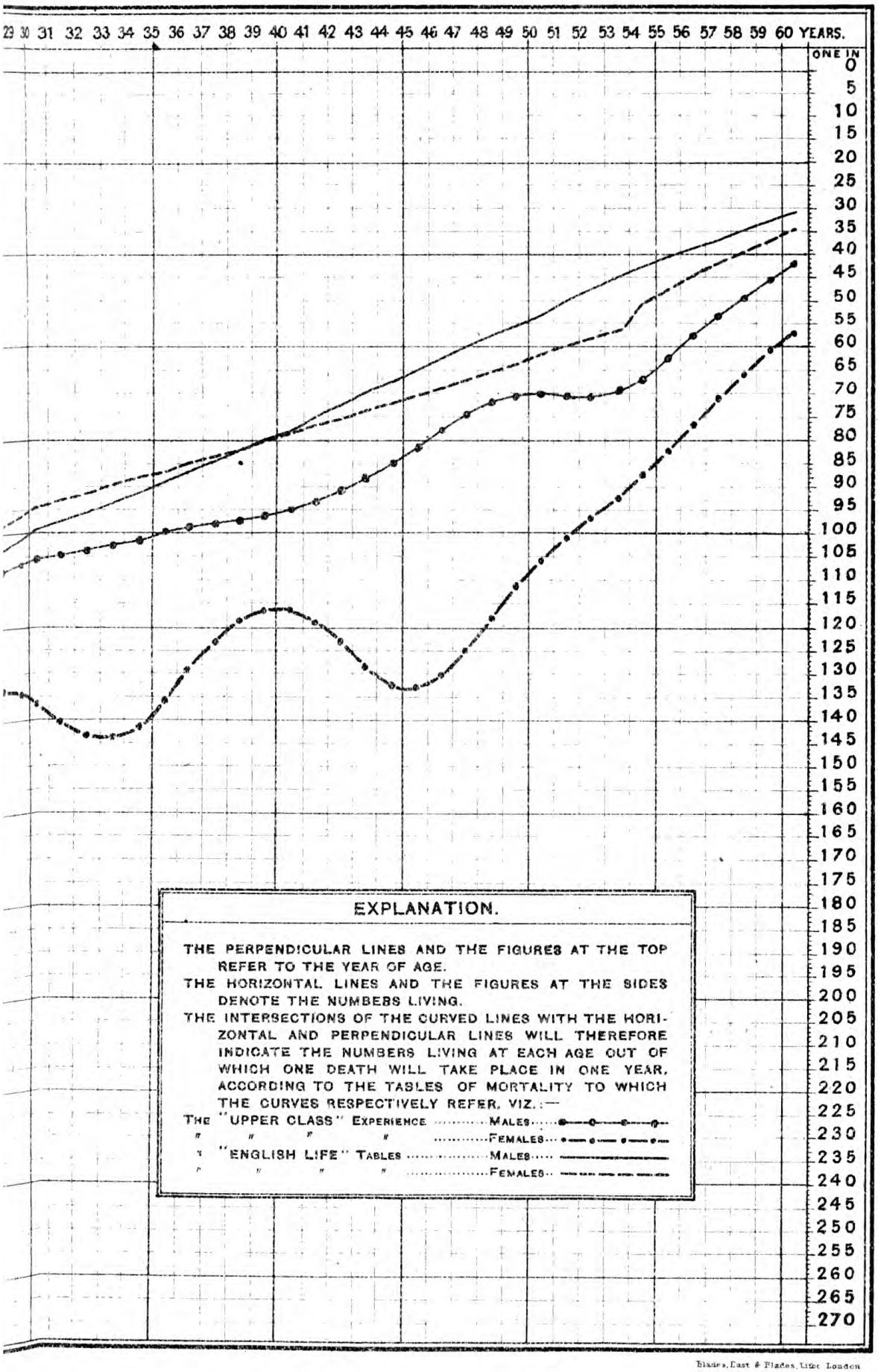
DIAGI

SHOWING THE NUMBERS LIVING AT ANY AGE UNDER 60. (



GRAM D:

OUT OF WHICH ONE DEATH WILL TAKE PLACE IN ONE YEAR.



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In the upper and professional classes it is upon the men that the wearing toil and anxieties of life chiefly press, the women enjoying a comparative exemption from them. In the present age, when so many are striving to be foremost in the race of life, the husband is frequently, or it may be constantly, engaged in an arduous struggle to maintain or improve his position, and, whether successful or unsuccessful, he, in too many instances, injures his health in the effort. Unless, however, he be exceptionally unfortunate, and at the same time have no friends to fall back upon, his wife and family will probably still be sufficiently supplied with the bare physical necessaries for healthy existence. With the labouring classes the case is very different. Among them the mental anxieties of obtaining a livelihood are rarely great enough to produce injurious results, but if the husband's wages are insufficient, the consequent physical privations tell upon the health of his family, his wife included, at least as much as, and probably more than, upon his own.

There are observable in the "Upper Class" female curve two striking deflections, one at about age 33, and the other at about age 45, indicating decided diminutions in the rate of mortality for a few years at those periods of life. There are not any distinct traces of such deflections in the male curve, nor in the "English Life" curves, male or female; but they appear, though in a minor degree, and not at precisely the same ages, both in the "Carlisle" table (which includes males and females), and in the females of the "Peerage Families" experience.

In the "Upper Class" female curve the deflections alluded to are too strongly marked to admit of the supposition that they are accidental, or are attributable to the observations not extending over numbers sufficiently large to ensure an approximately correct average; and it may therefore be considered, as at least highly probable, that among females in the upper classes the rate of mortality, instead of constantly increasing after the period

of childhood, as it does among males, experiences some diminution for a few years after ages 29 and 40 respectively as compared with what it is immediately antecedent to those ages.

CHAPTER VI.

Mortality in Infancy.

As the mortality in infancy is very great, indeed greater than at any later period of life short of extreme old age, it seemed desirable to analyze it more minutely than was done in the general tables.

With that view the original returns were referred to, and the deaths of all infants who died under one year of age, of whose births and deaths the precise dates were given, were extracted, and tabulated for each day of age at death up to the twenty-first day after birth, and for each week of age beyond that period; males being distinguished from females.

In many cases however the precise day of birth or of death was omitted to be stated, the months only being given, or the child being described as so many days, weeks or months old at death. These were all collected together by themselves, without distinction, except as to sex, and were afterwards arranged under the different ages at death in exact proportion to the numbers of precisely recorded deaths at each age.

The tables so obtained were then adjusted by a modification of the formula employed in adjusting the general tables, but the mortality of each sex on the day of birth was left unaltered.

The results will be found in table IV. in two forms, viz., firstly the numbers surviving to, and dying in, each interval of age out of 100,000 born alive; and, secondly, the numbers that die in one day at each age out of 365,000 alive at the

commencement of each day, or, what is equivalent thereto, the numbers that would die in one year out of 1000 constantly maintained alive at each age, if the rate of mortality at such age remained unchanged for a whole year afterwards.

By prefixing, therefore, a decimal spot, and a cypher where it is required to make up three places of decimals, these latter numbers become directly comparable with the probabilities of dying in one year in the general and other tables.

The proportionate numbers of deaths in one day at each period of age are graphically illustrated by diagram E, which, however, does not extend below the third day after birth, the death rate before then being too high to be depicted without unduly extending the size of the diagram.

In tracing the rate of mortality the first feature that presents itself to notice is the large number of deaths that take place on the same day as birth ; as much as 10 per cent. of the total mortality of the first year of life in the case of males, and $8\frac{1}{2}$ per cent. in that of females, occurring on that day. In estimating the significance of these proportions, it is to be borne in mind that the day of birth includes an average life period of twelve hours only; since, assuming that births occur indifferently at all times of the day and night, the mean hour of birth will be half way between the beginning and the end of the day.

The far greater part however of this mortality, as well as of that which prevails for the first few days after birth, probably arises more from the infants failing to acquire full vitality in their new stage of existence, or from congenital malformation rendering it impossible for life to be maintained independent of the mother, than from the operation of any external causes after birth.

From birth up to the eighth day afterwards there is a rapid diminution in the rate of mortality, but then a change sets in, and the rate increases until the fourteenth day, when

it reaches its maximum ; at which period the mortality is more than 50 per cent. in excess of what it was on the eighth day.

The cause of this remarkable temporary increase in the death rate is not readily apparent, but it is indicated at precisely the same ages in both sexes, although in greater degree among males than females, in this respect exhibiting a feature which characterises other fluctuations in the rate of mortality at later periods of life.

From the fourteenth day the mortality in both sexes rapidly decreases again. In the male curve this rapid rate of decrease changes during the fourth week to a much slower one, which, with the exception of two periods of perturbation, is continued to the end of the year.

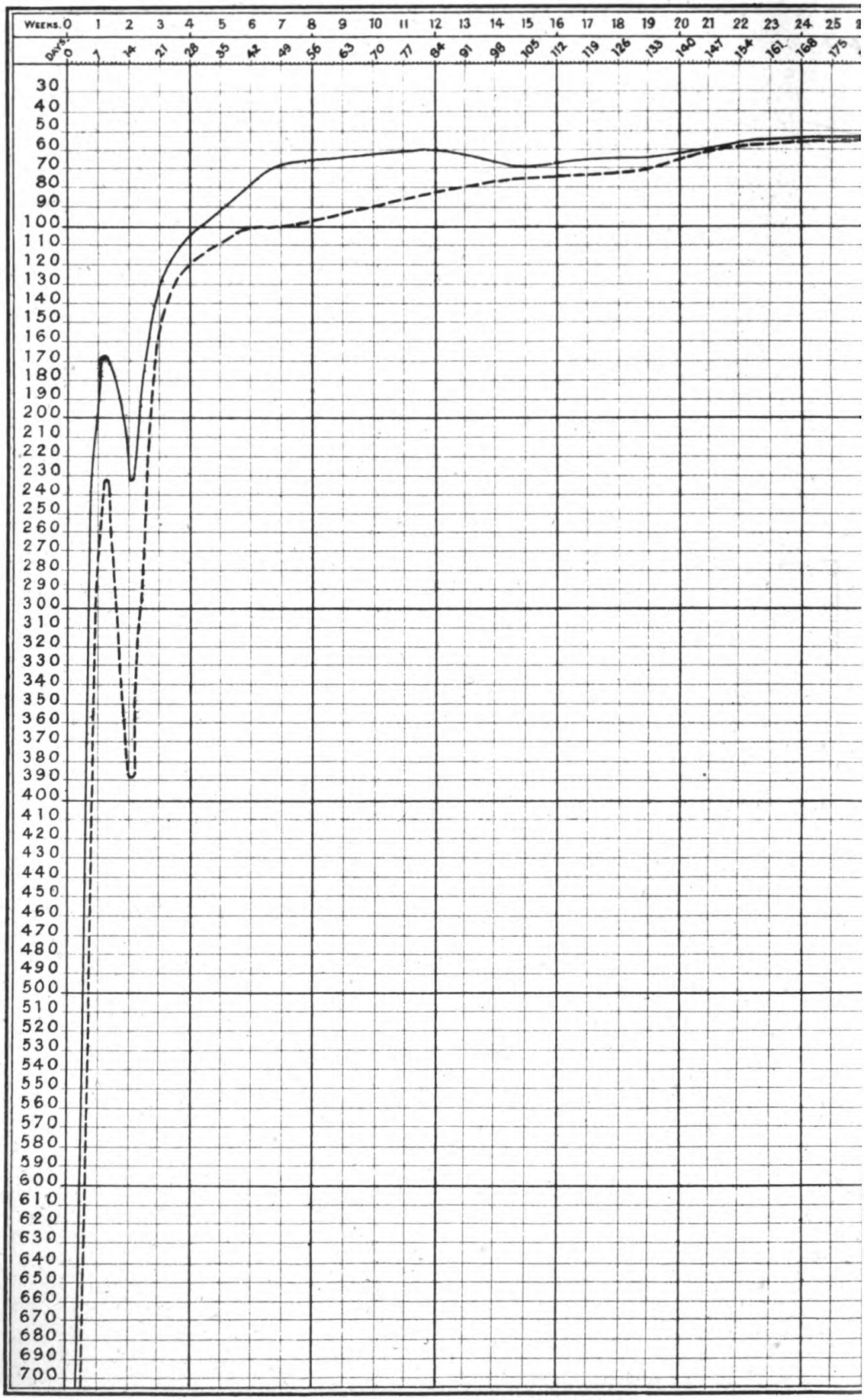
The female curve pursues a generally similar course, but the rapid rate of decrease is maintained till the seventh week, and it does not alter so abruptly to a slower one as in the male curve.

The periods of perturbation alluded to occur in both sexes at the same ages. The first one commences at the thirtieth week, from which time up to the thirty-third week with males and the thirty-second week with females, there is a progressive increase in the death rate, and the latter does not regain its previous minimum until the thirty-ninth and thirty-eighth weeks with males and females respectively. The source of the temporary increase of mortality at this period of infancy may not improbably be traced to the disturbance of the constitution induced by dentition.

The second perturbation shows itself at the forty-eighth week with males and at the forty-seventh week with females, at which periods the progressive decrease in the rate of mortality is again arrested, and an increase sets in, which continues to the end of the year.

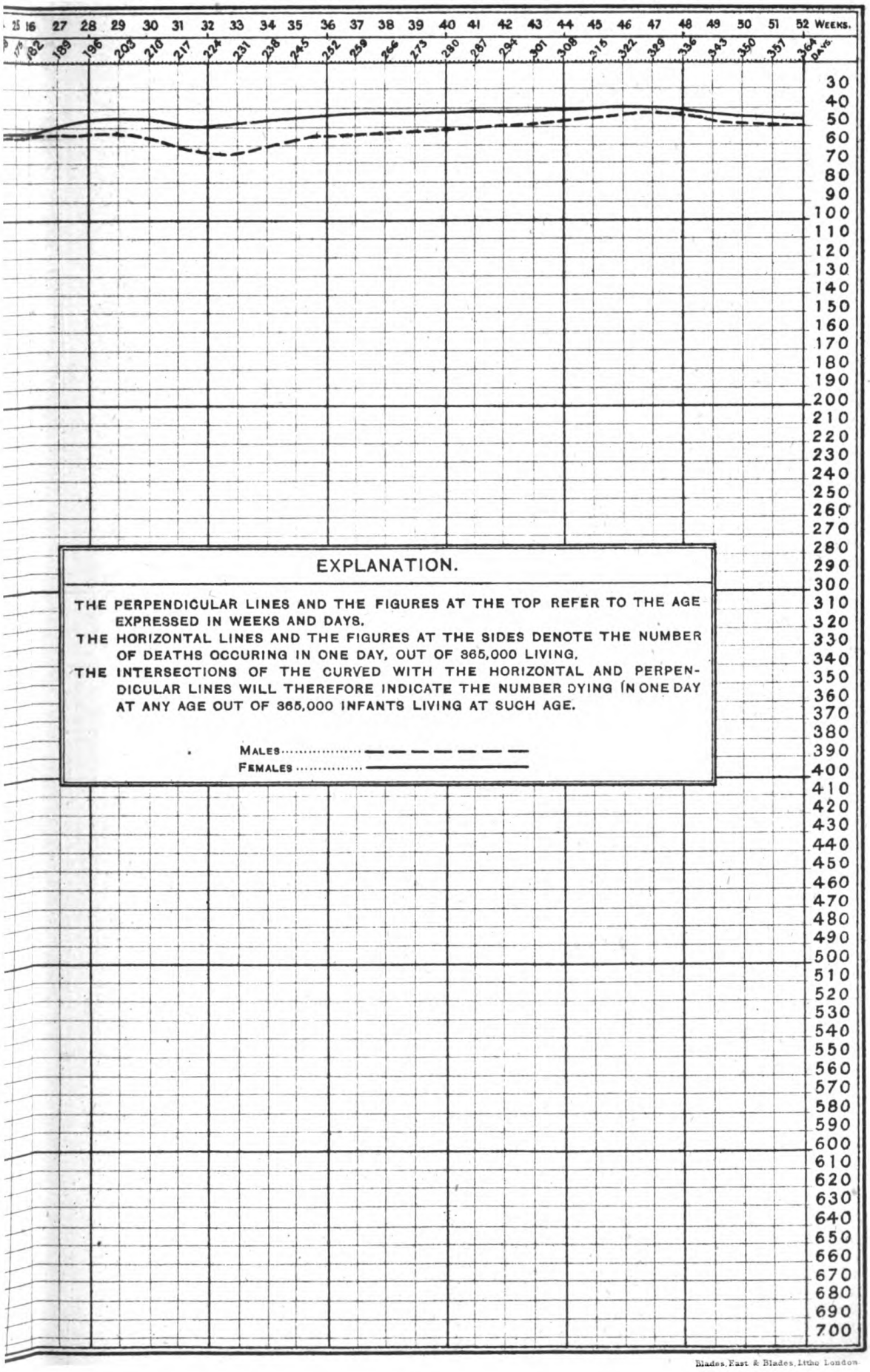
DIAGR

SHOWING THE INTENSITY OF MORTALITY UNDER ONE YEA



AGRAM E:

YEAR OF AGE. ACCORDING TO THE "UPPER CLASS" EXPERIENCE.



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There is another temporary increase of mortality observable among females, but not among males, for a short time before and after the sixteenth week.

All through the first year of life the mortality is greater among males than among females, but the ratio of one to the other varies very considerably at different periods of it, the distinction being much more marked in the earlier than in the more advanced stages of infancy, and in some of the latter it is scarcely perceptible.

The following table shows the ratios of male to female mortality on the day of birth, and in each interval of thirteen weeks afterwards. Also the proportions of the whole mortality in the first year that take place in those intervals.

Period.	Number of Deaths of Males to 1000 Deaths of Females out of equal numbers of each born Alive.	Proportion of the Total Mortality in the First Year.	
		Males.	Females.
		Per Cent.	Per Cent.
Day of Birth	1506	10·02	8·44
First 13 weeks afterwards...	1402	45·84	41·58
Second „ „ ...	1064	17·42	20·76
Third „ „ ...	1194	14·64	15·55
Fourth „ „ ...	1120	12·08	13·67
Average and Totals ...	1268	100·00	100·00

CHAPTER VII.

The Rate of Mortality among Children classified according to the Professions of their Fathers.

The data available for this branch of the enquiry consist of:—

16,981 Children of Clergymen,
5,710 Children of members of the Legal Profession,
6,477 Children of members of the Medical Profession, and
19,931 Children whose fathers did not belong to either of those Professions (general).

The rate of mortality in each class was calculated in the manner described in Chapter III., and the numbers, thus deduced, that would survive to each age, up to age 45, out of an assumed number of 100,000 born alive, are stated in table V., and pictorially delineated in diagram F.

The variations between the several classes, considered with regard to the whole period, are unimportant, the curves of all nearly meeting at age 43, where the difference between the aggregate mortality from birth of the highest and the lowest scarcely exceeds 3 per cent.; viewed, however, in shorter intervals of age, as in the following arrangement, the differences at some periods are more considerable.

NUMBERS OF DEATHS THAT TAKE PLACE IN VARIOUS INTERVALS OF AGE OUT OF 10,000 LIVING AT THE COMMENCEMENT OF SUCH INTERVALS.

AGE.	CLERGY.	LEGAL.	MEDICAL.	GENERAL.
Birth to 1 Year.....	738	797	867	843
1 Year „ 15 Years ...	844	887	1007	994
15 „ „ 25 „ ...	743	692	644	682
25 „ „ 35 „ ..	857	765	613	799
35 „ „ 45 „ ...	888	949	860	880

It will be seen that in infancy and childhood the Clergy mortality is the lowest, and the Medical the highest, of any of the classes; but that in the two succeeding decades, viz.: from age 15 to age 35, their relative positions are exactly reversed, the Clergy then becoming the worst, and the Medical the best.

Up to age 30 the mortality of the Legal class assimilates more nearly to that of the Clergy than to that of either of the other classes; and throughout the same period of life a very close correspondence is observable between the Medical and General classes.

The low rate of mortality among the children of Clergymen in infancy and childhood may probably, in part, be attributed, directly to a larger proportion of them being

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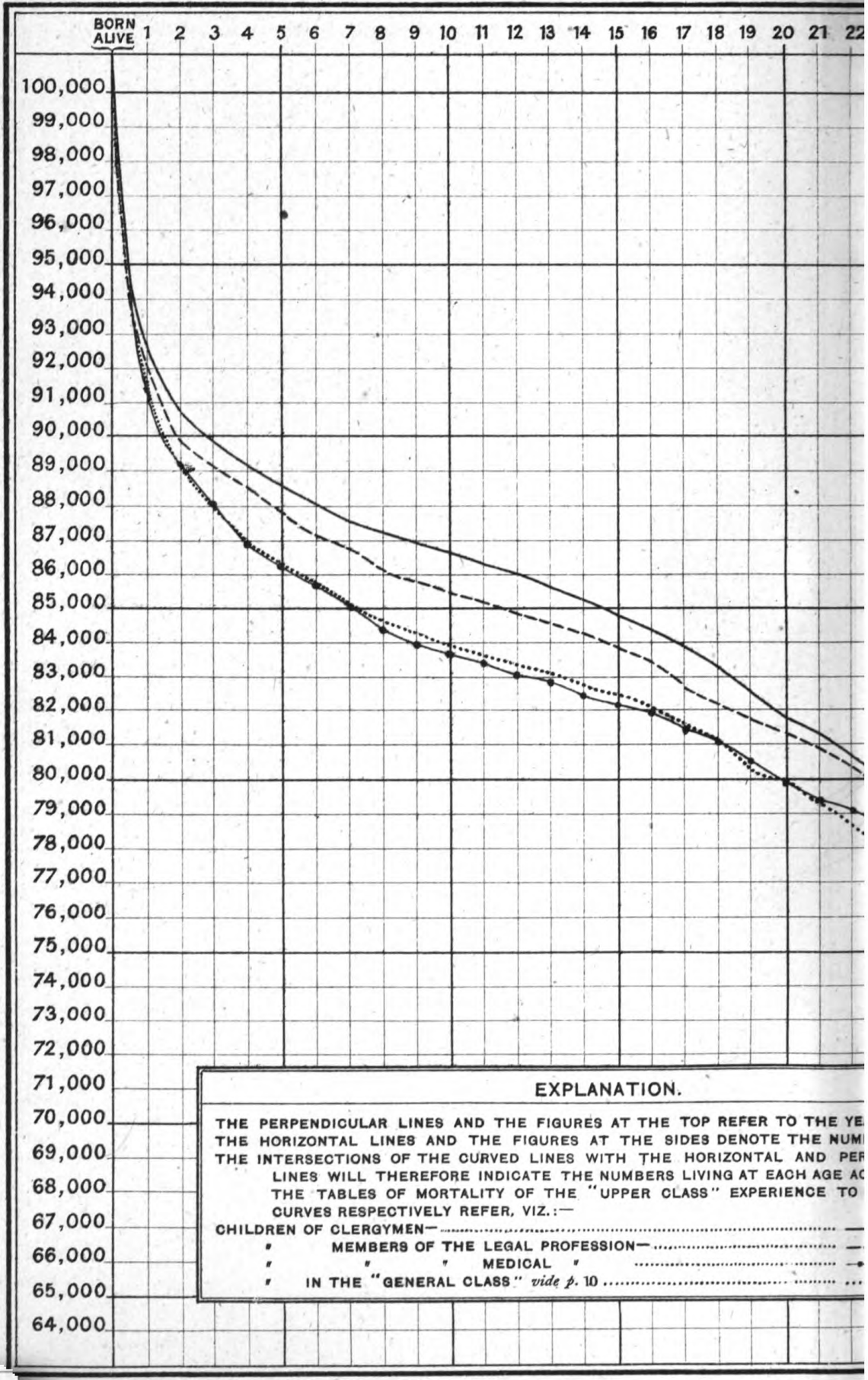


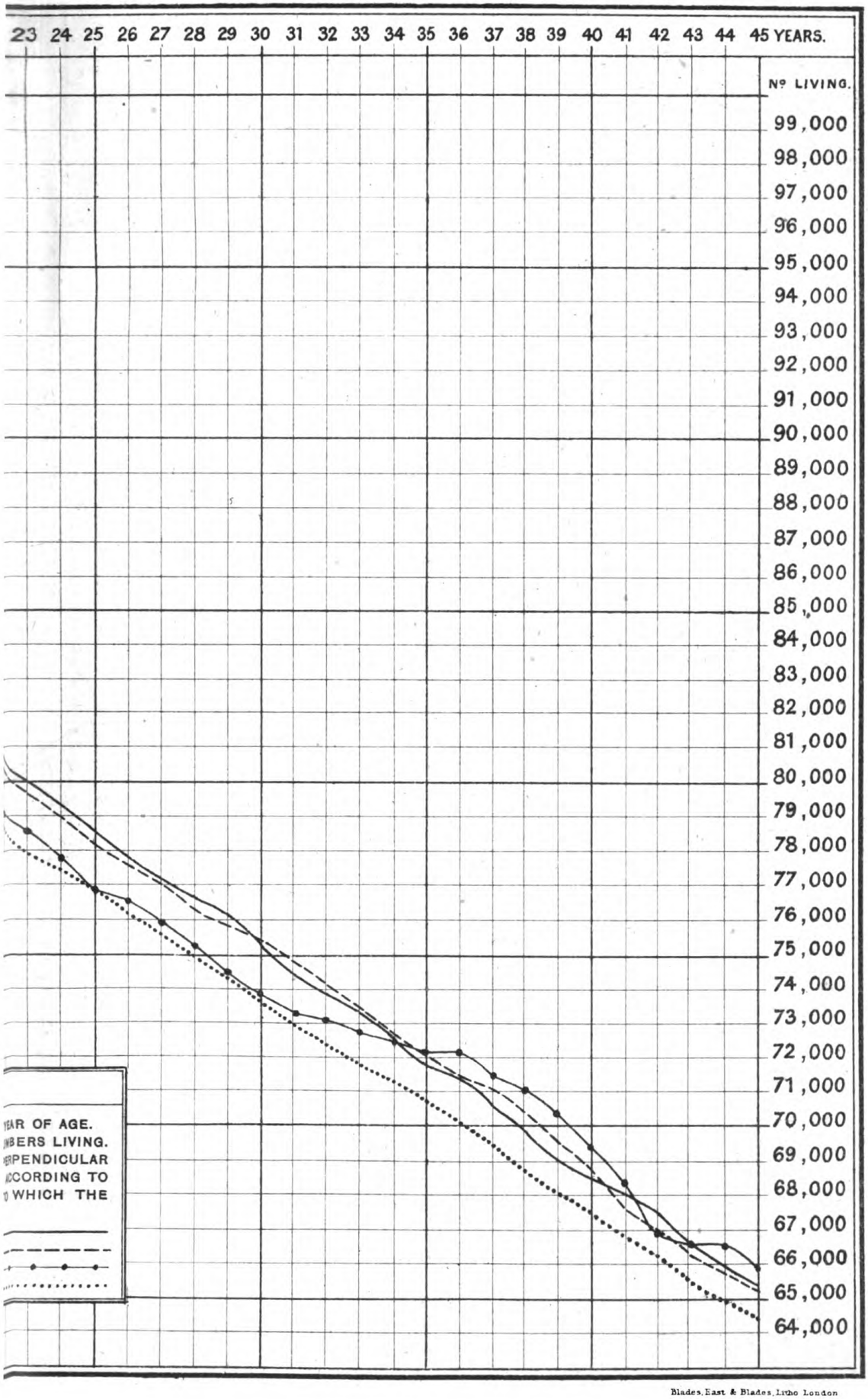
EXPLANATION.

THE PERPENDICULAR LINES AND THE FIGURES AT THE TOP REFER TO THE YE
THE HORIZONTAL LINES AND THE FIGURES AT THE SIDES DENOTE THE NUM
THE INTERSECTIONS OF THE CURVED LINES WITH THE HORIZONTAL AND PER
LINES WILL THEREFORE INDICATE THE NUMBERS LIVING AT EACH AGE AC
THE TABLES OF MORTALITY OF THE "UPPER CLASS" EXPERIENCE TO
CURVES RESPECTIVELY REFER, VIZ.:—

CHILDREN OF CLERGYMEN— .....
" MEMBERS OF THE LEGAL PROFESSION— .....
" " " MEDICAL " .....
" IN THE "GENERAL CLASS" *vide p.* 10 .....

\M F:

R THAT SURVIVE TO EACH OF THE UNDERMENTIONED AGES.



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brought up in the country, and thus removed from the ill effects of residence in towns, than is the case in the other classes; and indirectly to the same circumstance inducing more vigorous constitutions in the parents, so that the children have a greater inherent vitality; for the table indicates that the ratios of still-born children in the several classes follow the same order as their respective rates of mortality in infancy and childhood.

The only exception to this rule is the "General." But as a large proportion of the returns in that class were made by one of the sons, and not by the fathers, it is very possible that in some cases the fact of their having had still-born brothers or sisters might not be known to the persons making the returns, and such, consequently, being omitted, would cause the number of still births in that class to be understated.

CHAPTER VIII.

The Rate of Mortality among Children classified according to the numerical order of their births.

With a view to this part of the investigation the data were arranged in five classes, viz:—

First	Children
Second	"
Third	"
Fourth, fifth and sixth	"
Seventh and younger	"

such numerical orders of birth having reference to the issue of marriages, and not of the parents separately.

In estimating the order, no distinction was made between those born alive and those born dead; and multiple births were considered as single ones.

The numbers in each class were as follow:—

8,158	first	Children
7,682	second	"
6,947	third	"
15,334	fourth, fifth and sixth	"
10,722	seventh and younger.....	"

in addition to which there were 256 cases, where, owing to the returns being defective, the order of birth was uncertain.

The numbers that survive to every age up to 45, out of an assumed number of 100,000 born alive in each class, will be found in table VI., and that table is graphically illustrated by diagram G; the adjusted rate of mortality at different periods of life being similarly illustrated by diagram H.

One remarkable feature here observable is the large number of still-born eldest children, the proportion of dead to living births in that class being more than double the average of the other classes.

In the first week of life also the mortality amongst eldest children is much greater than in either of the other classes; but after that period it falls below the average for several years, and at most ages, up to the end of the sixth year, the eldest children shew the most favorable rate of mortality of all.

The mortality curve of eldest children, diagram H, differs also from those of younger children in two other respects, viz.:—*Firstly:* in the progressive diminution in the death rate during childhood terminating earlier and changing less abruptly to an increase; and *Secondly:* in there being another well-marked diminution after the twenty-second year.

Looking, however, at the aggregate mortality from birth to adult age (diagram G) there does not appear to be any important variation in the first four classes, the curves of the numbers left alive all approximating to each other very

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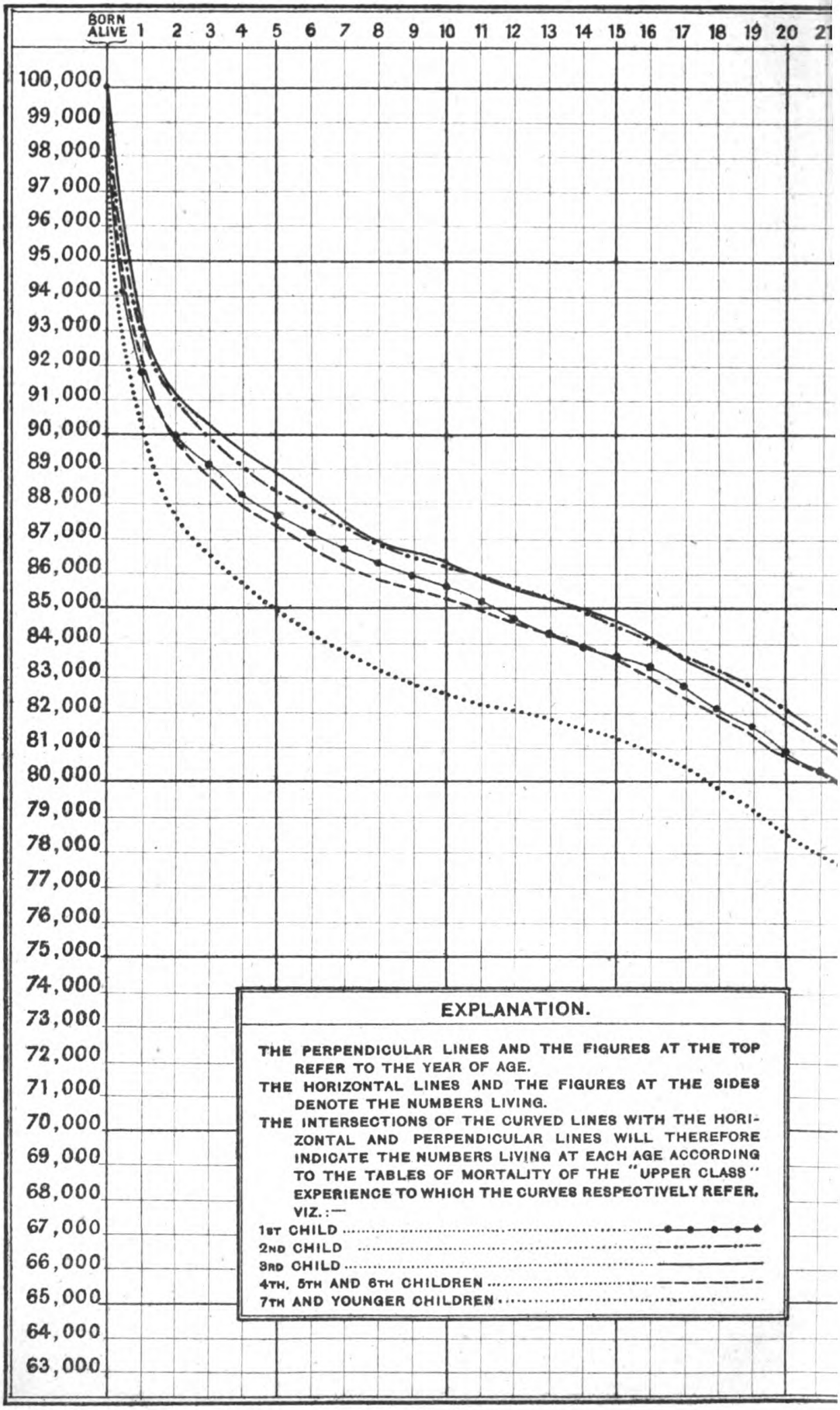
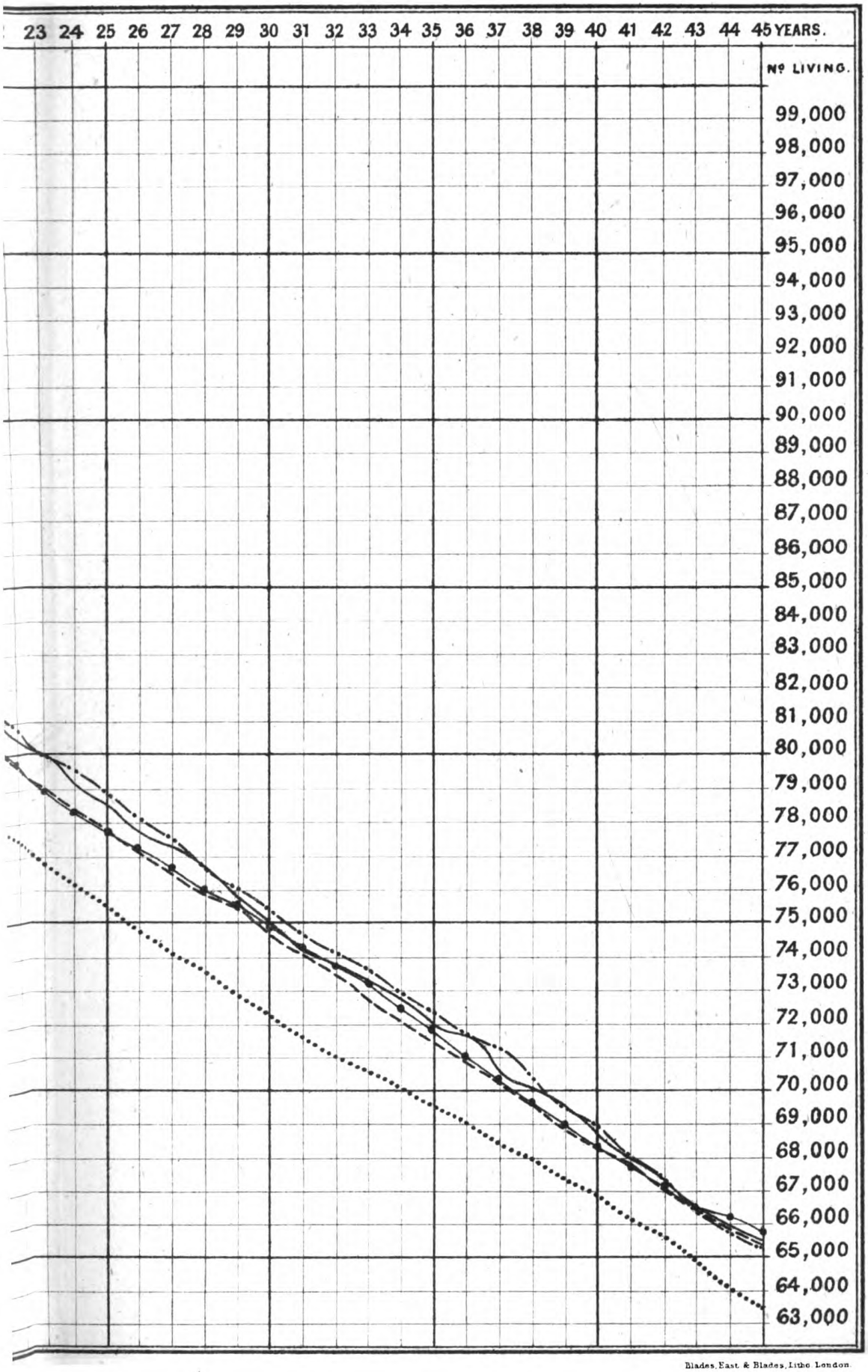
SHOWING, OUT OF 100,000 CHILDREN BORN ALIVE THE NU



RAM G:

BER THAT SURVIVE TO EACH OF THE UNDERMENTIONED AGES.



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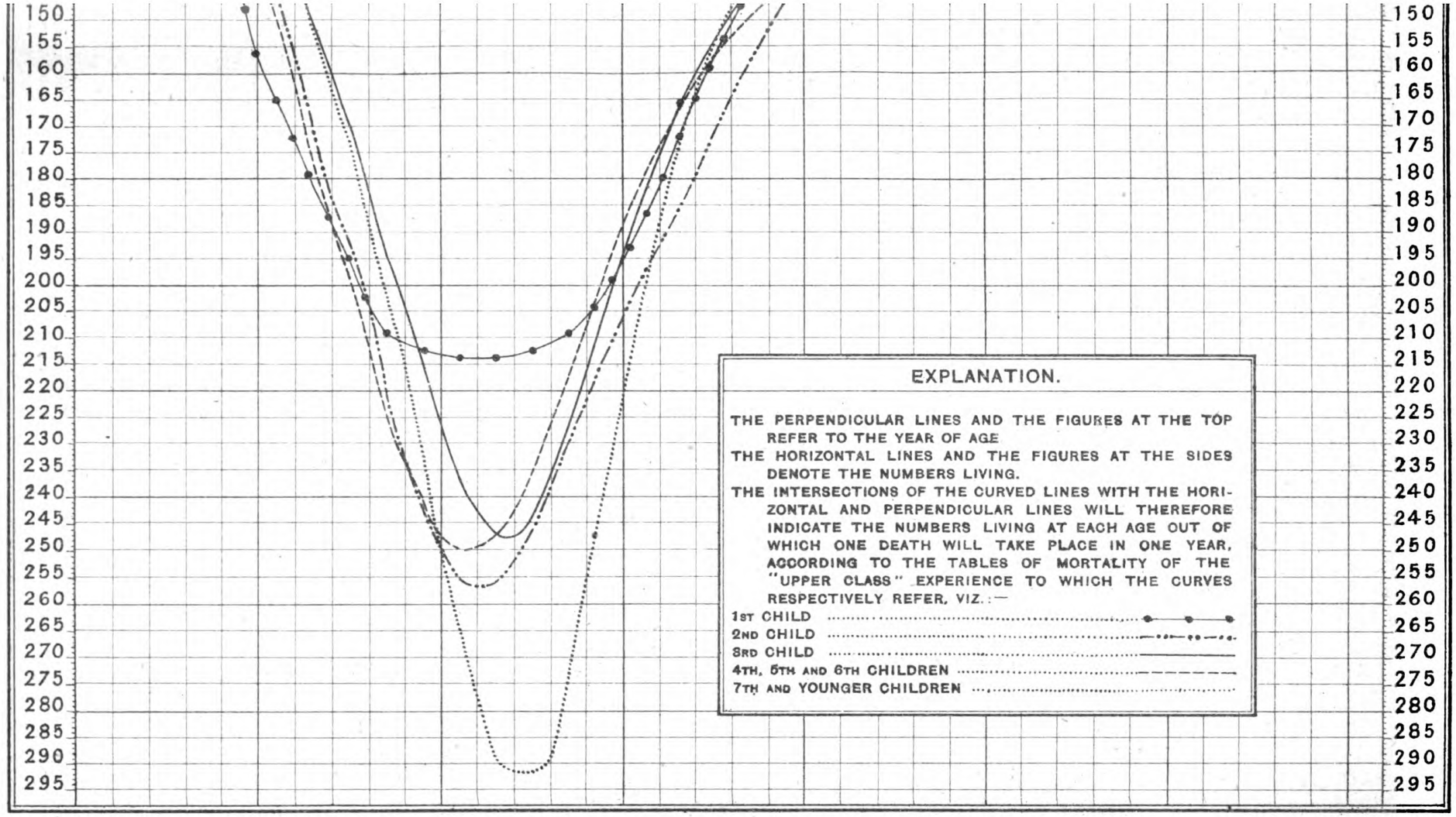

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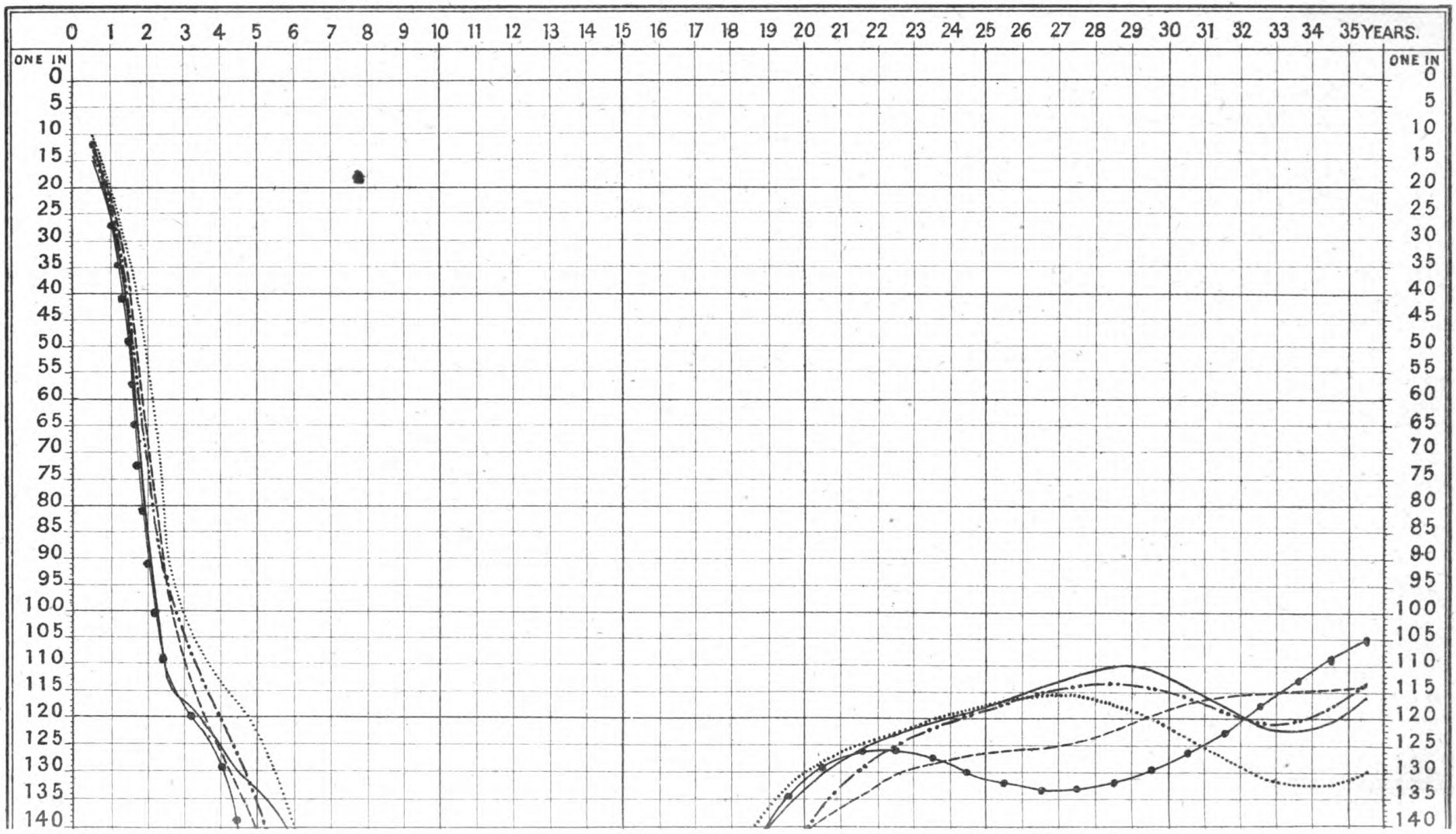
DIAGRAM H:

SHOWING THE NUMBERS LIVING AT ANY AGE UNDER 35. OUT OF WHICH ONE DEATH WILL TAKE PLACE IN ONE YEAR.



closely throughout; and at age 43, which, by a somewhat singular coincidence, is the same age at which the curves of the classifications by professions most nearly approach each other, they almost meet, the distance between the two which are furthest apart not indicating a greater difference than one-half per cent. in the aggregate mortality from birth to that age.

Among seventh and younger children the mortality in infancy and early childhood seems to be distinctly greater than in either of the other classes, the excess, above the average of elder children, during the first eight years of life, amounting to nearly 24 per cent.

Afterwards, however, their mortality is, on the whole, below the average of the others, but still not sufficiently so to entirely neutralize the previous excess, and, therefore, the aggregate mortality from the commencement of life remains, at all ages to which the observations extend, greater among seventh and younger children than among those prior to them in order of birth.

CHAPTER IX.

Relative Proportions of Males and Females Living at Different Periods of Life.

In table VII., columns A and B, are given the respective numbers that survive each year of age from birth up to age 75, according to the "Upper Class" adjusted experience, the starting numbers of 105,299 males and 100,000 females expressing the relative proportions of each, born alive as stated at page 6, viz., 24,640 males to 23,400 females.

Column C shows the number of males living at any age to every 1000 females living at the same age.

Columns D, E, and F contain similar particulars deduced from the "English Life" tables, and correspond to columns A, B, and C respectively.

The proportions of the two sexes at birth are, it will be seen, very nearly the same by both tables, there being by the "Upper Class" experience 1053 males, and by the "English Life" tables 1048 males, to 1000 females. The preponderance however in the number of males diminishes as the age advances, in consequence of the mortality among them being greater than among the females, the diminution being most rapid in the first year of life. At age 34 by the "Upper Class," and at age 53 by the "English Life" tables the numbers of the two sexes have become equal; and after those ages the diminution in the proportion of males still goes on, but faster in the "Upper Class" experience than in the "English Life" tables, so that at age 70 there are by the former tables only 813, and by the latter tables 925 males to 1000 females living.

The relative numbers born of the two sexes have been found to be as follow among the general populations of the undermentioned countries during the present century :—*

NUMBER OF MALES TO 1,000 FEMALES.

Country.	Born Alive.	Total Births including Stillborn	Country.	Born Alive.	Total Births including Stillborn
Austria.....	1062	1066	Norway	1050	1059
Baden	.....	1059	Prussia	.. ...	1057
Bavaria	.....	1068	Saxony	.....	1065
Belgium	1052	.....	Scotland.....	1053	.....
Denmark	1041	1055	Sweden	1046	.....
England	1048	.....	"Upper Class"	1051	1060
France	.....	1062			
Hanover	1054	1065			
Holland	.....	1065	Average	1051	1062

* *Vide* Mr. Hendrik's Essay on the Vital Statistics of Sweden, read before the Statistical Society in 1862.

An excess in number of male over female births would therefore appear to prevail generally, at all events among European races. Whether, however, it arises from the operation of any undeviating natural law, ordained, it may be, to compensate for the greater tenderness of the male constitution in infancy; or whether it is due simply to extraneous influences, and, if so, what those influences are, are questions too wide to be here discussed.

Relations of a distinct character may, however, be traced between the proportions of the sexes and the size of families, and also the position of children as regards the numerical order of their birth.

On arranging all the families included in the data in three classes, the first consisting of families with five or any lesser number of children, the second of families with from six to ten children, and the third of families with eleven or more children, the ratio of male to female births, including stillborn, is found to be—

In the 1st class as	1033 to 1000
In the 2nd class as	1075 to 1000
And in the 3rd class as	1083 to 1000

On arranging the children in the order of their birth the ratios are :—

For 1st, 2nd, and 3rd children as ...	1066 to 1000
For 4th, 5th, and 6th children as ...	1055 to 1000
And for 7th and younger children as	1052 to 1000

Hence it appears :—

Firstly. That the proportion of males is greater in large than in small families, and

Secondly. That it is greater among the earlier born than among the later born children.

CHAPTER X.

MULTIPLE BIRTHS.

The Upper Classes data, after allowing for cases in which the incompleteness of the returns render them unavailable for this purpose, furnish 50,289 cases of single births, 482 cases of twins, and 6 cases of triple births, thus making a total of 51,271 children to 50,777 deliveries. These numbers expanded to a radix of 1,000,000 deliveries are compared below with similar statistics of the populations of England and Wales for the year 1852*, and of Sweden for the years 1776 to 1855 inclusive†. The "Upper Class" and Swedish data include still born as well as living children, but as the English statistics refer exclusively to children born alive, the actual numbers as registered have, in order to make them available for comparison, being increased in the ratios that exist in the "upper class" data, between living births and total births, including still born, and between multiple living births and total multiple births, including still born, respectively :—

	In 1,000,000 deliveries there are the undermentioned numbers of				
	Single Births.	Twin Births.	Triple Births.	Quadruple Births.	Children.
"Upper Class."	990,390	9,492	118	0	1,009,729
England & Wales	988,408	11,503	76	...	1,011,643
Sweden	984,161	15,586	248	5	1,016,097

The proportion of still-born children is, as will be shown directly, very much larger in multiple than in single births; and it appears probable that among the former it is greater in triple than in twin births, although the data do not furnish a sufficient number of cases of triplets to warrant any reliable deductions being made from them on that point. If, however, it be so, the proportion of triplets for England and

* Fifteenth Report of the Register General.

† Hendriks on the Vital Statistics of Sweden.

Wales would be understated in the foregoing table, as the addition made to the number of registered cases in which all the children were born alive is based upon the proportion of still-born to living children among multiple births generally in the "Upper Class" experience, and such multiple cases consist almost entirely of twins.

Taking the results shown by the "Upper Class" and England and Wales together, the proportions of multiple to single births may be approximately stated as, one case of twins to a hundred single births, and one case of triplets to a hundred cases of twins. When, however, one case of twins occurs in a family, the probability of subsequent births being multiple is apparently greatly increased. Thus the 482 cases of twins in the "Upper Class" experience were divided among 420 families in which they occurred once, and 31 families in which they occurred twice; showing that when there has been one twin birth in a family, the chance of their being a second one is as much as one out of 15, or even in larger proportion, since in some of the families the mother had not passed the child-bearing period when the returns were made, and there might, consequently, be further cases of second twin births which would not come under observation.

The following table shows out of the total number of children in cases of single and multiple births respectively, the proportions that were still-born, that died on the day of birth, and that survived to the day after birth.

	MALES.		FEMALES.	
	In Single Births.	In Multiple Births.	In Single Births.	In Multiple Births.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Stillborn	2·48	10·96	1·81	6·39
Die on day of Birth	·89	5·47	·59	2·94
Total Dead	3·37	16·43	2·40	9·33
Survive to day after Birth ...	96·63	83·57	97·60	90·67

It thus appears that the proportion of infants that are still-born or die soon after birth is, in the case of males nearly five times, and in the case of females nearly four times, greater in multiple than in single births.

In the fifteenth report of the Register General, it is stated that the following numbers of cases in which two children were born alive at one birth were registered in England and Wales in the year 1852, viz:—

Two Males	1910	cases
One Male and One Female ...	2280	„
Two Females	1846	„
Total	6036	

The births of still-born children are not recorded, but, if it be assumed that the proportion of such in cases of multiple births among the population at large is the same as is indicated by the "Upper Class" experience, the number of twin births in which one or both children were still-born may be estimated on the following principles.

It has already been seen that by the "Upper Class" experience 10.96 per Cent. of the males and 6.39 per Cent. of the females in multiple births are still-born. The relative probabilities of a male being born alive or born dead will therefore be ·8904 and ·1096, and of a female ·9361 and ·0639 respectively. Assuming further that the probability of the death of one twin child taking place before birth is not influenced by the life or death, or by the sex, of the other child, the probabilities in the case of a male and female twin birth—

Of both being born alive will be	·8904 x ·9361 =	·8335
Of the Male being born alive and the Female dead ...	·8904 x ·0639 =	·0569
Of the Female being born alive and the Male dead ...	·9361 x ·1096 =	·1026
Of both being born dead ...	·1096 x ·0639 =	·0070
The sum of the probabilities being equal to certainty as expressed by unity... ...		1·0000

Treating cases of two males and two females respectively by a similar process the resulting probabilities will be—

Probabilities of :—	Two Males.	Two Females.
Both being born alive	·7928	.8762
One being born alive and one stillborn..	·1952	·1197
Both being stillborn	·0120	·0041
	1·0000	1·0000

Applying these probabilities to the cases registered of living twin births, the following numbers are obtained.

Alive or Dead at Birth.	Probable Relative Numbers of Cases.		
	Two Males.	One Male. One Female.	Two Females.
Both alive	1910	2280	1846
One alive, one stillborn ...	470	male 156 alive / female 281 alive	252
Both stillborn	29	19	9
Total	2409	2736	2107

The relative proportions of the sexes deduced from these numbers and from the " Upper Class," data will be—

	Number of Males to 1000 Females in Multiple Births.		
	Born Alive.	Still Born.	Total Births.
" Upper Class " experience	1129	2036	1187
England and Wales (Twins only).	1034	1861	1087

The remaining point for consideration is the proportionate numbers of differently constituted pairs in cases of twins. Of these there are four possible combinations, viz. :—

The first born a male and the second born a male . *i.e.* two males.
" a male " " a female } *i.e.* one of each sex.
" a female " " a male }
" a female " " a female. *i.e.* two females.

If the total numbers of males and females born were equal, and if the constitution of the pairs depended solely upon chance, any one of the four possible combinations would be as likely to occur as any other one; a proposition which may be illustrated in the following manner.

Supposing fifty black and fifty red playing cards to be shuffled together and then one to be drawn out; it is evident that the probabilities of its being a black or of its being a red one are equal; and as it must necessarily be either the one or the other, the probability of its being black will be half of certainty, and of its being red, half of certainty. Assuming it to prove black, if it be then returned to the pack, the latter shuffled, and a second card drawn out, the respective probabilities of such second card being a black or being a red one, will, as with the first, be equal to half of certainty.

The probabilities of a black card being drawn both the first and second times will therefore be..... $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

And of a black one being drawn the first time and a red one the second time ..... $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

And of a red one being drawn the first time and a black one the second time .... $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

And of a red one being drawn, both the first and second times ..... $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

The sum of all four probabilities making unity or certainty.

It might therefore be anticipated that in one hundred drawings of two cards each, there would be twenty-five pairs of black cards, fifty pairs of one black and one red, and twenty-five pairs of red cards.

Taking the black cards to represent males and the red cards females, the above numbers will denote the pairs composed of two males, of one male and one female, and of two females respectively, that would probably occur in one-hundred cases of twins, provided the total numbers of males and females born were the same, and that their combination in pairs were the result of chance only.

As however the numbers at birth of the two sexes differ, the calculation must be varied by considering the pack to be composed of black and red cards in the proportion that exists between the numbers of males and females, viz., for the "Upper Class" experience 1,187 of the former to 1,000 of the latter, making together 2,187. With these numbers the probability—

Of two black cards being drawn will be... $\frac{1187}{2187} \times \frac{1187}{2187} = \frac{1408969}{4782969} = \frac{295}{1000}$

Of one black and one red card being drawn $2 \times \frac{1187}{2187} \times \frac{1000}{2187} = \frac{2374000}{4782969} = \frac{496}{1000}$

Of two red cards being drawn..... $\frac{1000}{2187} \times \frac{1000}{2187} = \frac{1000000}{4782969} = \frac{209}{1000}$

In the following table will be found the proportions calculated on this principle, as well as the actual proportions, both for the "Upper Class" experience and for England and Wales.

Constitution of the pairs.	The number of differently constituted pairs in 1000 cases of twins.			
	"Upper Class" experience		England and Wales	
	Actual Number.	Calculated Number.	Actual Number.	Calculated Number.
Two Males	380	295	332	272
One Male, One Female	331	496	377	499
Two Females ...	289	209	291	229
Total ...	1,000	1,000	1,000	1,000

It hence appears that in twin births there is a much larger proportion of pairs of the same sex, and a correspondingly smaller proportion of pairs of opposite sexes, than would be the case if the combination of the pairs were the result of chance alone.

CHAPTER XI.

Age at Marriage.

In table VIII. are given the Ages at marriage of 7955 Bachelors who where married to Spinsters, and of 7806 Spinsters who were married to Bachelors;* the marriages

* The inequality of these numbers arises from there having been more cases in which the wife's than the husband's date of birth was omitted to be stated in the return.

before the year 1840 being distinguished from those which took place at a later date.

This separation was made with the view of testing the correctness of an impression which prevails, that marriages in the upper and professional classes are now deferred to a later period of life, on the average, than was formerly the case.

On calculating the mean ages from the numbers in the table, the results were found to be as follow :—

Period of Marriage.	*Mean Age at Marriage.*		*Mean difference in the Ages of Husband and Wife.*
	Bachelors. *Years.*	*Spinsters.* *Years.*	*Years.*
Before 1840	28·45	24·51	3·94
In and since 1840	29·95	25·53	4·42
Both periods.....	29·23	25·05	4·18

It would thus appear that marriages do take place somewhat later in life now than formerly, the difference shown above being 1.50 year in the case of husbands and 1.02 in the case of wives.

These numbers however require some modification, for the following reasons.

The returns from which the statistics of the marriages were taken were made, it will be remembered, in some cases by the husbands and in others by one of the sons. Where the return was made by a son, the marriage must, of course, have been a fruitful one, but when made by the husband, unfruitful as well as fruitful marriages would be included. Now, from the mode in which the returns were obtained, a much larger proportion of the marriages celebrated before 1840 were communicated by sons than of those celebrated after that date, and, consequently, the former will include a smaller proportion of unfruitful ones

than the latter. The unfruitfulness of marriages, however, often results from their having been entered into later in life than usual, whence it may be assumed that the average age of the parties to such marriages is greater than that of the parties to fruitful marriages. The apparent lower mean age at marriage before 1840, therefore, may thus be partly, but, as will be seen, only partly, accounted for. By excluding from consideration all cases in which the husband was over 40, or the wife over 36 years of age, it is probable that the disturbing effect produced by the different proportions of unfruitful marriages recorded in the two periods will practically be eliminated. This was accordingly done, and the results show that the mean age at marriage of Bachelors was 1·31 year and of Spinsters 0·78 year (or 16 months and 9 months respectively) younger before the year 1840 than since that time.

So corrected the table at page 44 will stand thus :—

Period of Marriage.	*Mean Age at Marriage.*		*Mean difference in Ages of Husband and Wife.*
	Bachelors. *Years.*	*Spinsters.* *Years.*	*Years.*
Before 1840	28·64	24·75	3·89
In and since 1840	29·95	25·53	4·42
Both periods.....	29·32	25·16	4·16

It will be more consistent with probability to assume, in the absence of any evidence to the contrary, that the increase in the mean age at marriage thus indicated, has been progressing at a uniform and comparatively slow rate during the whole time that the observations extend over, than that it took place more suddenly in any shorter period. If such assumption be correct, the ages in the last table will apply to the middle of the respective periods before and after 1840, that is to 1820 and 1855, having regard to the relative numbers of marriages in different years. In that interval therefore, viz. 35 years, the advance of 1.31 year in the mean marriage age of husband, and .78 year in that of wives

will have occurred, which is equivalent to an annual advance of .0374 year (14 days) in the case of husbands and .0223 year (8 days) in that of wives.

On this basis the following table, showing the mean age at marriage for every tenth year from 1800, has been constructed.

Date.	*Mean Age at Marriage.*		*Mean differences in Ages of Husbands and Wives.*
	Bachelors. *Years.*	*Spinsters.* *Years.*	*Years.*
1800	27·89	24·30	3·59
1810	28·26	24·52	3·74
1820	28·64	24·74	3·90
1830	29·01	24·96	4·05
1840	29·39	25·19	4·20
1850	29·76	25·41	4·35
1860	30·14	25·64	4·50
1870	30·51	25·86	4.65

The increase which seems to have taken place in the mean marriage age of Wives since the beginning of the present century, although less than that of Husbands, viz., 1·56 years as compared with 2·62 years, is nevertheless sufficiently marked to render it probable that it may exercise a sensible influence on the fecundity of marriages.

The average age of Wives at the date of birth of their last child in cases where both Husband and Wife have lived beyond the ordinary child-bearing age of the latter is, as will be seen hereafter, 38·00 years. At the beginning of the century there was, therefore, an interval of 13·70 years on the average between marriage and the termination of the child-bearing period; but in 1870 only 12·14 years, thus showing a diminution to the extent of one-ninth in the total period. If, however, there be taken into account, as for the present purpose it will be proper to do, the probability of the average duration of the fruitful period of marriage being curtailed by the death of one or both of the parties before it would otherwise terminate, the postponement of the marriage

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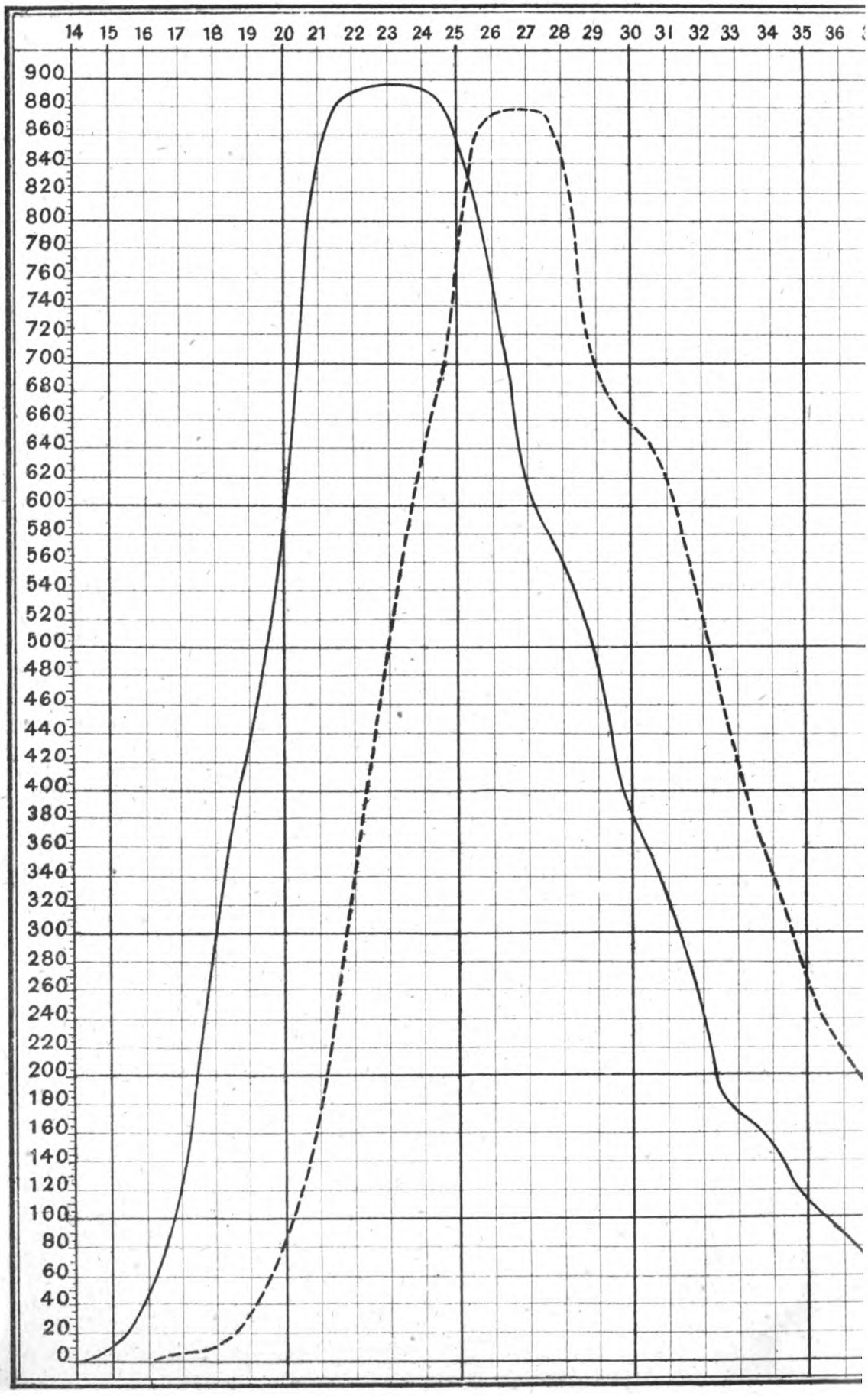
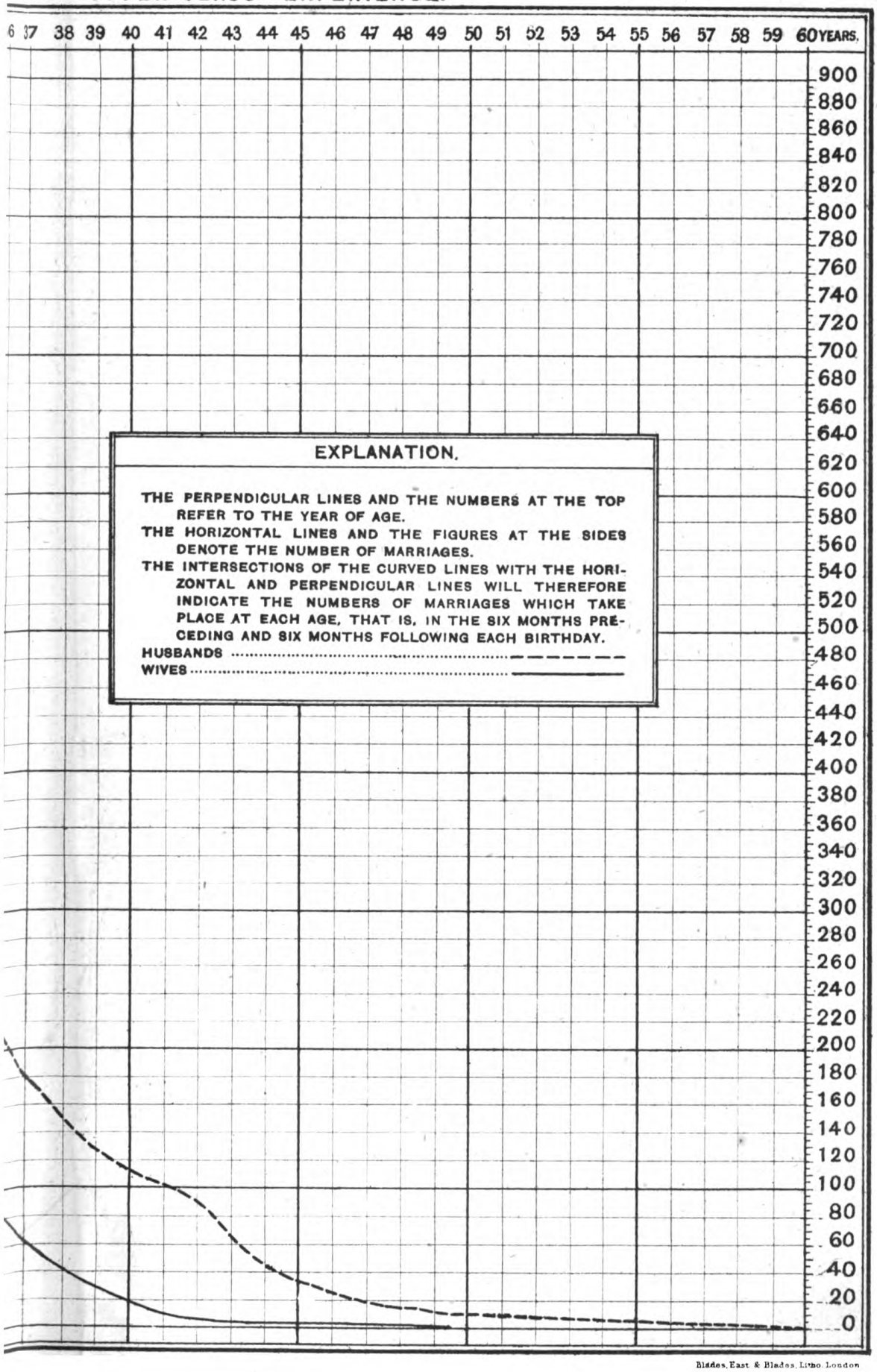
TO SPINSTERS ACCORDING TO T



GRAM I:

EACH AGE OUT OF A TOTAL OF 10,000 MARRIAGES OF BACHELORS

THE "UPPER CLASS" EXPERIENCE.



Blades, East & Blades, Litho. London

age of the Wife for 1·56 years will diminish to the extent of one-seventh her reproductive period of life.

In table IX., columns A and B, there are given the proportionate numbers married at each age out of a total number of 10,000 marriages of Bachelors to Spinsters, these numbers having been deduced from columns C and F in table VIII, with a slight adjustment at some ages where irregularities in the progressive differences seemed to render it desirable.

These adjusted numbers are graphically illustrated in diagram I.

It will there be seen that as regards both sexes there is a period of life which, from the large number of marriages occurring in it, may appropriately be termed the "marriage" age, viz., in the case of males from age 25 to age 28 and in that of females from age 21 to age 25.

The other columns in table XI. show the number of marriages that take place respectively before and after each age out of a total number of 10,000 at all ages collectively, and may consequently be made available for estimating the chances for or against a person being married previous to attaining any given age as compared with the chances of being married after passing such age.

At age 23, for example, 903 Bachelors and 3,727 Spinsters have been already married, leaving 9,097 Bachelors and 6,273 Spinsters to be married at later ages; so that, in round numbers, a bachelor has ten chances of being married after 23 to one of being married before that age; but a Spinster has less than two chances to one.

Again, 8608 Bachelors and 9671 Spinsters are married before age 35, and 1392 and 329 respectively at older ages; whence the chances of a Bachelor being married after age 35 are nearly as one to six of his being married earlier, while in the case of Spinsters, the chances are not more than one to twenty-nine.

Referring to table VII., which shows the relative numbers of males and females living at each age, columns A. and B, it will be found that at the mean marriage age of Bachelors at the present time, viz. $30\frac{1}{2}$ years (page 46), there are living 76,365 males as compared with 78,336 females, living at $25\frac{7}{8}$ years, the mean marriage age of Spinsters.

Although this comparison at mean ages may not give results rigorously exact, they will be sufficiently so to warrant the deduction that, under existing social influences, there must always remain a sensible proportion of females in the upper and professional classes unmarried for the simple reason that there are not men enough in their own position in life to furnish husbands for them.

The preponderance in the number of females over males at their respective marriage ages here pointed out will, however, to some small extent be modified, by there being a larger proportion of Widowers married to Spinsters than of Bachelors married to Widows (*vide* table X.); but it may be questioned whether this is not compensated for by a larger number of men than of women in the upper classes marrying beneath themselves in the social scale.

Classifying the data according to the professions of the husbands, the mean ages at marriage are as follow :—

Class.	*Bachelors.*			*Spinsters.*		
	Before 1840.	*In and since 1840.*	*Both Periods.*	*Before 1840.*	*In and since 1840.*	*Both Periods.*
Clergy	28·85	30·44	29·95	25·39	26·05	25·85
Legal	28·24	29·54	29·01	24·07	25·13	24·71
Medical	28·36	29·48	29·26	25·13	25·26	25·23
General	28·33	29·40	28·54	24·16	24·57	24·24

It thus appears that marriage in the " General " Class takes place somewhat earlier in life than in either of the three learned professions, and that the Clergy postpone it the longest.

It may be observed that in all the classes the marriage age has been older since 1840 than before that period; and also that there is a singular uniformity in the differences between the mean ages at marriage of Husbands and Wives, the variation in this respect ranging only from a minimum of 4·03 years in the Medical class to a maximum of 4·30 years in the Legal and "General" classes.

From the fourteenth and fifteenth annual reports of the Register General, it appears that in England and Wales there were solemnized 154,206 and 158,782 marriages in the years 1851 and 1852 respectively, and that in 139,471 cases in the two years the precise ages of both parties at the time of marriage were specified. These cases consisted of

115,062	marriages	of Bachelors	to Spinsters.
5,862	„	„ Bachelors	to Widows.
11,896	„	„ Widowers	to Spinsters.
6,651	„	„ Widowers	to Widows.
139,471	Total.		

The numbers in the reports are given for each year of age up to age 20, and for quinquennial periods at higher ages, those of marriages of Bachelors to Spinsters being as follow:—

Age.	Bachelors.	Spinsters.	Age.	Bachelors.	Spinsters.
15 and under 16	...	41	40 and under 45	1275	622
16 „ 17	3	269	45 „ 50	416	173
17 „ 18	62	1306	50 „ 55	183	55
18 „ 19	580	4970	55 „ 60	67	14
19 „ 20	2875	9738	60 „ 65	22	7
20 „ 25	63034	65636	65 „ 70	5	2
25 „ 30	33066	23800	70 „ 75	2	...
30 „ 35	10291	6528	75 „ 80	...	...
35 „ 40	3181	1900	80 „ 85	...	1

On apportioning the numbers in the quinquennial periods to each separate age in such a manner as to produce a

symmetrical series, and thence calculating the mean ages at marriage, the results obtained are, for Bachelors 25.60 years, and for Spinsters 23.68 years.

Comparing these results with those in the table at page 46, it appears that the mean age at marriage, in the upper classes is, or was in 1851 and 1852, as regards Bachelors, about $4\frac{1}{4}$ years, and as regards Spinsters, about $1\frac{3}{4}$ years, older than among the general population of the country.

CHAPTER XII.

Average Number of Children to a Marriage.

In table X. will be found summarized, according to the respective numbers of children in each family, 2141 cases in which both parents survived the child-bearing age of the mother, and 447 cases in which the mother died before passing such age, leaving the father surviving her; the cases being restricted to those only in which the return was made by the father of the children, and in which the date of birth of the mother, and whether the parents were bachelor and spinster or otherwise at time of marriage, were stated.

In selecting the cases, the cessation of child-bearing was assumed to have occurred if the mother was—

Over 48	and had had	no Child for	2 years
„ 47	„	„	3 „
„ 46	„	„	4 „
„ 45	„	„	6 „
„ 44	„	„	8 „
Under 44	„	„	10 „

This classification probably has the effect of including some isolated cases in which further births might occur, but it was found on trial that they would be so extremely few as

not to appreciably affect the results; while a more rigid classification would have excluded a large number of cases in which no rational doubt could exist that child-bearing had ceased, although the mothers had not attained such ages as to render it, on that account alone, certain.

Referring to the first division of the table, where both parents survive the child-bearing age of the mother, in column A there are 1919 marriages of bachelors to spinsters. Of these 152, or 8 per cent., were childless. In 131 cases, or nearly 7 per cent., there was only one child. Families of five children appear to be more frequent than any others; but those in which there are two, three, four, and six children respectively are nearly as numerous, this group comprising 984, or more than half of the whole number. Of families with more than six children the number of cases rapidly diminished as the number of children in each increases; and it is only in one family out of 42 that there are more than 12 children born.

The largest families included in the table are, it will be seen, of 18 children, of which there are three cases; and there are only four instances of larger numbers of children among the 7245 other families, which, for various reasons, were not included in the table, viz., one each of 19, 20, 23, and 25 children. The two last mentioned cases are so remarkable that it may be of interest to give some details respecting them. In both the informant was one of the surviving sons, and although the particulars were not so fully stated as might have been desirable, there seems to be no reason to doubt the correctness of the returns as regards the numbers of children, the first one having, in fact, been confirmed by further enquiry.

In the case of twenty-three children, all the earlier born ones died in infancy. A male died at the age of 14 of hæmorrhage of the lungs, a female at 27 of typhus, a female at 55 of cerebral congestion, a male at 75 of paralysis, a female at 77 of cystitis, a male and a female each at 86 of old age. Three sons are now (1871) living, aged 73, 77, and 79 respectively. The father died at 58 of typhus, and the mother at 86 of cholera.

In the case of twenty five children the father was aged 23, and the mother 21, when they were married in 1783. The children, twelve sons and thirteen daughters, all grew up to be adults, but only four of them are now living, viz., three daughters, at ages varying from 61 to 74, and one son aged 68. The child-bearing period extended over 27 years. The father died at the age of 55 from inflammation, and the mother at 88 of old age.

The ages of most of the children were stated as such directly in both of these returns, not the dates of their births and deaths, so that it is uncertain whether or not there were any twin births.

The mean number of children to each family deduced from the entries in column A (cases of bachelors married to spinsters, and where both parents survive the child-bearing period of the mother), is 5.28, or 528 children to 100 such marriages, of which number 517 would be born alive and 11 stillborn.

Classifying the data according to the professions of the fathers the results are—

Profession	Total Births, including Stillborn.	Born Alive.
Clergymen	5·36	5·25
Legal Profession	5·32	5·18
Medical Profession	4·96	4·82
General (*vide* page 10)	5·50	5·39

Column E shows the number of children in each family in cases of bachelors married to spinsters where the wife had died in the lifetime of her husband before her child-bearing period, as estimated by the scale of ages mentioned at the commencement of this chapter, had passed.

It must be remembered, however, that the scale in question was designed with the primary object of excluding

from columns A, B, C, and D, all cases except those in which the mothers had survived the child-bearing period, and not with the view of defining those in which they had died before it was passed. It is therefore probable that although columns E, F, G, and H, will include all of the latter class of cases, they will also include some others in which the period of child-bearing had really passed before the mothers' deaths occurred, and which therefore should more properly be placed in columns A, B, C, or D.

The proportion of cases in which an increase in the number of children in a family is prevented by the premature death of the father or mother, may be determined with an approximation to accuracy by calculating the probabilities of the parents' deaths taking place between the mean ages at marriage, and the mean period after marriage that child-bearing terminates.

The mean age at marriage as shown at page 45 is 25·16 years for spinsters married to bachelors, and 29·32 years for bachelors married to spinsters.

The mean age of mothers at the birth of their last child, in cases where both father and mother survive the child-bearing period is 38·00 years (page 62), or 12·84 years older than at marriage, and the mean age of their husbands at that time would consequently be 29·32+12·84=42·16 years. As, however, the last child might be posthumous, it may perhaps be proper to consider that if the husbands attain a mean age of six months less, or 41·66 years, their subsequent deaths would not affect the number of children.

From table II. it may be found that of 78,778 females living at age 25·16 years by the "Upper Class" experience, 71,677 survive to 38·00 years of age, and that of 73,478 males living at age 29·32 years, 64,933 survive to age 41·66. If now it be assumed that 73,478 marriages are contracted by the same numbers of males and females at those respective younger ages, there may be expected to survive to the older

ages 64,933 husbands and $\frac{71,677 \times 73,478}{78,778} = 66,855$ wives respectively; and 8545 husbands and 6623 wives to die before attaining those ages. It is obvious, however, that of those who survive some will be widowers and some widows, unless, which it is not necessary here to consider, they should have married again.

The probable number of marriages that will be undissolved by death may be determined either by calculating the number of cases in which the wife will have survived out of the 64,933 in which the husband survives, which will be expressed by $\frac{64,933 \times 71,677}{78,778}$; or by calculating the number of cases in which the husband will have survived out of the 66,855 in which the wife survives, which will be expressed by $\frac{66,855 \times 64,933}{73,478}$; both of which expressions = 59,080. Subtracting then, 59,080 from the 64,933 surviving husbands, and from the 66,855 surviving wives, there will remain 5853 widowers and 7775 widows.

The number of cases in which both husband and wife may be expected to die will be $\frac{8545 \times 6623}{73,478} = 770$.

The 73,478 assumed marriages will therefore probably have thus resulted at the termination of the child-bearing period :—

In	59,080	cases both husband and wife will then be living
„	5,853	„ the husband will be living and the wife dead
„	7,775	„ the wife will be living and the husband dead
„	770	„ both husband and wife will be dead
Total	73,478	

Reducing these numbers to a ratio of 10,000 marriages there will be :—

In	8,040	cases husband and wife both living
„	797	„ husband living, wife dead
„	1,058	„ wife living, husband dead
„	105	„ husband and wife both dead
Total	10,000	cases.

Applying these proportions to table X., it would result that of the 2331 cases in columns A and E collectively, 2121 should be in column A, and 210 in column E. But the numbers in these columns are actually 1919 and 412 respectively, thus showing a considerable discrepancy, which, however, as will be seen presently, may in great measure be accounted for.

Assuming the calculated numbers to indicate the correct proportions to each other of the two columns, there should be transferred from column E to column A 202 cases $= (412 - \frac{2331 \times 797}{8040 + 797})$ as being ones in which the mother had really ceased child-bearing before her death took place.

The total number of children in the families included in column E is 1778, and deducting from these 1067, for 202 families at 5·28 children each, there will remain 711 children to be divided among 210 families in which the mother died prematurely, which will give an average of 3·39 children each for such cases.

The data do not supply the means of ascertaining the average number of children in families where the fruitful period of marriage is shortened by the death of the father, or in those where both parents die prematurely; but there does not appear to be any reason for supposing that in the former it differs in any material degree from what it is in those cases where the wife's death is the arresting cause; and in cases where both parents die before the child-bearing period has passed, since it is the death of the first that determines the event, the mean number of children in a family may be assumed to be the same as where one parent only dies.

On such assumptions the numbers of children to 10,000 marriages of bachelors to spinsters would be as indicated by the table on the following page.

	Total Births, including Stillborn.	Born Alive.
In 8040 cases where both parents survive the child-bearing age of the mother, at an average of 5·28 births in each family ...	42,451	41,536
In 1960 cases where one or both parents die before such period is passed, at an average of 3·39 births in each family ...	6,644	6,501
Total	49,095	48,037
Average	4·91	4·80

The apparent discrepancy before alluded to in the relative proportions of the numbers of cases recorded in columns A and E respectively, as compared with the proportions calculated in accordance with the respective probabilities of the mother surviving to the end of the child-bearing period, or dying previously, may be traced principally to the following cause.

The calculated proportions, it will be observed, are based, and correctly so, upon the mean age of mothers at the birth of their last child, being, as found from table XIII., 38·00 years. The scale of ages, however, by which cases were excluded from column A, and as a consequence included in column E, taken in conjunction with the numbers under the several ages in the last mentioned table, has the effect of placing in the latter column cases in which the death of the mother took place up to the mean age of 44·36 years. Repeating the calculations on the basis of this age instead of the correct age of 38·00 years, numbers are obtained the relative proportions of which assimilate much more closely to those of columns A and E.

CHAPTER XIII.

Interval between Marriage and the Birth of Children.

It has already been mentioned (page 9) that in transferring the statistics of the families to the working cards, the intervals that elapsed between the marriage of the parents and the births of their children were calculated, in the cases of the first, second, third, fifth, eighth, eleventh, fourteenth and seventeenth in order of birth, and entered in the right hand column of the cards in years and decimal parts of a year.

The number of births thus recorded in each year after marriage will be found in table XI.; and in table XII. there are given the numbers of first, second and third births in decimal subdivisions of each of the first few years after marriage.

No cases were included except the mother was a spinster at the time of marriage, and the dates both of the marriage and of the children's births were precisely stated as to day, month and year.

Twin births were counted as two for number, but only as one in reckoning the order of birth of children born subsequently. For instance, in the example at page 8, there are eight children altogether; but as at the fifth birth there were twins, the two youngest children are reckoned as sixth and seventh, not as seventh and eighth, in order of birth.

As regards first children, the numbers of births slowly increase up to ·64 year after marriage, but the total numbers in that period form only a very small proportion, less

than one and a half per cent., of the whole; and it is probable that where they do not refer to premature deliveries mistakes may have been made as to dates or otherwise.

From ·64 to ·75 year the numbers in each fractional interval increase rapidly, and then remain without any very marked variation to ·84 year; they then fall off suddenly by nearly a third, and thereafter decrease slowly till the end of the first year, when the rate of decrease becomes much accelerated.

There is one period, however, at which the birth rate appears to be distinctly greater than at any other, viz., ·83 year, corresponding to the first half of the 44th week after marriage.

As it may in some respects be more convenient to refer the numbers of births to ordinary sub-divisions of time than to hundredths of a year, the following table is added, showing the proportionate numbers, out of a total number of 10,000 births of first children, that occur in each week from the 32nd to the 47th after marriage.

Weeks after Marriage.	Number of Births in each Week out of a total of 10,000 first births.	Weeks after Marriage.	Number of Births in each Week out of a total of 10,000 first births.
32nd	18	40th	419
33rd	26	41st	434
34th	27	42nd	447
35th	48	43rd	409
36th	51	44th	494
37th	81	45th	343
38th	166	46th	318
39th	308	47th	279

Altogether, slightly more than half of the total number of first births take place within twelve months after marriage, and upwards of two-thirds of the remainder in the course

of the second year. In a comparatively few instances, however, the first appearance of children is delayed for a much longer period, and the annexed particulars of fourteen cases, in which marriages that had been barren for ten years or more ultimately became fruitful, may not be without interest.

Number of Case.	Age of the Parents at Marriage.		Interval between the Marriage of the Parents and the Birth of the :—			Remarks Respecting the Parents.
	Father.	Mother	1st Child.	2nd Child.	3rd Child.	
	Years.	Years.	Years.	Years.	Years.	
8811	31·74	24·74	10·18	...	...	Both survived the Child-bearing age of the Mother.
1047	30·07	18·76	10·77	20·96	...	Do. Do.
7705	24·41	24·00	11·33	19·83	...	Do. Do.
7575	17·59	not stated	11·48	12·85	...	Do. Do.
8796	26·95	25·95	11·75	...	...	Do. Do.
7745	26·06	22·65	11·94	...	...	Do. Do.
5729	29·11	26·90	12·18	...	...	Do. Do.
4379	35·12	25·15	12·31	14·34	16 61	Do. Do.
7744	33·98	24·87	10·35	...	...	Both alive, but Mother not past Child-bearing age.
8929	41·50	25·17	10·92	...	...	Do. Do.
2491	25·43	21·07	12·82	14·57	...	Do. Do.
7963	32·51	21·03	13·66	16·09	...	Mother aged 43·91 when the Father died.
68	31·65	19·22	10·79	12·42	14·14	Mother died in Childbirth
2696	39·13	22	13·39	20·81	...	Do. Do.

The intervals that on the average elapse between marriage and the births of successive children are as follow; the results having been obtained in the cases of the 1st, 2nd, 3rd, 5th, 8th, 11th, 14th and 17th in order of birth by calculation from the actual numbers

of each as recorded in tables XI. and XII., but employing a more minute division of some of the years than is shewn in those tables; and by interpolation in the cases of the intervening orders of birth:—

Order of Birth.	Mean time of Birth after Marriage.	Differ-ence.	Order of Birth.	Mean Time of Birth after Marriage.	Differ-ence.
	Years.	Years.		Years.	Years.
1st Child	1·32		10th Child	16·33	1·40
2nd „	3·02	1·70	11th „	17·65	1·32
3rd „	4·83	1·81	12th „	18·85	1·20
4th „	6·69	1·86	13th „	19·87	1·02
5th „	8·53	1·84	14th „	20·71	·84
6th „	10·28	1·75	15th „	21·41	·70
7th „	11·92	1·64	16th „	22·01	·60
8th „	13·47	1·55	17th „	22·54	·53
9th „	14·93	1·46	18th „	23·02	·48

It will of course be understood that the differences in this table do not indicate the average periods intervening between the births of two succeeding children in the same families, or even in families consisting of similar numbers of children, but simply the amount of variation in the interval between marriage and the birth of children in numerical order from the first upwards, in large and small families taken together in the proportions in which they are found to occur; and they serve to show that, as might be inferred, children succeed each other more quickly in large than in small families.

With the view, however, of testing this more directly, the families in which the following conditions were fulfilled, viz,, the father being under the age of 35 years, and the mother under 30, and a spinster, at the date of the marriage, and both having survived beyond the time when the latter would be likely to bear children, were divided into six classes, according to the number of children in each family, and the average intervals between marriage and the births of the

1st, 2nd and 3rd children in each class were ascertained, the results being stated in the following table :—

In Families consisting of the undermentioned Numbers of Children.	Interval between the Marriage of the Parents and the Birth of the :—		
	1st Child.	2nd Child.	3rd Child.
	Years.	Years.	Years.
1, 2, or 3	1·78	4·84	7·38
4, 5, or 6	1·37	3·32	5·49
7, 8, or 9	1·18	2·82	4·68
10, 11, or 12	1·05	2·54	4·15
13, 14, or 15	1·06	2·40	3·81
16, or more	·96	2·15	3·47

It will be seen that there is a close and clearly defined relation between the number of children of which a family is ultimately composed and the intervals that elapse between the marriage of the parents and the births of the elder children, such intervals being, in the cases of second and third children, less than half the length in very large families that they are in small ones.

This table might therefore furnish to persons, while yet in the early years of their wedded life, the means of forming an approximately correct estimate as to the total number of children that they would be likely to have, and thus, in many instances, be of considerable practical value.

CHAPTER XIV.

Age at which Child-bearing Terminates.

In table XIII. the ages last birthday are stated of 4899 mothers at the date of birth of their last child, arranged according to the number of children which they had respectively borne.

The cases included in the table are restricted to those only in which both the father and mother had survived beyond the childbearing age of the latter. a point which was determined as regards each case in accordance with the scale mentioned at page 50.

The ages, it will be observed, range from 17 to 59 years.

Above the age 51 there are recorded seven cases, in three of which, viz,, one each at ages 51, 52, and 53, distinguished in the table by a †, the ages were verified by further inquiry. In the remaining four cases, three being at age 51 and one at 59, marked in the table by a *, various circumstances prevented confirmatory evidence being obtained; and in its absence the case at 59 must be considered as at least doubtful.

Dividing the years of age into quinquennial periods the proportionate numbers of cases in each are as follow, viz. :—

Under 20 Years of Age	·20	per Cent.
Above 20 and under 25	2·78	„
„ 25 „ 30	6·37	„
„ 30 „ 35	15·69	„
„ 35 „ 40	29·17	„
„ 40 „ 45	39·48	„
„ 45 „ 50	6·13	„
„ 50 Years or Age	·18	„
Total	100·00	

The mean age last birthday deduced from the number of cases at each respective age in the table is 37·50 years, to which adding ·50 year, *i.e.*, six months, for the average period elapsed since the last birthday, the result is exactly 38 years as the mean age of mothers at the date of the birth of their last child in cases where childbearing is not prematurely terminated by the death of either parent.

The productive period is, as might be anticipated, protracted to a later age in cases where the children have been

numerous than where they have been few, as the undermentioned results deduced from the table will show :—

	Mean Age of Mothers at the Birth of their last Child.
Families of only 1 Child..	31·08
Do. 2 or 3 Children	34·21
Do. 4 or 5	37·04
Do. 6 or 7	39·21
Do. 8 or 9	40·61
Do. 10, 11, or 12	41·74
Do. 13, 14, or 15	42·83
Do. 16 or more	44·32

CHAPTER XV.

The Length of a Generation.

The length of a generation in the sense here intended, is the mean period that elapses between the births of parents and the births of their children, or, in other words, the number of years that persons are, on the average, younger than their fathers and mothers.

In column A of table X there are given the numbers of different sized families resulting from marriages of bachelors to spinsters out of 1919 cases in which both husband and wife lived beyond the child-bearing age of the latter; and those families contain the following numbers of children in numerical orders of birth from the oldest to the youngest, viz.:—

1st	Children	1767		Brought forward ...	9538
2nd	„	1636	10th	Children	241
3rd	„	1453	11th	„	155
4th	„	1260	12th	„	92
5th	„	1075	13th	„	46
6th	„	846	14th	„	27
7th	„	652	15th	„	17
8th	„	487	16th	„	10
9th	„	362	17th	„	6
			18th	„	3
	Carried forward ...	9538		Total	10,135

The periods that, on the average, intervene between marriage and the births of successive children, have previously been shown at page 60, and these two sets of results furnish the means, by multiplying the periods in one by the corresponding numbers in the other, adding together the products so obtained, and dividing by the total number of children (10,135), of deducing the mean interval between the births of the children and the marriages of their parents, which is thus found to be 7·00, or exactly 7 years.

The mean ages at which, during the present century, marriages between bachelors and spinsters have been contracted, are, as shown at page 45, 29·32 years for the former, and 25·16 years for the latter. These ages, therefore, with 7 years added to each, will indicate the mean periods intervening between the births of children and the births of their fathers and mothers, viz.: 36·32 years and 32·16 years respectively, in the families included in column A of table X.

These results, however, will not express exactly the average length of a generation, because in a certain proportion of cases the fruitful period of marriage is abridged by the premature death of either the husband or the wife; and if such cases be included, as they ought to be in dealing with the subject now under consideration, the mean interval between the marriages of parents and the births of their children will be somewhat less than the term of 7·00 years, deduced from cases in which both husband and wife survived.

On the other hand, by including re-marriages the average age of the parents at marriage will be increased.

In chapter XII. it has been shown that out of 10,000 marriages of bachelors to spinsters, the fruitfulness of the unions will probably be terminated in 1960 cases by the premature deaths of one or both of the parties, and that the average number of children in such cases is 3·39, instead of 5·28, as it is when both parties survive. By rejecting the larger families in column E of Table X, so as to reduce

the average number of children in each of those remaining to 3·39, and calculating by the table at the end of chapter XIII., the mean interval between the births of these and the marriages of their parents, the result obtained is 4·59 years.

From the numbers of marriages recorded in the various columns of table X it may be deduced that 8·6 per cent. of men, and 2·6 per cent. of women, who have been married once, marry again*, and that to 10,000 marriages of bachelors to spinsters, there are:—

820 Widowers married to Spinsters
223 Bachelors " " Widows, and
60 Widowers " " Widows.

The mean ages of the parties to such unions, the average numbers of children born to them, and the mean intervals between the marriages of the parents and the births of their children are as follow:—

Marriages of :-	Mean Ages at Marriage.		Average Number of Children in each Family.	Mean Interval between the Parents Marriage and the Birth of their Children.
	Husband.	Wife.		
	Years.	Years.		Years.
Widowers and Spinsters ...	39·54	31·50	4·14	6·46
Bachelors and Widows ...	31·78	31·12	3·25	4·35
Widowers and Widows ...	43·07	36·36	2·50	3·61

* The proportions of re-marriages among the general population of the country are, approximately, 15.3 per cent. and 9.9 per cent. respectively for males and females, or 12.7 per cent. and 7.6 per cent. if males over 70 years of age, and females over 45 he excluded from consideration (vide 14th and 15th annual reports of the Registrar General). Two corrections would however be required to obtain the correct proportions; one on account of the constantly increasing number of marriages in the country, and the other from third and subsequent marriages not being distinguished in the reports from second marriages; but as those sources of error act in opposite directions they would to some extent counteract each other. The larger proportions thus indicated of re-marriages among the general population, as compared with the upper and professional classes, probably arises from such unions frequently presenting to Widowers and Widows in the labouring classes the best, or the only available, means of obtaining assistance in bringing up their Orphan Children.

The results thus deduced are summarized in the annexed table.

Marital Condition at Time of Marriage.	*Number of Marriages.*	*Mean Ages at Marriage.*		*Number of Children.*		*Mean intervals between the Marriages of the Parents and the Births of their Children.*	*Mean Ages of Parents when their Children are Born.*	
		Husband	*Wife.*	*Average in each Family.*	*Total*		*Father.*	*Mother.*
		Years.	*Years.*			*Years.*	*Years.*	*Years.*
Bachelor and Spinster both survive the child-bearing age of the Wife	8040	29·32	25·16	5·28	42,451	7·00	36·32	32·16
One or both dying before the child-bearing period has passed.....	1960			3·39	6,644	4·59	33·91	29·75
Widower and Spinster..	820	39·54	31·50	4·14	3,395	6·46	46·00	37·96
Bachelor and Widow...	223	31·78	31·12	3·25	725	4·35	36·13	35·47
Widower and Widow...	60	43·07	36·36	2·50	150	3·61	46·68	39·97
Total and Average.....	11,103				53,365		36·66	32·30

and on combining them in the proportions of the total numbers of children to each of the classes of marriages, the final results obtained are, that the average intervals between the births of fathers and mothers and the births of their children are 36·66 years and 32·30 years respectively. The mean of these intervals is 34·48 years; and that period, therefore, may be considered to represent very nearly the average length of a generation.

At the same time, this result must be regarded rather as a closely approximate, than as a rigidly accurate one, there being several possible sources of a minute amount of error involved in the mode in which it has been deduced. Among these there may be mentioned the somewhat different rates of mortality prevailing among elder and younger children; the possibly different rates of mortality among children of first and of subsequent marriages; a possible difference in the proportions of elder and younger children married, and of their fecundity when married; cases of second marriages in which the husband may have died prematurely not having

been included in the data; and the cases in some of the classes of marriages being scarcely numerous enough to yield a perfectly reliable average. No one, however, of these sources of error separately could exercise any material influence on the final results, and as some of them, so far as they would operate at all, would do so in different directions from others, it is probable that the balance of their effects if capable of estimation, would be found to be unimportant.

For all practical purposes, therefore, it may be considered that the average length of a generation, among the upper and professional classes in this country, is thirty-four and a half years.

TABLE I.

"UPPER CLASS." BOTH SEXES.

Age	A *Alive at date of observation.*	B *Sum of Fractions of a year passed through by those in column A.*	C *Died.*	D *Alive at commencement of Age.*	E *Alive at commencement of age corrected for calculation.*	F *Probability of dying before attaining the next age.*	G *Out of 100,000 Children born alive the number that survive to the beginning of each age.*	H *Out of 100,000 children born alive the number that die at each age.*
Stillborn & Premature	...	...	1059	49,099	...	...	...	...
·00 and ·01	13	·12	778	48,040	48,039·0	·01620	100,000	1620
·02 to ·09	66	3·66	659	47,249	47,220·5	·01396	98,380	1373
·10 „ ·49	367	106·93	1301	46,524	46,341·7	·02807	97,007	2723
·50 „ ·99	472	348·54	1102	44,856	44,618·5	·02470	94,2 4	2329
1·00 „ 1·49	412	101·47	664	43,282	43,081·2	·01541	91,955	1417
1·50 „ 1·99	408	309·87	356	42,206	42,017·9	·00847	90,538	767
2	849	397·39	464	41,442	40,990·4	·01132	89,771	1016
3	866	412·99	371	40,129	39,676·0	·00935	88,755	830
4	849	423·71	286	38,892	38,466·7	·00744	87,925	654
5	821	400·86	254	37,757	37,336·8	·00680	87,271	594
6	838	395·42	231	36,682	36,239·4	·00637	86,677	553
7	835	395·58	181	35,613	35,173·6	·00515	86,124	443
8	819	410·41	139	34,597	34,188·4	·00407	85,681	348
9	862	404·44	117	33,639	33,181·4	·00353	85,333	301
10	806	401·00	124	32,660	32,255·0	·00384	85,032	327
11	741	341·62	115	31,730	31,330·6	·00367	84,705	311
12	735	353·01	114	30,874	30,492·0	·00374	84,394	316
13	724	344·37	116	30,025	29,645·4	·00391	84,078	329
14	693	339·37	123	29,185	28,831·4	·00427	83,749	357
15	697	329·98	142	28,369	28,002·0	·00507	83,392	423
16	671	325·64	171	27,530	27,184·6	·00629	82,969	522
17	693	347·40	162	26,688	26,342·4	·00615	82,447	507
18	648	310·34	176	25,833	25,495·3	·00690	81,940	566
19	667	339·35	197	25,009	24,681·3	·00798	81,374	650
20	685	292·32	170	24,145	23,752·3	·00716	80,724	578
21	637	303·66	177	23,290	22,956·7	·00771	80,146	618
22	612	275·07	190	22,476	22,139·1	·00858	79,528	683
23	648	314·96	164	21,674	21,341·0	·00768	78,845	606
24	608	309·53	170	20,862	20,563·5	·00827	78,239	647
25	693	291·46	171	20,084	19,682·5	·00869	77,592	674
26	619	290·52	147	19,220	18,891·5	·00778	76,918	599
27	591	283·55	145	18,454	18,146·5	·00799	76,319	610
28	591	277·59	138	17,718	17,404·6	·00793	75,709	600
29	581	279·15	160	16,989	16,687·1	·00959	75,109	720

TABLE I.—*continued.*

Age.	A Alive at date of observation.	B Sum of Fractions of a year passed through by those in column A.	C Died.	D Alive at commencement of Age.	E Alive at commencement of age corrected for calculation.	F Probability of dying before attaining the next age.	G Out of 100,000 children born alive the number that survive to the beginning of each age.	H Out of 100,000 children born alive the number that die at each age.
30	617	295·56	148	16,248	15,926·6	·00929	74,389	691
31	588	292·86	111	15,483	15,187·9	·00731	73.698	539
32	542	252·63	117	14,784	14,494·6	·00807	73,159	591
33	582	271·31	111	14,125	13,814·3	·00804	72,568	583
34	523	245·79	110	13,432	13,154·8	·00836	71,985	602
35	556	258·95	102	12,799	12,501·9	·00816	71,383	582
36	486	246·15	109	12,141	11,901·1	·00916	70,801	648
37	479	220·26	106	11,546	11,287·3	·00939	70,153	659
38	458	228·63	110	10,961	10,731·6	·01025	69,494	712
39	479	231·01	90	10,393	10,145·0	·00887	68,782	610
40	402	188·43	94	9,824	9,610·4	·00978	68,172	667
41	434	204·21	82	9,328	9,098·2	·00901	67,505	608
42	419	190·51	100	8,812	8,583·5	·01165	66,897	779
43	395	187·25	72	8,293	8,085·3	·00891	66,118	589
44	398	186·08	55	7,826	7,614·1	·00722	65,529	473
45	375	172·39	78	7,373	7,170·4	·01088	65,056	708
46	412	208·44	66	6,920	6,716·4	·00983	64,348	632
47	356	172·13	65	6,442	6,258·1	·01039	63,716	662
48	361	183·73	67	6,021	5,843·7	·01147	63,054	723
49	357	176·40	62	5,593	5,412·4	·01146	62,331	714
50	357	162·49	63	5,174	4,979·5	·01265	61,617	780
51	289	127·01	61	4,754	4,592·0	·01328	60,837	808
52	296	136·99	51	4,404	4,245·0	·01201	60,029	721
53	264	122·43	41	4,057	3,915·4	·01047	59,308	621
54	252	117·10	36	3,752	3,617·1	·00995	58,687	584
55	262	128·46	55	3,464	3,330·5	·01651	58,103	960
56	230	107·68	42	3,147	3,024·7	·01389	57,143	793
57	213	100·95	47	2,875	2,762·9	·01701	56,350	959
58	201	98·42	38	2,615	2,512·4	·01512	55,391	838
59	207	98·55	48	2,376	2,267·6	·02117	54,553	1155
60	192	93·14	39	2,121	2,022·1	·01929	53,398	1030
61	176	85·02	43	1,890	1,799·0	·02390	52,368	1252
62	157	72·76	31	1,671	1,586·8	·01954	51,116	999
63	154	70·54	33	1,483	1,399·5	·02358	50,117	1182
64	152	75·77	39	1,296	1,219·8	·03197	48,935	1565
65	122	57·86	28	1,105	1,040·9	·02690	47,370	1274
66	107	51·13	26	955	899·1	·02892	46,096	1333
67	93	42·16	20	822	771,2	·02593	44,763	1161
68	83	44·74	19	709	670·7	·02833	43,602	1235
69	63	32·01	20	607	576·0	·03472	42,367	1471
70	90	38·62	24	524	472·6	.05078	40,896	2077
71 and above	247	117·68	163	410	280·7	...	...	...

TABLE II.

THE NUMBERS THAT SURVIVE EACH YEAR OF AGE OUT OF 100,000 CHILDREN BORN ALIVE ACCORDING TO VARIOUS TABLES OF MORTALITY.

AGE.	UPPER CLASS EXPERIENCE.	CARLISLE TABLE.	ENGLISH LIFE TABLES.	CLERGY CHILDREN 1830 EXPERIENCE.	PEERAGE FAMILIES EXPERIENCE.
	UNADJUSTED.	ADJUSTED.	ADJUSTED.	ADJUSTED.	UNADJUSTED.
0	100,000	100,000	100,000	100,000	100,000
1	91,955	84,610	85,051	91,667	93,038
2	89,771	77,790	79,683	88,000	91,521
3	88,755	72,740	76,859	86,000	90,797
4	87,925	69,980	75,013	84,754	90,372
5	87,271	67,970	73,682	83,852	89,926
6	86,677	66,760	72,692	83,186	89,586
7	86,124	65,940	71,915	82,668	89,266
8	85,681	65,360	71,259	82,253	88,902
9	85,333	64,930	70,713	81,872	88,516
10	85,032	64,600	70,251	81,504	88,194
11	84,705	64,310	69,848	81,138	87,656
12	84,394	64,000	69,484	80,769	86,987
13	84,078	63,680	69,141	80,395	86,577
14	83,749	63,350	68,803	79,993	86,255
15	83,392	63,000	68,456	79,536	85,890
16	82,969	62,610	68,089	79,030	85,525
17	82,447	62,190	67,694	78,488	84,967
18	81,940	61,760	67,262	77,924	84,237
19	81,374	61,330	66,790	77,340	83,655
20	80,724	60,900	66,275	76,743	82,899
21	80,146	60,470	65,717	76,128	82,251
22	79,528	60,050	65,150	.....	81,227
23	78,845	59,630	64,575	.....	80,550
24	78,239	59,210	63,993	.....	79,677
25	77,592	58,790	63,405	.....	78,976
26	76,918	58,360	62,810	.....	78,165
27	76,319	57,930	62,209	.....	77,372
28	75,709	57,480	61,602	.....	76,756
29	75,109	56,980	60.990	.....	75,985
30	74,389	56,420	60,372	.....	75,344
31	73,698	55,850	59,749	.....	74,613
32	73,159	55,280	59,121	.....	74,100
33	72,568	54,720	58,486	.....	73,385
34	71,985	54,170	57,846	.....	72,667

TABLE II. - *continued.*

AGE.	UPPER CLASS EXPERIENCE.	CARLISLE TABLE.	ENGLISH LIFE TABLES.	CLERGY CHILDREN 1830 EXPERIENCE.	PEERAGE FAMILIES EXPERIENCE.
	UNADJUSTED.	ADJUSTED.	ADJUSTED.	ADJUSTED.	UNADJUSTED.
35	71,383	53,620	57,199	.....	72,172
36	70,801	53,070	56,546	.....	71,494
37	70,153	52,510	55,886	.....	70,698
38	69,494	51,940	55,218	.....	70,169
39	68,782	51,360	54,542	.....	69,519
40	68,172	50,750	53,858	.....	68,888
41	67,505	50,090	53,165	.....	67,876
42	66,897	49,400	52,463	.....	67,185
43	66,118	48,690	51,750	.....	66,463
44	65,529	47,980	51,026	.....	65,661
45	65,056	47,270	50,292	.....	65,042
46	64,348	46,570	49,545	.....	64,160
47	63,716	45,880	48,786	.....	63,239
48	63,054	45,210	48,013	.....	62,514
49	62,331	44,580	47,228	.....	61,803
50	61,617	43,970	46,428	.....	61,001
51	60,837	43,380	45,614	.....	59,998
52	60,029	42,760	44,772	.....	59,226
53	59,308	42,110	43,914	.....	58,665
54	58,687	41,430	43,037	.....	57,753
55	58,103	40,730	42,111	.....	56,506
56	57,143	40,000	41,153	.....	55,443
57	56,350	39,240	40,162	.....	54,117
58	55,391	38,420	39,138	.....	53,469
59	54,553	37,490	38,079	.....	52,139
60	53,398	36,430	36,983	.....	51,166
61	52,368	35,210	35,849	.....	50,042
62	51,116	33,950	34,675	.....	48,566
63	50,117	32,680	33,460	.....	47,135
64	48,935	31,430	32,203	.....	45,642
65	47,370	30,180	30,903	.....	44,085
66	46,096	28,940	29,560	.....	42,101
67	44,763	27,710	28,175	.....	40,626
68	43,602	26,480	26,751	.....	39,154
69	42,367	25,250	25,290	.....	37,137
70	40,896	24,010	23,798	.....	35,194
71	38,819	22,770	22,279	.....	33,205
72	36,977	21,430	20,742	.....	31,159
73	35,319	19,970	19,196	.....	29,609
74	32,568	18,410	17,649	.....	27,626
75	30,249	16,750	16,112	.....	25,155

TABLE III.

Mortality of Males and Females Separately.

Age.	Numbers that Survive each Age out of 100,000 Born Alive.			
	MALES.		FEMALES.	
	Upper Class Experience.	English Life Tables.	Upper Class Experience.	English Life Tables.
Total Births	102,545	.....	101,846	.....
Born Alive	100,000	100,000	100,000	100,000
·02	98,060	.....	98,718	.....
·10	96,504	.....	97,537	.....
·50	93,520	.....	95,088	.....
1·00	91,032	83,640	92,927	86,529
1·50	89,539	.....	91,589	.....
2	88,860	78,263	90,729	81,171
3	87,786	75,485	89,774	78,299
4	86,972	73,685	88,927	76,406
5	86,283	72,372	88,311	75,055
6	85,628	.....	87,782	.....
7	85,060	.....	87,246	.....
8	84,630	.....	86,789	.....
9	84,268	.....	86,455	.....
10	83,927	68,986	86,196	71,577
11	83,599	.....	85,871	.....
12	83,336	.....	85,509	.....
13	83,056	.....	85,156	.....
14	82,774	.....	84,777	.....
15	82,440	67,278	84,395	69,692
16	82,103	.....	83,881	.....
17	81,698	.....	83,236	.....
18	81,240	66,140	82,678	68,438
19	80,650	.....	82,138	.....
20	79,956	65,190	81,536	67,412
21	79,267	.....	81,075	.....
22	78,553	.....	80,559	.....
23	77,762	.....	79,991	.....
24	77,107	.....	79,437	.....
25	76,374	62,422	78,882	64,434
26	75,674	.....	78,235	.....
27	74,991	.....	77,726	.....
28	74,342	.....	77,157	.....
29	73,739	.....	76,560	.....

TABLE III.—*continued.*

AGE.	NUMBERS THAT SURVIVE EACH AGE OUT OF 100,000 BORN ALIVE.			
	MALES.		FEMALES.	
	UPPER CLASS EXPERIENCE.	ENGLISH LIFE TABLES.	UPPER CLASS EXPERIENCE.	ENGLISH LIFE TABLES.
30	72,922	59,509	75,941	61,277
31	72,176	.....	75,307	.....
32	71,590	.....	74,818	.....
33	70,891	.....	74,342	.....
34	70,225	.....	73,846	.....
35	69,478	56,444	73,397	57,991
36	68,833	.....	72,880	.....
37	68,080	.....	72,342	.....
38	67,427	.....	71,677	.....
39	66,659	.....	71,024	.....
40	66,039	53,166	70,424	54,584
41	65,294	.....	69,840	.....
42	64,747	.....	69,166	.....
43	63,855	.....	68,507	.....
44	63,237	.....	67,950	.....
45	62,556	49,577	67,700	51,040
46	61,660	.....	67,194	.....
47	60,972	.....	66,621	.....
48	60,160	.....	66,118	.....
49	59,273	.....	65,566	.....
50	58,351	45,573	65,070	47,324
51	57,575	.....	64,286	.....
52	56,477	.....	63,775	.....
53	55,805	.....	63,002	.....
54	55,205	.....	62,358	.....
55	54,592	40,946	61,802	43,333
56	53,548	.....	60,925	.....
57	52,795	....	60,089	.....
58	51,452	.....	59,515	.....
59	50,618	.....	58,671	.....
60	49,563	35,633	57,413	38,397
61	48,503	.....	56,409	.....
62	46,926	.....	55,477	.....
63	45,836	.....	54,569	.....
64	44,832	.....	53,206	.....
65	42,977	29,459	51,924	32,416
66	41,425	.....	50,922	.....
67	39,878	.....	49,796	.....
68	38,604	.....	48,746	.....
69	37,183	.....	47,697	.....
70	35,744	22,349	46,195	25,316

TABLE IV.

Intensity of Mortality under One Year of Age.

"Upper Class" Experience, Adjusted.

Age in Days.	Numbers that Survive to each period of Age out of 100,000 Born Alive.		Numbers that Die during each period of Age out of 100,000 Born Alive.		Numbers that Die in One Day out of 365,000 Alive at the commencement of each Day.	
	Males.	Females.	Males.	Females.	Males.	Females.
0	100,000	100,000	899	597	3281	2179
1	99,101	99,403	394	309	1451	1136
2	98,707	99,094	294	188	1086	693
3	98,413	98,906	212	118	785	434
4	98,201	98,788	147	81	687	297
5	98,054	98,707	102	65	379	240
6	97,952	98,642	79	56	293	208
7	97,873	98,586	69	51	258	188
8	97,804	98,535	62	45	232	167
9	97,742	98.490	68	46	255	171
10	97,674	98,444	77	48	287	178
11	97,597	98,396	86	51	323	188
12	97,511	98,345	95	52	356	195
13	97,416	98,293	102	57	382	212
14	97,314	98,236	104	62	389	232
15	97,210	98,174	92	60	347	222
16	97,118	98,114	80	52	302	195
17	97,038	98,062	66	47	250	175
18	96,972	98,015	54	42	205	158
19	96,918	97,973	46	38	172	142
20	96,872	97,935	41	36	156	135
21	96,831	97,899	39	34	147	128
22 to 28	96,792	97,865	236	213	127	113
29 „ 35	96,556	97,652	207	185	112	99
36 „ 42	96,349	97,467	190	158	103	85
43 „ 49	96,159	97,309	185	137	100	72
50 „ 56	95,974	97,172	180	126	98	67
57 „ 63	95,794	97,046	175	122	95	66
64 „ 70	95,619	96,924	167	119	91	64
71 „ 77	95,452	96,805	161	115	88	62
78 „ 84	95,291	96,690	153	112	84	60
85 „ 91	95,138	96,578	148	116	81	63
92 „ 98	94,990	96,462	143	121	78	66

TABLE IV.—*continued.*

AGE IN DAYS.	NUMBERS THAT SURVIVE TO EACH PERIOD OF AGE OUT OF 100,000 BORN ALIVE.		NUMBERS THAT DIE DURING EACH PERIOD OF AGE OUT OF 100,000 BORN ALIVE.		NUMBERS THAT DIE IN ONE DAY OUT OF 365,000 ALIVE AT THE COMMENCEMENT OF EACH DAY.	
	MALES.	FEMALES.	MALES.	FEMALES.	MALES.	FEMALES.
99 to 105	94,847	96,341	138	127	76	69
106 „ 112	94,709	96,214	136	127	75	69
113 „ 119	94,573	96,087	134	124	74	67
120 „ 126	94,439	95,963	132	121	73	66
127 „ 133	94,307	95,842	129	118	71	65
134 „ 140	94,178	95,724	122	115	67	63
141 „ 147	94,056	95,609	114	110	63	60
148 „ 154	93,942	95,499	106	106	59	58
155 „ 161	93,836	95,393	105	102	58	56
162 „ 168	93,731	95,291	103	100	57	55
169 „ 175	93,628	95,191	101	99	56	54
176 „ 182	93,527	95,092	99	98	55	54
183 „ 189	93,428	94,994	98	94	54	52
190 „ 196	93,330	94,900	96	88	54	48
197 „ 203	93,234	94,812	94	84	53	46
204 „ 210	93,140	94,728	97	84	54	46
211 „ 217	93,043	94,644	104	86	58	47
218 „ 224	92,939	94,558	111	90	62	50
225 „ 231	92,828	94.468	113	90	64	49
232 „ 238	92,715	94,378	111	87	62	48
239 „ 245	92,604	94,291	104	82	59	46
246 „ 252	92,500	94,209	100	81	56	45
253 „ 259	92,400	94,129	97	79	55	44
260 „ 266	92,303	94,049	95	78	54	43
267 „ 273	92,208	93,971	93	77	53	43
274 „ 280	92,115	93,894	92	76	52	42
281 „ 287	92,023	93,818	90	75	51	42
288 „ 294	91,933	93,743	88	74	50	41
295 „ 301	91,845	93,669	86	73	49	41
302 „ 308	91,759	93,596	84	72	48	40
309 „ 315	91,675	93,524	81	71	46	40
316 „ 322	91,594	93,453	78	71	44	39
323 „ 329	91.516	93,382	74	70	42	39
330 „ 336	91,442	93,312	74	71	42	40
337 „ 343	91,368	93,241	79	74	45	41
344 „ 350	91,289	93,167	84	77	48	44
351 „ 357	91,205	93,090	86	81	49	45
358 „ 364	91,119	93,009	87	82	50	46

TABLE V.

MORTALITY AMONG CHILDREN CLASSIFIED ACCORDING TO THE RANK OR PROFESSION OF THEIR FATHERS.

AGE.	NUMBERS THAT SURVIVE EACH AGE OUT OF 100,000 BORN ALIVE.			
	CLERGY.	LEGAL.	MEDICAL.	GENERAL.
Total Births.	102,025	102,606	102,875	102,027
Born Alive.	100,000	100,000	100,000	100,000
.02	98,216	98,850	98,856	98,234
.10	96,983	97,123	97,679	96,780
.50	94,530	94,263	94,163	94,119
1.00	92,618	92,034	91,335	91,571
1.50	91,433	90,703	89,848	89,959
2	90,706	89,843	89,168	89,159
3	89,832	89,118	88,007	87,992
4	89,158	88,512	86,921	87,053
5	88,572	87,831	86,249	86,360
6	88,038	87,175	85,706	85,725
7	87,558	86,754	85,032	85,118
8	87,267	86,129	84,392	84,662
9	86,989	85,819	83,997	84,268
10	86,681	85,478	83,678	83,985
11	86,300	85,151	83,393	83,684
12	86,020	84,886	83,036	83,354
13	85,626	84,516	82,862	83,071
14	85,255	84,261	82,432	82,769
15	84,798	83,869	82,139	82,465
16	84,343	83,411	81,931	82,033
17	83,847	82,663	81,416	81,545
18	83,250	82,204	81,023	81,059
19	82,520	81,788	80,518	80,538

TABLE V.—*continued.*

AGE	NUMBERS THAT SURVIVE EACH AGE OUT OF 100,000 BORN ALIVE.			
	CLERGY.	LEGAL.	MEDICAL.	GENERAL.
20	81,734	81,296	79,802	79,934
21	81,252	80,849	79,370	79,272
22	80,614	80,286	79,113	78,613
23	79,989	79,597	78,562	77,895
24	79,276	78,957	77,797	77,360
25	78,501	78,068	76,847	76,842
26	77,741	77,569	76,505	76,144
27	77,129	77,009	75,909	75,547
28	76,595	76,258	75,263	74,937
29	76,072	75,780	74,456	74,307
30	75,306	75,371	73,865	73,549
31	74,434	74,755	73,222	72,910
32	73,885	74,111	73,106	72,366
33	73,260	73,434	72,724	71,790
34	72,575	72,615	72,444	71,261
35	71,771	72,097	72,138	70,699
36	71,361	71,431	72,138	70,083
37	70,524	71,051	71,460	69,428
38	69,912	70,388	71,058	68,748
39	69,009	69,693	70,393	68,092
40	68,496	68,745	69,427	67,518
41	68,062	67,674	68,369	66,859
42	67,489	67,031	66,931	66,280
43	66,635	66,272	66,621	65,506
44	65,990	65,735	66,621	64,933
45	65,398	65,255	65,931	64,480

TABLE VI.

Mortality among Children Classified according to the numerical order of their Birth.

Age.	Numbers that Survive each Age out of 100,000 Born Alive.				
	1st Child.	2nd Child.	3rd Child.	4th, 5th, & 6th Children.	7th & Younger Children.
Total Births.	104,016	102,005	101,549	101,738	102,085
Born Alive.	100,000	100,000	100,000	100,000	100,000
·02	97,552	98,699	98,743	98,554	98,286
·10	96,467	97,410	97,719	97,232	96,332
·50	93,723	95,088	95,266	94,581	93,048
1·00	91,782	92,998	93,102	92,169	90,264
1·50	90,620	91,867	91,917	90,563	88,556
2	89,987	91,040	91,175	89,849	87,640
3	89,130	89,947	90,313	88,774	86,539
4	88,225	89,074	89,528	87,976	85,731
5	87,678	88,359	88,901	87,358	84,956
6	87,162	87.836	88,194	86,770	84,314
7	86,693	87,331	87,486	86,230	83,733
8	86,318	86,844	86,933	85,841	83,252
9	85,917	86,458	86,633	85,555	82,852
10	85,599	86,194	86,307	85,261	82,536
11	85,222	85,939	85,917	84,919	82,249
12	84,731	85,626	85,613	84,594	82,090
13	84,261	85,376	85,303	84,270	81,840
14	83,904	84,919	85,065	83,937	81,558
15	83,592	84,489	84,657	83,532	81,309
16	83,291	84,086	84,156	83,031	80,934
17	82,770	83,595	83,555	82,461	80,508
18	82,152	83,211	83,071	82,007	79,888
19	81,640	82,754	82,506	81,389	79,266

TABLE VI.—*continued.*

AGE.	NUMBERS THAT SURVIVE EACH AGE OUT OF 100,000 BORN ALIVE.				
	1ST CHILD.	2ND CHILD.	3RD CHILD.	4TH, 5TH, & 6TH CHILDREN.	7TH & YOUNGER CHILDREN.
20	80,902	82,157	81,857	80,778	78,567
21	80,336	81,433	81,216	80,309	77,951
22	79,710	80,804	80,485	79,694	77,429
23	78,904	79,998	80,034	79,028	76,726
24	78,315	79,595	79,184	78,389	76,153
25	77,708	78,842	78,521	77,791	75,472
26	77,208	78,112	77,756	77,110	74,800
27	76,639	77,541	77,279	76.508	74,067
28	76,027	76,713	76,730	75,910	73,543
29	75,534	76,107	75,833	75,470	72,857
30	74,885	75,398	74,996	74,684	72,230
31	74,242	74,663	74,161	74,032	71,599
32	73,758	74,118	73,761	73,416	71,028
33	73,197	73,555	73,240	72,693	70,550
34	72,457	72,904	72,733	72,107	70,076
35	71,824	72,333	72,017	71,492	69.581
36	71,033	71,705	71,621	70,922	69,035
37	70,355	71,308	70,667	70,308	68,405
38	69,651	70,406	70,062	69,645	67,954
39	69,001	69,464	69,521	68,869	67,326
40	68,282	68,932	68,719	68,274	66,832
41	67,741	68,035	67,979	67,811	66,106
42	67,134	67,367	67,363	67,132	65,668
43	66,501	66,392	66,550	66,417	64,896
44	66,219	65,761	65,983	65,800	64,078
45	65,778	65,251	65,504	65,377	63,510

TABLE VII.

RELATIVE PROPORTIONS OF MALES AND FEMALES LIVING AT DIFFERENT AGES.

"UPPER CLASS" EXPERIENCE.			AGE.	"ENGLISH LIFE" TABLES.		
NUMBERS ALIVE AT EACH AGE.		NUMBER OF MALES TO 1,000 FEMALES.		NUMBERS ALIVE AT EACH AGE.		NUMBER OF MALES TO 1,000 FEMALES.
MALES.	FEMALES.			MALES.	FEMALES.	
A	B	C		D	E	F
105,299	100,000	1,053	0	104,811	100,000	1,048
95,856	92,927	1,032	1	87,665	86,529	1,013
93,569	90,729	1,031	2	82,028	81,171	1,011
92,561	89,862	1,030	3	79,117	78,299	1,010
91,740	89,120	1,029	4	77,230	76,407	1,011
91,001	88,469	1,029	5	75,854	75,055	1,011
90,337	87,892	1,028	6	74,823	74,058	1,010
89,773	87,393	1,027	7	74,013	73,277	1,010
89,273	86,946	1,027	8	73,335	72,612	1,010
88,838	86,551	1,026	9	72,776	72,055	1,010
88,448	86,182	1,026	10	72,304	71,577	1,010
88,094	85,826	1,026	11	71,899	71,157	1,010
87,762	85,466	1,027	12	71,534	70,777	1,011
87,433	85,087	1,028	13	71,194	70,416	1,011
87,094	84,676	1,029	14	70,859	70,058	1,011
86,729	84,226	1,030	15	70,514	69,691	1,012
86,320	83,738	1,031	16	70,150	69,305	1,012
85,840	83,220	1,031	17	69,755	68,890	1,013
85,297	82,684	1,032	18	69,322	68,438	1,013
84,688	82,139	1,031	19	68,847	67,946	1,013
84,021	81,594	1,030	20	68,327	67,411	1,014
83,310	81,050	1,028	21	67,760	66,834	1,014
82,584	80,505	1,026	22	67,186	66,248	1,014
81,844	79,956	1,024	23	66,607	65,650	1,015
81,100	79,940	1,021	24	66,019	65,046	1,015
80,362	78,836	1,019	25	65,425	64,434	1,015
79,630	78,265	1,017	26	64,827	63,815	1,016
78,904	77,688	1,016	27	64,221	63,188	1,016
78,179	77,110	1,014	28	63,610	62,557	1,017
77,445	76,533	1,012	29	62,994	61,920	1,017
76,728	75,964	1,010	30	62,371	61,277	1,018
76,002	75,409	1,008	31	61,744	60,630	1,018
75,276	74,873	1,005	32	61,110	59,977	1,019
74,552	74,350	1,003	33	60,466	59,319	1,019
73,824	73,833	1,000	34	59,817	58,658	1,020

TABLE VII.—*continued.*

"UPPER CLASS" EXPERIENCE.			AGE.	"ENGLISH LIFE" TABLES.		
NUMBERS ALIVE AT EACH AGE.		NUMBER OF MALES TO 1,000 FEMALES.		NUMBERS ALIVE AT EACH AGE.		NUMBER OF MALES TO 1,000 FEMALES.
MALES.	FEMALES.			MALES.	FEMALES.	
A	B	C		D	E	F
73,095	73,311	997	35	59,160	57,990	1,020
72,363	72,773	994	36	58,494	57,318	1,021
71,631	72,212	992	37	57,818	56,643	1,021
70,897	71,626	990	38	57,130	55,962	1,021
70,166	71,021	988	39	56,434	55,276	1,021
69,435	70,410	986	40	55,723	54,584	1,021
68,705	69,805	984	41	55,000	53,888	1,021
67,964	69,217	982	42	54,265	53,185	1,020
67,216	68,654	979	43	53,513	52,477	1,020
66,451	68,118	975	44	52,745	51,762	1,019
65,667	67,603	971	45	51,963	51,041	1,018
64,858	67,095	967	46	51,162	50,312	1,017
64,023	66,580	962	47	50,342	49,577	1,015
63,162	66,047	956	48	49,503	48,833	1,014
62,280	65,489	951	49	48,645	48,083	1,012
61,396	64,902	946	50	47,766	47,324	1,009
60,518	64,289	941	51	46,865	46,558	1,007
59,658	63,651	937	52	45,918	45,781	1,002
58,811	62,990	934	53	44,944	44,997	999
57,965	62,307	930	54	43,942	44,202	994
57,093	61,597	927	55	42,916	43,334	990
56,180	60,850	923	56	41,862	42,425	987
55,203	60,060	919	57	40,782	41,476	983
54,163	59,222	915	58	39,670	40,489	980
53,057	58,328	910	59	38,525	39,463	976
51,895	57,376	904	60	37,347	38,398	973
50,664	56,372	899	61	36,133	37,290	969
49,363	55,326	892	62	34,879	36,139	965
47,994	54,242	885	63	33,587	34,943	961
46,560	53,133	876	64	32,252	33,704	957
45,070	52,009	867	65	30,875	32,416	952
43,531	50,868	856	66	29,458	31,084	948
41,948	49,688	844	67	28,002	29,705	943
40,325	48,429	833	68	26,507	28,282	937
38,660	47,026	822	69	24,979	26,818	931
36,938	45,412	813	70	23,424	25,317	925
35,171	43,539	808	71	21,798	23,783	917
33,368	41,409	806	72	20,260	22,223	912
31,537	39,106	806	73	18,668	20,647	904
29,671	36,765	807	74	17,085	19,062	896
27,844	34,532	806	75	15,520	17,480	888

TABLE VIII.

AGE AT MARRIAGE.

Bachelors Married to Spinsters.

Number of Husbands Married at Each Age.				Number of Wives Married at Each Age.			
	A	B	C	D	E	F	
Age Last Birth-day.	Before 1840.	In and since 1840.	In both Periods.	Before 1840.	In and since 1840.	In both Periods.	Age Last Birth-day.
				2	1	3	14
				12	6	18	15
16	1	2	3	42	17	59	16
17	5	...	5	103	66	169	17
18	17	5	22	184	113	297	18
19	38	6	44	222	173	395	19
20	78	23	101	318	261	579	20
21	149	59	208	338	362	700	21
22	210	126	336	335	363	698	22
23	257	203	460	316	373	689	23
24	294	267	561	307	391	698	24
25	357	326	683	300	328	628	25
26	303	396	699	227	309	536	26
27	301	394	695	203	246	449	27
28	289	318	607	186	238	424	28
29	247	284	531	134	188	322	29
30	228	283	511	115	162	277	30
31	199	259	458	102	128	230	31
32	163	214	377	69	81	150	32
33	122	179	301	56	73	129	33
34	99	146	245	45	55	100	34
35	74	117	191	31	48	79	35
36	62	100	162	20	39	59	36
37	60	68	128	11	20	31	37

TABLE VIII.—*continued.*

NUMBER OF HUSBANDS MARRIED AT EACH AGE.				NUMBER OF WIVES MARRIED AT EACH AGE.			
	A	B	C	D	E	F	
AGE LAST BIRTH-DAY.	BEFORE 1840.	IN AND SINCE 1840.	IN BOTH Periods.	BEFORE 1840.	IN AND SINCE 1840.	IN BOTH Periods.	AGE LAST BIRTH-DAY.
38	40	65	105	7	13	20	38
39	40	60	100	7	20	27	39
40	33	51	84	3	12	15	40
41	27	51	78	1	4	5	41
42	29	35	64	1	5	6	42
43	16	26	42	...	2	2	43
44	15	21	36	...	3	3	44
45	11	11	22	1	1	2	45
46	9	12	21	...	4	4	46
47	9	4	13	...	...	...	47
48	6	7	13	...	2	2	48
49	1	8	9	...	...	...	49
50	3	6	9	...	...	...	50
51	...	4	4	...	...	...	51
52	1	4	5	...	...	...	52
53	3	3	6	...	...	...	53
54	1	4	5	...	1	1	54
55	1	1	2	...	...	...	...
56	1	...	1	...	...	...	...
57	1	1	2	...	...	...	...
58	1	2	3	...	...	...	...
59	...	1	1	...	...	...	...
60	1	1	2	...	...	...	...
Totals	3802	4153	7955	3698	4108	7806	Totals

TABLE IX.

AGES AT MARRIAGE IN "UPPER CLASS" ADJUSTED.

AGE.	OF 10,000 MARRIAGES OF BACHELORS TO SPINSTERS THERE TAKE PLACE—						AGE.
	AT EACH AGE LAST BIRTHDAY.		PREVIOUS TO EACH AGE.		AFTER EACH AGE.		
	A HUSBANDS.	B WIVES.	C HUSBANDS.	D WIVES.	E HUSBANDS.	F WIVES.	
14	...	4	...	...	10000	10000	14
15	...	23	...	4	10000	9996	15
16	4	76	...	27	10000	9973	16
17	6	216	4	103	9996	9897	17
18	22	380	10	319	9990	9681	18
19	61	506	32	699	9968	9301	19
20	127	742	93	1205	9907	8795	20
21	261	886	220	1947	9780	8053	21
22	422	894	481	2833	9519	7167	22
23	578	894	903	3727	9097	6273	23
24	705	886	1481	4621	8519	5379	24
25	859	812	2186	5507	7814	4493	25
26	879	687	3045	6319	6955	3681	26
27	874	584	3924	7006	6076	2994	27
28	763	534	4798	7590	5202	2410	28
29	667	420	5561	8124	4439	1876	29
30	643	355	6228	8544	3772	1456	30
31	576	287	6871	8899	3129	1101	31
32	474	192	7447	9186	2553	814	32
33	379	165	7921	9378	2079	622	33
34	308	128	8300	9543	1700	457	34
35	240	101	8608	9671	1392	329	35
36	198	75	8848	9772	1152	228	36
37	166	50	9046	9847	954	153	37
38	140	36	9212	9897	788	103	38
39	119	23	9352	9933	648	67	39
40	106	15	9471	9956	529	44	40
41	98	7	9577	9971	423	29	41
42	80	4	9675	9978	325	22	42
43	53	3	9755	9982	245	18	43
44	39	3	9808	9985	192	15	44
45	30	3	9847	9988	153	12	45
46	22	3	9877	9991	123	9	46
47	17	2	9899	9994	101	6	47
48	14	2	9916	9996	84	4	48
49	11	1	9930	9998	70	2	49
50	11	...	9941	9999	59	1	50
51	10	...	9952	9999	48	1	51
52	8	...	9962	9999	38	1	52
53	7	...	9970	9999	30	1	53
54	6	1	9977	9999	23	1	54
55	5	...	9983	10000	17	...	55
56	4	...	9988	10000	12	...	56
57	3	...	9992	10000	8	...	57
58	2	...	9995	10000	5	...	58
59	2	...	9997	10000	3	...	59
60	1	...	9999	10000	1	...	60

TABLE X.

Number of Children to a Marriage.

Number of Children in each Family, including Stillborn.	Cases in which the Return was made by the Father of the Children, and in which the date of Birth of the Mother was stated, as also whether the parents were Bachelor and Spinster, or otherwise, at time of Marriage.							
	Both Parents survived Child-bearing age of Mother.				Mother died during Child-bearing period, Father surviving her.			
	Bachelor.		Widower.		Bachelor.		Widower.	
	Spinster	Widow.	Spinster	Widow.	Spinster	Widow.	Spinster	Widow.
	A	B	C	D	E	F	G	H
	Number of Cases.				Number of Cases.			
0	152	5	31	3	20	...	1	...
1	131	7	14	2	68	...	6	...
2	183	11	25	3	50	4	4	...
3	193	3	14	1	54	1	1	...
4	185	4	21	2	39	2	5	1
5	229	3	15	1	59	1	...	...
6	194	6	11	...	29	...	3	...
7	165	...	6	1	34	2	1	...
8	125	1	2	...	17	...	...	...
9	121	2	5	...	17	...	1	...
10	86	...	10	...	6	...	1	...
11	63	...	5	...	8	...	...	...
12	46	...	3	...	6	...	...	...
13	19	...	2	...	1	...	...	...
14	10	...	2	...	...	...	...	...
15	7	...	1	...	2	...	1	...
16	4	...	...	...	1	...	...	...
17	3	...	...	...	1	...	...	...
18	3	...	...	...	...	...	...	...
	1919	42	167	13	412	10	24	1

TABLE XI.

Interval between Marriage of Spinsters and the Birth of Children.

Year after Marriage.	Number of Children Born in each Year after the Marriage of the Parents:—							
	1st Children.	2nd Children.	3rd Children.	5th Children.	8th Children.	11th Children.	14th Children.	17th Children.
1st	3159	...	...	...	...	...	...	...
2nd	2163	675	...	...	...	...	...	...
3rd	421	2904	163	...	...	...	...	...
4th	137	1103	1560	...	...	...	...	...
5th	69	403	1491	19	...	...	...	...
6th	26	161	730	247	...	...	...	...
7th	21	80	353	669	...	...	...	...
8th	11	46	179	742	2	...	...	...
9th	7	37	95	605	26	...	...	...
10th	7	21	60	380	87	...	...	...
11th	5	15	39	235	193	...	...	...
12th	4	10	23	143	204	4	...	...
13th	3	5	23	105	253	11	...	...
14th	2	6	14	71	229	25	...	...
15th	...	3	6	37	195	54	...	...
16th	...	...	4	27	136	67	3	...
17th	...	2	5	15	99	69	5	...
18th	...	...	3	13	82	75	7	...
19th	...	...	...	9	32	65	9	...
20th	...	2	...	9	23	50	13	2
21st	...	2	...	1	19	49	9	1
22nd	...	...	1	2	4	30	12	1
23rd	...	...	...	1	6	14	8	2
24th	...	...	...	1	1	12	10	2
25th	...	...	...	...	2	6	6	1
26th	...	...	...	...	2	3	1	...
27th	...	...	...	1	...	...	1	...
28th	...	...	...	...	...	...	...	1
29th	...	...	...	...	...	1	1	1
30th	...	...	...	...	...	...	1	...
Total.....	6035	5475	4749	3332	1595	535	86	11

TABLE XII.

Interval between Marriage of Spinsters and the birth of Children.

Number of Children born in each of the undermentioned intervals after the Marriage of the Parents.

First Children.		Second Children.		Third Children.	
Interval in Years and Decimal Parts of a Year.	Number Born.	Interval in Years and Decimal Parts of a Year.	Number Born.	Interval in Years and Decimal Parts of a Year.	Number Born.
Under ·60	51	Under 1·5	17	Under 2·5	8
·60 and ·61	12	1·5	28	2·5	9
·62 „ ·63	16	1·6	35	2·6	13
·64 „ ·65	19	1·7	122	2·7	22
·66 „ ·67	31	1·8	193	2·8	44
·68	15	1·9	280	2·9	67
·69	19	2·0	339	3·0	97
·70	19	2·1	335	3·1	117
·71	45	2·2	330	3·2	117
·72	46	2·3	345	3·3	157
·73	80	2·4	327	3·4	165
·74	94	2·5	314	3·5	189
·75	140	2·6	265	3·6	169
·76	129	2·7	277	3·7	200
·77	121	2·8	191	3·8	173
·78	149	2·9	181	3·9	176
·79	140	3·0	189	4·0	189
·80	142	3·1	140	4·1	180
·81	124	3·2	154	4·2	154
·82	133	3·3	136	4·3	154
·83	170	3·4	110	4·4	153
·84	140	3·5	98	4·5	156
·85	109	3·6	71	4·6	153
·86	102	3·7	71	4·7	129
·87	107	3·8	63	4·8	124
·88	90	3·9	71	4·9	99
·89	88	4·0	65	5·0	115
·90 to ·99	828	4·1	41	5·1	80
1·00 „ 1·09	554	4·2	58	5·2	92
1·10 „ 1·19	371	4·3	40	5·3	88
1·20 „ 1·29	296	4·4	33	5·4	63
1·30 „ 1·39	202	4·5	39	5·5	67
1·40 „ 1·49	161	4·6	38	5·6	58
1·50 „ 1·99	579	4·7	21	5·7	63
2·00 „ 2·49	282	4·8	38	5·8	46
2·50 „ 2·99	139	4·9	30	5·9	58

For Numbers of Children born at longer intervals after marriage, *vide* Table XI.

TABLE XIII.

In Families consisting of the undermentioned Number of Children.	THE AGES OF MOTHERS LAST BIRTHDAY WHEN THEIR LAST CHILD WAS BORN, IN CASES WHERE BOTH THE FATHER AND MOTHER SURVIVED THE CHILD-BEARING AGE OF THE MOTHER. NUMBERS OF CASES AT EACH AGE.																																				Total Number of Cases.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	59	
1	2	1	5	8	10	16	9	11	14	10	9	6	13	13	8	13	14	7	5	8	8	8	11	10	6	7	4	2	2	1	2	1	...	...	...	...	...	...	244
2	...	1	1	1	9	12	12	8	16	11	14	18	24	17	30	17	26	15	21	22	19	19	17	16	11	18	15	4	1	3	3	...	...	...	...	...	...	...	401
3	...	...	...	1	3	3	7	11	8	15	16	13	20	20	18	19	21	25	26	25	28	29	32	20	16	14	18	6	4	3	1	1	1	...	...	†1	...	...	425
4	...	...	...	...	...	1	2	7	4	3	9	15	11	28	25	25	35	38	23	24	33	37	27	38	33	26	14	17	5	4	1	...	...	...	...	...	...	...	485
5	...	...	...	...	...	...	1	3	2	5	7	13	11	15	20	27	29	28	27	39	42	47	57	52	33	32	35	20	9	4	3	2	...	1	*1	...	...	...	565
6	...	...	...	...	...	...	...	...	...	...	2	4	4	11	19	22	24	20	17	43	37	39	49	51	39	37	33	20	12	4	3	4	...	...	...	...	...	...	494
7	...	...	...	...	...	1	...	...	...	1	1	4	4	6	4	12	18	18	23	27	35	39	47	49	61	52	35	30	9	7	3	1	2	...	...	...	†1	...	490
8	...	...	...	...	...	...	...	...	...	...	1	...	2	3	7	10	9	10	15	21	29	35	38	74	57	59	37	31	16	6	6	...	...	...	*1	...	...	...	467
9	...	...	...	...	...	...	...	...	...	...	...	...	2	2	...	7	9	1	10	14	21	29	39	40	53	50	45	24	23	7	6	4	...	...	...	...	...	*1	387
10	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	5	2	6	5	7	10	24	30	42	41	40	34	32	15	11	3	...	1	...	*1	...	...	...	312
11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	3	5	4	10	11	17	31	33	32	30	21	25	12	2	1	1	...	...	...	...	...	239
12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	1	1	1	1	3	6	7	18	15	21	21	33	21	11	6	3	1	...	...	...	...	...	...	170
13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	5	11	7	15	23	12	20	7	5	5	1	1	...	†1	...	...	...	115
14	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	2	3	1	5	3	9	10	3	3	2	...	1	...	...	...	...	...	...	43
15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	3	3	3	4	2	10	4	2	...	...	...	1	...	...	...	...	34
16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	5	...	2	...	1	...	...	...	...	...	...	...	10
17	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	2	1	2	4	...	...	...	...	...	...	..	...	...	10
18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	3	...	...	1	...	...	...	...	...	...	6
19	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1
20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1
TOTAL...	2	2	6	10	22	33	31	40	44	45	59	73	91	116	133	158	189	173	178	239	280	334	398	453	426	428	364	263	157	77	42	18	6	2	4	1	1	1	4899

*Marked thus † above Age 50 are verified: marked thus * are not verified.*