

THE BALANCE
OF
BIRTHS AND DEATHS

THE INSTITUTE OF ECONOMICS
OF
THE BROOKINGS INSTITUTION

THE INSTITUTE OF ECONOMICS

THE BROOKINGS INSTITUTION

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THE BALANCE OF BIRTHS AND DEATHS

VOLUME I.
WESTERN AND NORTHERN EUROPE

BY
ROBERT R. KUCZYNSKI

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DIRECTOR'S PREFACE

For more than a century the rate of population growth has been a subject not only of interest but of concern to students of the social sciences. At the opening of the nineteenth century, Malthus' *Essay on the Principle of Population* focussed the attention of the world upon the inevitability, as he saw it, of over-population as the result of a law of growth — population tending to increase in geometric ratio and the means of subsistence tending to increase only in arithmetic ratio. In the Occidental world, however, the discovery and settlement of vast and rich new areas and a revolution in economic methods have permitted a remarkable rise in the standard of living since Malthus' day, notwithstanding the continuous increase in population. But it remains true that over-population is still regarded not only in Asia but also in many European countries as a primary cause of economic distress.

Meanwhile, the growing practice of birth control has given rise to the fear in some quarters that the present danger is not that the population will increase too fast, but rather that it will not long be maintained. Meanwhile, also, the markedly varying rates of population increase in different countries and in different areas of the world have occasioned another set of fears — lest this or that particular nation or particular race will cease to hold its place in the eternal scheme of things.

Existing population literature does not afford the answer to such fundamental questions as: In what countries of the world is population still amply reproducing itself? In what countries is the population ceasing to maintain itself? The mere citation of figures concerning the ratio of births and deaths does not afford the answer. Close analysis of fertility and mortality is required if one is to ascertain the trend of population in the different countries of the world.

In this volume, which is concerned with the countries of Western and Northern Europe, the Institute of Economics presents the first of a series of studies intended to be a comprehensive survey of the trend of human fertility. A second volume dealing with Southern and Eastern Europe, Africa, and Asia is expected to be published in the spring of 1929, and a third covering North and South America and Australia early in 1930. These three volumes will be confined to a statement of the facts, but subsequent studies will be devoted to an analysis of the social causes and the economic and political consequences of the great differences in fertility which exist between countries like England, France, Germany, the United States, and Australia, on the one hand, and Poland, Russia, Japan, and South America, on the other.

The preparation of this volume has been under the supervision of a Committee consisting of the Director of the Institute, and Charles O. Hardy and Constantine E. McGuire of the Institute staff. The author desires to express his obligations to Dr. Johannes Rahts, former chief of the population division of the German Statistical Office, for many

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valuable suggestions and to the librarians of the Surgeon General's Office, the Bureau of Labor Statistics and the Department of Commerce for facilities in consulting statistical documents.

HAROLD G. MOULTON,
Director.

Institute of Economics,
July, 1928.

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THE BALANCE OF BIRTHS AND DEATHS

THE BALANCE OF BIRTHS AND DEATHS

INTRODUCTION

A NEW book on the population problem? And one which will confine itself solely to stating the facts without attempting to explain them? Are there really any worthwhile new facts to state? Do we not know perfectly well that mortality has decreased practically everywhere in the course of the last hundred years and that natality has fallen in Western Europe and elsewhere in the course of the last forty or fifty years, that there is an excess of births over deaths practically everywhere, and that population will necessarily increase so long as births exceed deaths? Yes, we know all this perfectly well, so well indeed that we are ready to characterize as foolish any person who would pretend that a nation with a large excess of births over deaths may still be dying out. Yet such an assertion would not only not be foolish but would even be much to the point today.

It has indeed not been sufficiently realized so far that, however low may be the number of deaths, there must be a definite and rather considerable number of births in order to insure the reproduction of the population. Even if Isaiah's vision became true that "the child shall die an

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hundred years old," it would still be necessary that on the average each woman have two children who in turn become parents of two children, etc., if the population were not sooner or later to decrease.

Let us, for a moment, consider England which in 1927 had 655,000 births and 485,000 deaths. It may seem at first sight that an excess of 170,000 births is a proof of considerable vitality and it may even be assumed that by further improvements in public health the number of deaths might still be reduced. Yet, incredible as it may sound, those 655,000 births of 1927 mean that on the average each woman during her life-time gives birth to but two children, and that if the population is to hold its own not one of the children thus born may die before attaining parenthood. In case then that natality does not again increase, the population of England is bound to die out no matter how low mortality may be reduced. And this state of affairs is by no means confined to England. Conditions are about the same in Germany, and only slightly better in France.

Therefore, a new book on the population problem which will merely state the facts may not be superfluous.

The unusual angle from which this book attacks the population problem necessitates the application of unusual methods. These methods had to be explained. They can be explained and have been explained without quoting any mathematical formula. The author even feels sure that the understanding of those methods does not presume any mathematical training on the side of the reader. If,

'then, any reader possessing a high-school education does not understand the methodological explanations given in this book, it will neither be the fault of the reader nor of the high-school, but the fault of the author. Yet, there may be readers who do not care at all about statistical methods and are interested merely in the principal results. For those readers a brief summary of the results will be given here.

Around 1850, $3\frac{1}{2}$ million children a year were born in Western and Northern Europe. Fifty years later the annual number of births was $4\frac{3}{4}$ millions. At present it is again about $3\frac{1}{2}$ millions. In the meantime, the population has considerably increased: from 113 millions in the middle of the nineteenth century to 189 millions in 1927. The birth rate, that is the number of births per 1,000 inhabitants, therefore has considerably decreased: from 1841 to 1885, it averaged about 32; by 1913 it had fallen to 24; in 1927 it was 18 only. The decrease of the birth rate began in France but involved sooner or later every country so that there is no longer any marked difference between the birth rates of the various parts of Western and Northern Europe.

Forty or fifty years ago, the average number of children born to each woman (married and unmarried) was four or five in all countries of Western and Northern Europe, with the exception of France and Ireland, where it was about three. In 1926, it was practically everywhere below three and averaged about 2.3. Part of the children, of course, die before reaching marrying age. Forty or fifty years ago,

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the number of children born to each woman and becoming parents in their turn averaged about three in all countries of Western and Northern Europe with the exception of France and Ireland, where it was about two. In 1926, the number of such children was still above two in some of the smaller countries, like Holland, Denmark, and Finland, but it was below two in all the larger countries: in France and especially in England and Germany.

If each woman has two children who become parents in their turn, the population will hold its own. If she has three such children, the population will increase by one-half within one generation. If she has less than two such children, the population will sooner or later decrease. With a fertility and a mortality as they prevailed forty or fifty years ago, the population then would have increased by about one-half per generation in all countries of Western and Northern Europe with the exception of France and Ireland, where the population about held its own. With a fertility and a mortality as they prevail at present, the population of some smaller countries still shows a genuine growth, but the population of the larger countries, France, and especially England and Germany, is doomed to die out.

CHAPTER I

BIRTH RATES

It is generally believed that natality in most countries of Western and Northern Europe was about constant until the end of the third quarter of the nineteenth century. While it is admitted that vital statistics exhibit an increasing natality in England in the forties, fifties, and sixties of the nineteenth century, this fact is usually disposed of by pointing to improvements in the registration of births.¹ Even granted that every increase of the official birth rate in earlier periods is to be explained by a more thorough registration, it certainly would be impossible to account for decreases in the official birth rate by decreases in the efficiency of registration. As a matter of fact the countries which have statistics for the twenty-five years following the Napoleonic wars (Denmark, Finland, France, Prussia, Norway, Sweden) all show a decrease of natality during that period, and ups and downs are still more conspicuous if one goes back to the scanty statistics covering the period from 1735 to 1815.²

The decline of the birth rate which began in the last quarter of the nineteenth century proved to be a continuous one. The

¹ See for example Newsholme, Sir Arthur, *The Elements of Vital Statistics*, New Edition, 1923, pp. 92-93.

² See tables, pp. 6, 94.

YEARLY BIRTH RATES BY PERIODS, 1736-1927

PERIOD	BELGIUM	DEN- MARK	ENGLAND AND WALES	SCOT- LAND	IRE- LAND	FIN- LAND	FRANCE (1)	FRANCE (2)	GER- MANY (1)	GER- MANY (2)	HOL- LAND	NOR- WAY	SWEDEN	SWITZ- ERLAND
1736-40	—	—	—	—	—	—	—	—	—	—	—	30.0	—	—
1741-45	—	—	—	—	—	—	—	—	—	—	—	29.0	—	—
1746-50	—	—	—	—	—	—	—	—	—	—	—	31.5	35.1*	—
1751-55	—	—	—	—	—	45.3	—	—	—	—	—	34.4	37.1	—
1756-60	—	—	—	—	—	44.5	—	—	—	—	—	34.3	34.3	—
1761-65	—	—	—	—	—	43.7	—	—	—	—	—	35.3	34.6	—
1766-70	—	—	—	—	—	41.7	—	—	—	—	—	33.5	33.8	—
1771-75	—	—	—	—	—	38.8	—	—	—	—	—	29.4	31.3	—
1776-80	—	—	—	—	—	41.3	—	—	—	—	—	30.8	34.7	—
1781-85	—	—	—	—	—	40.4	—	—	—	—	—	29.9	31.8	—
1786-90	—	—	—	—	—	37.5	—	—	—	—	—	30.7	32.1	—
1791-95	—	—	—	—	—	41.1	—	—	—	—	—	33.5	33.9	—
1796-1800	—	29.9 ^b	—	—	—	39.2	—	—	—	—	—	32.3 ^c	32.8	—
1801-05	—	32.3	—	—	—	38.4	—	—	—	—	—	28.2	31.4	—
1806-10	—	30.3	—	—	—	34.3	31.7	—	—	—	—	26.8	30.4	—
1811-15	—	30.8	—	—	—	37.0	31.7	—	—	—	—	27.1	32.9	—
1816-20	—	32.4	—	—	—	37.7	32.0	—	—	—	—	32.7	33.7	—
1821-25	—	32.2	—	—	—	38.7	31.4	—	—	—	—	33.7	35.8	—
1826-30	—	29.9	—	—	—	37.8	30.5	—	—	—	—	32.9	33.5	—
1831-35	33.1	30.8	—	—	—	34.2	29.6	—	—	—	—	31.2	32.4	—
1836-40	34.2	29.9	31.3 ^d	—	—	32.6	28.4	—	—	—	35.1 ^e	28.1	30.6	—

1841-45	32.3	30.1	32.3	—	—	35.5	28.1	28.3	36.8	36.3	34.4	30.4	31.3	—
1846-50	28.6	30.7	32.8	—	—	35.4	26.7	26.9	35.8	35.3	31.7	30.9	30.9	—
1851-55	28.9	31.9	33.9	31.3 ^f	—	36.3	26.1	26.2	34.9	34.3	33.3	32.5	31.8	—
1856-60	31.1	32.9	34.4	34.5	—	35.6	26.6	26.7	36.3	35.7	33.0	33.3	33.7	—
1861-65	31.3	30.9	35.1	35.1	25.0 ^e	37.0	26.7	26.7	37.0	36.5	35.3	31.9	33.2	—
1866-70	32.1	30.6	35.3	34.9	26.8	31.8	26.1	26.1	37.8	37.2	35.2	29.9	29.7	29.8 ^a
1871-75	32.4	30.8	35.5	35.0	27.2	37.0	25.5	25.9	38.9	38.7	36.1	30.3	30.7	30.2
1876-80	32.0	32.0	35.3	34.7	25.8	36.9	25.3	25.7	39.2	39.0	36.4	31.6	30.3	31.3
1881-85	30.9	32.4	33.5	33.3	23.9	35.5	24.7	25.0	37.0	36.8	34.8	31.0	29.4	28.7
1886-90	29.4	31.4	31.4	31.4	22.8	34.5	23.0	23.3	36.5	36.4	33.6	30.5	28.8	27.5
1891-95	29.1	30.4	30.5	30.5	23.0	31.8	22.3	22.6	36.3	36.1	32.9	30.1	27.4	27.7
1896-1900	29.0	30.0	29.3	30.0	23.3	32.6	21.9	22.3	36.0	35.7	32.2	30.0	26.9	28.4
1901-05	27.9	29.0	28.2	29.2	23.1	31.3	21.2	21.6	34.3	34.0	31.5	28.5	26.1	27.8
1906-10	24.8	28.2	26.3	27.6	23.3	30.9	19.9	20.2	31.6	31.3	29.6	26.4	25.4	26.0
1911-14	22.2	26.1	24.1	25.8	23.0	28.1	18.6	18.8	27.8	27.4	28.1	25.3	23.5	23.5
1915-19	13.6	23.8	19.4	21.9	21.0	23.3	11.3	11.3	16.7	16.5	25.8	24.0	20.8	18.9
1920-21	21.9	24.6	24.0	26.7	21.8	24.8	21.0	21.0	25.6	25.4	28.1	25.1	22.6	20.9
1922-23	20.5	22.3	20.1	23.2	21.0	23.6	19.2	19.2	22.0	22.0	26.2	22.8	19.2	19.5
1924-25	19.9	21.4	18.6	21.6	21.4	22.4	18.8	18.8	20.6	20.6	24.7	20.3	17.8	18.6
1926	19.0	20.5	17.8	20.9	21.2	21.7	18.8	18.8	19.5	19.5	23.8	19.7	16.9	18.2
1927	—	19.6	16.7	19.8	20.6	—	18.1	18.1	18.3	18.3	23.1	18.8	—	—

(1) Territory of the period

• 1749-50 only

• 1800 only

(2) Present territory

• 1796-99 only

• 1838-40 only

• 1840 only

† 1855 only

• 1864-65 only

• 1870 only

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decrease in the late seventies and the early eighties was not greater than had occurred at numerous previous occasions.³ The birth rate in 1881-85 was comparatively low in Great Britain, Ireland, France, Sweden. But it was higher than 1846-55 in Belgium and in Switzerland; higher than 1801-15, 1821-55, 1861-80 in Denmark; higher than 1806-10, 1831-40, 1846-50, 1866-70 in Finland; higher than 1841-60 in Germany and in Holland; higher than 1736-45, 1771-90, 1801-15, 1836-50, 1866-75 in Norway. If we combine all countries of Western and Northern Europe (taking them with their present territory), we find that the birth rate in that territory was still 31.4 in 1881-85 as compared with 31.9, 30.9, 30.8, 31.7, 32.1, 32.0, 32.7, and 32.8 in the eight preceding quinquennial periods. The decisive factor then was that the decrease of the birth rate did not stop in the eighties. If we again combine the countries of Western and Northern Europe (taking them this time not with their present but with their pre-war territory), we find that the birth rate which had fluctuated between 31.3 and 34.2 from 1872 to 1886 dropped below 31 in 1887 and never reached 31 again. It fell definitely below 30 in 1897, below 29 in 1903, below 28 in 1905, below 27 in 1909, below 26 in 1910, and below 25 in 1911. The second half of the eighties has then to be considered as the turning point in the

³ A decrease of the birth rate like that from 1751-55 to 1771-75 in Sweden (37.1 to 31.3) and Finland (45.3 to 38.8), or that from 1791-95 to 1806-10 in Finland (41.2 to 34.3) and Norway (33.5 to 26.8), or that from 1821-25 to 1836-40 in Sweden (35.8 to 30.6), Norway (33.7 to 28.1), and Finland (38.7 to 32.6), or that from 1836-40 to 1846-50 in Belgium (34.2 to 28.6), finds no parallel in the period from 1871 to 1885.

BIRTH RATES

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trend of the birth rate. The decrease was slow up to the beginning of the twentieth century and the absolute number of births still increased until 1901. The decrease of the birth rate became ever more rapid from 1909 on and the absolute number of births in 1914 was smaller than in any of the 40 preceding years.

The World War did not essentially change the trend of the birth rate. During the war, the birth rate was very low, being 17.0 only in 1915-19 as compared with 24.2 in 1911-

POPULATION, BIRTHS, AND BIRTH RATES, 1841-1926 *

PERIOD	MEAN POPULATION (in thousands)	AVERAGE YEARLY BIRTHS	BIRTH RATE
1841-45	109,170	3,480,648	31.9
1846-50	112,464	3,472,880	30.9
1851-55	114,451	3,523,544	30.8
1856-60	117,179	3,714,050	31.7
1861-65	121,620	3,899,311	32.1
1866-70	125,475	4,016,593	32.0
1871-75	128,702	4,209,905	32.7
1876-80	134,634	4,416,136	32.8
1881-85	139,760	4,385,320	31.4
1886-90	144,700	4,372,226	30.2
1891-95	150,049	4,460,828	29.7
1896-1900	157,140	4,616,319	29.4
1901-05	164,998	4,686,460	28.4
1906-10	172,726	4,590,764	26.6
1911-14	179,507	4,336,742	24.2
1915-19	180,212	3,063,521	17.0
1920-21	181,342	4,320,368	23.8
1922-23	183,947	3,865,617	21.0
1924-25	186,645	3,712,743	19.9
1926	188,267	3,612,720	19.2

* Present territory of Belgium, Denmark (incl. Faroe Islands and Iceland), Great Britain (incl. Islands in the British Seas) and Northern Ireland, Irish Free State, Finland, France, Germany, Saar Territory, Holland, Luxemburg, Norway, Sweden, Switzerland.

POPULATION, BIRTHS, AND BIRTH RATES, 1870-1914 *

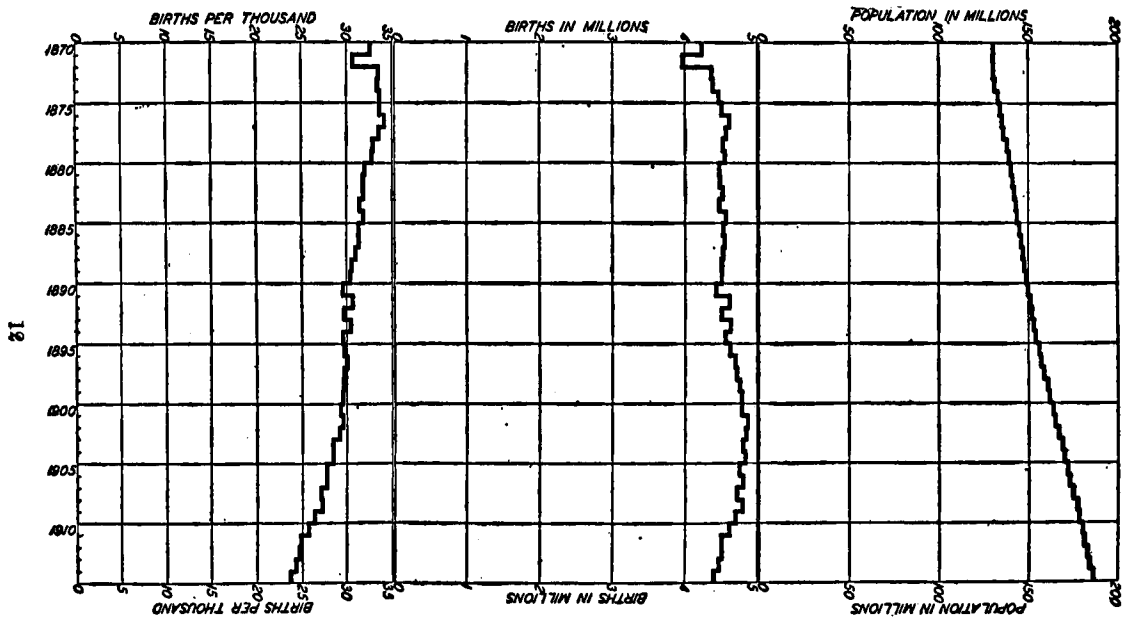
YEAR	MEAN POPULATION (in thousands)	BIRTHS	BIRTH RATE
1870	129,692	4,233,145	32.6
1871	129,673	3,969,437	30.6
1872	130,318	4,366,342	33.5
1873	131,400	4,382,797	33.4
1874	132,577	4,467,832	33.7
1875	133,855	4,511,576	33.7
1876	135,120	4,618,746	34.2
1877	136,423	4,584,723	33.6
1878	137,759	4,532,950	32.9
1879	139,031	4,560,436	32.8
1880	140,096	4,481,508	32.0
1881	141,002	4,485,551	31.8
1882	141,888	4,515,407	31.8
1883	142,754	4,488,713	31.4
1884	143,726	4,571,146	31.8
1885	144,732	4,535,358	31.3
1886	145,812	4,558,239	31.3
1887	146,846	4,536,608	30.9
1888	147,904	4,508,620	30.5
1889	149,030	4,514,984	30.3
1890	149,995	4,437,081	29.6
1891	150,974	4,622,490	30.6
1892	152,039	4,519,832	29.7
1893	153,122	4,650,227	30.4
1894	154,387	4,573,737	29.6
1895	155,762	4,641,038	29.8
1896	157,273	4,719,176	30.0
1897	158,898	4,734,765	29.8
1898	160,684	4,774,851	29.7
1899	162,332	4,802,802	29.6
1900	163,738	4,796,910	29.3
1901	165,303	4,886,568	29.6
1902	166,971	4,869,567	29.2
1903	168,578	4,806,484	28.5
1904	170,173	4,847,001	28.5
1905	171,744	4,769,769	27.8
1906	173,331	4,817,093	27.8
1907	174,895	4,737,266	27.1
1908	176,562	4,801,893	27.2
1909	178,208	4,709,187	26.4
1910	179,810	4,626,365	25.7
1911	181,289	4,507,434	24.9
1912	182,679	4,511,440	24.7
1913	184,143	4,472,880	24.3
1914	185,695	4,403,422	23.7

* Pre-war territory of Belgium, Denmark proper, Great Britain (excl. Islands in the British Seas) and Ireland, Finland, France, Germany, Holland, Norway, Sweden, Switzerland.

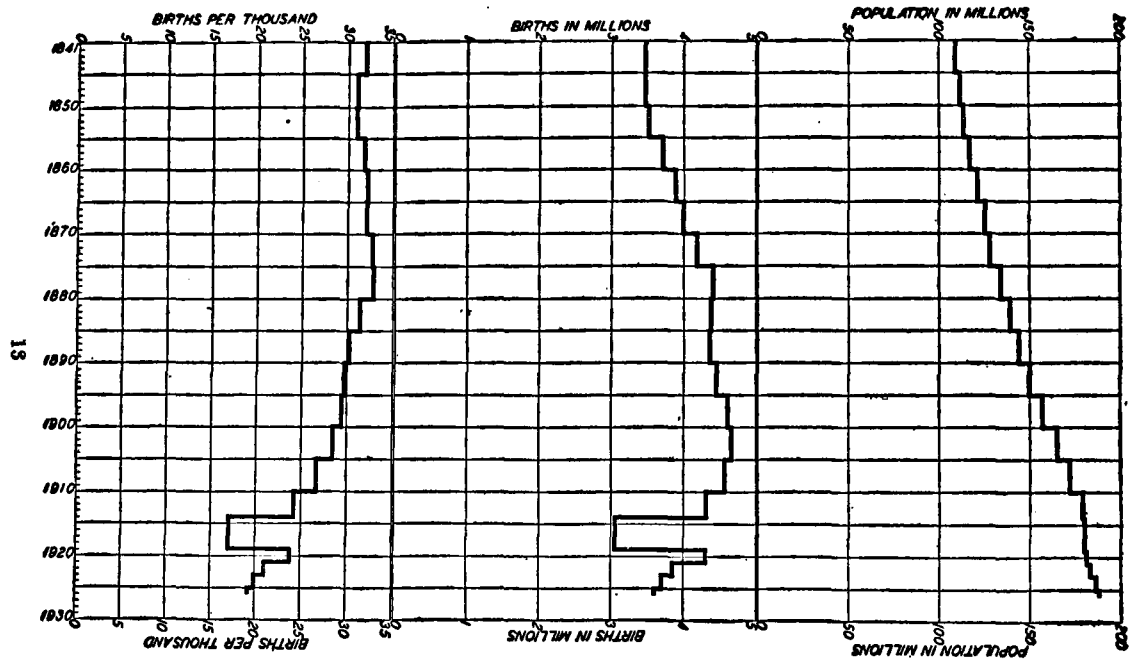
1914. Immediately after the war, the contraction of many marriages which had been postponed caused the birth rate to rise temporarily. It reached 23.8 in 1920-21; but it fell again: to 21.0 in 1922-23, 19.9 in 1924-25, and 19.2 in 1926.⁴ Although the population of Western and Northern Europe had increased from 109.2 millions in 1841-45 to 188.3 millions in 1926 or by 72 per cent, the number of births in 1926 (3,613,000) was practically the same as the average in 1841-45 (3,481,000).⁵

The decrease of the birth rate did not start at the same time in every country. It began in France and in Ireland earlier than in all other countries so that since about the forties of the nineteenth century there has been a marked difference between the birth rates of the various countries of Western and Northern Europe, the rate of Germany always having the lead while the rates of France and Ireland always lagged behind. These conditions continued into the first decade of the twentieth century. As late as 1906-1910, the German birth rate, although it had in the meantime gone down rapidly, still led with 31.6, Finland being second with 30.9, Holland third with 29.6, and Ireland and France lowest with 23.3 and 19.9. But in the last years before the war a conspicuous trend towards similarity of the birth rates took place. Holland, Germany, and Finland, it is true, still occupied the first three places in 1913, but their birth rates had dropped to 28.3, 27.5, and 27.2 respectively, and in eight other countries, including Ireland, the rate varied between 22.5 and 25.6 only, while in France it was 18.8. During the war, the birth

⁴ In 1927, it was about 18.2. ⁵ In 1927, it was about 3,450,000.



POPULATION, BIRTHS, AND BIRTH RATES IN WESTERN AND NORTHERN EUROPE, 1870-1914



POPULATION, BIRTHS, AND BIRTH RATES IN WESTERN AND NORTHERN EUROPE, 1841-1926

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rate was of course especially low in the belligerent countries, and the recovery in 1920-21 did not affect all countries with the same intensity. But as early as 1921, the trend towards equality in rates again set in, and the birth rates, if one excludes Holland, varied only as follows:

In 1921 between	25.3	and	20.7
" 1922 "	23.5	"	19.3
" 1923 "	23.7	"	18.8
" 1924 "	22.4	"	18.1
" 1925 "	22.3	"	17.5
" 1926 "	21.7	"	16.9

Holland occupied the first rank in each year since 1913. France was at the bottom of the ladder until 1919 and again in 1921 and 1922, but her birth rate exceeded that of Switzerland in 1920, 1925, and 1926, that of Sweden in 1923-26, that of England and Wales in 1925 and 1926. Ireland too had completely changed her position. While in 1913 her birth rate exceeded only that of France and Belgium, the fact that the Irish birth rate subsequently assumed a virtually stationary level had the result that in 1926 it was higher than in any other country except Holland and Finland.

Not much stress should be laid on the birth rates in small countries. The usual comparison of small with large countries is indeed rather misleading. Holland still has a considerably higher birth rate than any other country of Western and Northern Europe. In 1925, for example, it was 24.2 as compared with 20.7 in Germany. But while Holland, with a population of 7,366,000 had 178,545 births, the four eastern provinces of Germany, with an aggre-

gate population of 7,100,000, had 178,009 births or about as many as Holland, and the birth rate for this territory was 25.1 as compared with 24.2 for Holland. On the other hand, the birth rate in 1925 was in Switzerland 18.4, in Sweden 17.5, and in the Free State of Saxony 17.7, the populations being 4, 6, and 5 millions respectively. If the large countries then were subdivided so as to admit adequate comparison with the small countries, the position of the smaller countries would no longer appear extreme. Such a subdivision is indeed necessary for all studies entering into details. For a study of the problem in general, the increasing uniformity of the birth rates in the various countries leads to another alternative: combine a group of countries in order to eliminate divergencies of little significance occurring in small countries.

CHAPTER II

FERTILITY RATES

THE *birth rate* shows the percentage by which a population increases through the birth of children, but since it is calculated without regard to the sex and age composition of the population it does not afford an adequate gauge for the measurement of fertility. (If in a given population the percentage of women of child-bearing age is large, the birth rate is likely to be high even if fertility is small, while if the percentage of women of child-bearing age is small, the birth rate is likely to be low, even if fertility is large.) The fact that England during the last generation before the war had a higher birth rate than Sweden, although the number of births per 1,000 women of child-bearing age was larger in Sweden, is thus explained by the higher percentage of women of child-bearing age in England. It therefore has become customary to measure fertility by relating the number of births to the number of women of child-bearing age. If, then, child-bearing age is assumed to cover the period from 15 to 50 years,¹ the general fertility rate is the number of births per 1,000 women of 15 to 50 years.

The general fertility rate, on the whole, has followed the same trend as the birth rate. If the percentage of women

¹ See Appendix B.

of child-bearing age among the total population were always and everywhere the same, say 25 per cent, the general fertility rate would always and everywhere be four times as large as the birth rate. This is, of course, not the case, but the percentage of women of child-bearing age among the total population actually varies much less than one might expect in view of the enormous differences in distribution of populations by age and sex. The lowest percentage ever ascertained for any country of Western and Northern Europe was that of 23.88 in Ireland for 1871, while the highest percentage before the war was that of 27.69 in England for 1911. These extreme differences, of course, seem rather high; but if one combines all the countries of Western and Northern Europe (with their pre-war territory), the percentage of women of child-bearing age was as follows:

1860:	25.89
1870:	25.40
1880:	25.03
1890:	25.29
1900:	25.70
1910:	25.89

While it may be instructive to study the general fertility rate for individual countries, it, then, seems superfluous to compute such rates for the whole of Western and Northern Europe in pre-war times. If the percentage of women of child-bearing age was 25.89 both in 1860 and in 1910, the fertility rate must have decreased in 1910 as compared with 1860 in exactly the same proportion as the birth rate.

WOMEN OF CHILD-BEARING AGE PER CENT OF TOTAL POPULATION, 1750-1925

YEAR ABOUT	BELGIUM	DENMARK	ENGLAND AND WALES	SCOTLAND	IRELAND	FINLAND	FRANCE	GERMANY	HOLLAND	NORWAY	SWEDEN	SWITZERLAND
1750	—	—	—	—	—	24.00	—	—	—	—	25.93	—
1775	—	—	—	—	—	25.24	—	—	—	—	✓26.90	—
1800	—	—	—	—	—	26.02	—	—	—	✓25.75	26.21	—
1825	—	—	—	—	—	26.24	—	—	—	24.95	25.19	—
1840	—	25.82	—	—	—	—	—	—	—	—	25.99	—
1845	25.16	25.82	—	—	—	—	—	—	—	25.50	25.94	—
1850	—	25.85	25.89	26.79	—	25.47	26.18	—	25.83	—	26.05	—
1855	25.36	25.40	—	—	—	—	—	—	—	24.73	25.97	—
1860	—	25.14	25.91	26.46	25.72	—	25.99	—	✓26.09	—	26.01	26.90
1865	24.44	—	—	—	—	25.62	—	—	—	24.73	25.57	—
1870	—	24.97	25.47	25.64	23.88	✓26.60	25.65	25.42	25.25	—	25.44	26.13
1875	—	—	—	—	—	25.82	25.47	25.06	—	24.84	25.00	—
1880	23.95	24.47	25.38	25.44	24.45	25.37	25.33	24.81	24.03	—	25.06	25.55
1885	—	—	—	—	—	24.64	—	—	—	—	24.44	—
1890	24.49	24.30	26.16	25.72	24.96	24.43	25.65	24.97	23.90	24.44	24.04	25.48
1895	—	—	—	—	—	—	25.85	—	—	—	23.91	—
1900	25.35	24.91	27.47	26.63	✓25.74	24.50	25.73	25.03	24.42	24.34	24.06	25.80
1905	—	—	—	—	—	—	25.81	—	—	—	—	—
1910	25.86	25.02	27.69	26.71	24.60	24.44	25.87	25.32	24.82	24.64	24.24	26.02
1915	—	—	—	—	—	—	—	—	—	—	24.49	—
1920	✓27.77	✓25.97	✓28.27	✓27.38	—	25.92	✓27.59	28.83	25.49	✓25.26	25.22	27.72
1925	—	—	28.19	—	—	—	—	✓28.99	—	—	—	—

Since 1915, the general fertility rate has decreased much more than the birth rate. The percentage of women of child-bearing age has increased indeed in all countries of Western and Northern Europe, and this mainly because, on account of the fall of the birth rate, the percentage of children has decreased. Combining all the countries of Western and Northern Europe (with their present territory), the percentage of women of child-bearing age in 1920 was 27.84. It probably has increased somewhat in the subsequent years since the percentage of children has continued to decrease materially. Assuming that in 1926 the percentage of women of child-bearing age was 28, the birth rate of 19.19 per 1,000 in Western and Northern Europe would correspond to a fertility rate of $\frac{1919}{28} = 68.5$ per 1,000. Assuming, on the other hand, that in 1911-14 the percentage of women of child-bearing age was 26, the birth rate of 24.16 would correspond to a fertility rate of $\frac{2416}{26} = 92.9$. While the birth rate from 1911-14 to 1926 has decreased by 21 per cent, the fertility rate has decreased by 26 per cent.

The general fertility rate indicates how much the women of child-bearing age add to the population through births, but since it is calculated without regard to the specific age composition of the women in child-bearing age, it does not after all afford an adequate gauge for the measurement of the actual fertility of those women. If among the women of child-bearing age the percentage of women between 25 and 35 years is large, the general fertility rate is likely to

be high even if the specific fertility in each age group may be low, while if the percentage of women between 25 and 35 is small, the general fertility rate is likely to be low even if the specific fertility in each group may be high. The fact that Norway in 1890-91 had almost the same general fertility rate as 15 years earlier although the fertility in almost each age group decreased considerably is thus to be explained by the increased percentage of women between 25 and 35. It, therefore, becomes necessary to compute *specific fertility rates* by age of mothers.²

Fertility rates for the individual years of age would then seem to afford a perfect measure of fertility as a whole. But the result appears cumbrous since it involves the consideration of about 40 different fertility rates. The prob-

² The author, in an address to the Fourteenth International Congress on Hygiene and Demography, held in 1907, emphasized the inadequacy of the general fertility rate by stating:

"How little the general fertility rate affords a measure for the fertility in the different years of age may be illustrated by a comparison of conditions in Sweden and in Berlin. In Sweden, in 1891-1900, 115 children were born per year to each 1,000 women of child-bearing age; in Berlin, in 1896-1900, 91 children. The general fertility rate in Berlin lagged behind that of Sweden by 21.2 per cent. A comparison of the proportion between the children born and the women of child-bearing age in the different years of life shows that in Berlin the figures increase up to the 25th year only, in Sweden however up to the 30th year. In Berlin, the rates in the earlier years of life are, without exception, higher than in Sweden; Berlin's lead, however, diminishes as the age increases, and in the 25th year, when, in Berlin, the peak of fertility is reached, there are already somewhat more births to each 1,000 women in Sweden than there are in Berlin. Sweden's preponderance then grows constantly: at 35 years Sweden's rate is twice as high, at 40 years it is three times as high, at 43 years four times as high, at 46 years five times as high as that of Berlin. The difference between the general fertility rate in Sweden and that in

lem, however, how to fuse those different annual rates into one numerical expression is easy to solve. All that is necessary is to add the different specific fertility rates. The sum thus obtained — which we may call the *total fertility* — indicates indeed exactly how many children would be born to 1,000 women arriving at the age of child-bearing, with fertility as it is and if none of those 1,000 women died before having passed through child-bearing age. Simple as this solution is, it seems to have escaped general attention. So far as the author is aware it was first proposed at the International Congress on Hygiene and Demography of 1907³ when, in discussing the fertility rates of Sweden for 1891–1900 and of Berlin for 1896–1900, he recommended:

. . . to ascertain how many births to each thousand girls arriving at the age of child-bearing would have occurred in each of those two territories, if their number had not been reduced at all by

Berlin would evidently be larger if the more fertile age groups among the women of child-bearing age were not — largely under the influence of immigration — more amply represented in Berlin than in Sweden.”

The basic data for this comparison between Sweden and Berlin are given in the table on page 22, cols. 1, 3, 5, and 7. Attention should perhaps be called to the fact that the Swedish confinement rates (col. 5) are not entirely comparable with the Berlin fertility rates (col. 7) since each confinement is counted only once even if it yields twins, etc. But the source of error, of course, is not considerable: the 1,354,225 confinements of the decade resulted in 1,374,118 births.

³ See “Bericht ueber den XIV. Internationalen Kongress fuer Hygiene und Demographie,” Berlin, September 23–29, 1907, Vol. III, pp. 1472–1484; reprinted in *Jahrbuecher fuer Nationaloekonomie und Statistik*, Third Series, Vol. XXXV, pp. 229–241. See also Willcox, Walter F., “Statistics at the Fourteenth International Congress on Hygiene and Demography,” *Quarterly Publications of the American Statistical Association*, September 1912, Vol. XIII, pp. 223–225.

FERTILITY RATES BY YEARS OF AGE IN SWEDEN AND IN BERLIN

YEARS OF AGE	SWEDEN						BERLIN
	Mean Number of Females ^a		Confinements per Year ^a		Confinements per 1,000 Females		Live- and Still-Born per 1,000 Females ^b 1896-1900
	1891-1900	1901-10	1891-1900	1901-10	1891-1900	1901-10	
12	.....	52,551	—	0.1	—	0.00	—
13	49,492	52,237	0.3	0.8	0.0f	0.02	—
14	48,677	51,927	3.2	5.5	0.07	0.11	0.37
15	47,689	51,306	21.4	34.4	0.45	0.67	1.40
16	46,478	50,436	102.0	167.8	2.19	3.33	5.69
17	45,150	49,378	356.9	554.9	7.90	11.23	17.75
18	43,808	48,165	849.6	1,267.5	19.39	26.32	36.52
19	42,479	46,884	1,641.2	2,263.4	38.64	48.28	58.31
20	41,116	45,622	2,609.6	3,360.7	63.47	73.66	89.07
21	39,587	44,584	3,541.7	4,469.9	89.47	100.26	111.32
22	37,977	43,563	4,436.4	5,449.2	116.82	125.09	136.98
23	36,574	42,488	5,097.2	6,213.6	139.37	146.24	151.78
24	35,624	41,432	5,687.9	6,784.9	159.66	163.76	170.88
25	34,995	40,431	6,151.1	7,142.8	175.77	176.66	172.21
26	34,511	39,435	6,477.2	7,379.4	187.69	187.13	172.15
27	34,195	38,503	6,744.2	7,380.7	197.23	191.69	165.72
28	33,936	37,647	6,885.4	7,431.3	202.89	197.39	168.63
29	33,585	36,874	6,963.4	7,258.3	207.34	196.84	156.34
30	33,361	36,069	7,030.5	7,081.3	210.74	196.33	155.21
31	33,439	35,093	6,963.9	6,786.6	208.26	193.39	126.92
32	33,682	34,010	6,999.9	6,463.2	207.82	190.04	131.56
33	33,732	33,009	6,833.9	6,052.4	202.59	183.36	112.63
34	33,284	32,394	6,585.4	5,801.1	197.85	179.08	105.64
35	32,637	32,009	6,307.0	5,497.3	193.25	171.74	94.14
36	32,069	31,724	5,978.2	5,214.3	186.42	164.36	93.48
37	31,476	31,536	5,618.9	4,927.9	178.51	156.26	76.33
38	30,716	31,368	5,102.8	4,601.1	166.13	146.68	73.05
39	30,062	31,104	4,639.0	4,140.1	154.31	133.11	58.81
40	29,478	30,921	4,183.0	3,724.7	141.90	120.46	47.82
41	28,850	31,008	3,457.0	3,193.6	119.83	102.99	33.55
42	28,184	31,209	2,822.4	2,665.4	100.14	85.40	27.46
43	27,511	31,217	2,136.6	1,997.8	77.66	64.00	19.24
44	26,913	30,784	1,453.0	1,359.4	53.99	44.16	12.16
45	26,451	30,170	891.0	821.6	33.68	27.23	7.20
46	26,043	29,618	475.9	436.8	18.27	14.75	3.78
47	25,668	29,029	224.1	187.6	8.73	6.46	1.92
48	25,437	28,292	98.4	75.1	3.87	2.65	0.82
49	25,176	27,641	38.5	24.8	1.53	0.90	0.46
50	24,824	27,042	13.0	5.9	0.52	0.22	0.11
51	24,339	26,403	1.1	0.7	0.05	0.03	0.04
52	23,784	25,735	0.3	0.5	0.01	0.02	0.15
53	.....	.....	—	—	—	—	0.14
54	.....	.....	—	—	—	—	0.12
Total	.....	.....	135,422.5	138,224.4	4,074.42	3,832.30	2,797.86

^a See Sundbårg, Gustav, "Fortsatta Bidrag till en Svensk Befolkningsstatistik för Åren 1750-1900," *Statistisk Tidskrift* 1907, p. 277; *Sveriges Officiella Statistik, Befolkningsrörelsen Översikt för Åren 1901-1910*, p. 42^a.

^b See *Statistisches Jahrbuch der Stadt Berlin*, Vol. XXVII, p. 83.

deaths and if consequently the number of women at each year of age between 15 and 50 had been the same. If, with this purpose in view, one adds the fertility rates of the individual years of life, computed by relating the births to the number of living women, one will find for Sweden 4,134* and for Berlin 2,798 births per 1,000 women who reach child-bearing age. If the influence of mortality is excluded from consideration, fertility then appears by 32.3 per cent smaller in Berlin than in Sweden.

It may seem surprising nowadays that such an analysis which while proving the inadequacy of the general fertility rate showed so simple a way of accurately measuring fertility did not attract any interest at the time it was made. One must, however, remember on what phases of vital statistics interest focussed twenty years ago. At that time the excess of births over deaths was higher in most countries than ever before. Mortality had decreased at a stupendous rate and since the number of *surviving* children was exceptionally large, the decrease of fertility was generally considered as a natural reaction of the still greater decrease of mortality. Births were of interest only in relation to deaths, and the author himself recommended the computation of the actual total fertility only for cases where in the absence of life tables an accurate calculation of the net reproduction of the population was impossible. In the meantime, however, conditions have utterly changed. Fertility has decreased much more than mortality. No one still believes that anywhere

* The total of the confinement rates is 4,047.4. This figure had to be raised to 4,134, since there were 1,014.7 births per 1,000 confinements.

in Western or Northern Europe the number of births is materially influenced by the number of deaths. Fertility has become a problem of itself. The accurate measurement of fertility, therefore, is most urgent.

In the report submitted to the Fourteenth Congress on Hygiene and Demography, it had been shown that according to the fertility of 1891-1900 in Sweden, 1,000 women entering child-bearing age would give birth to 4,134 children (including still-born), if none of these women died before having passed through child-bearing age. This also means, that each 1,000 girls born would give birth to 4,134 children, if none of those girls died before having passed through child-bearing age. And, since our purpose is here to exclude the influence of mortality, we may put it still more simply by saying that according to the fertility of 1891-1900 in Sweden, 4,134 is the number of children born to each 1,000 women.

The majority of those 4,134 children are boys. Since we are concerned here with births, we may restrict ourselves to the female sex. We should, moreover, since the live-births offer a better basis of comparison, exclude still-births. The total number of births in 1891-1900 was 1,374,118 of which 1,338,726 were live-births and 650,732 female live-births. The total fertility has therefore to be reduced in the proportion of 650,732 : 1,374,118. The new total thus obtained is $\frac{4134 \times 650,732}{1,374,118} = 1,957.8$ and this, according to the fertility of 1891-1900 in Sweden, is the number of girls born to each 1,000 women. $\frac{1957.8}{1000}$ or

1.958 would then be what we may call the gross reproduction rate of Sweden in 1891-1900.

The cases are, however, rare, where confinements or births are published by years of age of the mother, those data, as a rule, being made available for quinquennial age groups only. The question then arises whether an adequate gross reproduction rate may be computed from quinquennial fertility rates. If the number of women at each year within the quinquennial age group were the same, or if the annual fertility rates were all alike within the quinquennial period, all that would be necessary would be to multiply each quinquennial rate by five and add the products. But the number of women at each year of age and the fertility rates, of course, vary a great deal. Fortunately, however, those differences compensate each other to such a degree that they do not materially affect the final results.

Sweden may serve as an example for testing the accuracy of gross reproduction rates computed from quinquennial fertility rates.

The sum of the annual confinement rates was 4,074.4 for 1891-1900, and 3,832.3 for 1901-10.⁴ The sum of the quinquennial confinement rates, multiplied by five, was 4,070.0 for 1891-1900 and 3,826.3 for 1901-10. The total then was

⁴ From 1891-1900 to 1901-10, the birth rate has decreased in Sweden from 27.14 to 25.77, the general fertility rate from 113.3 to 106.5, the total of the yearly confinement rates from 4,074.4 to 3,832.3. Since there were in the yearly average of 1901-10 138,224.4 confinements resulting in 140,319.3 births of which 136,840.8 were live-births and 66,446.1 female live-births, the total of the confinement rates has to be reduced in the proportion of 66,446.1: 138,224.4. The gross reproduction rate then was 1.842.

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CONFINEMENT RATES BY QUINQUENNIAL AGE GROUPS IN SWEDEN

YEARS OF AGE	MEAN NUMBER OF FEMALES		CONFINEMENTS PER YEAR		CONFINEMENTS PER 1000 FEMALES	
	1891-1900	1901-10	1891-1900	1901-10	1891-1900	1901-10
15-19 ¹	225,604	246,169	2,974.6	4,294.4	13.19	17.44
20-24	190,878	217,689	21,372.8	26,278.3	111.97	120.72
25-29	171,222	192,890	33,221.3	36,592.5	194.02	189.71
30-34	167,498	170,575	34,413.6	32,184.6	205.46	188.68
35-39	156,960	157,741	27,645.9	24,380.7	176.13	154.56
40-44	140,936	155,139	14,052.0	12,940.9	99.71	83.41
45-49 ²	128,775	144,750	1,742.3	1,553.0	13.53	10.73
Total . .	1,181,873	1,284,953	135,422.5	138,224.4	814.01	765.25

¹ The group 15-19 years includes the few confinements under 15 years.

² The group 45-49 years includes the few confinements over 50 years.

CONFINEMENT RATES BY YEARS OF AGE IN SWEDEN

YEARS OF AGE	1891-1900		1901-1910	
	Computed from		Computed from	
	Annual Rates	Quinquennial Rates	Annual Rates	Quinquennial Rates
15-19 ¹	68.7	65.9	90.0	87.2
20-24	568.8	559.9	609.0	603.6
25-29	970.9	970.1	949.7	948.6
30-34	1,027.3	1,027.3	942.2	943.4
35-39	878.6	880.7	772.1	772.8
40-44	493.5	498.5	417.0	417.1
45-49 ²	66.6	67.6	52.3	53.6
Total . . .	4,074.4	4,070.0	3,832.3	3,826.3

¹ The group 15-19 years includes the few confinements under 15 years.

² The group 45-49 years includes the few confinements over 50 years.

for both periods smaller if one uses the quinquennial instead of the annual rates. But this is not true for each age group. How are these results to be explained? If the number of women in each year of age was decreasing, so that there would be less women of 16 years than of 15 years, less women of 17 years than of 16 years, etc., the quinquennial rate would be comparatively smaller than the annual rates as long as the confinement rate increases, since the weight of the high confinement rates of the last years of the quinquennial period would be too light, and the quinquennial rate would be comparatively larger than the annual rates whenever the confinement rate decreases, since the weight of the high confinement rates of the first years of the quinquennial period would be unduly heavy. As the number of women is actually on the whole decreasing while the confinement rate increased in 1891-1900 and 1901-10 until the 31st and the 29th year respectively and decreased afterwards, the confinement rates for the quinquennial periods are indeed from 15 to 30 years comparatively higher than the annual confinement rates while the reverse, in general, is true for the older age groups. That this rule does not apply throughout and that both methods lead to the same result for 1891-1900 in the group from 30 to 35 years and for 1901-10 in the group from 40 to 45 years is due to the fact that the number of living women did not at that time decrease within that age group.⁵

By reducing the total of the quinquennial confinement rates in the proportion which the female live-born bear to the confinements, we obtain as gross reproduction rate for 1891-1900 : 1.9557 instead of 1.9578, and for 1901-10 : 1.8393 instead of 1.8422. These differences are so small that it

⁵ It may be incidentally mentioned that the deviation from the rule was caused by the exceptionally large number of births in the years 1858-60.

seems safe to compute reproduction rates from quinquennial fertility rates.⁶

The question naturally arises whether one might not go a step farther and compute reproduction rates from the general fertility rate. If the number of women in each quinquennial period from 15-20 to 45-50 years of age were the same or if the quinquennial fertility rates were all alike within the child-bearing age, all that would be necessary in order to find the total fertility would be to multiply the general fertility rate by 35 just as we have multiplied the seven quinquennial fertility rates by five. But the number of women at each quinquennial period of age and the quinquennial fertility rates, of course, vary a great deal. Let us again see how far in the case of Sweden those differences affect the results.

The sum of the annual confinement rates was 4,074.4 for 1891-1900 and 3,832.3 for 1901-10. The sum of the quinquennial confinement rates, multiplied by five, was 4,070.0 for 1891-1900 and 3,826.3 for 1901-10. The general confinement rate (from 15 to 50 years) was 114.58 for 1891-1900 and 107.57 for 1901-10. Multiplied by 35, those confinement rates would give a total of 4,010.4 for 1891-1900 and of 3,765.0 for 1901-10. The results would be by 1.5 and 1.6 per cent lower than those obtained from the quinquennial rates.

The differences just ascertained do not seem discouragingly high in themselves. Yet they are important enough to make a closer investigation necessary. The following table shows the gross reproduction rates in Sweden from 1776-1922, (a) computed

⁶ Louis I. Dublin and Alfred J. Lotka have applied this abbreviated method in their study "On the True Rate of Natural Increase," *Journal of the American Statistical Association*, September, 1925, Vol. XX, p. 309.

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from the quinquennial fertility rates, (b) computed from the general fertility rates:

GROSS REPRODUCTION RATES IN SWEDEN, 1776-1922

YEARS	(a)	(b)	YEARS	(a)	(b)
1776-80	2223.5	2223.8	1851-55	2045.2	2087.1
1781-85	2009.2	2057.5	1856-60	2172.3	2219.1
1786-90	2004.8	2075.4	1861-65	2195.1	2206.2
1791-95	2150.5	2198.9	1866-70	2017.9	1992.8
1796-1800	2127.9	2127.8	1871-75	2147.2	2078.2
1801-05	2066.1	2055.1	1876-80	2163.4	2070.4
1806-10	1986.6	1977.4	1881-85	2080.7	2009.6
1811-15	2108.3	2113.5	1886-90	2048.9	2031.3
1816-20	2149.4	2180.4	1891-95	1967.5	1948.2
1821-25	2333.6	2390.8	1896-1900	1943.7	1906.8
1826-30	2248.4	2288.3	1901-05	1881.3	1839.8
1831-35	2231.2	2214.9	1906-10	1798.6	1781.1
1836-40	2137.7	2053.0	1911-15	1593.7	1613.4
1841-45	2153.4	2066.9	1916-20	1414.5	1446.9
1846-50	2051.5	2031.7	1921-22	1346.0	1382.3

The rates were almost identical in 1776-80 and 1796-1800. Those computed from the general fertility rates were higher in 1781-95, 1811-30, 1851-65, and 1911-22; in all the other periods they were lower than the rates computed from the quinquennial age groups. For some periods the differences are rather large: in 1786-90, rate (b) was by 3.5 per cent higher than rate (a); in 1836-45 and 1871-85, rate (b) was by 3.2 to 4.3 per cent lower than rate (a). In 1786-90 and 1876-80, rate (a) was 2,004.8 and 2,163.4, while rate (b) was 2,075.4 and 2,070.4; that is, the more accurate rate (a) increased by 8 per cent, while rate (b) showed a slight decrease.⁷ A com-

⁷ The still less accurate birth rate showed a considerable decrease, from 32.1 to 30.3.

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parison of the basic data for 1786-90 and 1876-80 will throw some more light upon the causes of this discrepancy.

	15-20	20-25	25-30	30-35	35-40	40-45	45-50	TOTAL
Women								
1786-90	94,956	95,012	91,353	86,998	79,696	68,371	59,500	575,886
1876-80	222,504	190,398	164,100	148,737	140,030	134,100	124,108	1,123,977
Confinements								
1786-90	9,882	54,752	91,509	93,931	65,742	31,470	6,127	353,413
1876-80	11,111	101,785	172,231	173,694	143,320	78,825	11,818	692,784
Confinement Rates								
1786-90	20.81	115.25	200.34	215.94	164.98	92.06	20.59	122.74
1876-80	9.99	106.92	209.91	233.56	204.70	117.56	19.04	123.27

It appears that the age groups from 15 to 25 years and from 40 to 50 years which are the least fertile were much more strongly represented in 1876-80 than in 1786-90, while the contrary is true of the age groups from 25 to 40 years. Let us see what would have been the general confinement rate in 1876-80, if the age composition would then have been the same as in 1786-90. The number of confinements would have amounted to 742,531 (instead of 692,784), and the general confinement rate to 132.13 (instead of 123.27). Let us see, on the other hand, what would have been the general confinement rate in 1876-80, if the age composition had been what it was, but if the quinquennial confinement rates had been the same as in 1786-90. The number of confinements would have amounted to 647,853 only, and the general confinement rate to 115.28.

The deviation of the trend of the general fertility rates from the trend of the quinquennial fertility rates will perhaps still better be illustrated on the basis of an hypothetical case. Assuming that the number of women and of births is as indicated in the following table, the total of the quinquennial

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fertility rates multiplied by 5 would be 5,550, and the general fertility rate multiplied by 35 would likewise be 5,550.

	15 TO 20 YEARS	20 TO 25 YEARS	25 TO 30 YEARS	30 TO 35 YEARS	35 TO 40 YEARS	40 TO 45 YEARS	45 TO 50 YEARS	TOTAL
Women Births	100,000	90,000	80,000	70,000	60,000	50,000	40,000	490,000
Fertility Rate	2,000	13,500	20,000	21,000	13,200	6,000	2,000	77,700
Fertility Rate	20	150	250	300	220	120	50	1,110

Let us now assume that there were 10,000 more women of 15 to 20 years and 10,000 less women of 45 to 50 years, while the number of births remained the same for each age group. The general fertility rate, of course, would remain the same, but the fertility rate in the age group from 15 to 20 years would drop from 20 to 18.18, while the fertility rate of the age group from 45 to 50 years would rise from 50 to 66.67, and the total of the quinquennial fertility rates multiplied by 5 would increase from 5,550 to 5,624. Let us assume on the other hand that the number of women in each age group remained the same, but that there were 1,000 more births in the youngest age group and 1,000 less births in the oldest age group. The general fertility rate would then still remain the same, but the fertility rate in the youngest age group would increase from 20 to 30, the fertility rate in the oldest age group would drop from 50 to 25, and the total of the quinquennial fertility rates would be 5,475 instead of 5,550. The trend of the general fertility rates indeed follows so little the trend of the quinquennial fertility rates that it is not justifiable to compute a gross reproduction rate from a general fertility rate.

The table on pages 37-39 shows for those countries for which they could be computed (1) fertility rates by quinquennial age groups;⁸ (2) the total fertility, that is the sum of the quinquennial fertility rates multiplied by five, which indicates the number of children⁹ born to 1,000 women; (3) the gross reproduction rate, that is the number of live-born girls born to each woman. The table on page 33 summarizes the gross reproduction rates for the last sixty years.

In analyzing the trend of the gross reproduction rate in the various countries, we shall begin with Northern Europe, since the data available for Western Europe are less comprehensive.

Finland. In 1866-70, the gross reproduction rate (on account of the famine of 1867-68) was comparatively low; it amounted to 2.084 only. Between 1871-75 and 1886-90 it fluctuated between 2.363 and 2.420. In 1891-1900, it dropped to 2.278 and then fell from period to period until in 1921-25 it was 1.533 only. Since the birth rate in 1926 was 21.70 as compared with 23.22 in 1921-25, the gross reproduction rate in 1926 was presumably about 1.43.

⁸ The reader will perhaps wonder why the decrease of fertility is comparatively small for women under 25 years and particularly large for women over 30 years. We have, however, two good reasons for not telling why this is the case: first, we do not know it; second, this would lead us into a discussion of the causes of decreasing fertility which lies outside the scope of this study. We may mention in this connection that an analysis of the causes of decreasing fertility would presuppose a thorough study of the marital conditions in the different age groups, a distinction between first and later children born to mothers of the different age groups, etc.

⁹ The figures refer, as the case may be, to live-born children, live- and still-born children, or confinements.

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GROSS REPRODUCTION RATES, 1866-1926

YEARS	FINLAND	NORWAY	DENMARK	SWEDEN	FRANCE	GERMANY	ENGLAND AND WALES
1866-1870	2.084			2.018			
1871-1875	2.388	} 2.275 ^a		2.147			
1876-1880	2.420			2.163			
1881-1885	2.363		} 2.220 ^b	2.081			
1886-1890	2.400			2.049			} (2.459)
		} 2.144 ^c	} 2.140 ^d				
1891-1895	} 2.278					1.968	} 1.447 ^e	} (2.366)
1896-1897			} 2.042 ^f	} 1.944			
1898-1900							1.393
1901-1903	} 2.140	} 2.064 ^g	} 1.954	1.881	} (2.126)		
1904-1905							1.799
1906-1907			} 1.851	} 1.799		1.310	
1908-1910							
1911-1913	} 1.716	} 1.853 ^h	} 1.671	1.594			
1914-1915						1.414	0.766
1916-1919			} 1.661	} 1.523	1.414		
1920						1.282	
1921				1.346		1.312	
1922	} 1.533		} 1.391		} 1.159		
1923							
1924							
1925							(1.132)
1926	(1.43)	(1.33)	1.270	(1.11)	(1.15)	(1.07)	(1.05)

^a 1874-1876

^b 1878-1884

^c 1889-1892

^d 1885-1894

^e 1892-1897

^f 1895-1900

^g 1899-1905

^h 1910-1911

Norway. The gross reproduction rate dropped from 2.275 in 1874-76 to 1.661 in 1916-20. Since the birth rate in 1926 was 19.67 as compared with 24.54 in 1916-20, the gross reproduction rate in 1926 was presumably about 1.33.¹⁰

Denmark. The gross reproduction rate declined steadily from 2.220 in 1878-84 to 1.270 in 1926.¹¹

¹⁰ Since the birth rate in 1927 fell to 18.83, the gross reproduction rate in that year was presumably about 1.27.

¹¹ Since in 1927 the birth rate dropped to 19.6, the gross reproduction rate in that year was about 1.22.

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Sweden. Between 1776-80 and 1886-90 the gross reproduction rate fluctuated between 1.987 (1806-10) and 2.334 (1821-25). In 1891-95, it dropped to 1.968 and then fell from period to period until in 1921-22 it was 1.346 only. Since the birth rate in 1926 was 16.88 as compared with 20.56 in 1921-22, the gross reproduction rate in 1926 was presumably about 1.11.

France. The gross reproduction rate, as far back as 1892-97, was 1.447 only, that is about as low as the rate in Finland in 1926. But it further dropped from period to period until in 1908-13 it was 1.232. During the war it was, of course, exceedingly low: in the 77 unoccupied provinces it amounted to 0.766 only. In 1920-21, it rose to 1.282, but it fell again and in 1922-25 was 1.159. Since the birth rate in 1926 was 18.78 as compared with 19.00 in 1922-25, the gross reproduction rate in 1926 was about 1.15.¹²

Germany. The gross reproduction rate dropped from 2.459 in 1881-90 to 2.366 in 1891-1900 and to 2.126 in 1901-10. In 1925, it was 1.132 only. Since the birth rate in 1926 was 19.54 as compared with 20.73 in 1925, the gross reproduction rate in 1926 was about 1.07.¹³

England and Wales. The gross reproduction rate dropped from 1.312 in 1921 to 1.079 in 1925. Since the birth rate in 1926 was 17.78 as compared with 18.27 in 1925, the gross reproduction rate in 1926 was about 1.05.¹⁴

¹² Since in 1927 the birth rate dropped to 18.11, the gross reproduction rate in that year was about 1.10.

¹³ Since in 1927 the birth rate dropped to 18.3, the gross reproduction rate in that year was about 1.00.

¹⁴ Since in 1927 the birth rate dropped to 16.7, the gross reproduction rate in that year was about 0.98.

The following table shows the gross reproduction rate and the birth rate for 1926.

GROSS REPRODUCTION RATE AND BIRTH RATE, 1926

COUNTRIES	GROSS REPRODUCTION RATE	BIRTH RATE
Finland	1.43	21.7
Norway	1.33	19.7
Denmark	1.27	20.5
Sweden	1.11	16.9
France	1.15	18.8
Germany	1.07	19.5
England	1.05	17.8

France and Sweden have about the same gross reproduction rate, but their birth rate is 18.8 and 16.9 respectively. Germany and Norway have about the same birth rate, but their gross reproduction rate is 1.07 and 1.33 respectively. The relation of the birth rate to the gross reproduction rate, then, differs so widely that it would be quite impossible to make use of the birth rate for estimating the gross reproduction rate.

Nor is there a close relation between the general fertility rate and the gross reproduction rate. This has already been shown for Sweden. The ratio of the two rates is given here for all countries for the last period for which fairly accurate data are available.

In Finland and Norway the gross reproduction rate is 17.1 times as large as the general fertility rate; in Germany, on the other hand, it is only 15.8 times as large. The differences are then rather important. They are, however, not so large as to forbid a rough estimate of the gross reproduction rate in all Western and Northern Europe.

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The general fertility rate in that territory in 1926 has been shown to be 68.5 per 1,000.¹⁵ If, in order to give appropriate weighting to the respective ratios, we multiply this general fertility rate by 16.3 or 16.4, we arrive at a gross reproduction rate of 1.12.

GROSS REPRODUCTION RATE AND GENERAL FERTILITY RATE

COUNTRIES	YEARS	GROSS REPRODUCTION RATE	GENERAL FERTILITY RATE	RATIO OF GROSS REPRODUCTION RATE TO GENERAL FERTILITY RATE
Finland	1921-25	1.533	89.6	17.1
Norway	1916-20	1.661	97.3	17.1
Denmark	1926	1.270	78.6	16.2
Sweden	1921-22	1.346	81.1	16.6
France	1922-25	1.159	69.5	16.7
Germany	1925	1.132	71.4	15.8
England	1921	1.312	79.2	16.6

In the eighties of the last century, the gross reproduction rate in Germany and in Northern Europe varied between 2.0 and 2.5. The total number of children (boys and girls) born to each woman then averaged four or five. Conditions were more or less the same in the other countries of Western Europe with the exception of France and Ireland, where the number of children to each woman probably was about three. In 1926 the gross reproduction rate in the large countries of Western Europe as well as in all countries of Northern Europe varied between 1.05 and 1.43. The total number of children (boys and girls) born to each woman then varied between 2.15 and 2.95. Con-

¹⁵ See p. 19.

ditions were more or less the same in the smaller countries of Western Europe with the exception perhaps of Holland, where the number of children to each woman possibly still exceeded three.

According to the fertility in Western and Northern Europe in 1926, the number of girls born to each woman is 1.12, and the number of children (boys and girls) born to each woman 2.3.

FERTILITY RATES BY QUINQUENNIAL AGE GROUPS, 1776-1926

YEARS	15 TO 20 YEARS	20 TO 25 YEARS	25 TO 30 YEARS	30 TO 35 YEARS	35 TO 40 YEARS	40 TO 45 YEARS	45 TO 50 YEARS	TOTAL FERTIL- ITY	GROSS REPRO- DUCTION RATE
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DENMARK

(Confinement rates)

1878-84	14.1	132.5	239.7	244.5	190.3	95.0	10.7	4,633.4	2.220
1885-94	15.6	132.6	233.7	224.8	183.4	90.0	9.2	4,446.1	2.140
1895-1900	17.3	140.3	224.1	209.0	170.0	78.9	8.2	4,238.9	2.042
1901-05	20.1	143.1	225.3	198.1	150.0	66.9	7.3	4,054.2	1.954
1906-10	24.5	148.4	208.2	182.6	135.5	60.8	5.9	3,829.5	1.851
1911-15	23.9	137.6	187.8	161.4	119.6	54.2	5.5	3,450.1	1.671
1916-20	22.1	128.6	173.5	148.1	106.5	47.8	4.6	3,156.1	1.523
1921-25	24.0	122.0	160.8	131.5	93.3	41.0	4.1	2,833.4	1.391
1926	23.6	114.9	145.1	122.6	79.6	35.9	3.3	2,625.0	1.270

ENGLAND

(Live-birth rates)

1921	15.3	108.0	156.1	137.5	96.9	22.0	2.3	2,690.6	1.312
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FINLAND

(Confinement rates)

1866-70	13.8	123.9	215.8	220.7	177.6	99.1	18.0	4,343.6	2.084
1871-75	18.7	149.9	239.0	252.9	202.6	111.4	19.8	4,971.8	2.388
1876-80	20.2	153.6	238.6	244.0	209.5	119.5	19.3	5,023.3	2.420
1881-85	20.0	151.7	231.3	238.6	200.5	121.3	19.3	4,914.2	2.363
1886-90	18.3	155.7	236.8	240.5	204.4	121.2	20.7	4,988.1	2.400
1891-1900	17.3	154.8	211.4	237.8	192.7	115.6	17.7	4,740	2.278
1901-10	16.2	138.5	211.9	216.0	184.9	106.0	16.0	4,447.6	2.140
1911-20	14.6	116.7	167.7	165.6	142.3	86.0	13.1	3,579.9	1.716
1921-25	14.5	115.8	161.1	138.9	119.9	68.8	10.7	3,198.6	1.533

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FERTILITY RATES BY QUINQUENNIAL AGE GROUPS, 1776-1926 (Continued)

YEARS	15	20	25	30	35	40	45	TOTAL FERTIL- ITY	TOTAL REPRO- DUCTION RATE
	TO 20 YEARS	TO 25 YEARS	TO 30 YEARS	TO 35 YEARS	TO 40 YEARS	TO 45 YEARS	TO 50 YEARS		

FRANCE

(Live- and still-birth rates)

1892-97	28.5	131.8	179.4	141.8	92.3	39.1	6.7	3,099.0	1.447
1898-1903	27.8	141.2	169.9	128.6	86.8	35.7	5.7	2,978.4	1.393
1904-07	28.3	138.1	158.2	121.7	76.0	32.7	5.1	2,801.1	1.310
1908-13	28.4	139.3	150.1	109.1	70.8	27.2	2.7	2,638.1	1.232
1914-19*	15.0	73.7	88.5	72.8	53.3	23.3	2.3	1,644.7	.766
1920-21	24.6	137.5	166.1	118.3	72.5	27.8	2.7	2,747.4	1.282
1922-25	25.3	133.4	146.1	103.5	60.3	22.9	2.3	2,468.6	1.159

* 77 provinces only (excluding 10 occupied provinces).

NINE GERMAN STATES*

(Live- and still-birth rates)

1881-90	18.8	177.2	277.6	238.3	182.2	80.2	10.2	4,922.3	—
1891-1900	20.7	182.7	275.6	231.4	166.5	69.7	8.2	4,773.8	—
1901-10	23.3	176.0	260.8	198.5	138.1	59.0	6.4	4,310.1	—

* Live- and still-births in Hesse, Oldenburg, Brunswick, Saxony-Weimar, Saxony-Altenburg, and the Schwarzburg and Rouse principalities.

SAXONY

(Live- and still-birth rates)

1911-14	28.7	159.9	182.2	125.1	89.9	37.9	3.1	3,134.1	1.472
1915-19	10.1	71.8	98.5	73.4	53.3	21.6	2.0	1,653.5	.772
1920-23	18.3	124.5	149.5	108.0	63.0	23.5	1.9	2,443.4	1.141
1924	17.8	102.0	113.7	79.6	45.6	16.5	1.4	1,883.1	.879

NORWAY

(Live-birth rates)

1874-76	7.2	101.3	208.9	238.6	212.3	134.8	31.1	4,671.2	2.275
1889-92*	7.5	99.8	203.6	230.0	209.7	129.1	29.8	4,547.4	2.144
1899-1905	11.2	109.8	203.7	210.8	182.1	110.1	21.7	4,246.9	2.064
1910-11	10.5	103.9	184.5	187.8	164.7	92.5	18.0	3,809.5	1.853
1916-20	11.0	103.0	167.6	170.8	141.5	79.4	14.1	3,437.2	1.661

* Live- and still-birth rates.

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FERTILITY RATES BY QUINQUENNIAL AGE GROUPS, 1776-1926 (Continued)

YEARS	15 TO 20 YEARS	20 TO 25 YEARS	25 TO 30 YEARS	30 TO 35 YEARS	35 TO 40 YEARS	40 TO 45 YEARS	45 TO 50 YEARS	TOTAL FERTIL- ITY	GROSS REPRO- DUCTION RATE
SWEDEN									
(Confinement rates)									
1776-80	20.6	119.6	214.4	242.9	190.7	106.2	26.0	4,602	2,224
1781-85	21.3	114.9	201.1	212.1	170.2	88.5	20.5	4,143	2,009
1786-90	20.8	115.3	200.3	215.9	165.0	92.1	20.6	4,150	2,005
1791-95	20.0	125.0	218.0	234.3	175.7	96.4	21.4	4,454	2,150
1796-1800	19.1	121.5	214.7	234.1	180.4	92.4	20.5	4,414	2,128
1801-05	17.2	117.1	206.4	222.8	175.9	94.2	19.5	4,265	2,066
1806-10	15.2	111.6	202.2	213.7	167.3	90.0	19.5	4,097	1,987
1811-15	16.6	117.6	211.5	228.2	182.2	93.9	18.5	4,343	2,108
1816-20	15.6	120.2	213.1	230.4	187.3	102.9	19.3	4,444	2,149
1821-25	16.9	130.8	233.5	251.4	201.1	110.3	20.8	4,824	2,334
1826-30	14.0	127.1	225.0	241.2	196.4	107.2	19.4	4,651	2,248
1831-35	12.2	120.7	226.9	242.5	197.6	109.6	18.3	4,639	2,231
1836-40	8.8	107.6	218.3	236.8	193.9	105.2	18.0	4,443	2,138
1841-45	8.7	101.4	213.9	242.5	199.7	110.6	17.7	4,473	2,153
1846-50	7.4	94.3	200.1	232.4	197.2	107.2	17.6	4,281	2,051
1851-55	7.6	93.6	200.0	230.6	195.3	110.6	16.8	4,272	2,045
1856-60	8.0	101.8	204.6	239.8	210.5	120.7	20.1	4,528	2,172
1861-65	8.9	104.5	208.1	239.8	208.3	127.0	19.6	4,581	2,195
1866-70	8.6	98.9	195.6	219.1	193.3	110.1	18.1	4,219	2,018
1871-75	9.1	105.9	207.1	233.0	203.1	121.3	18.1	4,488	2,147
1876-80	10.0	106.9	209.9	233.6	204.7	117.6	19.0	4,508	2,163
1881-85	10.3	105.2	201.4	225.1	195.2	113.8	16.9	4,340	2,081
1886-90	10.8	107.4	198.5	218.7	190.4	108.0	16.5	4,252	2,049
1891-95	11.6	107.9	193.4	208.8	180.1	102.7	14.4	4,094	1,968
1896-1900	14.7	115.7	194.6	202.1	172.4	96.9	12.7	3,945	1,944
1901-05	15.9	119.5	193.3	193.6	159.7	87.8	11.5	3,907	1,881
1906-10	18.9	121.9	186.3	184.3	149.3	78.9	10.0	3,748	1,799
1911-15	19.5	113.3	163.3	158.3	130.4	69.2	8.1	3,310.6	1,594
1916-20	16.9	105.5	148.7	140.0	111.0	58.7	7.3	2,990.7	1,414
1921-22	19.3	105.7	142.7	129.7	102.3	52.6	6.7	2,793.4	1,346

CHAPTER III

NET REPRODUCTION RATES

WE have thus far only discussed how much the population increases through births, but we have not yet examined how much it decreases through deaths. In this chapter we will study the balance of birth and deaths.

The usual method of establishing such a balance consists in comparing the number of births and the number of deaths. It will be pointed out, for example, that from 1841 to 1880 there was in Western and Northern Europe a yearly number of births of 3,842,000 and a yearly number of deaths of 2,869,000, leaving a yearly balance of 973,000 or 0.81 per cent of the population; that from 1881 to 1914 the yearly number of births was 4,497,000 and the yearly number of deaths 3,027,000, leaving a yearly balance of 1,470,000 or 0.93 per cent of the population; that finally, in 1926, there were 3,613,000 births and 2,449,000 deaths, leaving a balance of 1,164,000 or 0.62 per cent of the population. It will then, as a rule, be concluded that the natural increase of the population of Western and Northern Europe, while being relatively smaller than before the World War, is still very strong, since an annual increase of 0.62 per cent means a doubling of the population within about 110 years.

As a matter of fact, births even in Western and Northern Europe still amply keep up with deaths. But this does not imply that the reproduction of the people of Western and

Northern Europe is still ample. If the newly born were merely to replace the dead, all that would be necessary would be that births equal deaths and if no death occurred, no birth would be needed. This consideration in itself shows that something must be wrong with the usual comparison of births and deaths. If in a given population no death occurred and no birth, this population would ever grow older and after fifty years there would be no more women of child-bearing age and no more men with full physical working capacity. The total population would still be as large as fifty years earlier, but in those fifty years it would not have done anything towards its reproduction and it would have lost any future chance of reproduction.

A comparison of the yearly births and the yearly deaths is not sufficient to allow a judgment upon vitality. If in a given country the number of aged persons is small and the number of persons in the best years of life is large, this country may have a low death rate and a high birth rate even if mortality in each age group is large and if fertility is small. The possibly large excess of births over deaths in such a country may give the impression of a still high vitality while the fertility in fact is perhaps no longer sufficient to enable this population to hold its own. In spite of the still large excess of births over deaths, mortality and fertility may already be such that if they do not change, this population is doomed to die out.

The pertinent question is not: is there an excess of births over deaths? but rather: are natality and mortality such that a generation which would be permanently subject to them would during its lifetime, that is until it has died out,

produce sufficient children to replace that generation? If, for instance, 1,000 newly born produce in the course of their lives exactly 1,000 children, the population after the death of the older 1,000 will remain unaltered. If natality and mortality continue to be what they were, the 1,000 children will in the course of their lives again produce 1,000 children, and if natality and mortality remain permanently the same, the population will always exactly hold its own. If more than 1,000 children are produced by a generation of 1,000 newly born, the population will increase; if less than 1,000 are produced, the population will decrease and finally die out.

Since we are concerned here with birth-giving only, it suffices to take into account the female population. The pertinent question then is: are natality and mortality such that 1,000 newly born girls will in the course of their lives give birth to 1,000 girls? If this is the case, the first generation of 1,000 females will at its death have been fully replaced by the girls they have borne, and the population will remain constant; otherwise, it will in the long run increase or decrease.

It becomes necessary, first, to ascertain on the basis of present mortality how many out of 1,000 newly born girls reach child-bearing age, that is, 15 years, how many reach 16 years, etc., finally how many pass through child-bearing age, that is, reach fifty years. This information is to be derived from the life table¹ which for

¹ See, for a full description of life tables, *United States Life Tables 1890, 1901, 1910, and 1901-1910*, prepared by James W. Glover, Washington, 1921.

a given period exhibits the number of females surviving at the beginning of each year of age out of 1,000 live-born, assuming that the mortality for each year of age was that of the period under consideration.

It becomes necessary, secondly, to ascertain the actual number of females living in each year of child-bearing age and the number of female births by years of age of the mother in order to compute the female fertility rate for each year of age, that is, the number of female births for 1,000 women of 15 to 16 years, for 1,000 women of 16 to 17 years, etc.

It becomes necessary, thirdly, to apply those fertility rates to the number of women who according to the life table would in a stationary population be 15 to 16 years of age, 16 to 17 years, etc. These numbers are derived from the numbers of female survivors by assuming that the women of 15 to 16 years would be equal to the average of those surviving 15 and those surviving 16 years, etc. By multiplying the number of women of 15 to 16 years in the stationary population by the female fertility rate of the women of 15 to 16 years, we find how many girls will be born to 1,000 newly born girls at the age of 15-16 years (with present natality and mortality). By a similar computation we find the results for the age of 16-17 years, etc. The sum of all the new fertility rates thus found will show the total number of females borne by the original stock of 1,000 females. If this total is equal to 1,000, the population holds its own; if it is larger, the population increases; if it is smaller, the population, in

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case natality and mortality continue the same, is bound to die out.

This is the only accurate method of calculating a fertility table. The basic data needed for its computation are a life table for females, the actual number of women for each year of child-bearing age, and the number of female live-born by years of age of the mothers.² The table on page 45 shows the results for Sweden in 1891-1900 and 1901-10.³

² Since the female live-born are practically never classified by years of age of the mothers, one may, as the case may be, substitute the total live-born or the total live- and still-born or the confinements and reduce the sum of the fertility rates according to the ratio which the total live-born or the total live- and still-born or the confinements bear to the number of female live-born.

³The first fertility table was calculated in 1886 by Richard Boeckh, director of the statistical office of the city of Berlin. (See *Statistisches Jahrbuch der Stadt Berlin 1884*, pp. 30-34.) He took the life table of the city of Berlin for 1879, multiplied the number of females of each year of age by the fertility rate of that year of age in 1879 and added the products so obtained. The sum, 2,172, gave him the number of births to 1,000 females on the basis of the natality and mortality of 1879. Since according to the distribution of the sexes at birth there were 2,053 births per 1,000 female births, he concluded that the real natural increase of the Berlin population in 1879

was $\frac{2,172}{2,053} - 1 = 6$ per cent. He later calculated five similar fertility tables for 1886-90. The author of this book, who in 1898-1900 was a student of Boeckh and an assistant in the Berlin statistical office, computed five such tables for 1891-95, while the successor of Boeckh, E. Hirschberg, computed five tables for 1896-1900. (See *Statistisches Jahrbuch der Stadt Berlin 1893*, p. 36, *1897*, p. 57, *1899*, pp. 101-104, *1900-02*, pp. 82-83.) These Berlin tables for 1879 and 1886-1900 and a Swedish table for 1891-1900 which the author computed in 1907 in connection with his address to the Fourteenth Congress on Hygiene and Demography, seem to be the only complete fertility tables that so far have been calculated.

FERTILITY TABLES OF SWEDEN, 1891-1900 AND 1901-10

YEARS OF AGE	CONFINEMENTS PER 1,000 FEMALES		YEARS LIVED BY 1,000 LIVE-BORN FEMALES		CONFINEMENTS PER 1000 LIVE-BORN FEMALES	
	1891-1900	1901-10	1891-1900	1901-10	1891-1900	1901-10
12 . . .	—	0.00	816.78	858.29	—	0.00
13 . . .	0.01	0.02	813.76	855.38	0.01	0.02
14 . . .	0.07	0.11	810.66	852.23	0.06	0.09
15 . . .	0.45	0.67	807.35	848.82	0.36	0.57
16 . . .	2.19	3.33	803.76	845.09	1.76	2.81
17 . . .	7.90	11.23	800.11	841.09	6.32	9.45
18 . . .	19.39	26.32	796.28	836.95	15.44	22.03
19 . . .	38.64	48.28	792.17	832.75	30.61	40.21
20 . . .	63.47	73.66	787.95	828.46	50.01	61.02
21 . . .	89.47	100.26	783.69	823.98	70.12	82.61
22 . . .	116.82	125.09	779.30	819.38	91.04	102.50
23 . . .	139.37	146.24	774.72	814.78	107.97	119.15
24 . . .	159.66	163.76	770.06	810.21	122.95	132.68
25 . . .	175.77	176.66	765.37	805.50	134.53	142.30
26 . . .	187.69	187.13	760.69	800.65	142.77	149.83
27 . . .	197.23	191.69	756.08	795.84	149.12	152.55
28 . . .	202.89	197.39	751.52	791.10	152.48	156.16
29 . . .	207.34	196.84	746.86	786.37	154.85	154.79
30 . . .	210.74	196.33	742.11	781.60	156.39	153.45
31 . . .	208.26	193.39	737.35	776.88	153.56	150.24
32 . . .	207.82	190.04	732.54	772.23	152.24	146.76
33 . . .	202.59	183.36	727.74	767.55	147.43	140.74
34 . . .	197.85	179.08	722.94	762.75	143.03	136.59
35 . . .	193.25	171.74	718.00	757.84	138.75	130.15
36 . . .	186.42	164.36	712.95	752.90	132.91	123.75
37 . . .	178.51	156.26	707.97	747.92	126.38	116.87
38 . . .	166.13	146.68	702.91	742.83	116.77	108.96
39 . . .	154.31	133.11	697.65	737.74	107.65	98.20
40 . . .	141.90	120.46	692.33	732.62	98.24	88.25
41 . . .	119.83	102.99	686.97	727.44	82.32	74.92
42 . . .	100.14	85.40	681.60	722.21	68.26	61.68
43 . . .	77.66	64.00	676.24	716.97	52.52	45.89
44 . . .	53.99	44.16	670.82	711.68	36.22	31.43
45 . . .	33.68	27.23	665.34	706.28	22.41	19.23
46 . . .	18.27	14.75	659.89	700.84	12.06	10.34
47 . . .	8.73	6.46	654.50	695.18	5.71	4.49
48 . . .	3.87	2.65	648.91	689.32	2.51	1.83
49 . . .	1.53	0.90	642.98	683.34	0.98	0.62
50 . . .	0.52	0.22	636.71	677.17	0.33	0.15
51 . . .	0.05	0.03	630.22	670.85	0.03	0.02
52 . . .	0.01	0.02	623.55	664.35	0.01	0.01
TOTAL .	4,074.42	3,832.30			2,987.11	2,973.34

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According to this table, the number of confinements per 1,000 live-born girls was 2,987.1 in 1891-1900. Since the 1,354,225 confinements which occurred in that period yielded 650,732 live-born girls,⁴ the original stock of 1,000 live-born girls yielded $\frac{2,987 \times 650,732}{1,354,225} = 1,435$ girls. The actual number of births then was 43.5 per cent higher than was necessary to maintain the population and the *net reproduction rate*, as we may call it, was 1.435. Since the gross reproduction rate was 1.958⁵ we come to the following conclusion: According to the fertility prevailing in Sweden in 1891-1900, 1,958 girls were born to each 1,000 women; according to the mortality prevailing in the same period, this number would be reduced to 1,435. If fertility and mortality had remained the same, the 1,435 surviving girls would give birth to $1,435 \times 1.958$ girls of whom $\frac{1,435}{1,958}$ would survive, so that the net yield of the 1,435 girls would be $1,435 \times 1.435 = 2,060$, etc. Population would double in about two generations.

But fertility and mortality, of course, change. In Sweden, the gross reproduction rate dropped from 1.958 in 1891-1900 to 1.842 in 1901-1910, and mortality decreased almost as much. As a result of this the number of confinements per 1,000 live-born girls fell only from 2,987 to 2,973 and the net reproduction rate from 1.435 to 1.429.

Since confinements or births are, as a rule, made available for quinquennial periods only, the question arises whether an adequate net reproduction rate may be computed from quin-

⁴ See p. 24.

⁵ See p. 25.

quennial fertility rates. Such computations indeed were made fifteen years ago by a student of Boeckh, Johannes Rahts, who at that time was chief of the population division of the German Statistical Office.⁶ Thirty-two abbreviated fertility tables of the same kind are given in Appendix D. Let us test again in the case of Sweden how far the results of the abbreviated method differ from those of the accurate method.

As shown in the table on page 45, the number of confinements per 1,000 live-born girls was 2,987.1 in 1891-1900 and 2,973.3 in 1901-10. If one substitutes the figures of quinquennial age groups, the number of confinements appears to be 2,982.5 and 2,967.8. The net reproduction rate according to the accurate method was 1.4354 in 1891-1900 and 1.4293 in 1901-1910, according to the abbreviated method it was 1.4331 and 1.4266, respectively. These differences are so small that it seems safe to compute net reproduction rates from quinquennial age groups.

It may again be asked whether one might not go a step farther and compute net reproduction rates from general fertility rates. The general confinement rate (from 15 to 50 years) in Sweden was 114.58 for 1891-1900 and 107.57 for 1901-1910. Multiplied by the number of years lived (25.56 in 1891-1900 and 26.97 in 1901-1910), those confinement rates would give a total of 2,928.5 and 2,900.9. The results would be by 1.8 and 2.3 per cent lower than those obtained from quinquennial rates. These differences perhaps do not appear so very large in themselves. But they are actually much more serious in other cases. For

⁶ Rahts has computed such abbreviated fertility tables for a group of German states in 1881-90, 1891-1900, 1901-10, for Sweden in 1816-40, 1841-55, 1891-1900, for Denmark in 1895-1900, and for France in 1898-1903. (See *Statistik des Deutschen Reichs*, Vol. 246, pp. 18*-19*.) In recent years a similar table has been computed by Dublin and Lotka for the white population of the United States in 1920. (See *Journal of the American Statistical Association*, September, 1925, Vol. XX, p. 309.)

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1871-80, for instance, the general confinement rate (123.68) multiplied by the number of years lived (23.57) would give a total of 2,915.6 or 3.9 per cent less than that obtained from the quinquennial rates.⁷ The general fertility rates, then, can be used no more for computing net reproduction rates than for computing gross reproduction rates.

The net reproduction rate, of course, must always be smaller than the gross reproduction rate. Both rates could only be equal, if all newly born girls reached child-bearing age and passed through child-bearing age. The table on page 49 shows how many out of 1,000 newly born girls enter child-bearing age and how many live through the child-bearing period. It will be seen, for instance, that in Denmark, according to the mortality of 1885-94, 758 out of 1,000 newly born girls entered child-bearing age and 583 passed through child-bearing age, while for 1926 the corresponding figures are 901 and 782. The last column of this table shows the average number of years lived in child-bearing age by the newly born girls. If none of them died before 50 years of age, they would all live 35 years in child-bearing age. The average number of years lived in child-bearing age must, therefore, always be lower than 35 years. It was lowest, according to this table, in Germany in 1881-90, when the average number of years lived in child-bearing age was 20.22 only. By 1925, this number had risen to 28.42. The average number for all Western and Northern Europe in 1926 was probably about 29.

⁷ Johannes Rahts, whom we asked for an opinion, emphasized the fact that the deviations are the larger the more the actual age distribution differs from that of a stationary population.

WOMEN PASSING THROUGH CHILD-BEARING AGE, 1816-1926

YEARS	FEMALES SURVIVING		YEARS LIVED BETWEEN 15 AND 50 YEARS
	15 YEARS OUT OF 1,000 LIVE-BORN	50 YEARS LIVE-BORN	
<i>Denmark</i>			
1885-94	758	583	23.70
1895-1900	802	644	25.60
1901-05	839	684	26.97
1906-10	856	710	27.72
1911-15	871	730	28.38
1916-20	872	703	27.79
1921-25	897	773	29.62
1926	901	782	29.84
<i>England and Wales</i>			
1920-22	871	742	28.61
<i>Finland</i>			
1881-90	699	526	21.69
1901-10	751	574	23.31
1911-20	778	580	23.87
1921-25	836	667	26.38
<i>France</i>			
1898-1903	772	584	23.98
1908-13	816	636	25.71
1920-21	837	665	26.50
1922-25	866	699	27.64
<i>Germany</i>			
1881-90	653	481	20.22
1891-1900	696	538	21.96
1901-10	749	598	23.92
1925	866	738	28.42
<i>Sweden</i>			
1816-40	719	513	22.08
1841-50	741	554	23.13
1851-60	716	527	22.20
1861-70	727	558	22.88
1871-80	749	580	23.57
1881-90	778	614	24.63
1891-1900	809	640	25.56
1901-10	851	680	26.97
1911-15	878	713	28.04
1916-20	876	680	27.23
1921-22	904	756	29.29

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This shows that there is not much margin left for further improvement. It will probably never be possible to raise that number by another 10 per cent. We may succeed in materially extending the lives of the women who have passed child-bearing age, but this, of course, will not in the least affect the number of births. No essential change of the net reproduction rate should, therefore, be expected from a reduction of mortality.

The table on pages 50-51 shows for those countries for which net reproduction rates could be computed the gross reproduction rates, the net reproduction rates, and the ratio between the two rates.

GROSS REPRODUCTION RATES AND NET REPRODUCTION RATES,
1816-1926

YEARS	GROSS RATE	NET RATE	RATIO (GROSS RATE = 100)
<i>Denmark</i>			
1878-84	2.220	—	—
1885-94	2.140	1.463	68
1895-1900	2.042	1.509	74
1901-05	1.954	1.524	78
1906-10	1.851	1.486	80
1911-15	1.671	1.372	82
1916-20	1.523	1.228	81
1921-25	1.391	1.192	86
1926	1.270	1.097	86
<i>England and Wales</i>			
1921	1.312	1.087	83
1925	1.079	—	—

NET REPRODUCTION RATES

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GROSS REPRODUCTION RATES AND NET REPRODUCTION RATES,
1816-1926 (Continued)

YEARS	GROSS RATE	NET RATE	RATIO (GROSS RATE = 100)
<i>Finland</i>			
1866-70	2.084	—	—
1871-75	2.388	—	—
1876-80	2.420	—	—
1881-90	2.380	1.485	62
1891-1900	2.278	—	—
1901-10	2.140	1.433	67
1911-20	1.716	1.161	68
1921-25	1.533	1.146	75
<i>France</i>			
1892-97	1.447	—	—
1898-1903	1.393	0.979	70
1904-07	1.310	—	—
1908-13	1.232	0.930	75
1914-19	0.766	—	—
1920-21	1.282	0.994	78
1922-25	1.159	0.937	81
<i>Germany</i>			
1881-90	2.459	1.448	59
1891-1900	2.366	1.512	64
1901-10	2.126	1.480	70
1925	1.132	0.937	83
<i>Sweden</i>			
1816-40	2.218	1.411	64
1841-50	2.100	1.394	66
1851-60	2.111	1.343	64
1861-70	2.106	1.379	65
1871-80	2.155	1.454	67
1881-90	2.064	1.455	70
1891-1900	1.958	1.435	73
1901-10	1.842	1.429	78
1911-15	1.594	1.288	81
1916-20	1.414	1.111	79
1921-22	1.346	1.137	85

In studying the trend of the net reproduction rate, we shall again begin with Northern Europe where the available data are more complete.

Finland. The net reproduction rate which in 1881-90 and 1901-10 had been 1.485 and 1.433, respectively, dropped to 1.146 in 1921-25. Since the gross reproduction rate fell from 1.533 in 1921-25 to about 1.43 in 1926, the net reproduction rate in that year was certainly lower than in 1921-25; it presumably was about 1.09.

Denmark. The net reproduction rate rose from 1.463 in 1885-94 to 1.524 in 1901-05. It then decreased steadily to 1.097 in 1926.⁸

Sweden. While the gross reproduction rate began its fall in the nineties of the last century, the net reproduction rate as late as 1901-10 was rather high. It fluctuated altogether from 1816-40 to 1901-10 between 1.343 and 1.455. In 1911-15, it dropped to 1.288 and in 1916-20 to 1.111. In 1921-22, with strongly decreasing mortality, it rose to 1.137. Since the gross reproduction rate in 1926 was presumably 1.11, the net reproduction rate in that year was presumably about 0.95.

France. The net reproduction rate as far back as 1898-1903 was only 0.979. The gross reproduction rate continued to decrease faster than mortality so that in 1908-13 the net reproduction rate was 0.930. During the war, the net reproduction rate was below 0.6. In 1920-21, it rose to 0.994. The increase of fertility after the war did then not result in more than a balance of births and deaths. In

⁸In 1927, it dropped to about 1.03.

1922-25, the net reproduction again dropped to 0.937; it was probably about the same in 1926.⁹

Germany. In spite of a very high mortality, the net reproduction rate was in the three decades from 1881-90 to 1901-10: 1.448, 1.512, and 1.480, respectively. In 1925, it was 0.937 only, with a gross reproduction rate of 1.132. In 1926, the gross reproduction rate was about 1.07 and the net reproduction rate presumably about 0.89.¹⁰

England and Wales. Between 1921 and 1926, the gross reproduction rate dropped from 1.312 to about 1.05. The net reproduction rate which in 1921 had been 1.087 was about 0.88 in 1926.¹¹

In all Western and Northern Europe, the gross reproduction rate in 1926 has been about 1.12. Since the net reproduction rate in all probability did not exceed five-sixths of the gross reproduction rate, the net reproduction rate in all probability did not exceed 0.93.

In the eighties of the last century, the net reproduction rate in Germany, Denmark, Sweden, and Finland was 1.4 or 1.5. The total number of children (boys and girls) born to each woman and becoming parents in their turn, then, averaged three. This means a doubling of the population within two generations. Conditions were more or less the same in the other countries of Western and Northern Europe with the exception of France and Ireland, where the number of children to each woman probably was about

⁹ In 1927, it dropped to about 0.91.

¹⁰ In 1927, it dropped to about 0.83.

¹¹ In 1927, it dropped to about 0.82.

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two: the population there only held its own. In 1926, the net reproduction rate was 1.1 in Denmark and Finland, but less than 1 in France and Sweden, and especially in England and Germany. The total number of future parents (boys and girls) born to each woman in 1926 was still higher than two in some of the smaller countries, but it was lower than two in all the larger countries. The average number was about 1.9. This means that the population does not hold its own.

According to the fertility and mortality in Western and Northern Europe in 1926, 100 mothers give birth to 93 future mothers only. With the fertility of 1926 the population is bound to die out unless mortality of potential mothers decreases beyond reasonable expectations. And fertility continued its downward path in 1927.

CHAPTER IV

PRESENT AND FUTURE BALANCE

IN 1926 the number of births in Western and Northern Europe (3,613,000) exceeded the number of deaths (2,449,000) by 1,164,000 or 48 per cent. How is it to be explained that in spite of such a surplus of births the population did not reproduce itself but had a virtual deficit of about 7 per cent? How is it to be explained that with a birth rate of 19.2 and a death rate of 13.0 the population does not hold its own? The answer to these most pertinent questions is to be found by a study of the age composition.

In the present population of Western and Northern Europe the proportion of women in child-bearing age is particularly large and the proportion of young children and old persons particularly small. The population of a given territory is equal to the number of persons born in that territory in the last 100 years minus the number of persons who died in that territory in the last 100 years.¹ If the number of

¹ It would be more accurate to add: plus the number of persons who immigrated into that territory in the last 100 years minus the number of persons who emigrated from that territory in the last 100 years; but although there was some immigration from Eastern and Southern Europe and a rather considerable emigration to overseas, we may neglect the migratory movements since they had no decisive influence upon the age composition of the population of Western and Northern Europe as a whole.

births in those 100 years remains constant or increases, and if the number of deaths does not fluctuate conspicuously, there will be more children under five years than from five to ten years, more children from five to ten years than from ten to fifteen years, etc. In the actual population of Western and Northern Europe — see the table on page 57 and the graph on page 58 — there are more children of 10 to 15 years than of under five years or of five to ten years; there are more persons of 15 to 20 years than in any lower age group; there are more persons of 20 to 30 years than under 10 years, and there are very few persons over 65 years. If we compare the age composition of the two sexes, we find a small excess of males in the lowest four age groups, while in all other age groups there is an excess of females, which is especially large in the ages of 25 to 45 and of over 60 years.

The decisive factor in shaping the age composition of the present population of Western and Northern Europe was the trend of births. The average yearly number of births, which had been 3,481,000 in 1841-45, increased to 4,210,000 in 1871-75 and to 4,686,000 in 1901-05, then dropped to 4,337,000 in 1911-14 and to 3,916,000 in 1920-26, after having been as low as 3,064,000 in 1915-19. It is evident that with such a trend in the number of births there must at present be comparatively few children under five years (born in 1921-25) and very few children from five to ten years (born in 1916-20), while there should be very many persons of 15 to 50 years (born in 1876-1910) and comparatively few older persons (born before 1876). This is actually the case for the female sex but not for those age

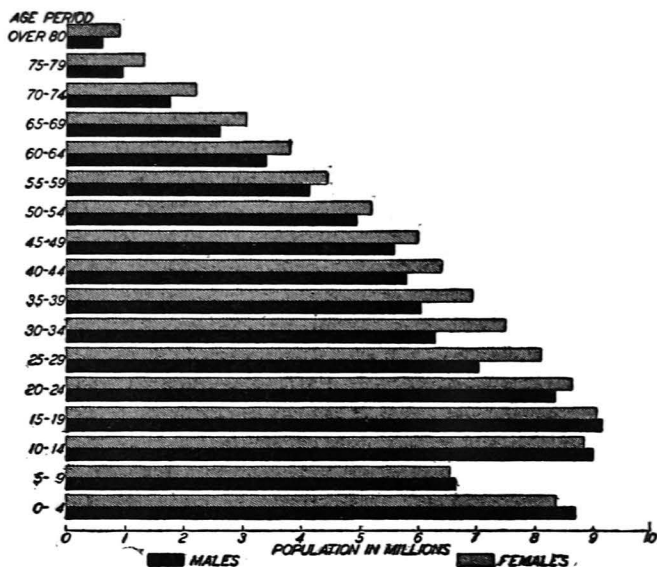
groups of the male sex which have been decimated through the war, that is, the present age groups from 25 to 45 years.

APPROXIMATE AGE COMPOSITION OF POPULATION, 1926

YEARS OF AGE	MALES (in millions)	FEMALES (in millions)	TOTAL (in millions)	MALES PER CENT	FEMALES PER CENT	TOTAL PER CENT	FEMALES PER 100 MALES
0-5	8.69	8.35	17.04	4.61	4.44	9.05	96
5-10	6.64	6.55	13.19	3.53	3.48	7.01	99
10-15	8.92	8.77	17.69	4.74	4.66	9.40	98
15-20	9.18	9.07	18.25	4.88	4.82	9.70	99
20-25	8.33	8.67	17.00	4.43	4.60	9.03	104
25-30	7.03	8.11	15.14	3.73	4.31	8.04	115
30-35	6.30	7.51	13.81	3.35	3.99	7.34	119
35-40	6.04	6.97	13.01	3.21	3.70	6.91	115
40-45	5.82	6.43	12.25	3.09	3.41	6.50	110
45-50	5.61	6.00	11.61	2.98	3.19	6.17	107
50-55	4.96	5.22	10.18	2.64	2.77	5.41	105
55-60	4.16	4.45	8.61	2.21	2.36	4.57	107
60-65	3.40	3.78	7.18	1.80	2.01	3.81	111
65-70	2.58	3.06	5.64	1.37	1.63	3.00	119
70-75	1.75	2.18	3.93	0.93	1.15	2.08	124
75-80	0.95	1.32	2.27	0.50	0.70	1.20	139
Over 80	0.59	0.88	1.47	0.31	0.47	0.78	149
Total	90.95	97.32	188.27	48.31	51.69	100.00	107

The age composition of the population of Western and Northern Europe tends to lower the number of deaths. Mortality is everywhere very high among the youngest children and among the oldest persons while it is practically negligible in the age from two or three until about fifty years. Since at present the number of young children and of old persons is small, the death rate necessarily must be low. It actually is not higher than 13 per 1,000. But this low rate cannot possibly last with present mortality. The persons between 15 and 50 years, who now are so numerous,

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AGE COMPOSITION OF POPULATION OF WESTERN AND NORTHERN EUROPE, 1926

will grow older and will thereby swell those age groups where death claims most victims, while there are not sufficient children to fill up the age groups which are more or less secure against death. The present death rate of 13 per 1,000, is therefore, taken by itself, misleading. That it cannot permanently last can moreover be easily realized by a simple logical consideration. A death rate of 13 per 1,000 means that $\frac{13}{1000}$ or $\frac{1}{77}$ of the population die within a year, and if such a rate were permanent, it would mean that

the average length of life is 77 years. But the length of life, of course, is actually much lower in every country of Western and Northern Europe. Even in Denmark, with its exceptionally low mortality, the mean length of life in 1921-25 was 61 years. Denmark in that period had 11.3 deaths per 1000 inhabitants, but the death rate derived from the actual mortality in the individual years of age was $\frac{1}{61}$, or 16.4 per 1,000. By a similar process we find as corrected death rates for England 1920-22: 17.3 (crude death rate 12.4), Scotland 1921: 18.3 (13.6), Germany 1921-1923: 18.7 (14.0).² The difference between the crude death rate, that is the number of deaths per 1,000 inhabitants, and the corrected death rate, that is the rate derived from the mortality in the individual years of age is not as large in all countries of Western and Northern Europe. It is rather small, for instance, in France, where the number of births has not changed very much in the course of the last forty years. But there the crude death rate is comparatively high — it amounted to 17.2 in 1921-25 and to 17.5 in 1926. The main reason is that in France the number of old people is comparatively high. In spite of the fact that mortality in France has by no means been particularly favorable, the percentage of persons over 50 years is 25 per cent as compared with 20 per cent in the rest of Western and Northern Europe, simply because France — on account of the greater stability in the numbers of births —

² For Germany see *Statistik des Deutschen Reichs*, Vol. 316, p. 50*. The other figures have been derived from the mean length of life as given in the official statistics of the individual countries.

has a more regular age composition. Yet, even in France the proportion of old persons is smaller than it would be if the present infant mortality had prevailed at the time when the persons now over fifty years were born. Even in France the corrected death rate is higher than the crude death rate. The statistics so far available for 1926 do not enable us to ascertain accurately the corrected death rate for all Western and Northern Europe, but they indicate that this corrected death rate must have been between 17 and 18 per 1,000.

The age composition of the population of Western and Northern Europe tends to swell the number of births. Since at present the proportion of children and of old persons is comparatively small, the number of births must be comparatively high. But the women who now are in child-bearing age will by and by pass this stage and will have to be fully replaced if with present fertility the number of births is not to decrease. The chances of such a replacement in the near future are easy to ascertain. In 1926 there were in Western and Northern Europe 23.67 million females under 15 years and 25.85 million females from 15 to 30 years. It is evident that even if all girls who now are under 15 years reached child-bearing age, they would by no means be able to replace those who now are between 15 and 30 years. This result, of course, is partly due to the reduction of births during the war. But even if there had lived in 1926 as many girls of 5 to 10 and of 10 to 15 years as of under 5 years, the girls of under 15 years (who then would number 25.06 millions) would not suffice fully to replace those of 15 to 30 years.

The situation with which we are confronted can perhaps best be realized by starting from the present number of female births. The total number of female births in 1926 was $1\frac{3}{4}$ millions. The total number of women from 15 to 50 years was $52\frac{3}{4}$ millions. If the number of female births continued to be $1\frac{3}{4}$ millions and if no death occurred, there would be in fifty years from now $1\frac{3}{4} \times 35 = 61\frac{1}{4}$ million women between 15 and 50 years or considerably more than at present. But according to the mortality of 1926, the average number of years which the newly born girls may expect to live in the age of child-bearing is 29. If, then, the number of female births continues to be $1\frac{3}{4}$ millions, and if mortality remains what it was in 1926, the number of women between 15 and 50 years, fifty years from now, would be $1\frac{3}{4} \times 29 = 50\frac{3}{4}$ millions only as compared with $52\frac{3}{4}$ millions in 1926. But with present fertility the number of births is bound to decrease before that, since the number of women now between 15 and 30 years cannot be replaced by those now under 15 years of age.

The 1926 birth rate of 19.2 per 1000 is then quite misleading. How much it differs from the corrected birth rate can easily be shown for females. The number of female births in 1926 was $1\frac{3}{4}$ millions. The total number of females was $97\frac{1}{3}$ millions. The number of female births per 1,000 females then was 18. According to the fertility and mortality of 1926, the number of children born to 1,000 newly born girls was about 930. If we assume that the mean length of life according to the mortality of females in 1926 was about 58 years, the yearly number

of female births to 1,000 females would have been $\frac{930}{58} = 16$.

The corrected female birth rate then was 16 per 1,000 as compared with a crude female birth rate of 18 per 1,000.

With a fertility and mortality as they prevailed in Western and Northern Europe forty or fifty years ago, the population would have doubled in three generations. With a fertility and a mortality as they have prevailed for some years, the population of Western and Northern Europe is bound to die out. This process, of course, will be rather slow. With the present age composition it would take decades until there actually would be an excess of deaths over births, and it would take centuries until the population would be half of what it is now. The process will be accelerated if emigration continues, while it will not, of course, be affected by immigration since we are concerned only with the present population and its descendants.³ It can be stopped by an essential change in mortality or in fertility. But the future reduction of mortality in those ages which are the only decisive ones, that is, those under fifty years, cannot be very great after all that has already been accomplished. The future then depends mainly on the trend of fertility.

³ It may however be noted incidentally that a yearly addition of 100,000 women in child-bearing age, by immigration or by birth to future immigrants, would suffice to re-establish the equilibrium between births and deaths.

APPENDIX A

BIRTHS AND BIRTH RATES

THE birth rate is the rate of newly born per 1,000 of the average population in a definite territory. We must, therefore, consider the meaning of (1) births, (2) average population, (3) territory.

I. BIRTHS

The newly born in vital statistics are usually subdivided into live-born and still-born. Since the statistical definitions of live-born and still-born have changed in the course of time and also vary between different countries, it may at first sight seem preferable to neglect any distinction and to consider only total births. But some countries, like Great Britain, do not register still-births at all. We shall, therefore, confine ourselves in this international study to the live-born. The reader should, however, keep in mind that the numbers of live-born and consequently the birth rates which we give in this book are slightly affected by the definition of live-born in use at the different periods and in the various countries. It would exceed our scope to give a detailed analysis of those definitions. It may suffice to mention a few examples which will show that the live-born in England or Denmark, for instance, include newly-born that in France and Belgium would be registered as still-born.

England and Wales. The statistics of live-born include all children born who have shown any sign of life after birth.

- ✓ A still-born child is one which, after complete expulsion from the body of the mother, has neither breathed nor shown any signs of life. It should be noted that any child born and living for any time, however short, is regarded as live birth.¹

Denmark. Same as England.

Prematurely born children born alive to be recorded as live births. Any foetus born without obvious signs of life in the 29th week of pregnancy or after should be recorded as a still-birth; but if before the 29th week it should be deemed a miscarriage and not recorded.²

Belgium. The statistics of live-born exclude children who were born alive but who died within three days after birth without birth registration.

- ✓ Officially, a "still-birth" is defined as the birth of a dead child after the 180th day of gestation, but according to established procedure, under "still-born" are included:

- (a) Children born dead.
- (b) Children born alive, but dying before registration (i.e. within three days of birth).

A circular issued by the Ministry of the Interior in 1880, which is still in force, states:

The returns of still-births compiled from the registry of deaths may include not only children actually born dead, but also children who, although born alive, died on the first, the second, or even the third day after birth, but who must be regarded as still-born, since they were not returned as live-births to the Public Registrar, and consequently could not be entered in the register of births.³

¹ League of Nations, Health Organization. Statistical Handbooks Series: No. 3, *Official Vital Statistics of England and Wales*, p. 45.

² Statistical Handbooks Series: No. 6. *The Official Vital Statistics of the Scandinavian Countries and the Baltic Republics*, p. 72.

³ Statistical Handbooks Series: No. 2, *The Official Vital Statistics of the Kingdom of Belgium*, p. 26; for full text of the circular, see *ibid.*, pp. 73-74.

The number of children born alive, but dying before registration, amounted in 1881-1913 and 1919-25 to 0.74 and 0.71 per cent of the live-born and to 16.0 and 15.0 per cent of the "still-born."

AVERAGE YEARLY NUMBER OF LIVE-BIRTHS AND STILL-BIRTHS IN BELGIUM, 1881-1925 *

YEARS	LIVE-BORN	"STILL-BORN"		
		Dead at Birth	Dying before Registration	Total
1881-1890 . . .	175,828	7,241	1,195	8,436
1891-1900 . . .	186,544	7,318	1,448	8,766
1901-1910 . . .	187,549	7,097	1,470	8,567
1911-1913 . . .	171,363	6,412	1,316	7,728
1919-1925 . . .	152,415	6,186	1,092	7,278

* See *Annuaire Statistique de la Belgique et du Congo Belge 1912*, pp. 108-9; *1924-1925*, pp. xxx, xxxiii, 37.

Holland. Prior to 1918: same as Belgium; from 1918 to 1923: (1) same as Belgium, (2) all live-born children (excluding the living fetuses of less than six months); from 1924 on: (2) only. The statistics from 1924 on, then, include among the live-born births which would not have been included prior to 1918. The number of such births in 1918-23 amounted to 1.03 of the live-born and to 30.0 per cent of the "still-born."⁴

France. Same as Belgium. For 1907-24 the percentage of children who breathed but were excluded from the statistics

⁴ See *Jaarcijfers voor Nederland 1927*, p. 13. It is interesting to note that this percentage was evidently much higher than the Dutch registration officers themselves had assumed, since some years prior it had been officially "estimated that somewhere about 15-20 per cent of the children so entered were born alive" (see *Journal of the Royal Statistical Society*, December, 1912, Vol. LXXVI, p. 65).

of live-born amounted to 0.73 per cent of the actually live-born and to 15.2 per cent of the "still-born."⁵

The reader should further keep in mind that the registration of births, especially during the earlier registration years, was not complete. In England and Wales, for instance, where civil registration began on July 1, 1837, an unknown number of births was not recorded until, through the Births and Deaths Registration Act of 1874, the registration of births was made compulsory, and omission to register became a punishable offence. The deficiency in birth registration for 1837-76, according to an estimate of the Registrar-General, Dr. Farr, averaged 5 per cent.⁶ In the last quarter of the nineteenth century and up to 1914 registration was practically complete all over Western and Northern Europe.⁷ But the world war again shattered the accuracy of the birth records, especially in the occupied territories of France, etc., and complete registration could only be re-established in 1920.

Wherever registration is deficient, the statistical authorities may or may not fill the gaps. In the case of England and Wales, for instance, no attempt apparently has ever been made to revise the yearly births data which were somewhat incomplete prior to 1876. In the case of the occupied territories of France, on the other hand, the French Statistical Office has made a careful, though, of course, quite uncertain estimate

⁵ See Statistical Handbooks Series: No. 9, *The Official Vital Statistics of the French Republic*, pp. 70-74, and *Statistique Générale de la France, Statistique du Mouvement de la Population*, New Series, Vol. IV, p. LXXIX.

⁶ See *Official Vital Statistics of England and Wales*, p. 29.

⁷ See for some details "*Report of Special Committee on Infantile Mortality*," *Journal of the Royal Statistical Society*, December, 1912, pp. 52-59, 81. Conditions prior to 1918 were not altogether satisfactory in Finland (see *The Official Vital Statistics of the Scandinavian Countries and the Baltic Republics*, pp. 38-39).

of the births in 1914-19.⁸ We have used in both cases the official figures as they stand.

There are, however, still other cases, where the registration may have been complete, but where on account of changes in political sovereignty statistics have not been compiled or at least not published. No statistics, for instance, are available for Alsace-Lorraine in 1917-18, the German statistics stopping with 1916, the French statistics starting with 1919. The German Statistical Office, it is true, has made an estimate of the births in all Germany by "increasing the figures of those two years by $\frac{1}{40}$, which part about corresponds to the share of Alsace-Lorraine";⁹ but this estimate does not seem adequate, since the share of Alsace-Lorraine which indeed had been about $\frac{1}{40}$ before the war was only $\frac{1}{47}$ in 1915 and in 1916. We have, therefore, assumed that the share of Alsace-Lorraine, which suffered particularly from the war, was the same for 1917 and 1918 as for 1915 and 1916. Similar estimates have been made in this book for other territories ceded by Germany for which birth statistics are lacking in the first post-war years.

Attention must finally be called to the fact that in compiling birth statistics some countries use the *de facto* enumeration, while others have accepted a *de jure* method (by including children born at sea and excluding the births of mothers with a foreign residence), and that some countries include for a given period the number occurring while others include the number registered during that period. These, however, are negligible differences.

⁸ See *Statistique du Mouvement de la Population*, New Series, Vol. III, pp. 148-172.

⁹ *Statistik des Deutschen Reichs*, Vol. 276, p. XXXIII.

II. AVERAGE POPULATION

The birth rate is the rate of newly born per 1,000 of the average population in a given period. But the average population is never exactly known for any period. The only reliable data are census figures and those very figures, even assuming them to be complete, are not always comparable, since they may refer either to the *de facto* population or to a *de jure* population, the latter including residents living abroad (also soldiers) and excluding foreigners with a foreign residence. As to the period between two censuses, only estimates, as a rule, are available. Those estimates which usually are based on the more or less reliable statistics of births and deaths and the more or less unreliable statistics of immigration and emigration refer either to the end of each year or to the middle of each year or to the mean (average of beginning and end) of each year. ✓ In computing the birth rate for a given year, the mean population certainly is preferable to the mid-year population, and wherever we had ourselves to compute birth rates we have used as a basis the mean population, taking it from the official statistics when it was so given or computing it by ascertaining the average of the population at the end of the preceding year and at the end of the year under consideration. We have applied this method also in the case of Belgium, where in the official statistics the birth rate for each year is erroneously computed by relating the births to the population at the end of the year.

If the period under consideration does not exceed one year, the population at the middle of the year probably will not differ much from the average population of the year, and we have therefore taken as they stand official birth rates computed on the basis of the mid-year population. But if the period under consideration covers a much larger period, say ten years,

the error caused by relating the births of that period to the population in the middle of the period may become considerable. The French Statistical Office, in a most comprehensive international survey made before the war, has published, aside from many correctly computed birth rates by years and by longer periods, special decennial birth rates by relating the average yearly births to the mid-period population. How much the results of this method (a) differ from those of the correct method (b) which consists in relating the average yearly births to the average population may be seen from the following table for Sweden:¹⁰

PERIOD	BIRTH RATE		PERIOD	BIRTH RATE	
	(a)	(b)		(a)	(b)
1756-1765 . .	34.7	34.4	1826-1835 . .	32.9	32.9
1766-1775 . .	32.3	32.5	1836-1845 . .	31.1	30.9
1776-1785 . .	32.9	33.2	1846-1855 . .	31.3	31.4
1786-1795 . .	33.8	33.0	1856-1865 . .	33.4	33.4
1796-1805 . .	32.1	32.0	1866-1875 . .	30.6	30.2
1806-1815 . .	32.2	31.6	1876-1885 . .	29.7	29.8
1816-1825 . .	35.0	34.8	1886-1895 . .	28.1	28.1

We, therefore, have discarded all birth rates for periods of over two years based on the mid-period population, and have as a matter of principle computed such birth rates by relating the average yearly births to the average population of the period.¹¹

¹⁰ The results of method (a) have been taken from *Statistique Internationale du Mouvement de la Population*, Vol. I, p. 196; the results of method (b) have been computed from data given in *Statistisk Årsbok för Sverige 1927*, pp. 47-48.

¹¹ We thus give the birth rate for the entire period reduced to one year. This birth rate is not necessarily identical with the average of the yearly birth rates, which is obtained by dividing the total of the yearly birth rates

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Attention should, finally, perhaps be called to the fact that the trend of yearly birth rates is slightly affected by the number of days in a year. The increase in the birth rate of Finland from 36.6 in 1875 to 36.7 in 1876, does not represent an actual increase, since 1875 was a common year and 1876 a leap year.¹²

by the number of years covered by the period. In official publications both rates sometimes are indiscriminately used without much care about terminology, although, theoretically, the two methods vary a great deal. In practice, they would lead to very different results in extreme cases only. Let us assume four different countries with the following development in a triennial period:

YEAR	A		B		C		D	
	Popu- lation	Births	Popu- lation	Births	Popu- lation	Births	Popu- lation	Births
1st . . .	100,000	2,000	100,000	4,000	300,000	6,000	300,000	12,000
2nd . . .	200,000	6,000	200,000	6,000	200,000	6,000	200,000	6,000
3rd . . .	300,000	12,000	300,000	6,000	100,000	4,000	100,000	2,000

The average yearly birth rate would be in all countries 30, while the triennial birth rate, reduced to one year, would be in countries A and D 33.33, in countries B and C 26.67. But such great changes in population and birth rates actually never occur and the difference between the results of the two methods is usually negligible.

In the very few cases where the yearly birth rates only were available we have, then, computed the birth rate for the period by taking the average of the yearly birth rates. But when not otherwise stated, our birth rates by periods represent the birth rate for the entire period reduced to one year.

¹² A casual reader might object that it represents an actual increase after all since Finland counts the births according to the date of registration and 1876 with its 53 Sundays had no more registration days than 1875. But such an objection would be utterly futile. Registration in Finland is made by the clergy and can be effected on Sundays as on week-days.

III. TERRITORY COVERED

The birth rate as originally published by the statistical office of an individual country usually refers to the territory of that time. But when boundaries change, the office, assuming thereby to present a better basis of comparison between birth rates of former and of recent times, frequently endeavors to compute, for the past, birth rates corresponding to the new boundaries of the country and from then on publishes the revised rates only. When boundaries change again, it often occurs that the data necessary for a new revision of the original rates are not available, and the official statistics of many countries, therefore, contain a series of birth rates which partly correspond to the former territory and partly to the present territory. The confusion resulting from a change in boundaries is sometimes so great that the statistical office itself no longer knows to which territory its data refer. The French Statistical Office, in computing the birth rate for the quinquennial period 1866-70, has thus at one time excluded the births of Alsace-Lorraine in 1869-70, but included the population of Alsace-Lorraine for all those years.¹³

In our opinion, a comparison of birth rates for the territory within the political boundaries at various times is at least as instructive as a comparison of birth rates computed wholly with respect to the territory now so comprised. We have on the whole no serious objections to a comparison of birth rates for the present territory, if the change of boundaries has reduced the territory — although we do not find it particularly useful to study the pre-war birth rate in the present territory of countries like Austria or Hungary. But we wonder whether it may not be misleading to compare such birth rates in case the present

¹³ See *Statistique Internationale du Mouvement de la Population*, Vol. I, pp. 158, 162, 166.

territory includes districts which formerly belonged to another country. Very little, as a matter of fact, is known about the intensity with which various factors affect the birth rate; but it is quite certain that legislation is one important factor and that the birth rate of a district is likely to change with changing sovereignty. We rather suspect, for instance, that the increase of the birth rate of Alsace-Lorraine from 29 in 1851-60 to 30 in 1891-1900, coinciding with a decrease of the French birth rate from 26 to 22, was partly due to the fact that Alsace-Lorraine in the meantime had become a part of Germany. We, therefore, do not think that the German official statistics have improved the comparability of the German birth rates by including Alsace-Lorraine for the periods preceding 1870, and we certainly find it illogical that this scheme is still adhered to after Alsace-Lorraine has been excluded from the official German birth rate since 1917.

In preparing our tables on population, births, and birth rates, we have as far as possible discarded all series which refer partly to the territory of former times and partly to the present territory. We have, however, not confined ourselves to an analysis for the territory formerly comprised, since we are quite aware that there are after all problems the solution of which requires the study of the trend of the birth rate for a geographical rather than for a political entity. We therefore add for the two countries whose boundaries have materially changed in the course of time, namely for France and Germany, some data for the present territory. In studying our tables, the reader should, however, keep in mind that although in order to avoid erroneous conclusions it is necessary to know just to what territory a birth rate refers, in a good many cases the statistical publications of the individual countries, and still more so the international compilations, do not give information that is adequate in this respect. In delimiting the territories covered by

the data contained in the following tables, we will, therefore, insert the "dodge line" frequently applied to the statements in bond circulars: "They are based on information obtained from official sources and while not guaranteed are believed to be reliable."

Belgium. The official statistics (see *Annuaire Statistique de la Belgique 1900*, p. 90, and *Annuaire Statistique de la Belgique et du Congo Belge, 1912*, p. 102, *1924-1925*, p. 37) give the population on December 31, 1830-1925, the yearly births for 1830-1925, and yearly birth rates for 1830-1925. The data for 1830-1919 refer to the territory for the respective years and, therefore, include for 1830-38 the parts of the provinces of Limburg and Luxemburg ceded to Holland through the treaties of April 19, 1839. The data of 1920-24 still exclude the counties of Eupen and Malmedy ceded by Germany in consequence of the Treaty of Versailles of January 10, 1920. The data for 1925 refer to the present territory.

The population of Eupen and Malmedy on December 31, 1920, is given in *Aperçu Annuel de la Démographie des Divers Pays du Monde, 1922*,¹⁴ p. 3, and the population of the present Belgian territory as of December 31, 1921-26, in *Aperçu 1927*, pp. 4-5; the births in Eupen-Malmedy for 1921-24 are given in *Aperçu 1927*, p. 115, and the births in the present territory for 1926 in *Moniteur belge*, June 5, 1927.

The mean population in the territory respectively comprised has been computed for 1831-1919 from the official figures for December 31, 1830-1919. In order to compute the mean population for 1839, it became necessary to deduct from the official population figure for December 31, 1838, the population of the districts ceded to Holland. For December 31, 1836, the popu-

¹⁴ Such a survey has been published by the Permanent Office of the International Statistical Institute for 1922, 1925, and 1927. It will be quoted in this Appendix as *Aperçu*.

lation of Belgium has been estimated at 4,242,598 including those districts (*Annuaire 1900*, p. 90), and at 3,927,901 excluding those districts (*ibid.*, p. 40). It has here been assumed that the population in the ceded districts was likewise about 315,000 on December 31, 1838. For 1920-26, the mean population in the territory as of those years (which coincides with the present territory) has been computed from the figures in *Aperçu 1922* and *1927*, it having been assumed that the mean population of Eupen and Malmedy in 1920 was equal to that of December 31, 1920 (60,213).

The births for 1831-1919 were taken as they were from *Annuaire 1900, 1912, 1924-25*. For 1920-24, the figures in the *Annuaire* were supplemented by those given in *Aperçu 1927* for Eupen and Malmedy, it having been assumed that the number of births in 1920 was the same as in 1921 (1405). For 1925 and 1926, the births were taken as they were from *Annuaire 1924-25* and *Moniteur belge* respectively.

Since in the Belgian official statistics the birth rate is reckoned as a rate per 1,000 of the population living at the end of the year, all yearly birth rates have been computed anew by relating the births to the mean population of the year.

Our whole series of data for Belgium 1831-1926 thus refers to the population of the respective period. The data for 1920-1926 refer at the same time to the present territory. In order to give data for the present territory for 1841-1919 we ought to have included for each year the figures for Eupen and Malmedy; but the population of this district is so small that it did not seem worth while to take it into special consideration.

Denmark. The official statistics (see *Danmarks Statistik, Statistisk Aarbog 1922*, pp. 16-18, *1927*, p. 21; *Statistiske Efterretninger*, May 5, 1928, Vol. XX, p. 81) give the population on July 1, 1800-1927, the yearly births for 1800-1927, and the yearly birth rates for 1800-1927. The data for 1800-59

refer to the territory as before the peace treaty of October 30, 1864, through which Denmark gained an increase of 7,811 inhabitants (see *Sammendrag af Statistiske Oplysninger angaaende Kongeriget Danmark*, No. 1, Copenhagen 1869, p. 1). The data for 1860-1920 refer to the territory as after this treaty. The data for 1921-27 refer to the present territory and include the districts ceded by Germany, June 14-15, 1920, on account of the vote of February 10, 1920.

The mean population in the territory corresponding to the periods 1800-1919 and 1921-27 has been assumed to be equal to the officially estimated population of July 1 of those years, no attempt having been made to revise the figures for 1860-64. The mean population for 1920 has been computed by adding 163,000 to the official figure, the population of the ceded districts having been 163,622 at the census of February 1, 1921 (see *Statistisk Aarvog 1927*, p. 11).

The births for 1800-1919 and 1921-27 were taken as they were from the official statistics. The number of births for 1920 has been computed by adding to the official figure for 1920, 3,847 births, the birth rate in Sleswig having been 23.6 in 1920 (see *Statistik des Deutschen Reichs*, Vol. 336, p. 4).

The yearly birth rates for 1800-1919 and 1921-27 were taken as they were from the official statistics; the rate for 1920 has been computed by relating the number of births to the mean population of the year.

With the exception of the years 1860-64, where there is a negligible deviation, our whole series of data for Denmark 1800-1927 thus refers to the population of the respective time. The data for 1920-27 refer also to the present territory. In order to give data for the present territory for 1841-1919, we ought to have taken into account for 1841-59 the slight change of boundaries that occurred in 1864 and we ought to have included for 1841-1919 the territory ceded by Germany in 1920. But neither

of those changes seems sufficiently important to deserve special consideration.

Faroe Islands, Iceland. None of the data for Denmark include the Faroe Islands or Iceland. The Statistical Yearbooks of Denmark (see *Statistisk Aarbog 1902*, p. 174; *1903*, p. 178; *1906*, pp. 178, 180; *1916*, pp. 209-10; *1927*, pp. 183, 189; see also *Statistisk Tabelværk*, Fourth Series, Letter A, No. 5, p. 287; No. 7, p. 289; No. 9, p. 241) give the yearly births for the Faroe Islands in 1880-1925, and for Iceland in 1890-1925. Other official statistics of Denmark (*Statistiske Meddelelser*, Fourth Series, Vol. 24, Part 5, pp. 5-6, Vol. 56, Part 4, pp. 3-8) give for the Faroe Islands the births, including still-births, by periods of 10 or 11 years for 1840-1910 and the live-births by decennial periods for 1881-1910, and by periods of 5 or 6 years for 1880-1915; for Iceland the births, including still-births, for the period 1801-40 and by periods of 10 or 11 years for 1841-1901 and the live-births by decennial periods for 1881-1900. The official statistics of Iceland (see *Landshagsskyrslur fyrir Ísland 1910*, p. 103; *1911*, pp. 204; *Statistique de l'Islande*, Vol. XXIV, pp. 21*, 7) give the mean population of Iceland for the decennial period 1891-1900, for the quinquennial period 1901-05, and for December 31, 1906-1915, and the live-births by decennial periods for 1876-1905. The League of Nations, Health Organization, Statistical Handbooks Series (see No. 6, *The Official Vital Statistics of the Scandinavian Countries and the Baltic Republics*, p. 84) gives for Iceland the births, including still-births, by decennial periods for 1735-1924.

In order to include the Faroe Islands and Iceland in the table covering Western and Northern Europe, still other sources and some estimates had to be resorted to. The mean population by quinquennial periods for 1841-1900 has been taken from the semi-official Swedish compilation by Gustav Sundbärg, *Aperçus Statistiques Internationaux, Dixième Année*, p. 35. According

to the censuses of February 1, 1901, 1906, 1911, 1916, 1921, and November 5, 1925, the population of the Faroe Islands was 15,230, 16,348, 18,000, 19,617, 21,352, and 22,835. We have assumed here that the population in 1901-05, 1906-10, 1911-14, 1915-19, 1920-21, 1922-23, 1924-25, and 1926 was 16,000, 17,000 18,000 20,000 21,000 22,000, 23,000, and 23,000. The mean population of Iceland for 1901-05 has been taken from the official statistics of Iceland, that for 1906-26 has been computed from the estimates for December 31, 1906-19, 1921-26, and the census data for December 1, 1920, given in the official statistics of Iceland and *Aperçu 1922*, p. 4, *Aperçu 1925*, p. 12, *Aperçu 1927*, p. 14.

The births in 1881-1925 for the Faroe Islands and in 1891-1925 for Iceland were taken from the official Danish and Icelandic statistics. The births for 1841-80 or 1841-90 were estimated on the basis of the statements in the statistics of Denmark and Iceland, and the International Statistical Institute's *Annuaire International de Statistique 1917*, p. 34. The births for 1926 were taken from *Aperçu 1927*, pp. 116-117.

In view of the small population of these islands, no separate birth rates are given, all data being used only for computing birth rates by periods for Western and Northern Europe.

England and Wales. The official statistics (see *Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales 1881*, pp. xliii, cxii, cxiv; *idem*, 1900, p. cxxv; *idem*, 1910, pp. 2-4; *The Registrar-General's Statistical Review of England and Wales for the Year 1926, Tables, Part II, Civil*, pp. 2-5) give the estimated mid-year population for 1801-1926, the yearly births for 1838-1926, the quinquennial births for 1841-1925, the yearly birth rates for 1838-1926, and the quinquennial birth rates for 1841-1925. The data refer to the territory during those periods which

coincides with the present territory. The population figures, however, refer for 1915-1920 to the civilian population only; estimates of the total population for those years are given in *Annual Reports of the Registrar-General 1915*, p. x, *1916*, p. 80, *1917*, p. 82, *1918*, p. 19, *1919*, p. 89, *1920*, p. x.

The mean population in 1838-1926 has been assumed to be equal to the officially estimated total mid-year population of those years.

The yearly births for 1838-1926, the yearly birth rates for 1838-1926, and the quinquennial birth rates for 1841-1910 were taken as they were from the *Annual Reports* and the *Statistical Review*. The birth rates by periods for 1911-25 have been computed by relating the total births to the sum of the mean populations of all years covered by the period. The mean population, the births, and the birth rate for 1927 have been taken from *Journal of the Royal Statistical Society, 1928*, Vol. xci, pp. 295-96.

Scotland. The official statistics (see *Annual Report of the Registrar-General of Births, Deaths, and Marriages in England 1881*, pp. cxii-cxv; *Annual Report of the Registrar-General for Scotland 1926*, pp. lxxv-lxxvii) give the estimated mid-year population for 1801-1926, the yearly births for 1855-1926, and the yearly birth rates for 1855-1926. The data refer to the territory in those years, which coincides with the present territory.

The mean population in 1841-1926 has been assumed to be equal to the estimated mid-year population of those years. The yearly births for 1855-1926 and the yearly birth rates for 1855-1926 were taken as they were from the official statistics. The mean population, the births, and the birth rate for 1927 have been taken from *Journal of the Royal Statistical Society, 1928*, Vol. xci, p. 298.

In order to include Scotland in the tables covering Western

and Northern Europe, it became necessary to make estimates for the births in the three quinquennial periods 1841-45, 1846-50, and 1850-55. We have here assumed that the birth rate was equal to that of England and Wales, namely 32.3, 32.8, and 33.9.

Ireland. The official statistics of Ireland (see *Supplement to the Forty-Seventh Report of the Registrar-General of Marriages, Births, and Deaths, in Ireland*, pp. vi, 60; *Fifty-Seventh Detailed Annual Report of the Registrar-General for Ireland*, p. v) give the estimated mid-year population for 1826-1920, the yearly births for 1864-1920, and the yearly birth rates for 1864-1920. The official statistics of Northern Ireland (see *The Registrar-General's First Annual Report containing General Abstracts of Marriages, Births and Deaths registered in Northern Ireland during the year 1922*, p. 6; *Fifth Annual Report 1926*, p. 6) give the estimated mid-year population for 1911-26, the yearly births for 1912-26, and the yearly birth rates for 1912-26. The official statistics of the Irish Free State (see *Detailed Annual Report of the Registrar-General for Saorstát Éireann containing a General Abstract of the Numbers of Marriages, Births and Deaths registered in Saorstát Éireann during the year 1922*, p. v; *idem 1926*, pp. viii, 68) give the estimated mid-year population for 1911-26, the yearly births for 1912-26, and the yearly birth rates for 1912-26. All data for Ireland refer to the territory of the respective periods which coincides with the present territory. The separate data of Northern Ireland and the Irish Free State for 1911-26 refer to the present territory as established in 1920.

The mean population in 1841-1926 has been assumed to be equal to the officially estimated mid-year population of those years, the mean population of Ireland for 1911-26 having been computed by adding the mid-year populations of Northern Ireland and the Irish Free State. But while, as a rule, we do

not question the official population estimates, we want to say in this connection that we think those estimates for 1842-50 to be too high. The population, according to the censuses of June 7, 1841, and March 30, 1851, was 8,196,597 and 6,574,278. The Registrar-General assumes the population to have steadily increased until 8,295,061 in the middle of 1845, and then to have decreased to 8,287,848 in 1846, 8,025,274 in 1847, 7,639,800 in 1848, 7,256,314 in 1849, 6,877,549 in 1850, and 6,514,473 in 1851. Since the emigration was already rather large in 1841-46, we cannot believe that the population still increased in the first part of the forties and, as we, of course, accept the census figures of 1851, we do not believe that the population decreased by as much as 1,773,375 from the middle of 1846 to the middle of 1851. But as we have not sufficient evidence to prepare an adequate estimate of our own, we accept the official estimates for the whole period.

The births in 1864-1926 were taken as they were from the *Reports* of the Registrar-Generals, the births of Ireland for 1912-26 having been computed by adding the births of Northern Ireland and the Irish Free State.

The yearly birth rates of Ireland for 1864-1910 and of Northern Ireland and the Irish Free State for 1916-26 have been taken as they were from the *Reports* of the Registrar-Generals; all other birth rates have been computed anew.

The mean population, the births, and the birth rate for 1927 have been taken from *Journal of the Royal Statistical Society* 1928, Vol. xci, pp. 300-01.

In order to include Ireland in the tables covering Western and Northern Europe it became necessary to make estimates for the births in the five quinquennial periods from 1841-45 to 1861-65. We have here assumed that the birth rate was 30 in the period 1841-45, 28 in the periods 1846-50, 1851-55, and 1856-60, and 26 in the period 1861-65.

Islands in the British Seas. None of the data for Great Britain and Ireland include the Isle of Man, Jersey, or Guernsey and its dependencies. But the reports of the Registrar-General of Wales and England (see *Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales, 1881*, p. xcvi, *1889*, p. lv, *1901*, p. cli; *The Registrar-General's Statistical Review of England and Wales for the Year 1926, Tables, Part II, Civil*, p. 115) give separately the yearly births in those islands for 1851-1926.

In order to include the Islands in the British Seas in the table covering Western and Northern Europe, other sources and some estimates had to be resorted to. The mean population by quinquennial periods for 1841-1900 has been taken from the semi-official Swedish publication by Gustav Sundbärg, *Aperçus Statistiques Internationaux, Dixième Année*, p. 36. According to the censuses of April 1, 1901, April 3, 1911, and June 20, 1921, the population of those islands was 150,370, 148,915, and 150,514. We have assumed here that the population was 150,000 in 1901-05, 149,000 in 1906-14, 150,000 in 1915-21, and 151,000 in 1922-26. As to the births in 1841-50, we have assumed a birth rate of 28.

In view of the small size of these islands, no separate birth rates are given, all data being used only for computing birth rates by periods for Western and Northern Europe.

Finland. The official statistics (see *Éléments Démographiques Principaux de la Finlande pour les Années 1750-1890*, Vol. I, pp. 39-40, Vol. II, pp. 128-29, 202-3; *Annuaire Statistique de Finlande 1927*, pp. 54-55; *Mouvement de la Population en 1926*, pp. 5, 21) give the mean population by years and by quinquennial periods for 1751-1925 as well as the population on December 31, 1925, and 1926; the births and the birth rates by years for 1751-1926 and by quinquennial periods for 1751-1925. The data refer to the territory as of those years and,

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therefore, exclude for 1751-1811 the government of Wiborg annexed on December 31, 1811 (185,000 inhabitants). From 1812 on, the territory of the respective periods coincides with the present territory.

The mean population for 1751-1925 by years and for 1751-1910 by periods, the births and the birth rates for 1751-1926 by years and for 1751-1910 by periods have been taken as they were from the official statistics. The mean population for 1926 has been computed from the official figures for December 31, 1925 and 1926. The birth rates by periods for 1911-25 have been computed by relating the total births to the sum of the mean populations of all years covered by the period.

France. The official Statistical Yearbook (*Annuaire Statistique 1926*, pp. 11*-12*) gives the mid-year population for 1802-1926, the yearly births by thousands for 1806-1926, and the yearly birth rates for 1806-1926. The data for 1806-60 refer to the territory according to the treaty of Paris of 1815; from 1861 on they include Savoy and the part of the county of Nice ceded by Italy through the treaty of Turin of March 24, 1860; from 1869 to 1918 they exclude Alsace-Lorraine ceded to Germany through the treaty of Frankfort in 1871; from 1919 on they again include Alsace-Lorraine. The data then refer to the territory respectively comprised for 1815-68 and 1871-1926, and at the same time to the present territory for 1861-68 and 1919-26.

The mean population in the territory included in 1806-68 and 1871-1926 has been assumed to be equal to the officially estimated mid-year population of those years, no attempt having been made to revise the figures for the Napoleonic period. The mean population including Alsace-Lorraine for 1869 and 1870 has been taken from the French official publication *Statistique Internationale du Mouvement de la Population*, Vol. I, p. 37.

Since the yearly births are given only by thousands in the Yearbook, the actual figures had to be taken from other sources: those for 1806-1910 were taken from *Statistique Internationale du Mouvement*, Vol. I, pp. 36-37, Vol. II, p. 15, those for 1911-24, from *Statistique du Mouvement de la Population*, New Series, Vol. II, p. 1, Vol. III, pp. 170, 172, Vol. IV, p. lxii, those for 1925-27 from *Journal Officiel de la République Française*, May 5, 1928. The births in Alsace-Lorraine for 1869-70 were taken from *Statistique Internationale du Mouvement*, Vol. I, p. 32. The births by quinquennial periods for 1806-1910 have been taken from *ibid.*, Vol. I, p. 158, Vol. II, p. 62*, the figure for 1866-70 having been revised by including for 1869 and 1870 Alsace-Lorraine.

The yearly birth rates for 1806-1868 and 1871-1927 have been taken as they were from *Annuaire Statistique* 1926, pp. 11*-12*, and *Journal Officiel de la République Française*, May 5, 1928; those for 1869 and 1870 were computed by including Alsace-Lorraine. The quinquennial birth rates for 1806-1865 and 1871-1910 were taken as they were from *Statistique Internationale du Mouvement*, Vol. I, p. 166, Vol. II, pp. 68-69. The birth rates for 1866-70 and for the periods from 1911-14 on, have been computed by relating the total births to the sum of the mean populations of all years covered by the period.

Aside from this series of data referring for 1815-1926 to the territory of the time considered, it was deemed advisable, as has been explained before, to give for 1841-1926 data referring to the present territory. In order to do this, Savoy and the part of Nice, ceded by Italy in 1860, had to be included for 1841-60, and Alsace-Lorraine had to be included for 1871-1918. There exist neither population nor birth statistics prior to 1861 for the territories ceded by Italy. Their population, according to the French census of April/May, 1861, was 669,059 (see *Résultats Généraux du Dénombrement de 1861*, p. xi). We have

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here assumed that the mean population in the four quinquennial periods from 1841-45 to 1856-60 was 593,000, 614,000, 635,000, and 657,000, and that the birth rate all the time was 35. As to Alsace-Lorraine, the mean population and the births for 1871-1910 have been taken from *Statistik des Deutschen Reichs*, Vol. 240, p. [132]. The mean population for 1911-16 has been taken from *Statistik des Deutschen Reichs*, Vol. 256, p. 4, Vol. 266, p. 4, Vol. 275, p. 4, Vol. 276, pp. 4, 134, 264; the mean population for 1917-18, in accordance with Vol. 276, pp. xxii, (4), (116), has been assumed to have been the same as in 1916; the births for 1911-16 have been taken from Vol. 275, pp. 13*, 17*, Vol. 307, pp. 9*, 12*; the births for 1917 and 1918 have been assumed to have been, as in 1915-16, $\frac{1}{48}$ of the births in all Germany.

Germany. The official statistics (*Statistik des Deutschen Reichs*, Vol. 44, p. 2, Vol. 240, p. [110], *Statistisches Jahrbuch für das Deutsche Reich 1927*, pp. 8, 28, *Wirtschaft und Statistik*, 1928, pp. 114, 380) give the mean population for 1841-1926, the yearly births for 1841-1927, and the yearly birth rates for 1871-1927, all data being given for 1841-1870 also by quinquennial periods. The population data for 1841-1918 refer to the pre-war territory, those for 1919 to the pre-war territory without Alsace-Lorraine and the part of the province of Posen ceded to Poland. Those for 1920 and 1921 are as for 1919 but without the Memel Territory, the Free City of Danzig, the territories ceded to Poland without plebiscite, to Czechoslovakia, Denmark, and Belgium. Those for 1922-27 are as for 1920-21, but without the part of Upper-Silesia ceded to Poland according to the note of the Ambassadors' Conference of October 20, 1921. Since Alsace-Lorraine belonged to France until 1871, and since the Saar Territory has been at least temporarily separated from Germany through the Treaty of Versailles, this series of population data refers only to the territory

of the years specified for 1871-1919. The *Statistical Yearbook 1927* (p. 8) contains, however, another series of population data for 1920-26 excluding the Saar Territory, and this series, then, refers to the territory of the time specified and for 1922-26 also to the present territory. The birth figures for 1841-1916 and the birth rates for 1871-1916 refer to the territory of the corresponding period, and, therefore, exclude the Island of Helgoland for 1871-90; from 1917 on, they are exclusive of Alsace-Lorraine; for 1919-20 they correspond to the first, and for 1921-26 to the second series of population data. This series of births and birth rates, then, refers for 1871-1916, 1919, and 1921-27 to the territory of the time in question, which for 1922-27 coincides with the present territory.

In order to establish a continuous series from 1841 to 1927 for the territory of the time specified, first of all, Alsace-Lorraine had to be excluded for 1841-70. It may perhaps appear altogether preposterous to speak of a "Germany" before the Empire was founded, yet for statistical purposes it seems justifiable to anticipate for 1841-70 the later Empire, only excluding Alsace-Lorraine which during that whole period belonged to France. The mean population and the births of "the territory of the time specified" were then computed for 1841-70 by deducting from the official figures the mean population and the births in Alsace-Lorraine (see *Statistik des Deutschen Reichs*, Vol. 44, p. 48), the birth rates being then arrived at by relating the births to the mean population. The mean population for 1871-1926 and the births and the birth rates for 1871-1916, 1919, and 1921-27 were taken from the official sources. The births for 1917-18 were arrived at by adding for Alsace-Lorraine $\frac{1}{47}$ of the figures in *Statistical Yearbook 1927*, p. 28; the births for 1920 by deducting the births in the Saar Territory (see *Bericht des Statistischen Amtes des Saargebietes*, Vol. V, p. 39).

In order to establish a continuous series from 1841 to 1927

for the present territory a great mass of computations would be necessary since the territory of the time considered coincides for 1922-27 only with the present territory, and since boundaries have changed materially. The German Statistical Office (*Statistik des Deutschen Reichs*, Vol. 336, p. 1) has estimated the number of births in the present territory for 1913 and 1919-21. These figures were taken as they were for 1919-21. As to the mean population of the present territory, we have estimated it for 1919 at 59,500,000 and for 1920-21 at 60,500,000. For the periods preceding 1919, it would have been necessary first to include for 1841-90 the Island of Helgoland, second to exclude for 1871-1918 Alsace-Lorraine and for 1841-1918 the other territories ceded as a consequence of the Treaty of Versailles as well as the Saar Territory. The population of Helgoland, when the island came to Germany, was so small (2,000 inhabitants) that it could be altogether neglected. The exclusion of Alsace-Lorraine was carried out along the lines described above (see France). For the territories ceded to Poland, to the Free City of Danzig, to the Memel Territory, and to Czechoslovakia, the necessary deductions, unfortunately, could not be effected in a clean-cut manner, since no separate statistics are available for those territories for the time preceding their cession. A rather crude method had, therefore, to be applied in estimating their population and births for 1841-1918. In 1910, according to the census, the total population of those territories amounted to 4,375,275 or 6.74 per cent of the total population of Germany (64,925,993). If this percentage had stayed the same for the whole period under consideration and if the birth rate had been all the time the same in the ceded districts as in the remainder of Germany, all that would be necessary would be to deduct for each year 6.74 per cent from the population and from the number of births of Germany. But the percentage of the population living in those districts

had been considerably larger in former times, and their birth rate always was especially high. No uniform percentage, therefore, can be applied either to the basic population nor to the births. It then becomes necessary to first ascertain in which provinces the ceded districts were located.

PROVINCE	POPULATION 1910		
	TOTAL	IN CEDED TERRITORY	PER CENT
East Prussia	2,064,175	166,025	8.04
West Prussia	1,703,474	1,295,334	76.04
Pomerania	1,716,921	224	0.01
Posen	2,099,831	1,946,461	92.70
Silesia	5,225,962	967,231	18.51

Pomerania can be neglected, since the ceded district was quite unimportant. As to the other four provinces, we have assumed that the ceded districts comprised always the same percentage of the population of the province to which they belonged as in 1910, and that the birth rate was always the same in the ceded district as in the entire province. The following percentages were then deducted from the population and from the number of births in Germany (including Alsace-Lorraine):

PERIOD	POPULATION	BIRTHS
1841-50	7.8	9.2
1851-60	7.9	9.3
1861-70	8.0	9.3
1871-80	7.9	8.8
1881-90	7.6	8.6
1891-1900	7.2	8.3
1901-10	6.9	8.1
1911-18	6.7	8.1

As to the Saar Territory, the population for December 1, 1910, could be taken from the German official statistics (see *Statistisches Jahrbuch für das Deutsche Reich 1927*, p. 10) and the population of December 31, 1911–1918 as well as the births in 1911–18 from the Saar Territory's official statistics (see Saar Territory). The mean population has been computed from the official figures (by assuming for 1911 that it was equal to the average of the population on December 1, 1910, and December 31, 1911). But no attempt has been made to make any deduction for the Saar Territory in 1841–1910. The same is true for the territories ceded to Belgium and Denmark. The population of Eupen and Malmedy, being 60,003 on December 1, 1910, and 60,213 on December 31, 1920, has been assumed to have been 60,000 in each year from 1911 to 1918, while the birth rate has been estimated equal to that of the whole province of Rhineland. The population of the part of Sleswig ceded to Denmark, being 166,348 on December 1, 1910, and 163,622 on February 1, 1921, has been assumed to have been 167,000 in 1911–14 and 165,000 in 1915–18 while the birth rate has been estimated equal to that of the whole province of Sleswig.

The reader should then keep in mind that the data for the mean population and the births in the "present territory" of Germany are not altogether homogeneous: they include for 1841–1910 the Saar Territory and the districts ceded to Belgium and Denmark, i.e. territories with 878,000 inhabitants at the end of that period.

Saar Territory. The official statistics (see *Bericht des Statistischen Amtes des Saargebietes*, Vol. V, p. 39) give the population on December 31, 1911–26, the yearly births and the yearly birth rates for 1911–26. All data refer to the present territory. The Saar Territory has not been included in the tables as a separate country, but the data have been used in computing the population and the births in the

present territory of Germany for 1911-18 and in Western Europe for 1919-26.

Holland. The official statistics (see *Jaarcijfers over 1887 en vorige Jaren*, p. 8; *Jaarcijfers voor het Koninkrijk der Nederlanden Rijk in Europa 1904*, p. 8, 1915, p. 11; *Jaarcijfers voor Nederland 1923-1924*, p. 11, 1927, p. 13) give the mean population, the yearly births, and the yearly birth rates for 1870-1927. Methorst¹⁵ gives the yearly birth rates from 1840 on. The mean population, the births and the birth rates by quinquennial periods are to be found in *Statistique Internationale du Mouvement de la Population*, Vol. I, pp. 156, 162, 165. All data refer to the territory corresponding to the respective years, which for the entire period coincides with the present territory.

For 1841-70 the mean population and the births have been taken from *Statistique Internationale du Mouvement*, the yearly birth rates from Methorst; the birth rates by quinquennial periods have been computed by taking the average of the birth rates given by Methorst, which do not altogether agree with those in *Statistique Internationale du Mouvement*, Vol. I, p. 33. For 1871-1927 the mean population, the births, and the yearly birth rates have been taken from *Jaarcijfers*; the birth rates by periods have been computed by relating the total births to the sum of the mean populations of all years covered by the period.

Luxemburg. The official statistics (see *Note Statistique, Extrait de L' "Annuaire Officiel 1928,"* p. 6) give the yearly births and the yearly birth rates for 1891-1926. The data refer to the territory corresponding to the respective period coinciding uniformly with the present territory.

In order to include Luxemburg in the table covering Western and Northern Europe, other sources and some estimates had

¹⁵ Methorst, H. W. (director of the central statistical bureau of Holland), "Results of Differential Birth Rate in the Netherlands" in *Proceedings of the World Population Conference 1927*, p. 173,

to be resorted to. The mean population by quinquennial periods for 1841-1900 has been taken from Sundbärg's *Aperçus Statistiques Internationaux*, p. 37, the mean population for 1901-1910 from *Statistique Internationale du Mouvement de la Population*, Vol. II, p. 14. According to the censuses of December 1, 1910 and 1916, the population was 259,891 and 263,824; for December 31, 1921, the International Statistical Office has estimated the population at 261,236. We have here assumed that the mean population was 262,000 in 1911-14, 263,000 in 1915-19, and 261,000 in 1920-21. For the years 1922-27, the mean population has been computed from the estimates for December 31, 1921 to 1926, published in *Aperçu 1927*, p. 18, and *Bulletin Mensuel* (published by the International Statistical Institute), May 1928, p. 45.

The births for 1891-1926 were taken from the official statistics, those for 1927 from *Bulletin Mensuel*, August 1927, p. 89, November 1927, p. 45, February 1928, p. 45, May 1928, p. 45. For 1841-90, the births were estimated by assuming that the birth rate was equal to that of Belgium.

In view of the small size of the country, no separate birth rates are given, all data being used only for computing birth rates by periods in Western and Northern Europe.

Norway. The official statistics (see *Statistiske Oversikter 1926*, pp. 4-9; *Statistisk Årbok for Kongeriket Norge 1926 og 1927*, pp. 4, 16-17; *Statistiske Meddelelser 1928*, pp. 90-92) give the population on July 1, by years for 1735-1925 and by quinquennial periods for 1735-1925 as well as the population on December 31, 1925, 1926, and 1927; the births and the birth rates by years for 1735-1927 and by quinquennial periods for 1735-1925. The data refer to the territory corresponding to the respective period coinciding uniformly with the present territory.

The mean population for 1735-1925 by years and for 1735-

1910 by periods, the births and the birth rates for 1735-1927 by years and for 1735-1910 by periods have been taken as they were from the official statistics. The mean population for 1926 and 1927 has been computed from the official figures for December 31, 1925-27. The birth rates by periods for 1911-25 have been computed by relating the total births to the sum of the mean populations of all years covered by the period.

Sweden. The official statistics (*Statistisk Årsbok för Sverige 1922*, pp. 30-32, *1927*, pp. 47-48) give the mean population, the births, and the birth rates by years for 1749-1926 and by periods for 1749-1925. The data refer to the territory corresponding to the respective period coinciding uniformly with the present territory.

All data were taken as they were from the official statistics, the birth rates by periods for 1911-25 having been computed by relating the total births to the sum of the mean populations of all years covered by the period.

Switzerland. The official statistics (see *Schweizerische Statistik*, 112. *Lieferung*, pp. 7*, 68, 158. *Lieferung*, pp. 8*-9*, 170. *Lieferung*, p. 65*; *Statistisches Jahrbuch der Schweiz 1909*, p. 17, *1926*, pp. 46-48; *Bulletin des Eidgenössischen Gesundheitsamtes 1928*, p. 111) give the population for the middle of the decades from 1831 to 1870, the mean population by years for 1851-1926 and by quinquennial periods for 1851-1910; the approximate number of births, including still-births, by years and by quinquennial periods for 1836-70, and the live-births by years for 1870-1927 and by quinquennial periods for 1871-1910; the birth rates (including still-births) by years and by quinquennial periods for 1851-70, the live-birth rates by years for 1870-1926 and by quinquennial periods for 1871-1910. The data refer to the territory of the respective years embraced, coinciding throughout the period with the present territory.

The mean population for 1851-1910, and the births and the

birth rates for 1870-1926 were taken as they were from the official statistics, the birth rates by periods for 1911-25 having been computed by relating the total live-births to the sum of the mean populations of all years covered by the period. All other data necessary to include Switzerland in the tables covering Western and Northern Europe had to be arrived at by estimates of our own. The population of Switzerland, according to the census statistics, was 2,190,258 in January/February, 1837, and 2,392,740 on March 18-23, 1850. The Statistical Office of Switzerland has estimated the population for the middle of 1841-50 at 2,320,729. We have here assumed that the mean population in 1841-45 was 2,285,000 and in 1846-50 2,361,000. As to the number of live-births in 1841-69, it has been assumed that they constituted 95 per cent of all births.

Aside from the birth rates of the individual countries, we have given in the text (pages 9-10) birth rates for the whole of Western and Northern Europe. The computation of such birth rates which, as has been explained (pages 14-15), tends to eliminate divergencies occurring in smaller countries, is very easy whenever the *combined* countries comprise the same territory all the time. Changes in the frontiers of the individual countries can indeed be neglected as long as the boundaries of the aggregate territory of the group do not change. The computation of the yearly birth rate of Western and Northern Europe from 1870 to 1914 (see page 10) does not then present any inconvenience. But the problem becomes much more difficult if one attempts to make the computation for the post-war period. The cessions of German territory to Belgium, Denmark, and France may again be neglected, since it would not influence the final result whether those territories appear in the total of Germany or in the total of any other country of the group. But the territories ceded in the

East must be accounted for in some way. They must either be added to the group for the post-war period or they must be deducted for all former years. Since these territories belong rather to Eastern Europe than to Western Europe, it was deemed proper to make the necessary deductions for the former years, which is to consider the present eastern frontiers of Germany as the eastern frontiers of Western Europe for the entire period under consideration. It might then seem that it would suffice to add the population and the births of the countries of Western and Northern Europe, as given in the tables pp. 98-101, taking for France and Germany the figures for the present territory. But such a total would not include Eupen and Malmedy for 1911-19, the part of the province of Sleswig ceded to Denmark for 1911-19, nor the Saar Territory for 1911-26. In order to account for this deficiency we have supplemented the figures for 1911-18 according to the method described on page 88. We have further assumed that the population of Eupen and Malmedy, which on December 31, 1920 was 60,213, had been 60,000 in 1919; and that the population of the part of Sleswig ceded to Denmark which on February 1, 1921 was 163,622, had been 163,000 in 1919. As to the birth rates in 1919 we have assumed them to be equal to those for Rhineland and for Sleswig, namely, 20.3 and 18.3 respectively. As to the Saar Territory, we have computed the mean population and have taken the births from *Bericht des Statistischen Amtes des Saargebietes*, Vol. V, p. 39. All those items have been included in the table on page 9.

94 THE BALANCE OF BIRTHS AND DEATHS

YEARLY BIRTH RATES, 1735-1927

1. 1735-1815

YEAR	FIN- LAND	NOR- WAY	SWEDEN	YEAR	DEN- MARK	FIN- LAND	FRANCE	NOR- WAY	SWEDEN
1735	—	29.4	—	1776	—	39.0	—	28.8	32.9
1736	—	30.7	—	1777	—	40.1	—	31.3	33.0
1737	—	30.5	—	1778	—	42.7	—	31.2	34.8
1738	—	28.1	—	1779	—	43.2	—	30.2	36.7
1739	—	30.9	—	1780	—	41.2	—	32.5	35.7
1740	—	29.6	—	1781	—	37.7	—	31.5	33.5
1741	—	27.1	—	1782	—	41.7	—	30.9	32.0
1742	—	26.3	—	1783	—	40.0	—	27.7	30.3
1743	—	28.5	—	1784	—	42.7	—	30.5	31.5
1744	—	30.1	—	1785	—	39.8	—	28.9	31.4
1745	—	32.8	—	1786	—	39.9	—	30.6	32.9
1746	—	28.2	—	1787	—	40.4	—	29.3	31.5
1747	—	33.0	—	1788	—	36.1	—	30.8	33.9
1748	—	32.9	—	1789	—	34.2	—	30.7	32.0
1749	—	33.0	33.8	1790	—	37.0	—	32.1	30.5
1750	—	30.6	36.4	1791	—	36.0	—	32.7	32.6
1751	44.3	35.0	38.7	1792	—	42.2	—	34.7	36.6
1752	44.7	33.5	35.9	1793	—	43.8	—	34.0	34.4
1753	44.1	34.8	36.1	1794	—	41.4	—	33.7	33.8
1754	46.4	35.3	37.2	1795	—	42.1	—	32.4	32.0
1755	46.9	33.5	37.5	1796	—	39.7	—	31.6	34.7
1756	45.8	36.1	36.1	1797	—	41.2	—	32.8	34.8
1757	43.3	34.5	32.6	1798	—	38.6	—	32.3	33.7
1758	42.3	33.6	33.4	1799	—	38.7	—	32.6	32.0
1759	44.5	32.3	33.6	1800	29.9	37.6	—	—	28.7
1760	46.6	34.9	35.7	1801	31.1	39.6	—	27.7	30.0
1761	45.8	35.9	34.8	1802	32.2	39.2	—	27.6	31.7
1762	41.3	35.8	35.1	1803	33.1	35.6	—	28.9	31.4
1763	43.0	34.5	35.0	1804	32.2	39.1	—	27.7	31.9
1764	45.7	35.8	34.7	1805	32.8	38.4	—	29.2	31.7
1765	42.9	34.5	33.4	1806	30.2	35.7	31.4	29.6	30.8
1766	41.5	34.0	33.8	1807	31.0	36.2	31.8	29.0	31.2
1767	40.7	35.1	35.4	1808	30.6	30.4	31.3	26.9	30.4
1768	42.9	32.8	33.6	1809	29.3	28.6	32.0	22.2	26.7
1769	42.4	33.7	33.1	1810	30.3	40.5	31.8	26.3	32.9
1770	40.9	32.1	33.0	1811	30.5	36.4	31.6	26.7	35.3
1771	38.0	31.6	32.2	1812	29.8	38.9	30.1	29.1	33.6
1772	37.6	28.2	28.9	1813	29.1	35.6	30.5	25.6	29.7
1773	37.9	25.0	25.5	1814	30.4	36.7	33.9	24.2	31.2
1774	40.3	28.3	34.5	1815	34.1	37.5	32.5	29.9	34.8
1775	40.4	33.8	35.6						

BIRTHS AND BIRTH RATES

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2. 1816-1854

YEAR	BELGIUM	DENMARK	ENGLAND AND WALES	FINLAND	FRANCE	GERMANY	HOLLAND	NORWAY	SWEDEN
1816	—	32.9	—	38.8	32.9	—	—	35.1	35.3
1817	—	32.8	—	39.0	31.8	—	—	32.5	33.4
1818	—	32.1	—	38.4	30.6	—	—	30.8	33.8
1819	—	32.5	—	36.1	32.9	—	—	31.9	33.0
1820	—	31.5	—	36.6	31.7	—	—	33.3	33.0
1821	—	32.1	—	41.4	31.7	—	—	34.7	35.4
1822	—	33.7	—	35.6	31.7	—	—	32.9	35.9
1823	—	32.6	—	40.3	31.2	—	—	33.9	36.8
1824	—	31.3	—	37.8	31.6	—	—	32.5	34.6
1825	—	31.3	—	38.5	31.0	—	—	34.3	36.5
1826	—	31.4	—	37.6	31.4	—	—	34.8	34.8
1827	—	29.2	—	36.7	30.8	—	—	32.0	31.3
1828	—	30.3	—	39.3	30.5	—	—	31.8	33.6
1829	—	29.6	—	38.7	30.0	—	—	33.6	34.9
1830	—	28.9	—	36.6	29.9	—	—	32.3	32.9
1831	33.1	29.7	—	35.2	30.3	—	—	31.0	30.5
1832	31.5	27.0	—	34.5	28.6	—	—	29.9	30.9
1833	33.4	32.2	—	30.2	29.5	—	—	30.7	34.1
1834	33.5	33.0	—	36.6	29.8	—	—	31.7	33.7
1835	34.0	31.7	—	34.3	29.9	—	—	32.6	32.7
1836	34.1	30.5	—	31.1	29.2	—	—	29.4	31.8
1837	33.5	30.0	—	31.6	28.0	—	—	28.7	30.8
1838	35.4	29.8	30.3	31.8	28.5	—	—	27.7	29.4
1839	33.8	29.0	31.7	33.7	28.2	—	—	26.7	29.5
1840	34.1	30.4	31.8	34.7	27.9	—	35.1	27.8	31.4
1841	33.6	29.7	32.2	34.0	28.5	36.6	35.5	29.8	30.3
1842	32.5	30.1	32.1	37.2	28.5	37.8	34.2	30.7	31.7
1843	31.7	29.8	32.3	35.8	28.2	36.2	33.8	30.2	30.8
1844	31.6	30.3	32.6	35.0	27.5	36.0	34.4	29.9	32.2
1845	32.0	30.6	32.5	35.7	27.9	37.5	34.2	31.2	31.5
1846	27.7	30.1	33.8	33.2	27.3	36.2	31.4	31.1	29.9
1847	27.2	30.6	31.5	33.9	25.4	33.6	28.6	30.8	29.6
1848	27.7	30.6	32.4	36.5	26.5	33.5	30.1	29.7	30.3
1849	30.5	31.0	32.9	37.5	27.7	38.5	34.2	32.0	32.8
1850	29.8	31.4	33.4	35.7	26.8	37.4	34.4	31.0	31.9
1851	30.2	30.1	34.2	38.2	27.1	36.9	34.7	31.9	31.7
1852	29.9	33.2	34.2	35.0	26.8	35.7	35.0	31.0	30.7
1853	28.2	31.6	33.3	35.1	26.0	34.9	32.7	32.0	31.4
1854	28.9	32.7	34.1	37.5	25.5	34.3	32.4	34.2	33.5

3. 1855-1894

YEAR	BELGIUM	DENMARK	ENGLAND AND WALES	SCOTLAND	IRELAND	FINLAND	FRANCE	GERMANY	HOLLAND	NORWAY	SWEDEN	SWITZER- LAND
1855	27.4	31.9	33.7	31.3	—	35.8	25.0	32.5	31.6	33.4	31.7	—
1856	29.4	32.4	34.4	34.0	—	36.3	26.3	33.7	32.3	32.2	31.5	—
1857	31.5	32.9	34.4	34.3	—	32.8	25.9	36.3	34.2	33.0	32.4	—
1858	31.5	33.2	33.7	34.4	—	36.5	26.7	37.1	32.0	33.5	34.8	—
1859	32.2	33.6	35.0	35.0	—	35.8	27.9	37.7	34.7	34.8	35.0	—
1860	30.8	32.6	34.3	35.6	—	36.4	26.2	36.6	31.9	33.3	34.8	—
1861	31.0	31.6	34.6	34.9	—	37.8	26.9	35.9	35.4	30.7	32.6	—
1862	30.3	30.8	35.0	34.6	—	37.3	26.5	35.6	33.2	32.1	33.4	—
1863	32.0	30.9	35.3	35.0	—	36.2	26.9	37.7	36.3	32.7	33.6	—
1864	31.7	30.1	35.4	35.6	24.2	39.3	26.6	38.1	35.6	31.9	33.6	—
1865	31.5	31.1	35.4	35.5	25.9	34.2	26.5	37.9	36.1	31.9	32.8	—
1866	32.2	32.0	35.2	35.4	26.5	32.0	26.4	38.1	35.4	31.7	33.1	—
1867	32.3	30.3	35.4	35.1	26.3	32.3	26.4	37.0	35.4	30.1	30.8	—
1868	31.7	31.0	35.8	35.3	26.7	24.6	25.7	37.1	34.9	29.5	27.5	—
1869	31.8	29.3	34.8	34.3	26.7	33.7	26.0	38.0	34.3	28.9	28.2	—
1870	32.6	30.3	35.2	34.6	27.7	36.3	25.9	38.7	36.1	29.2	28.8	29.8
1871	31.1	30.1	35.0	34.5	28.1	37.3	22.9	34.5	35.4	29.3	30.4	29.0
1872	32.5	30.3	35.6	34.9	27.8	36.4	26.7	39.5	36.0	30.0	30.0	29.8
1873	32.7	30.8	35.4	34.8	27.1	37.0	26.0	39.7	36.2	29.9	30.8	29.7
1874	32.9	30.9	36.0	35.6	26.6	37.9	26.2	40.1	36.4	31.0	30.8	30.4
1875	32.7	31.9	35.4	35.2	26.1	36.6	25.9	40.6	36.5	31.5	31.2	31.8
1876	32.9	32.6	36.3	35.6	26.4	36.7	26.2	40.9	37.1	31.5	30.8	32.8
1877	32.6	32.3	36.0	35.3	26.2	38.2	25.5	40.0	36.5	31.7	31.1	32.0
1878	31.7	31.6	35.6	34.9	25.1	35.4	25.2	38.9	36.1	31.5	29.8	31.3
1879	31.7	31.9	34.7	34.3	25.2	37.8	25.1	38.9	36.6	32.1	30.5	30.5
1880	31.1	31.7	34.2	33.6	24.7	36.5	24.6	37.6	35.5	30.9	29.4	29.6
1881	31.6	32.2	33.9	33.7	24.5	35.0	24.9	37.0	35.0	30.0	29.1	29.8
1882	31.4	32.3	33.8	33.5	24.0	36.3	24.8	37.2	35.3	30.6	29.4	28.9
1883	30.7	31.8	33.5	32.8	23.5	35.9	24.8	36.6	34.3	31.0	28.9	28.5
1884	30.7	33.3	33.6	33.7	23.9	36.1	24.7	37.2	34.9	31.6	30.0	28.3
1885	30.1	32.5	32.9	32.7	23.5	34.2	24.3	37.0	34.4	31.5	29.4	27.7
1886	29.8	32.4	32.8	32.9	23.2	35.3	23.9	37.1	34.6	30.9	29.8	27.8
1887	29.5	31.7	31.9	31.8	23.1	36.2	23.5	36.9	33.7	31.4	29.7	27.9
1888	29.3	31.5	31.2	31.3	22.8	34.9	23.1	36.6	33.7	30.4	28.8	27.7
1889	29.3	31.2	31.1	30.9	22.7	33.4	23.0	36.4	33.2	29.6	27.7	27.6
1890	29.0	30.5	30.2	30.4	22.3	32.9	21.8	35.7	32.9	30.4	28.0	26.6
1891	29.8	31.0	31.4	31.2	23.1	34.3	22.6	37.0	33.7	30.8	28.3	28.2
1892	28.8	29.6	30.4	30.7	22.5	31.5	22.3	35.7	32.0	29.6	27.0	27.7
1893	29.4	30.8	30.7	30.8	23.0	29.9	22.8	36.8	33.8	30.3	27.4	27.9
1894	28.8	30.4	29.6	29.9	23.0	30.8	22.3	35.9	32.7	29.6	27.1	27.3

4. 1895-1927

YEAR	BELGIUM	DEN- MARK	ENGLAND AND WALES	SCOT- LAND	NORTH- ERN IRELAND	IRISH FREE STATE	IRELAND (Total)	FINLAND	FRANCE	GER- MANY	HOL- LAND	NOR- WAY	SWEDEN	SWITZER- LAND
1895	28.7	30.3	30.3	30.0	—	—	23.3	32.6	21.7	36.1	32.8	30.4	27.5	27.3
1896	29.2	30.5	29.6	30.4	—	—	23.7	32.1	22.5	36.3	32.7	30.0	27.2	28.1
1897	29.2	29.8	29.6	30.0	—	—	23.5	31.9	22.3	36.0	32.5	30.0	26.7	28.3
1898	28.8	30.2	29.3	30.1	—	—	23.3	34.0	21.8	36.1	31.9	30.3	27.1	28.5
1899	29.0	29.7	29.1	29.8	—	—	23.1	33.2	21.9	35.9	32.1	29.9	26.4	29.0
1900	28.8	29.7	28.7	29.6	—	—	22.7	32.0	21.4	35.6	31.6	29.7	27.0	28.6
1901	29.7	29.7	28.5	29.5	—	—	22.7	32.5	22.0	35.7	32.3	29.8	27.0	29.0
1902	28.6	29.2	28.5	29.3	—	—	23.0	31.5	21.6	35.1	31.8	29.2	26.5	28.5
1903	27.7	28.7	28.5	29.4	—	—	23.1	30.4	21.1	33.8	31.6	28.6	25.7	27.4
1904	27.3	28.9	28.0	29.1	—	—	23.6	31.8	20.9	34.0	31.4	27.9	25.7	27.3
1905	26.3	28.4	27.3	28.6	—	—	23.4	30.5	20.6	33.0	30.8	27.1	25.7	26.9
1906	25.9	28.5	27.2	28.6	—	—	23.5	31.3	20.5	33.1	30.4	26.8	25.7	26.9
1907	25.4	28.2	26.5	27.7	—	—	23.2	31.2	19.7	32.3	30.0	26.3	25.5	26.2
1908	25.0	28.6	26.7	28.1	—	—	23.3	30.7	20.1	32.1	29.7	26.3	25.7	26.4
1909	23.8	28.2	25.8	27.3	—	—	23.4	31.2	19.5	31.0	29.1	26.7	25.6	25.5
1910	23.7	27.5	25.1	26.2	—	—	23.3	30.1	19.6	29.8	28.6	25.8	24.7	25.0
1911	23.0	26.7	24.4	25.6	—	—	23.2	29.1	18.7	28.6	27.9	25.7	24.0	24.2
1912	22.7	26.6	24.0	25.9	24.3	22.7	23.1	29.1	19.0	28.3	28.1	25.4	23.8	24.2
1913	22.5	25.6	24.1	25.5	24.0	22.6	23.0	27.2	18.8	27.5	28.3	25.0	23.2	23.2
1914	20.4	25.6	23.8	26.1	23.9	22.3	22.8	26.9	17.8	26.8	28.3	25.1	22.9	22.4
1915	16.1	24.2	21.8	23.9	23.2	22.0	22.3	25.4	11.6	20.4	26.3	23.6	21.6	19.5
1916	12.9	24.4	21.0	22.9	22.1	21.1	21.4	24.1	9.4	15.2	26.6	24.2	21.2	18.9
1917	11.3	23.7	17.8	20.3	20.7	20.0	20.2	24.3	10.4	13.8	26.2	25.1	20.9	18.5
1918	11.2	24.1	17.7	20.5	21.6	19.9	20.4	23.8	12.2	14.2	25.3	24.6	20.3	18.7
1919	16.3	22.6	18.5	22.0	22.0	19.9	20.5	19.2	13.0	20.0	24.6	22.7	19.8	18.6
1920	21.9	25.3	25.5	28.1	25.9	21.6	22.8	25.3	21.3	25.9	28.6	26.1	23.6	20.9
1921	22.0	24.0	22.4	25.2	23.6	19.7	20.8	24.3	20.7	25.3	27.7	24.0	21.5	20.8
1922	20.5	22.2	20.4	23.5	23.3	19.5	20.6	23.4	19.3	22.9	26.1	23.1	19.6	19.6
1923	20.6	22.3	19.7	22.8	23.9	20.5	21.5	23.7	19.1	21.0	26.2	22.5	18.8	19.4
1924	20.1	21.8	18.8	21.9	22.7	21.1	21.6	22.4	18.7	20.5	25.1	21.0	18.1	18.4
1925	19.8	21.0	18.3	21.3	22.0	20.8	21.2	22.3	18.9	20.7	24.2	19.5	17.5	18.8
1926	19.0	20.5	17.8	20.9	22.5	20.6	21.2	21.7	18.8	19.5	23.8	19.7	16.9	18.2
1927	—	19.6	16.7	19.8	21.3	20.3	20.6	—	18.1	18.3	23.1	18.8	—	—

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MEAN POPULATION BY PERIODS, 1735-1927
(in thousands)

PERIOD	BELGIUM	DEN- MARK	FAROE ISLANDS, ICELAND	ENGLAND AND WALES	SCOT- LAND	IRELAND	ISLANDS IN THE BRITISH SEAS	FINLAND
1735	—	—	—	—	—	—	—	—
1736-40	—	—	—	—	—	—	—	—
1741-45	—	—	—	—	—	—	—	—
1746-50	—	—	—	—	—	—	—	—
1751-55	—	—	—	—	—	—	—	441
1756-60	—	—	—	—	—	—	—	473
1761-65	—	—	—	—	—	—	—	510
1766-70	—	—	—	—	—	—	—	543
1771-75	—	—	—	—	—	—	—	584
1776-80	—	—	—	—	—	—	—	632
1781-85	—	—	—	—	—	—	—	672
1786-90	—	—	—	—	—	—	—	699
1791-95	—	—	—	—	—	—	—	732
1796-1800	—	925 ^a	—	—	—	—	—	804
1801-05	—	943	—	—	—	—	—	866
1806-10	—	984	—	—	—	—	—	886
1811-15	—	1,014	—	—	—	—	—	1,034
1816-20	—	1,069	—	—	—	—	—	1,140
1821-25	—	1,136	—	—	—	—	—	1,220
1826-30	—	1,198	—	—	—	—	—	1,304
1831-35	4,136	1,222	—	—	—	—	—	1,378
1836-40	4,170	1,269	—	15,511 ^d	—	—	—	1,409
1841-45	4,194	1,329	66	16,333	2,683	8,246	129	1,496
1846-50	4,355	1,397	67	17,358	2,822	7,617	138	1,590
1851-55	4,528	1,475	71	18,405	2,938	6,230	143	1,668
1856-60	4,614	1,571	75	19,472	3,026	5,893	143	1,708
1861-65	4,862	1,670	77	20,629	3,127	5,703	144	1,795
1866-70	4,949	1,759	79	21,952	3,276	5,469	144	1,787
1871-75	5,225	1,839	81	23,413	3,441	5,335	144	1,845
1876-80	5,445	1,937	83	25,038	3,629	5,263	142	1,986
1881-85	5,687	2,033	84	26,630	3,799	5,037	143	2,132
1886-90	5,994	2,142	84	28,140	3,944	4,808	146	2,295
1891-95	6,235	2,231	87	29,765	4,122	4,614	149	2,449
1896-1900	6,610	2,370	91	31,522	4,345	4,512	150	2,622
1901-05	6,937	2,518	95	33,297	4,536	4,421	150	2,804
1906-10	7,337	2,669	99	35,063	4,680	4,389	149	3,006
1911-14	7,564	2,818	105	36,501	4,742	4,357	149	3,193
1915-19	7,646	2,971	111	37,417	4,802	4,291	150	3,320
1920-21	7,528	3,264	115	37,706	4,873	4,358	150	3,366
1922-23	7,601	3,339	118	38,281	4,903	4,282	151	3,436
1924-25	7,742	3,407	121	38,818	4,888	4,253	151	3,497
1926	7,843	3,452	124	39,067	4,897	4,224	151	3,542
1927	—	3,475	—	39,290	4,895	4,211	—	—

(1) Territory of the respective period.

(2) Present territory.

BIRTHS AND BIRTH RATES

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MEAN POPULATION BY PERIODS, 1735-1927 (in thousands)

FRANCE (1)	FRANCE (2)	GER- MANY (1)	GER- MANY (2)	HOLLAND	LUXEM- BURG	NORWAY	SWEDEN	SWITZER- LAND
—	—	—	—	—	—	607	—	—
—	—	—	—	—	—	621	—	—
—	—	—	—	—	—	607	—	—
—	—	—	—	—	—	618	1,766 ^a	—
—	—	—	—	—	—	637	1,828	—
—	—	—	—	—	—	670	1,896	—
—	—	—	—	—	—	701	1,952	—
—	—	—	—	—	—	721	2,012	—
—	—	—	—	—	—	735	2,018	—
—	—	—	—	—	—	751	2,066	—
—	—	—	—	—	—	778	2,139	—
—	—	—	—	—	—	792	2,178	—
—	—	—	—	—	—	823	2,238	—
—	—	—	—	—	—	863 ^b	2,328	—
—	—	—	—	—	—	887	2,381	—
29,186	—	—	—	—	—	905	2,420	—
29,354	—	—	—	—	—	903	2,425	—
29,874	—	—	—	—	—	945	2,530	—
30,938	—	—	—	—	—	1,013	2,670	—
32,010	—	—	—	—	—	1,093	2,834	—
32,904	—	—	—	—	—	1,163	2,945	—
33,808	—	—	—	—	—	1,223	3,083	—
34,680	35,273	32,097	29,474	2,972	180	1,286	3,224	2,285
35,514	36,128	33,356	30,633	3,058	187	1,364	3,389	2,361
36,026	36,661	34,377	31,538	3,175	190	1,442	3,558	2,429
36,368	37,025	35,331	32,417	3,285	193	1,546	3,727	2,484
—	37,700	37,193	34,091	3,432	199	1,649	3,993	2,549
—	38,294	38,683	35,462	3,586	200	1,722	4,166	2,630
36,364	37,910	41,641	36,805	3,702	202	1,771	4,274	2,715
37,156	38,709	44,104	39,067	3,949	207	1,876	4,500	2,803
37,860	39,426	46,039	40,974	4,198	211	1,927	4,605	2,874
38,306	39,892	48,176	42,929	4,466	212	1,977	4,742	2,929
38,394	40,016	50,825	45,544	4,706	217	2,043	4,832	3,039
38,744	40,427	54,405	48,805	5,026	230	2,172	5,032	3,226
39,114	40,884	58,612	52,798	5,387	243	2,285	5,214	3,429
39,375	41,221	62,863	56,680	5,778	253	2,349	5,406	3,647
39,726	41,626	66,568	59,330	6,106	262	2,436	5,601	3,839
38,040	39,567	66,535	60,011	6,583	263	2,550	5,770	3,880
—	39,220	61,424	60,500	6,871	261	2,653	5,903	3,880
—	39,650	—	61,516	7,091	262	2,713	5,984	3,897
—	40,460	—	62,251	7,315	267	2,753	6,033	3,927
—	40,790	—	62,851	7,472	270	2,781	6,064	3,959
—	40,960	—	—	7,576	278	2,794	—	—

^a 1749-50 only.

^b 1796-99 only.

^c 1800 only.

^d 1838-40 only.

100 THE BALANCE OF BIRTHS AND DEATHS

AVERAGE YEARLY BIRTHS BY PERIODS, 1735-1927

PERIOD	BELGIUM	DEN-MARK	FAROE ISLANDS, ICELAND	ENGLAND AND WALES	SCOTLAND	IRELAND	ISLANDS IN THE BRITISH SEAS	FINLAND
1735	—	—	—	—	—	—	—	—
1736-40	—	—	—	—	—	—	—	—
1741-45	—	—	—	—	—	—	—	—
1746-50	—	—	—	—	—	—	—	—
1751-55	—	—	—	—	—	—	—	19,955
1756-60	—	—	—	—	—	—	—	21,082
1761-65	—	—	—	—	—	—	—	22,294
1766-70	—	—	—	—	—	—	—	22,622
1771-75	—	—	—	—	—	—	—	22,704
1776-80	—	—	—	—	—	—	—	26,085
1781-85	—	—	—	—	—	—	—	27,158
1786-90	—	—	—	—	—	—	—	26,228
1791-95	—	—	—	—	—	—	—	30,136
1796-1800	—	27,670 ^e	—	—	—	—	—	31,503
1801-05	—	30,456	—	—	—	—	—	33,247
1806-10	—	29,800	—	—	—	—	—	30,367
1811-15	—	31,210	—	—	—	—	—	38,311
1816-20	—	34,591	—	—	—	—	—	43,036
1821-25	—	36,573	—	—	—	—	—	47,215
1826-30	—	35,786	—	—	—	—	—	49,249
1831-35	136,918	37,607	—	—	—	—	—	47,096
1836-40	142,636	37,966	—	486,221 ^d	—	—	—	45,924
1841-45	135,412	40,030	2,260	528,301	(86,661)	(247,380)	3,612	53,170
1846-50	124,524	42,935	2,370	569,446	(92,562)	(213,276)	3,864	56,285
1851-55	130,833	47,045	2,570	624,343	(99,598)	(174,440)	4,109	60,548
1856-60	143,406	51,724	2,730	669,987	104,285	(165,004)	3,906	60,727
1861-65	152,116	51,655	2,830	724,970	109,764	(148,278)	3,988	66,386
1866-70	158,910	53,772	2,680	775,049	114,395	146,407	3,850	56,783
1871-75	169,275	56,643	2,610	831,735	120,376	144,924	3,648	68,319
1876-80	174,245	61,998	2,604	886,021	126,086	135,532	3,512	73,360
1881-85	175,601	65,899	2,622	892,880	126,409	120,297	3,549	75,629
1886-90	176,056	67,333	2,440	885,168	123,977	109,796	3,745	79,243
1891-95	181,389	67,821	2,727	907,853	125,800	105,980	3,522	77,916
1896-1900	191,700	71,000	2,754	923,177	130,209	105,024	3,573	85,558
1901-05	193,481	73,025	2,717	938,654	132,399	102,263	3,305	87,787
1906-10	181,617	75,274	2,805	920,988	128,987	102,408	3,191	92,799
1911-14	167,619	73,590	2,850	878,715	122,273	100,423	2,909	89,585
1915-19	103,739	70,657	3,023	724,716	105,277	90,004	2,158	77,479
1920-21	164,943	80,446	3,254	903,298	129,874	95,128	2,617	83,440
1922-23	155,967	74,363	3,224	769,128	113,494	90,084	2,533	81,051
1924-25	154,427	72,867	3,137	720,258	105,519	90,827	2,450	78,159
1926	148,840	70,688	3,508	694,563	102,449	89,338	2,452	76,875
1927	—	68,025	—	654,969	96,669	86,679	—	—

(1) Territory of the respective period.

(2) Present territory.

BIRTHS AND BIRTH RATES

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AVERAGE YEARLY BIRTHS BY PERIODS, 1735-1927

FRANCE (1)	FRANCE (2)	GERMANY (1)	GERMANY (2)	HOLLAND	LUXEM- BURG	NOR- WAY	SWEDEN	SWIT- ZER- LAND
	—		—	—	—	17,850	—	—
	—		—	—	—	18,607	—	—
	—		—	—	—	17,580	—	—
	—		—	—	—	19,474	61,997*	—
	—		—	—	—	21,940	67,808	—
	—		—	—	—	22,968	65,035	—
	—		—	—	—	24,733	67,537	—
	—		—	—	—	24,171	67,930	—
	—		—	—	—	21,599	63,257	—
	—		—	—	—	23,125	71,594	—
	—		—	—	—	23,236	67,938	—
	—		—	—	—	24,283	70,024	—
	—		—	—	—	27,594	75,817	—
	—		—	—	—	27,887 ^b	76,248	—
	—		—	—	—	25,046	74,646	—
	—		—	—	—	24,250	73,520	—
	—		—	—	—	24,455	79,808	—
	—		—	—	—	30,901	85,254	—
	—		—	—	—	34,131	95,706	—
	—		—	—	—	35,980	94,946	—
	—		—	—	—	36,273	95,360	—
	—		—	—	—	34,325	94,312	—
923,865				102,338	(5,814)	39,080	100,843	(70,415)
930,730				96,984	(5,348)	42,177	104,822	(66,020)
955,108				105,758	(5,491)	46,898	113,191	(64,123)
971,798				109,539	(6,002)	51,562	125,647	(70,936)
976,564				121,359	(6,229)	52,548	132,556	(76,686)
974,956				126,320	(6,420)	51,450	123,658	(77,703)
959,431				133,661	(6,545)	53,724	131,033	81,833
976,030	996,785	1,181,971	1,068,547	143,689	(6,624)	59,181	136,427	87,642
949,594	971,084	1,195,500	1,081,183	146,007	(6,520)	59,646	135,206	82,345
939,799	962,024	1,198,120	1,082,573	150,192	(6,233)	60,381	136,434	80,574
967,388	990,383	1,281,820	1,158,212	155,052	6,171	61,573	132,575	84,147
	1,004,934	1,377,834	1,245,012	161,671	6,683	65,142	135,170	91,817
	998,760	1,461,003	1,320,436	170,796	7,421	65,202	136,198	95,371
928,822	981,118	1,619,251	1,424,461	171,792	6,992	61,635	131,376	90,151
941,056	993,678	1,730,437	1,525,537	169,896	7,444	61,978	137,483	94,795
934,577	983,833	1,704,741	1,508,877	169,735	4,845	61,267	119,736	73,211
882,664	930,120	1,759,288	1,560,534	193,228	5,558	66,451	133,238	80,999
857,291	905,800	1,844,068	1,642,502	185,633	5,281	61,890	114,942	75,921
848,710	899,696	1,956,523	1,743,145	180,488	5,494	55,777	107,499	73,039
830,977	883,535	2,010,625	1,795,206	177,493	5,639	54,692	102,368	72,118
783,132	833,453	1,988,104	1,776,746	175,068	5,836	52,622	—	69,533
737,207	781,697	1,849,428	1,627,232					
430,721	448,605	1,110,116	991,864					
	822,647	1,569,947	1,534,977					
	760,480	1,350,832						
	761,790	1,281,660						
	766,226	1,227,900						
	741,708	1,160,206						

* 1749-50 only

^b 1796-99 only.

^c 1800 only.

^d 1838-40 only.

APPENDIX B

WOMEN OF CHILD-BEARING AGE

THERE are no definite limits to the child-bearing age. But in Western and Northern Europe births of a mother under 15 years or over 50 years practically never occur.¹ As to the relative limits, statisticians agree that women over 15 years only are to be considered as of child-bearing age, but the upper limit is flexible. Some draw the limit at 45 years while others put it at 50 years. The actual facts are not conclusive since the number of births for women from 45 to 50 years, while small, is not negligible. Theoretically, it is certainly more correct to relate the births to the women of 15-50 years. But since the women of 45-50 years do not much influence the total number of births, yet may considerably affect the number of women to which the number of births is related, their inclusion can have an undue effect upon the general fertility rate. On the other hand, some countries do not publish separately the number of women of 40-45 and 45-50 years, and this

¹ We venture this statement in spite of the fact that the statistics of some countries show a rather large number of mothers over 50 years. For 1901-05 the number of such mothers is given as being 5 in Denmark, 38 in Sweden, 157 in Finland, 238 in Norway, and 3,671 in France. (See *Statistique Internationale du Mouvement de la Population*, Vol. II, pp. 107-112.) The differences between the figures of Denmark and Norway are such that they cannot possibly represent the actual conditions. As to France, the number of such births dropped from 1,027 in 1906 to 64 in 1907 and stayed on the lower level up to the present time; the early figures, then, certainly were not accurate.

technical factor made us finally choose 50 years as the upper limit of child-bearing age.

The table on pages 106-110 gives the total population, the women of child-bearing age, and the percentage of such women in every country of Western and Northern Europe for which adequate official data are available.² In case of choice, preference has been given to dates ending a quinquennial period. As to the sources from which the data were taken, the following may be said:

Belgium. 1846-1866, data taken from *Recensement Général du 31 Décembre 1890*, Vol. I, pp. LI, LIII; 1880-1900, from *Recensement Général du 31 Décembre 1920*, Vol. I, pp. 74-75; 1911 and 1921, from *Annuaire Statistique de la Belgique et du Congo Belge 1924-1925*, pp. XXIV-XXV.

Denmark. 1840, 1845, 1855, 1860, 1890, 1901, data taken from *Statistisk Tabelværk*, Fifth Series, Letter A, No. 5, p. 55; 1850, from *Statistique Internationale du Mouvement de la Population*, Vol. I, p. 192; 1870 and 1880, from *Statistik des Deutschen Reichs*, Vol. 44, p. 110; 1911 and 1921, from *Statistisk Aarbog 1927*, pp. 10-11.

England and Wales. 1851-1921, data taken from *Census of England & Wales 1921*, *General Tables*, p. 142; 1922-25, from *The Registrar-General's Statistical Review of England and Wales for the Year 1922*, *Text*, p. 111; 1923, *Text*, p. 112; 1924, *Text*, p. 115; 1925, *Text*, p. 113.

Scotland. 1851 and 1861, data taken from *Census of Scotland 1861*, Vol. II, p. XVI; 1871-1921, from *Report of the Thirteenth Decennial Census of Scotland*, Vol. II, p. 167.

Ireland. 1861, data taken from *The Census of Ireland for the Year 1861*, Part II, Vol. I, p. 6; 1871 from *Statistique Internationale du Mouvement de la Population*, Vol. I, p. 192; 1881

² No data are given here for Faroe Islands, Iceland, the Islands in the British Seas, Luxemburg, and the Saar Territory.

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and 1891, from *Census of Ireland 1891*, Part II, p. 330; 1901 and 1911, from *Census of Ireland 1911, General Report, with Tables and Appendix*, p. 74.

Finland. 1751-1890, data taken from *Éléments Démographiques Principaux de la Finlande pour les Années 1750-1890*, Vol. I, pp. 59-61; 1900, from *Aperçu de la Population de la Finlande au 31 Décembre 1900 et Données tirées des Recensements Généraux Précédents, Tables*, p. 16; 1910, from *Annuaire Statistique de Finlande 1919*, p. 40; 1920, from *Annuaire Statistique de Finlande 1927*, p. 39.

France. 1851 and 1861, data taken from *Statistique Internationale du Mouvement de la Population*, Vol. I, p. 195; 1872-81, from *Statistik des Deutschen Reichs*, Vol. 44, p. 107; 1891, from *Résultats du Dénombrement de 1891*, pp. 190-191; 1896, from *Résultats Statistiques du Dénombrement de 1896*, p. 202; 1901, from *Résultats Statistiques du Recensement Général de la Population effectué le 24 mars 1901*, Vol. IV, p. 38; 1906, from *idem*, le 4 mars 1906, Vol. I, Part II, p. 27; 1911, from *idem*, le 5 mars 1911, Vol. I, Part II, p. 33; 1921, from *idem*, le 6 mars 1921, Vol. I, Part II, p. 19.

Germany. 1871, 1875, and 1880, data taken from *Statistik des Deutschen Reichs*, Vol. 44, p. 75; 1890, from *ibid.*, Vol. 68, p. 31*; 1900, from *ibid.*, Vol. 150, p. 85*; 1910 and 1925, from *Statistik des Deutschen Reichs*, Vol. 240, p. 80*, *Wirtschaft und Statistik 1928*, p. 118; 1919, from *Aperçu de la Démographie des Divers Pays du Monde 1925*, p. 64.

Holland. All data taken from *Jaarcijfers voor Nederland 1927*, p. 9.

Norway. 1801-65, data taken from *Statistique Internationale du Mouvement de la Population*, Vol. I, p. 192; 1875, from *Statistik des Deutschen Reichs*, Vol. 44, p. 111; 1891-1920, from *Norges Officielle Statistik*, Third Series, No. 229, pp. 107, 174-193, Sixth Series, No. 8, p. 111, *Statistisk Årbog 1904*, p. 7, 1927, p. 8.

Sweden. 1750-1900, data taken from *Statistisk Tidskrift 1906*, pp. 173, 227-229; 1910, from *Statistisk Årsbok för Sverige 1914*, pp. 10-11; 1915, from *Befolkningsrörelsen 1915*, p. 22; 1920 and 1922, from *Statistisk Årsbok för Sverige 1927*, pp. 10-11.

Switzerland. 1860-88, data taken from *Résultats Statistiques du Recensement Fédéral du 1 Décembre 1900*, Vol. II, p. 346; 1901-21, from *idem*, 1 Décembre 1920, *Premier Fascicule*, pp. 50-51.

In some cases where the census was not taken at the end of the year the age data refer to calendar years of birth.

The women whose age was not reported at the census have been proportionally assigned to the different age groups.

All data refer to the territory of the time specified, but those for Belgium, 1920, do not include Eupen and Malmedy. For Germany, 1910, data are given also for the present territory.

In giving combined results for Western and Northern Europe, data had to be assembled which do not all refer to the same date:

1860. The data for Denmark, Great Britain, Ireland, France, Holland, Sweden, and Switzerland are taken from censuses between December 31, 1859, and June 1861.

For Belgium, the total population of December 31, 1860, has been taken from *Annuaire Statistique de la Belgique et du Congo Belge 1924-25*, p. 37 (4,731,996); the women of child-bearing age, being 25.36 per cent on December 31, 1856, and 24.44 per cent on December 31, 1866, have been assumed to have constituted 24.99 per cent on December 31, 1860 (1,182,526).

For Finland, the total population of December 31, 1860, has been taken from *Éléments Démographiques* Vol. I, p. 2 (1,746,725); the women of child-bearing age being 25.47 per cent on December 31, 1850, and 25.62 per cent on December

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WOMEN OF CHILD-BEARING AGE, 1750-1925

DATE	TOTAL POPULATION	WOMEN 15-50 YEARS	PER CENT
<i>Belgium</i>			
Oct. 15, 1846 . . .	4,337,196	1,091,271	25.16
Dec. 31, 1856 . . .	4,529,560	1,148,476	25.36
Dec. 31, 1866 . . .	4,827,833	1,180,024	24.44
Dec. 31, 1880 . . .	5,520,009	1,322,002	23.95
Dec. 31, 1890 . . .	6,069,321	1,486,375	24.49
Dec. 31, 1900 . . .	6,693,548	1,696,508	25.35
Dec. 31, 1910 . . .	7,423,784	1,919,636	25.86
Dec. 31, 1920 . . .	7,406,299	2,056,435	27.77
<i>Denmark</i>			
Feb. 1, 1840 . . .	1,283,027	331,220	25.82
Feb. 1, 1845 . . .	1,350,327	348,692	25.82
Feb. 1, 1850 . . .	1,407,747	363,886	25.85
Feb. 1, 1855 . . .	1,499,850	380,957	25.40
Feb. 1, 1860 . . .	1,600,551	402,304	25.14
Feb. 1, 1870 . . .	1,784,741	445,579	24.97
Feb. 1, 1880 . . .	1,969,039	481,792	24.47
Feb. 1, 1890 . . .	2,172,380	527,806	24.30
Feb. 1, 1901 . . .	2,449,540	610,179	24.91
Feb. 1, 1911 . . .	2,757,076	689,816	25.02
Feb. 1, 1921 . . .	3,267,831	848,626	25.97
<i>England and Wales</i>			
Mar. 31, 1851 . . .	17,927,609	4,640,866	25.89
April 8, 1861 . . .	20,066,224	5,198,821	25.91
April 3, 1871 . . .	22,712,266	5,785,849	25.47
April 4, 1881 . . .	25,974,439	6,593,480	25.38
April 5, 1891 . . .	29,002,525	7,585,835	26.16
Mar. 31, 1901 . . .	32,527,843	8,934,080	27.47
April 2, 1911 . . .	36,070,492	9,988,232	27.69
June 19, 1921 . . .	37,886,699	10,712,239	28.27
Mid-year 1922 . . .	38,158,000	10,768,923	28.22
Mid-year 1923 . . .	38,403,000	10,825,094	28.19
Mid-year 1924 . . .	38,746,000	10,923,152	28.19
Mid-year 1925 . . .	38,890,000	10,964,801	28.19

WOMEN OF CHILD-BEARING AGE

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WOMEN OF CHILD-BEARING AGE, 1750-1925 (Continued)

DATE	TOTAL POPULATION	WOMEN 15-50 YEARS	PER CENT
<i>Scotland</i>			
Mar. 31, 1851	2,888,742	774,019	26.79
April 8, 1861	3,062,294	810,303	26.46
April 3, 1871	3,360,018	861,623	25.64
April 4, 1881	3,735,573	950,507	25.44
April 5, 1891	4,025,647	1,035,347	25.72
Mar. 31, 1901	4,472,103	1,190,821	26.63
April 2, 1911	4,760,904	1,271,616	26.71
June 19, 1921	4,882,497	1,336,724	27.38
<i>Ireland</i>			
April 8, 1861	5,798,967	1,492,135	25.73
April 3, 1871	5,412,377	1,292,465	23.88
April 4, 1881	5,174,836	1,265,391	24.45
April 5, 1891	4,704,750	1,174,420	24.96
Mar. 31, 1901	4,458,775	1,147,625	25.74
April 2, 1911	4,390,219	1,079,780	24.60
<i>Finland</i>			
Dec. 31, 1751	429,912	103,196	24.00
Dec. 31, 1775	610,145	154,006	25.24
Dec. 31, 1800	832,659	216,689	26.02
Dec. 31, 1825	1,259,151	330,422	26.24
Dec. 31, 1850	1,636,915	416,902	25.47
Dec. 31, 1865	1,843,245	472,155	25.62
Dec. 31, 1870	1,768,769	470,483	26.60
Dec. 31, 1875	1,912,647	493,856	25.82
Dec. 31, 1880	2,060,782	522,886	25.37
Dec. 31, 1885	2,208,518	544,244	24.64
Dec. 31, 1890	2,380,140	581,561	24.43
Dec. 31, 1900	2,712,562	664,682	24.50
Dec. 31, 1910	3,115,197	761,217	24.44
Dec. 31, 1920	3,364,807	871,995	25.92

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WOMEN OF CHILD-BEARING AGE, 1750-1925 (Continued)

DATE	TOTAL POPULATION	WOMEN 15-50 YEARS	PER CENT
<i>France</i>			
April-May, 1851	35,783,170	9,368,995	26.18
May-June, 1861	37,386,313	9,715,799	25.99
April-May, 1872	36,102,921	9,260,278	25.65
Dec. 1876	36,905,788	9,401,041	25.47
Dec. 18, 1881	37,672,048	9,543,821	25.33
April 12, 1891	38,133,385	9,779,592	25.65
Mar. 29, 1896	38,269,011	9,892,124	25.85
Mar. 24, 1901	38,450,788	9,892,576	25.73
Mar. 4, 1906	38,844,653	10,024,962	25.81
Mar. 5, 1911	39,192,133	10,138,099	25.87
Mar. 6, 1921	38,797,540	10,703,875	27.59
<i>Germany</i>			
Dec. 31, 1871	41,028,150	10,430,622	25.42
Dec. 31, 1875	42,775,234	10,718,342	25.06
Dec. 31, 1880	45,284,526	11,232,909	24.81
Dec. 1, 1890	49,428,470	12,342,063	24.97
Dec. 1, 1900	56,367,178	14,111,007	25.03
Dec. 1, 1910	64,925,993	16,436,991	25.32
Dec. 1, 1910 ¹	57,798,427	14,719,865	25.47
Oct. 8, 1919	60,412,084	17,417,543	28.83
June 16, 1925	62,410,619	18,095,155	28.99
<i>Holland</i>			
Nov. 19, 1849	3,056,879	789,441	25.83
Dec. 31, 1859	3,309,128	863,332	26.09
Dec. 1, 1869	3,579,529	903,758	25.25
Dec. 31, 1879	4,012,693	964,318	24.03
Dec. 31, 1889	4,511,415	1,078,361	23.90
Dec. 31, 1899	5,104,137	1,246,487	24.42
Dec. 31, 1909	5,858,175	1,453,752	24.82
Dec. 31, 1920	6,865,314	1,749,988	25.49

¹ Present territory.

WOMEN OF CHILD-BEARING AGE

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WOMEN OF CHILD-BEARING AGE, 1750-1925 (Continued)

DATE	TOTAL POPULATION	WOMEN 15-50 YEARS	PER CENT
<i>Norway</i>			
Feb. 1, 1801	883,440	227,452	25.75
Nov. 27, 1825	1,051,318	262,314	24.95
Nov. 29, 1835	1,194,827	289,271	24.21
Dec. 31, 1845	1,328,471	338,773	25.50
Dec. 31, 1855	1,490,047	368,473	24.73
Dec. 31, 1865	1,701,756	420,897	24.73
Dec. 31, 1875	1,818,853	451,743	24.84
Jan. 1, 1891	1,988,674	486,060	24.44
Jan. 1, 1901	2,242,995	546,001	24.34
Dec. 1, 1910	2,357,790	580,994	24.64
Dec. 1, 1920	2,649,775	669,240	25.26
<i>Sweden</i>			
Dec. 31, 1750	1,780,678	461,779	25.93
Dec. 31, 1755	1,875,029	478,384	25.51
Dec. 31, 1760	1,925,248	495,483	25.74
Dec. 31, 1765	1,976,824	513,733	25.99
Dec. 31, 1770	2,042,574	539,105	26.39
Dec. 31, 1775	2,020,847	543,638	26.90
Dec. 31, 1780	2,118,281	559,218	26.40
Dec. 31, 1785	2,149,773	571,247	26.57
Dec. 31, 1790	2,187,732	577,273	26.39
Dec. 31, 1795	2,281,137	600,162	26.31
Dec. 31, 1800	2,347,303	615,184	26.21
Dec. 31, 1805	2,422,039	628,302	25.94
Dec. 31, 1810	2,396,351	639,660	26.69
Dec. 31, 1815	2,465,066	656,525	26.63
Dec. 31, 1820	2,584,690	676,672	26.18
Dec. 31, 1825	2,771,252	698,151	25.19
Dec. 31, 1830	2,888,082	719,911	24.93
Dec. 31, 1835	3,025,439	756,476	25.00
Dec. 31, 1840	3,138,887	815,816	25.99
Dec. 31, 1845	3,316,536	860,420	25.94
Dec. 31, 1850	3,482,541	907,360	26.05
Dec. 31, 1855	3,641,011	945,516	25.97
Dec. 31, 1860	3,859,728	1,003,955	26.01

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WOMEN OF CHILD-BEARING AGE, 1750-1925 (Continued)

DATE	TOTAL POPULATION	WOMEN 15-50 YEARS	PER CENT
<i>Sweden (continued)</i>			
Dec. 31, 1865	4,114,141	1,052,096	25.57
Dec. 31, 1870	4,168,525	1,060,464	25.44
Dec. 31, 1875	4,383,291	1,095,837	25.00
Dec. 31, 1880	4,565,668	1,144,191	25.06
Dec. 31, 1885	4,682,769	1,144,680	24.44
Dec. 31, 1890	4,784,981	1,150,081	24.04
Dec. 31, 1895	4,919,260	1,176,251	23.91
Dec. 31, 1900	5,136,441	1,235,940	24.06
Dec. 31, 1910	5,522,403	1,338,700	24.24
Dec. 31, 1915	5,712,740	1,399,300	24.49
Dec. 31, 1920	5,904,489	1,488,863	25.22
Dec. 31, 1922	5,987,520	1,525,581	25.48
<i>Switzerland</i>			
Dec. 10, 1860	2,510,494	675,313	26.90
Dec. 1, 1870	2,669,147	697,348	26.13
Dec. 1, 1880	2,846,102	727,287	25.55
Dec. 1, 1888	2,917,754	743,455	25.48
Jan. 1, 1901	3,317,741	856,064	25.80
Jan. 1, 1911	3,755,740	977,311	26.02
Jan. 1, 1921	3,881,873	1,076,200	27.72

31, 1865, have been assumed to have constituted 25.57 per cent on December 31, 1860 (446,638).

For Germany, the mean population of 1860 has been taken from *Statistik des Deutschen Reichs*, Vol. 44, pp. 2, 48 (36,048,700). The percentage of women of child-bearing age being 26.22 in Saxony and Wurttemberg combined on December 3, 1861, (computed from *Statistisches Jahrbuch fuer den Freistaat Sachsen 1924-1926*, p. 10, and *Statistique Internationale du Mouvement de la Population*, Vol. I, p. 194) and 25.79 on December 31, 1871,

(computed from *Statistik* Vol. 44, pp. 86-87) while that in Germany (excluding Alsace-Lorraine) was 25.45 on December 31, 1871, (computed from *Statistik*, Vol. 44, pp. 75, 102), it has been assumed that the percentage for Germany in 1860 has been 25.88 (9,329,404).

For Norway, the population of July 1, 1860, has been taken from *Statistiske Oversikter 1926*, p. 7 (1,596,089); the women of child-bearing age, being 24.73 per cent both on December 31, 1855, and 1865, have been assumed to have constituted the same percentage in 1860 (394,713).

1870. The data for all countries except Belgium and Norway were taken from censuses between December 1, 1869, and May 1872. For Belgium the total population of December 31, 1870, has been taken from *Annuaire Statistique de la Belgique et du Congo Belge 1924-25*, p. 37 (5,087,826); the women of child-bearing age being 24.44 per cent on December 31, 1866, and 23.95 on December 31, 1880, have been assumed to have constituted 24.30 per cent on December 1, 1870 (1,236,342). For Norway the population of July 1, 1870 has been taken from *Statistiske Oversikter 1926*, p. 8 (1,735,425); the women of child-bearing age being 24.73 per cent on December 31, 1865, and 24.84 per cent on December 31, 1875, have been assumed to have constituted 24.78 per cent on July 1, 1870 (430,038).

1880. The data for all countries except Norway were taken from censuses between December 31, 1879, and December 18, 1881. For Norway the population of July 1, 1880, has been taken from *Statistiske Oversikter 1926*, p. 8 (1,919,075); the women of child-bearing age being 24.84 per cent on December 31, 1875 and 24.44 per cent on January 1, 1891, have been assumed to have constituted 24.72 per cent on July 1, 1880 (474,395).

1890, 1900, 1910. The data for all countries were taken

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from censuses between December 1, 1888, and April 12, 1891; December 31, 1899, and March 31, 1901; December 31, 1909, and April 2, 1911.

1920. The data for all countries except Ireland were taken from censuses between October 8, 1919, and June 19, 1921. For Ireland the mid-year population of 1920 has been taken from *The Registrar-General's Statistical Review of England and Wales for the Year 1926, Tables, Part II, Civil*, p. 3 (4,361,000); the women of child-bearing age have been assumed to constitute 25 per cent.

APPENDIX C

AGE OF MOTHERS

THE tables on pages 122-28 give the female population and the births (or confinements) by quinquennial age groups from 15 to 50 years in every country of Western and Northern Europe for which adequate official data on the age of the confined are available.¹ Births of mothers under 15 years were included in the age group 15 to 20 years, births of mothers over 50 years in the age group 45 to 50 years. The women whose age was not reported have in both tables been proportionally assigned to the different age groups. So far as census data were used, the sources were identical with those quoted in Appendix B.

Denmark. The average number of females in 1878-84 has been estimated on the basis of the census data of February 1, 1880. The figures for 1885-94, 1895-1900, 1901-05, and 1906-10 have been computed on the basis of the numbers of confinements and deaths, confinement rates, and death rates published in *Statistisk Tabelværk*, Fourth Series, Letter A, No. 7, p. XII, No. 9, pp. 17*, 228, Fifth Series, Letter A, No. 2, p. 12*, No. 5, pp. 124-25, No. 6, pp. 19*, 25*, No. 8, pp. 22*, 29*; *Statistik des Deutschen Reichs*, Vol. 246, p. 19*. The figures for 1911-15 and 1916-20 have been taken from *Statistisk Tabelværk*, Fifth Series, Letter A, No. 16, p. 24*. The figures for 1921-25 and 1926 have been estimated. For confinements 1878-79 see *Statistisk Tabelværk*, Fourth Series, Letter A, No. 2, p. IX, and

¹ No data are given here for the Faroe Islands, Iceland, Luxemburg.

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Statistik des Deutschen Reichs, Vol. 44, p. 143, 1880-84 *Statistisk Tabelværk*, Fourth Series, Letter A, No. 5, p. XI, 1885-89 Fourth Series, Letter A, No. 7, p. XII, 1890-94 Fourth Series, Letter A, No. 9, p. 228, 1895-1900 Fifth Series, Letter A, No. 2, p. 12*, 1901-05 Fifth Series, Letter A, No. 6, p. 19*, 1906-10 Fifth Series, Letter A, No. 8, p. 22*, 1911-15 Fifth Series, Letter A, No. 13, p. 36*, 1916-20 Fifth Series, Letter A, No. 15, p. 42*, 1921-26 *Aperçu de la Démographie des Divers Pays du Monde 1927*, p. 169. For female live-born 1878-1926 see *Statistisk Tabelværk*, Fourth Series, Letter A, No. 2, p. 215, No. 5, p. 43, No. 7, p. 45, No. 9, p. 169, Fifth Series, Letter A, No. 2, p. 13*, No. 6, p. 69, No. 8, p. 69; *Statistisk Aarbog 1918*, p. 20, 1927, pp. 22-23; *Aperçu 1927*, p. 116.

England and Wales. The age of the mother is not recorded in England, but there are some official data which permit to make an estimate of the age distribution in 1921. The Registrar-General (see *The Registrar-General's Statistical Review of England and Wales for the Year 1925, Text*, p. 133) has indeed derived from the census data of 1921 fertility rates of married and unmarried women by quinquennial age groups (see table p. 115, cols. 3 and 4). By multiplying those rates by the female population as found at the census (cols. 1 and 2) we arrive at a total of 810,359 legitimate and 38,615 illegitimate births (cols. 5 and 6). Since the actual numbers were 810,196 legitimate and 38,618 illegitimate births the figures had only slightly to be corrected; at the same time it has been assumed that $\frac{1}{300}$ of the mothers of live-born were over 45 years of age (cols. 7 and 8). In order to arrive at a further estimate of the age distribution of the mothers for 1925, it was necessary to first ascertain the fertility rates by quinquennial age groups for 1921 (col. 11) by dividing the births of 1921 (col. 9) by the women living in 1921 (col. 10). Those fertility rates have then been multiplied by the number of women living in mid-year 1925 (col. 12) as given

in the Registrar-General's Report (see *ibid.* p. 113). The products thus found (col. 13) indicate the number of births that would have occurred in 1925, if the fertility rates in that year had been the same as in 1921. Their total is 865,916; but the actual number of births in 1925 was only 710,582.

BIRTHS AND FERTILITY RATES IN ENGLAND

YEARS OF AGE	MARRIED WOMEN 1921 (1)	UNMARRIED WOMEN 1921 (2)	FERTILITY RATES		COMPUTED BIRTHS	
			Married Women 1921 (3)	Unmarried Women 1921 (4)	Legitimate 1921 (5)	Illegitimate 1921 (6)
15-20	31,145	1,744,086	447	7.65	13,922	13,342
20-25	459,789	1,243,278	359	15.14	165,064	18,823
25-30	920,986	699,304	268	8.71	246,824	6,091
30-35	1,059,538	460,111	197	0.78	208,729	359
35-40	1,089,287	382,626	131	—	142,697	—
40-45	1,035,109	343,012	32	—	33,123	—
45-50	919,123	324,845	—	—	—	—
Total	5,514,977	5,197,262	—	—	810,359	38,615

YEARS OF AGE	CORRECTED NUMBER OF BIRTHS			WOMEN 1921 (10)	FERTILITY RATES 1921 (11)	WOMEN 1925 (12)	BIRTHS 1925 WITH FERTILITY OF 1921 (13)
	Legitimate 1921 (7)	Illegitimate 1921 (8)	Total 1921 (9)				
15-20	13,919	13,343	27,262	1,775,231	15.36	1,802,695	27,684
20-25	165,031	18,825	183,856	1,703,067	107.96	1,727,504	186,502
25-30	246,774	6,091	252,865	1,620,290	156.09	1,654,285	258,217
30-35	208,687	359	209,046	1,519,649	137.53	1,585,213	218,015
35-40	142,668	—	142,668	1,471,913	96.92	1,452,821	140,809
40-45	30,288	—	30,288	1,378,121	21.98	1,443,897	31,736
45-50	2,829	—	2,829	1,243,968	2.27	1,298,386	2,953
Total	810,196	38,618	848,814	10,712,239	—	10,964,801	865,916

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The female live-born were taken from *The Registrar-General's Statistical Review of England and Wales for the Year 1926, Tables, Part II, Civil, p. 4.*

Finland. For average number of females and for confinements by quinquennial periods from 1866 to 1890 see *Éléments Démographiques Principaux de la Finlande pour les Années 1750-1890*, Vol. I, pp. 148-150, Vol. II, p. 102. The figures for 1891-1900 have been computed from the confinement rates published in *Mouvement de la Population de Finlande en 1919 et 1920*, p. 26. The figures for 1901-10 and 1911-20 have been taken from *Tables de Mortalité et de Survie pour les Années 1901-1910 et 1911-1920, Tableaux*, p. 3. The number of confinements for the years 1891-1920 have been taken from *Mouvement de la Population de Finlande en 1891*, p. 14, 1892, p. 13, 1893, p. 15, 1894, p. 16, 1895, p. 16, 1896, p. 16, 1897, p. 16, 1898, p. 16, 1899, p. 16, 1900, p. 53, 1901 et 1902, p. 24, 1903 et 1904, p. 24, 1905 et 1906, p. 24, 1907 et 1908, p. 26, 1909 et 1910, p. 35, 1911 et 1912, pp. 32-33, 1913 et 1914, p. 33, 1915 et 1916, p. 32, 1917 et 1918, p. 27, 1919 et 1920, p. 23, those for the years 1921-25 from *Aperçu de la Démographie des Divers Pays du Monde 1927*, p. 169. The female live-born for 1866-90 have been taken from *Éléments Démographiques Principaux de la Finlande pour les Années 1750-1890*, Vol. II, p. 150, for 1891-1910 from *Statistique Internationale du Mouvement de la Population*, Vol. I, p. 320, Vol. II, p. 97, for 1911-13 from *Annuaire International de Statistique*, Vol. II, 1917, p. 38, for 1914-25 from *Annuaire Statistique de Finlande 1927*, p. 60.

France. The average number of females in 1892-97 has been estimated on the basis of the census data of 1891 and 1896. The average number of females in 1898-1903 has been assumed to be equal to that of January 1, 1901, given in *Résultats Statistiques du Recensement Général de la Population effectué le 24 mars 1901*, Vol. IV, pp. 58-59. As females in 1904-07 have

been entered the females at the census of March 4, 1906, as females in 1908-13 the females at the census of March 5, 1911. The average number of females in 1914-19 (for the 77 unoccupied provinces) has been taken from *Statistique du Mouvement de la Population*, New Series, Vol. III, p. lxvi. The average number of females in 1920-21 has been assumed to be equal to that of the census of March 6, 1921. The females in 1922-25 have been estimated. The births and the female live-born in 1892-1925 have been taken from *Statistique Internationale du Mouvement de la Population*, Vol. I, pp. 338, 365, Vol. II, pp. 100, 112, *Annuaire International de Statistique*, Vol. II, 1917, pp. 46, 66, *Statistique du Mouvement de la Population*, New Series, Vol. III, pp. lxvi, 20-25, *Aperçu de la Démographie des Divers Pays du Monde 1925*, p. 257, 1927, pp. 116, 171.

Germany. The average numbers of females and the births in nine German States (Hesse, Oldenburg, Brunswick, Saxony-Weimar, Saxony-Altenburg, the Schwarzburg and Reuss principalities) for 1881-1910 have been taken from *Statistik des Deutschen Reichs*, Vol. 246, p. 9*. The average number of females in Saxony for 1911-24 has been estimated on the basis of the population data for January 1, 1911, October 8, 1919, and June 16, 1925, published in *Statistik des Deutschen Reichs*, Vol. 240, Part II, pp. 242-247, *Aperçu de la Démographie des Divers Pays du Monde 1925*, p. 68, *idem 1927*, p. 70, and of the number of women of 15 to 50 years given for each mid-year (from 1833 on) in *Statistisches Jahrbuch fuer den Freistaat Sachsen, 1921-23*, p. 17, 1924-26, p. 10; the number of live- and still-births and of female live-born have been taken from *Statistisches Jahrbuch fuer den Freistaat Sachsen 1913*, p. 34, 1914-15, p. 30, 1916-17, p. 26, 1918-20, p. 47, 1921-23, pp. 23, 46, 1924-26, pp. 61, 85, *Zeitschrift des Saechsischen Statistischen Landesamts 1918 und 1919*, pp. 36-39, 1923, pp. 32-35.

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BIRTHS AND FERTILITY RATES IN GERMANY

YEARS OF AGE	WOMEN GERMANY (1)	FERTILITY RATES 9 STATES (2)	COMPUTED BIRTHS GERMANY (3)	ESTIMATED BIRTHS GERMANY (4)	ESTIMATED FERTILITY RATES GERMANY (5)
<i>1881-1890</i>					
15-20 . .	2,268,196	18.785	42,608	45,382	20.0
20-25 . .	2,062,456	177.218	365,504	389,297	188.8
25-30 . .	1,799,457	277.554	499,447	531,958	295.6
30-35 . .	1,654,228	238.315	394,227	419,890	253.8
35-40 . .	1,461,948	182.160	266,309	238,644	194.0
40-45 . .	1,354,596	80.211	108,654	115,726	85.5
45-50 . .	1,182,848	10.224	12,093	12,881	10.9
Total . .	11,783,729	984.467	1,688,842	1,798,778	5,242.8
<i>1891-1900</i>					
15-20 . .	2,531,720	20.659	52,303	55,011	21.7
20-25 . .	2,356,037	182.724	430,504	452,796	192.2
25-30 . .	2,073,230	275.634	571,453	601,044	289.9
30-35 . .	1,857,672	231.389	429,845	452,103	243.4
35-40 . .	1,616,458	166.481	269,109	283,045	175.1
40-45 . .	1,485,317	69.670	103,482	108,840	73.3
45-50 . .	1,306,101	8.203	10,714	11,269	8.6
Total . .	13,226,535	954.760	1,867,410	1,964,108	5,021.0
<i>1901-1910</i>					
15-20 . .	2,895,545	23.282	67,414	70,419	24.3
20-25 . .	2,680,912	176.046	471,964	492,999	183.9
25-30 . .	2,380,343	260.776	620,736	648,401	272.4
30-35 . .	2,203,188	198.457	437,238	456,725	207.3
35-40 . .	1,923,219	138.083	265,564	277,400	144.2
40-45 . .	1,715,414	58.965	101,149	105,657	61.6
45-50 . .	1,475,378	6.412	9,460	9,881	6.7
Total . .	15,273,999	862.021	1,973,525	2,061,482	4,502.2

Although the age of the mother is not recorded in the largest German states, it seemed feasible to relate the births to the age groups of females on the basis of the data existing for some of the smaller states. For the three decades 1881-90, 1891-1900, and 1901-10, the average number of women by age groups, as published in *Statistik des Deutschen Reichs*, Vol. 246, p. 18* (see table page 118, col. 1) has been multiplied by the fertility rates of the nine German states for which data are available (col. 2). The sum of the products (col. 3) for 1881-90 is 1,688,842 which would have been the number of births in all Germany if the fertility in each age group had been the same as in the nine states. Since the actual number of births in Germany was 1,798,778, the computed number of births for each age group and the fertility rate of each age group have been multiplied by 1.06510 (cols. 4 and 5), this being the ratio of the actual to the computed number of births. In a similar way the results for 1891-1900 and 1901-10 have been multiplied by 1.05178 and 1.04457 respectively.

In order to also ascertain the fertility in Germany for a more recent year the following procedure has been chosen. The number of women by age groups at the census of June 16, 1925, (see table page 120, col. 1) has been multiplied by the fertility rates of Saxony for 1924 (col. 2). The sum of the products is 1,041,189, which would have been the number of births in all Germany if the fertility in each age group had been the same as in Saxony in 1924. But the actual number of births in Germany was 1,336,327.

The female live-born were taken from *Statistique Internationale du Mouvement de la Population*, Vol. I, p. 327, Vol. II, p. 98, *Statistisches Jahrbuch fuer das Deutsche Reich 1927*, p. 27.

Norway. The average numbers of females in 1874-76, 1889-1892, and 1910-11 have been assumed to be equal to those ascertained on December 31, 1875, January 1, 1891, and Decem-

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YEARS OF AGE	WOMEN GERMANY JUNE 16, 1925 (1)	FERTILITY RATES SAXONY 1924 (2)	COMPUTED BIRTHS GERMANY 1925 (3)
15-20	3,257,899	17.746	57,815
20-25	3,085,907	101.993	314,740
25-30	2,839,342	113.738	322,941
30-35	2,552,713	79.600	203,197
35-40	2,318,713	45.615	105,769
40-45	2,054,090	16.499	33,891
45-50	1,986,491	1.428	2,836
Total	18,095,155	—	1,041,189

ber 1, 1910, respectively. The average numbers of females in 1899-1905 and 1916-20 have been estimated on the basis of the census data of January 1, 1901, December 1, 1910, and December 1, 1920. The live-born have been taken from *Statistik des Deutschen Reichs*, Vol. 44, p. 143, *Statistique Internationale du Mouvement de la Population*, Vol. I, p. 314, *Statistisk Årbog 1903*, p. 17, 1913, pp. 25-26, *Norges Officielle Statistik*, Sixth Series, No. 27, p. 256, Seventh Series, No. 151, pp. 72-75.

Sweden. For quinquennial periods from 1776 to 1900 see *Statistisk Tidskrift 1906*, p. 293, 1907, p. 255, Gustav Sundbärg, *Bevölkerungsstatistik Schwedens 1750-1900*, p. 128. The figures for the years 1901-20 have been taken from *Bidrag till Sveriges Officiella Statistik A, Befolkningsstatistik 1901*, p. XVI, 1902, p. XVII, 1903, p. XVIII, 1904, p. XVIII, 1905, p. XIX, 1906, p. XIX, 1907, p. XIX, 1908, p. XIX, 1909, p. XX, 1910, p. XX, *Befolkningsrörelsen, 1911*, p. 41*, 1912, p. 39*, 1913, p. 39*, 1914, p. 43*, 1915, p. 43*, 1916, p. 41*, 1917, p. 40*, 1918-1920, pp. 28, 31, 34, 92-97. The average number of females by quinquennial age groups in 1921-22 has been computed by taking the average of the number on December 31, 1920, and

December 31, 1922, as given in *Folkräkningen den 31. December 1920*, Vol. III, p. 7, *Statistisk Årsbok för Sverige 1927*, p. 10. The number of confinements by quinquennial age groups in 1921-22 has been taken from *Aperçu 1927*, p. 169, the number of female live-born in 1921-22 from *Statistisk Årsbok 1927*, p. 59.

The table on pages 37-39 gives (1) the fertility rates (or confinement rates) by quinquennial age groups; (2) the total fertility, being the quintuple of the sum of the quinquennial rates and indicating the number of children born to each 1,000 newly born girls or to each 1,000 girls entering child-bearing age, if all of them passed through child-bearing age; (3) the gross reproduction rate, indicating the number of girls born per newly born girl or per girl entering child-bearing age if each of them passed through child-bearing age.

(1) The fertility rates (or confinement rates) have been computed from the tables on pages 122-28, mothers under 15 years having been included in the group 15 to 20 years, mothers over 50 years in the group 45 to 50 years. For England and Germany see pages 115, 118. The rates for Sweden 1776-1900 have been taken from *Statistisk Tidskrift, 1907*, p. 278.

(2) The total fertility has been computed by multiplying the sum of the fertility rates of the quinquennial age groups by five.

(3) The gross reproduction rate has been computed by multiplying the total fertility by the ratio that the number of female live-born bears to the number of births (or confinements) and by dividing the result by 1,000.

WOMEN OF CHILD-BEARING AGE ACCORDING TO QUINQUENNIAL AGE GROUPS, 1776-1926

YEARS	15 TO 20 YEARS	20 TO 25 YEARS	25 TO 30 YEARS	30 TO 35 YEARS	35 TO 40 YEARS	40 TO 45 YEARS	45 TO 50 YEARS	TOTAL
<i>Denmark</i>								
1878-84 . . .	88,600	87,800	76,800	66,700	61,300	55,800	49,600	486,600
1885-94 . . .	96,700	90,600	81,600	77,900	67,800	58,600	54,400	527,600
1895-1900 . . .	110,465	99,996	89,230	81,569	73,500	69,291	59,277	583,328
1901-05 . . .	121,100	109,500	95,800	86,000	77,100	75,200	63,700	628,400
1906-10 . . .	125,500	115,700	105,600	95,500	83,100	76,100	67,000	668,500
1911-15 . . .	134,900	120,700	113,400	103,000	92,300	79,500	71,500	715,300
1916-20 . . .	144,800	133,200	119,300	111,900	100,600	89,500	77,300	776,600
1921-25 . . .	161,000	150,000	136,000	123,000	113,000	102,000	89,000	874,000
1926 . . .	166,000	152,000	144,000	127,000	116,000	106,300	97,000	908,000
<i>England and Wales</i>								
1921 . . .	1,775,231	1,703,067	1,620,290	1,519,649	1,471,913	1,378,121	1,243,968	10,712,239
<i>Finland</i>								
1866-70 . . .	85,514	80,469	72,288	63,782	59,439	56,076	48,874	466,442
1871-75 . . .	87,829	83,356	76,928	69,301	59,908	55,360	50,593	483,275
1876-80 . . .	93,535	85,601	81,102	74,245	67,340	56,215	50,358	508,396
1881-85 . . .	89,672	91,252	82,784	78,414	71,551	64,241	53,070	530,984
1886-90 . . .	104,305	87,462	88,021	79,458	74,970	68,171	61,002	563,389
1891-1900 . . .	121,500	102,300	98,400	80,800	79,800	71,100	66,500	620,400
1901-10 . . .	137,440	127,776	114,903	101,438	85,292	76,944	72,311	716,104
1911-20 . . .	152,931	137,489	129,057	119,501	106,759	93,529	78,435	817,701
1921-25 . . .	168,000	151,000	133,000	127,000	116,000	104,000	93,000	894,000

France

1892-97 . . .	1,675,400	1,708,100	1,439,800	1,369,400	1,292,600	1,200,300	1,151,700	9,837,300
1898-1903 . .	1,644,334	1,620,919	1,514,939	1,409,698	1,349,842	1,242,456	1,131,095	9,913,283
1904-07 . . .	1,602,406	1,598,493	1,556,951	1,434,856	1,369,646	1,271,365	1,191,245	10,024,962
1908-13 . . .	1,594,129	1,567,883	1,551,510	1,497,442	1,403,587	1,299,976	1,223,572	10,138,099
1914-19 ¹ . . .	1,350,000	1,345,000	1,340,000	1,295,000	1,220,000	1,125,000	1,025,000	8,700,000
1920-21 . . .	1,719,248	1,641,524	1,554,521	1,514,556	1,498,813	1,442,321	1,332,892	10,703,875
1922-25 . . .	1,757,000	1,678,000	1,599,000	1,548,000	1,532,000	1,474,000	1,362,000	10,950,000

¹77 provinces only (excluding the 10 occupied provinces).

Nine German States^a

1881-90 . . .	119,369	106,195	93,172	85,282	76,138	72,074	63,456	615,686
1891-1900 . .	132,484	122,374	107,653	95,514	83,565	76,813	68,284	686,687
1901-10 . . .	148,352	134,766	120,280	112,125	99,201	88,068	76,331	779,123

^aHesse, Oldenburg, Brunswick, and six Thuringian states.

Saxony

1911-14 . . .	252,300	236,200	203,400	191,900	172,600	141,000	127,000	1,324,500
1915-19 . . .	250,000	236,000	218,000	203,000	175,000	170,000	143,000	1,395,000
1920-23 . . .	255,000	246,000	229,000	210,000	188,000	174,000	154,000	1,456,000
1924	255,000	254,000	237,000	215,000	201,000	173,000	166,000	1,501,000

Norway

1874-76 . . .	90,662	83,028	69,285	58,518	50,980	49,376	48,987	450,836
1889-92 . . .	93,460	82,419	76,489	68,340	62,703	54,098	48,551	486,060
1899-1905 . .	110,100	98,200	84,200	73,000	69,000	62,100	57,600	554,200
1910-11 . . .	118,354	100,232	87,173	80,696	70,505	63,418	60,616	580,994
1916-20 . . .	129,200	119,100	102,200	87,900	77,700	72,900	63,500	652,500

WOMEN OF CHILD-BEARING AGE ACCORDING TO QUINQUENNIAL AGE GROUPS, 1776-1926 (Continued)

YEARS	15 TO 20 YEARS	20 TO 25 YEARS	25 TO 30 YEARS	30 TO 35 YEARS	35 TO 40 YEARS	40 TO 45 YEARS	45 TO 50 YEARS	TOTAL
<i>Sweden</i>								
1776-80 . . .	98,324	95,447	88,443	77,038	68,042	63,655	59,622	550,571
1781-85 . . .	98,268	95,554	91,485	84,245	72,977	64,212	59,741	566,482
1786-90 . . .	94,956	95,012	91,353	86,998	79,696	68,371	59,500	575,886
1791-95 . . .	99,334	91,998	91,072	86,918	82,303	74,645	63,296	589,566
1796-1800 . . .	106,431	97,152	89,267	87,427	83,009	77,896	70,059	611,241
1801-05 . . .	107,700	102,717	93,274	84,898	82,432	77,630	72,251	620,902
1806-10 . . .	114,922	104,527	98,890	88,987	80,005	77,109	71,921	636,361
1811-15 . . .	117,400	110,162	99,249	92,998	82,847	73,755	70,308	646,719
1816-20 . . .	117,245	114,405	106,505	95,074	88,308	77,867	68,705	668,109
1821-25 . . .	114,855	113,294	110,056	101,689	90,011	82,846	72,537	685,288
1826-30 . . .	121,630	112,225	109,833	106,312	97,172	85,197	77,747	710,116
1831-35 . . .	136,333	117,532	107,352	104,569	100,138	90,657	78,570	735,151
1836-40 . . .	156,686	133,022	113,974	103,266	99,810	94,709	84,897	786,364
1841-45 . . .	164,868	151,903	128,804	109,632	98,512	94,359	88,885	836,963
1846-50 . . .	163,313	159,904	146,733	124,102	104,776	93,276	88,791	880,895
1851-55 . . .	165,020	158,645	154,979	141,254	118,819	99,363	87,774	925,854
1856-60 . . .	169,315	158,817	152,866	147,941	134,284	111,982	92,918	968,123
1861-65 . . .	178,143	165,594	157,263	146,396	144,053	128,213	107,522	1,027,184
1866-70 . . .	185,897	169,722	157,163	149,726	139,041	136,155	120,735	1,058,439

1871-75 . .	200,139	173,343	156,069	146,677	140,771	130,439	127,369	1,074,807
1876-80 . .	222,504	190,398	164,100	148,737	140,030	134,100	124,108	1,123,977
1881-85 . .	218,533	201,767	171,664	152,432	140,634	132,445	126,792	1,144,267
1886-90 . .	207,300	195,648	182,525	159,523	143,767	133,204	125,552	1,147,519
1891-95 . .	219,376	180,733	173,507	169,453	151,358	136,737	126,634	1,157,798
1896-1900 . .	231,833	201,023	168,936	165,543	162,562	145,136	130,916	1,205,949
1901-05 . .	244,310	211,221	187,663	161,841	159,859	156,549	139,259	1,260,702
1906-10 . .	248,029	224,156	198,117	179,308	155,622	153,730	150,240	1,309,202
1911-15 . .	256,645	232,400	214,077	191,957	173,783	150,502	148,267	1,367,631
1916-20 . .	269,649	244,691	222,970	206,490	185,671	167,961	144,978	1,442,410
1921-22 . .	275,605	255,180	232,404	213,991	195,870	176,943	157,229	1,507,222

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AVERAGE YEARLY BIRTHS BY QUINQUENNIAL AGE GROUPS OF MOTHERS, 1776-1926

YEARS	UNDER 20 YEARS	20 TO 25 YEARS	25 TO 30 YEARS	30 TO 35 YEARS	35 TO 40 YEARS	40 TO 45 YEARS	45 AND MORE YEARS	TOTAL	FEMALE LIVE-BORN
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Denmark

(Confinements)

1878-79	1,240	11,121	17,552	15,558	11,621	5,339	489	62,920	30,122
1880-84	1,249	11,844	18,750	16,607	11,679	5,283	546	65,958	31,606
1885-89	1,473	11,565	19,569	17,482	12,275	5,268	520	68,552	32,980
1890-94	1,524	12,071	18,574	17,537	12,591	5,285	478	68,060	32,774
1895-1900	1,911	14,033	19,997	17,043	12,494	5,468	486	71,432	34,404
1901-05	2,437	15,670	21,581	17,041	11,565	5,028	467	73,789	35,568
1906-10	3,074	17,165	21,987	17,438	11,261	4,631	394	75,950	36,716
1911-15	3,225	16,608	21,302	16,623	11,038	4,308	394	73,498	35,590
1916-20	3,194	17,136	20,698	16,570	10,718	4,276	358	72,950	35,205
1921-25	3,856	18,295	21,867	16,182	10,543	4,180	368	75,291	36,318
1926	3,913	17,466	20,886	15,574	9,239	3,802	323	71,203	34,447

England and Wales

(Live-Born)

1921	27,262	183,856	252,865	209,046	142,668	30,288	2,829	848,814	413,919
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Finland

(Confinements)

1866-70	1,179	9,968	15,597	14,074	10,555	5,556	879	57,808	27,731
1871-75	1,645	12,499	18,388	17,528	12,137	6,166	999	69,362	33,321
1876-80	1,891	13,148	19,349	18,116	14,105	6,718	973	74,300	35,800
1881-85	1,790	13,842	19,151	18,712	14,347	7,795	1,027	76,664	36,862
1886-90	1,904	13,619	20,847	19,109	15,328	8,259	1,263	80,329	38,554
1891-95	1,948	14,648	18,800	19,544	14,711	8,102	1,167	78,920	37,941
1896-1900	2,253	17,022	22,799	18,891	16,050	8,339	1,282	86,635	41,631
1901-05	2,144	17,068	23,943	21,318	14,613	8,569	1,113	88,768	42,737
1906-10	2,316	18,336	24,758	22,511	16,918	7,742	1,195	93,776	45,115
1911-15	2,385	16,917	23,287	20,956	16,244	8,506	1,006	89,301	42,786
1916-20	2,073	15,173	19,990	18,623	14,144	7,583	1,051	78,637	37,704
1921-25	2,436	17,487	21,423	17,643	13,904	7,162	993	81,048	38,832

France

(Live- and still-born)

1892-07	47,825	225,208	258,280	194,233	119,347	46,971	7,736	899,600	419,940
1898-1903	45,806	228,826	257,355	181,259	117,146	44,344	6,459	881,195	412,199
1904-07	45,394	220,773	246,323	174,688	104,093	41,552	6,113	838,936	392,496
1908-13	45,324	218,461	232,822	163,339	99,388	35,359	3,315	798,008	372,762
1914-19 ¹	20,242	99,122	118,541	94,333	65,055	26,205	2,393	425,891	198,310
1920-21	42,277	225,697	258,210	179,198	108,621	40,110	3,600	857,713	400,223
1922-25	44,520	223,850	233,658	160,137	92,284	33,771	3,066	791,286	371,374

¹ 77 provinces only (excluding the 10 occupied provinces)

AGE OF MOTHERS

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AVERAGE YEARLY BIRTHS BY QUINQUENNIAL AGE GROUPS OF MOTHERS,
1776-1926 (Continued)

YEARS	UNDER 20 YEARS	20 TO 25 YEARS	25 TO 30 YEARS	30 TO 35 YEARS	35 TO 40 YEARS	40 TO 45 YEARS	45 AND MORE YEARS	TOTAL	FEMALE LIVE- BORN
<i>Nine German States</i> ¹ (Live- and still-born)									
1881-90	2,243	18,820	25,860	20,324	13,869	5,781	649	87,546	--
1891-1900	2,737	22,361	29,673	22,101	13,912	5,351	560	96,695	--
1901-10	3,454	23,725	31,366	22,252	13,698	5,193	489	100,177	--
¹ Hesse, Oldenburg, Brunswick, and six Thuringian states.									
<i>Saxony</i> (Live- and still-born)									
1911-14	7,249	37,769	37,071	24,002	15,514	5,341	394	127,340	59,807
1915-19	2,521	16,958	21,468	14,912	9,323	3,669	281	69,132	32,290
1920-23	4,672	30,639	34,239	22,670	11,840	4,084	295	108,439	50,631
1924	4,517	25,928	26,984	17,134	9,189	2,842	237	86,811	40,533
<i>Norway</i> (Live-Born)									
1874-76	654	8,410	14,475	13,963	10,822	6,657	1,524	56,505	27,515
1889-92 ¹	697	8,224	15,575	15,717	13,149	6,983	1,449	61,794	29,135
1899-1905	1,228	10,788	17,152	15,387	12,563	6,840	1,248	65,206	31,683
1910-11	1,244	10,411	16,082	15,160	11,614	5,865	1,089	61,465	29,898
1916-20	1,423	12,275	17,127	15,011	10,992	5,791	895	63,514	30,697
¹ Live- and still-born.									

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AVERAGE YEARLY BIRTHS BY QUINQUENNIAL AGE GROUPS OF MOTHERS, 1776-1926 (Continued)

YEARS	UNDER 20 YEARS	20 TO 25 YEARS	25 TO 30 YEARS	30 TO 35 YEARS	35 TO 40 YEARS	40 TO 45 YEARS	45 AND MORE YEARS	TOTAL	FEMALE LIVE- BORN
<i>Sweden</i>									
(Confinements)									
1776-80	2,029	11,413	18,960	18,715	12,979	6,758	1,550	72,404	34,982
1781-85	2,091	10,979	18,399	17,869	12,420	5,684	1,226	68,668	33,301
1786-90	1,976	10,951	18,302	18,786	13,149	6,294	1,225	70,683	34,148
1791-95	1,983	11,499	19,854	20,362	14,460	7,198	1,355	76,711	37,039
1796-1800	2,037	11,800	19,162	20,467	14,974	7,200	1,439	77,079	37,160
1801-05	1,852	12,026	19,249	18,914	14,498	7,313	1,414	75,266	36,458
1806-10	1,749	11,668	19,993	19,019	13,384	6,939	1,399	74,151	35,952
1811-15	1,952	12,951	20,993	21,227	15,093	6,926	1,303	80,445	39,053
1816-20	1,824	13,754	22,691	21,905	16,537	8,014	1,327	86,052	41,622
1821-25	1,942	14,814	25,702	25,561	18,102	9,139	1,507	96,767	46,812
1826-30	1,707	14,268	24,709	25,638	19,079	9,134	1,510	96,045	46,428
1831-35	1,660	14,185	24,356	25,362	19,790	9,932	1,458	96,723	46,522
1836-40	1,382	14,317	24,880	24,452	19,350	9,967	1,529	95,677	46,127
1841-45	1,435	15,406	27,548	26,584	19,679	10,436	1,570	102,658	49,427
1846-50	1,202	15,073	29,363	28,841	20,671	10,001	1,568	106,719	51,135
1851-55	1,253	14,945	30,992	32,574	23,205	10,997	1,472	115,338	55,211
1856-60	1,353	16,163	31,286	35,475	28,265	13,522	1,864	127,928	61,380
1861-65	1,591	17,305	32,735	35,105	30,003	16,280	2,108	135,127	64,747
1866-70	1,595	16,782	30,753	32,812	26,872	14,988	2,183	125,985	60,265
1871-75	1,819	18,359	32,329	34,167	28,594	15,822	2,304	133,393	63,819
1876-80	2,222	20,357	34,446	34,739	28,664	15,765	2,364	138,557	66,488
1881-85	2,245	21,220	34,572	34,321	27,460	15,071	2,141	137,030	65,700
1886-90	2,230	21,013	36,230	34,883	27,379	14,392	2,076	138,203	66,600
1891-95	2,553	19,492	33,560	35,380	27,260	14,035	1,828	134,108	64,445
1896-1900	3,395	23,253	32,884	33,447	28,031	14,070	1,657	136,737	65,701
1901-05	3,893	25,234	36,280	31,333	25,525	13,749	1,600	137,614	66,270
1906-10	4,696	27,322	36,905	33,036	23,237	12,133	1,506	138,835	66,623
1911-15	5,000	26,337	34,953	30,387	22,657	10,421	1,203	130,958	63,042
1916-20	4,569	25,803	33,149	28,912	20,610	9,866	1,061	123,970	59,628
1921-22	5,329	26,974	33,163	27,708	20,026	9,308	1,049	123,557	59,526

APPENDIX D

LIFE TABLES AND FERTILITY TABLES

I. LIFE TABLES

THE tables on pages 130-33 give the female survivors at the age from 15 to 50 years in every country of Western and Northern Europe in each period for which official mortality tables and the number of births by age of mothers are available.

Denmark. 1855-1920, see *Statistisk Tabelværk*, Fourth Series, Letter A, No. 9, pp. 25*-26*, Fifth Series, Letter A, No. 2, p. 18*, No. 6, p. 30*, No. 8, p. 35*, No. 13, p. 39*, No. 15, p. 47*; 1921-25, see *Statistisk Aarbog 1927*, p. 25.

England. 1920-22, see *The Registrar-General's Decennial Supplement, England and Wales 1921, Part I, Life Tables*, p. 60.

Finland. 1881-90, see *Éléments Démographiques Principaux de la Finlande pour les Années 1750-1890*, Vol. II, pp. 376-377; 1901-20, see *Annuaire Statistique de Finlande 1927*, p. 63.

France. 1898-1903, see *Résultats Statistiques du Recensement de 1901*, Vol. IV, pp. 69-70; 1908-13, see *Annuaire Statistique 1921*, p. 16.

Germany. 1881-1910, see *Statistik des Deutschen Reichs*, Vol. 246, pp. 16*-17*.

Sweden. 1816-1910, see *Tables de Mortalité et de Survie en Suède pour les Années 1816-1910*, pp. 26-27; 1911-20, see *Statistisk Årsbok för Sverige 1927*, pp. 62-63.

FEMALE SURVIVORS IN CHILD-BEARING AGE, 1816-1925
(per 100,000 Live-Born)

YEARS OF AGE	DENMARK						
	1885-94	1895-1900	1901-05	1906-10	1911-15	1916-20	1921-25
15	75,786	80,246	83,856	85,596	87,094	87,235	89,724
16	75,357	79,925	83,571	85,346	86,888	86,983	89,550
17	74,932	79,590	83,267	85,075	86,650	86,705	89,354
18	74,509	79,245	82,952	84,789	86,388	86,374	89,130
19	74,089	78,897	82,627	84,491	86,108	85,992	88,892
20	73,672	78,547	82,294	84,180	85,820	85,583	88,642
21	73,262	78,192	81,955	83,862	85,523	85,177	88,381
22	72,860	77,831	81,606	83,537	85,208	84,758	88,129
23	72,459	77,465	81,247	83,203	84,884	84,293	87,879
24	72,049	77,092	80,880	82,857	84,560	83,829	87,599
25	71,624	76,707	80,506	82,500	84,231	83,374	87,307
26	71,179	76,313	80,129	82,134	83,900	82,875	87,016
27	70,720	75,912	79,748	81,760	83,570	82,363	86,739
28	70,249	75,503	79,360	81,377	83,226	81,855	86,481
29	69,772	75,085	78,965	80,989	82,873	81,323	86,191
30	69,292	74,659	78,555	80,598	82,511	80,785	85,869
31	68,812	74,221	78,131	80,205	82,131	80,269	85,571
32	68,328	73,770	77,700	79,806	81,731	79,777	85,266
33	67,839	73,310	77,264	79,399	81,331	79,276	84,933
34	67,342	72,842	76,817	78,987	80,946	78,753	84,615
35	66,834	72,369	76,365	78,565	80,557	78,230	84,278
36	66,318	71,893	75,911	78,133	80,138	77,725	83,933
37	65,796	71,416	75,449	77,697	79,693	77,242	83,575
38	65,262	70,936	74,980	77,253	79,250	76,767	83,181
39	64,712	70,452	74,502	76,803	78,803	76,261	82,786
40	64,142	69,963	74,007	76,341	78,336	75,736	82,392
41	63,559	69,462	73,493	75,865	77,871	75,230	81,986
42	62,978	68,944	72,970	75,375	77,411	74,731	81,557
43	62,399	68,412	72,443	74,870	76,923	74,226	81,123
44	61,820	67,867	71,913	74,352	76,415	73,709	80,673
45	61,243	67,308	71,377	73,818	75,905	73,165	80,170
46	60,669	66,751	70,825	73,276	75,378	72,602	79,638
47	60,096	66,190	70,253	72,728	74,843	72,050	79,111
48	59,520	65,609	69,659	72,165	74,298	71,506	78,558
49	58,937	65,000	69,044	71,587	73,698	70,936	77,950
50	58,344	64,364	68,405	70,990	73,038	70,326	77,308

FEMALE SURVIVORS IN CHILD-BEARING AGE, 1816-1925
(per 100,000 Live-Born)

YEARS OF AGE	ENGLAND	FINLAND			FRANCE	
	1920-22	1881-90	1901-10	1911-20	1898-1903	1908-13
15 . . .	87,067	69,916	75,097	77,777	77,248	81,566
16 . . .	86,869	69,573	74,616	77,310	76,903	81,258
17 . . .	86,658	69,211	74,146	76,815	76,527	80,923
18 . . .	86,432	68,830	73,671	76,300	76,124	80,560
19 . . .	86,191	68,438	73,229	75,789	75,696	80,168
20 . . .	85,938	68,034	72,782	75,259	75,246	79,750
21 . . .	85,675	67,619	72,338	74,702	74,774	79,312
22 . . .	85,404	67,200	71,875	74,127	74,285	78,858
23 . . .	85,126	66,770	71,422	73,571	73,780	78,391
24 . . .	84,843	66,329	70,972	73,027	73,261	77,918
25 . . .	84,553	65,878	70,518	72,465	72,732	77,437
26 . . .	84,257	65,423	70,053	71,878	72,197	76,948
27 . . .	83,955	64,965	69,549	71,303	71,661	76,456
28 . . .	83,649	64,510	69,041	70,718	71,129	75,962
29 . . .	83,337	64,052	68,516	70,166	70,599	75,468
30 . . .	83,019	63,584	68,009	69,619	70,068	74,972
31 . . .	82,694	63,101	67,513	69,083	69,536	74,472
32 . . .	82,362	62,603	67,040	68,530	69,002	73,967
33 . . .	82,021	62,090	66,557	67,968	68,465	73,459
34 . . .	81,672	61,575	66,078	67,377	67,923	72,950
35 . . .	81,314	61,052	65,569	66,825	67,377	72,442
36 . . .	80,947	60,527	65,058	66,257	66,825	71,934
37 . . .	80,571	59,988	64,505	65,714	66,269	71,423
38 . . .	80,186	59,448	63,970	65,149	65,709	70,897
39 . . .	79,790	58,901	63,426	64,608	65,147	70,361
40 . . .	79,381	58,347	62,900	64,065	64,583	69,814
41 . . .	78,959	57,787	62,328	63,514	64,015	69,255
42 . . .	78,522	57,226	61,767	62,942	63,441	68,687
43 . . .	78,070	56,659	61,217	62,363	62,859	68,118
44 . . .	77,600	56,098	60,709	61,783	62,266	67,541
45 . . .	77,109	55,543	60,199	61,208	61,661	66,949
46 . . .	76,594	54,988	59,657	60,627	61,043	66,335
47 . . .	76,053	54,427	59,102	60,039	60,409	65,701
48 . . .	75,484	53,856	58,541	59,391	59,757	65,036
49 . . .	74,883	53,264	57,979	58,726	59,084	64,345
50 . . .	74,246	52,646	57,388	58,027	58,385	63,630

FEMALE SURVIVORS IN CHILD-BEARING AGE, 1816-1925
(per 100,000 Live-Born)

YEARS OF AGE	GERMANY			SWEDEN		
	1881-90	1891-1900	1901-10	1816-40	1841-50	1851-60
15 . .	65,306	69,562	74,887	71,940	74,095	71,579
16 . .	65,045	69,319	74,661	71,610	73,766	71,235
17 . .	64,764	69,060	74,411	71,260	73,419	70,865
18 . .	64,468	68,787	74,143	70,900	73,067	70,489
19 . .	64,160	68,500	73,861	70,520	72,712	70,148
20 . .	63,838	68,201	73,564	70,120	72,352	69,741
21 . .	63,500	67,888	73,254	69,700	71,980	69,382
22 . .	63,142	67,559	72,929	69,280	71,587	68,997
23 . .	62,762	67,212	72,586	68,840	71,176	68,596
24 . .	62,360	66,848	72,225	68,370	70,763	68,174
25 . .	61,937	66,467	71,849	67,890	70,338	67,728
26 . .	61,497	66,072	71,463	67,390	69,913	67,301
27 . .	61,042	65,666	71,070	66,880	69,476	66,860
28 . .	60,570	65,249	70,669	66,340	69,038	66,416
29 . .	60,082	64,822	70,261	65,790	68,589	65,944
30 . .	59,584	64,385	69,848	65,230	68,126	65,446
31 . .	59,076	63,937	69,432	64,660	67,636	64,936
32 . .	58,554	63,479	69,008	64,070	67,118	64,400
33 . .	58,018	63,010	68,575	63,470	66,592	63,920
34 . .	57,473	62,533	68,132	62,870	66,049	63,339
35 . .	56,921	62,047	67,679	62,250	65,487	62,750
36 . .	56,360	61,549	67,215	61,620	64,914	62,172
37 . .	55,789	61,041	66,744	60,980	64,314	61,548
38 . .	55,215	60,524	66,266	60,320	63,696	60,938
39 . .	54,638	59,998	65,779	59,640	63,066	60,341
40 . .	54,054	59,467	65,283	58,960	62,416	59,665
41 . .	53,467	58,931	64,779	58,260	61,752	59,039
42 . .	52,880	58,391	64,269	57,550	61,072	58,360
43 . .	52,297	57,848	63,754	56,820	60,382	57,659
44 . .	51,720	57,302	63,238	56,090	59,679	56,956
45 . .	51,146	56,751	62,717	55,320	58,969	56,298
46 . .	50,569	56,195	62,181	54,540	58,258	55,639
47 . .	49,983	55,628	61,628	53,740	57,544	54,913
48 . .	49,385	55,040	61,053	52,930	56,822	54,175
49 . .	48,765	54,423	60,449	52,100	56,098	53,457
50 . .	48,110	53,768	59,812	51,260	55,363	52,698

FEMALE SURVIVORS IN CHILD-BEARING AGE, 1816-1925
(per 100,000 Live-Born)

YEARS OF AGE	SWEDEN (Continued)						
	1861-70	1871-80	1881-90	1891-1900	1901-10	1911-15	1916-20
15	72,670	74,947	77,833	80,910	85,060	87,847	87,579
16	72,370	74,632	77,502	80,559	84,704	87,513	87,181
17	72,060	74,308	77,158	80,194	84,313	87,145	86,715
18	71,750	73,976	76,808	79,828	83,905	86,767	86,205
19	71,410	73,636	76,449	79,428	83,486	86,367	85,664
20	71,070	73,283	76,080	79,005	83,064	85,938	85,106
21	70,710	72,915	75,703	78,585	82,627	85,501	84,537
22	70,350	72,532	75,317	78,154	82,170	85,068	83,961
23	69,970	72,135	74,920	77,705	81,705	84,632	83,380
24	69,580	71,724	74,510	77,240	81,252	84,193	82,777
25	69,180	71,296	74,089	76,771	80,790	83,725	82,169
26	68,780	70,851	73,655	76,303	80,309	83,246	81,540
27	68,370	70,391	73,212	75,835	79,822	82,783	80,901
28	67,950	69,921	72,766	75,382	79,346	82,323	80,277
29	67,530	69,444	72,320	74,922	78,874	81,883	79,664
30	67,090	68,964	71,868	74,449	78,400	81,477	79,065
31	66,640	68,481	71,405	73,974	77,920	81,027	78,474
32	66,190	67,995	70,938	73,496	77,455	80,559	77,889
33	65,710	67,504	70,469	73,012	76,992	80,100	77,309
34	65,250	67,006	70,000	72,535	76,518	79,640	76,734
35	64,740	66,498	69,521	72,053	76,031	79,178	76,173
36	64,220	65,985	69,030	71,547	75,537	78,707	75,620
37	63,700	65,464	68,529	71,044	75,044	78,230	75,073
38	63,180	64,931	68,021	70,550	74,539	77,742	74,535
39	62,610	64,380	67,501	70,031	74,028	77,264	74,009
40	62,040	63,819	66,969	69,499	73,519	76,772	73,475
41	61,430	63,252	66,429	68,967	73,005	76,251	72,935
42	60,840	62,685	65,887	68,427	72,483	75,713	72,394
43	60,220	62,118	65,350	67,893	71,959	75,171	71,860
44	59,600	61,554	64,816	67,356	71,436	74,639	71,326
45	59,010	60,992	64,277	66,808	70,900	74,107	70,780
46	58,380	60,429	63,724	66,260	70,356	73,574	70,231
47	57,760	59,857	63,160	65,718	69,812	73,030	69,673
48	57,120	59,270	62,593	65,181	69,223	72,465	69,122
49	56,480	58,661	62,018	64,601	68,641	71,888	68,547
50	55,780	58,029	61,430	63,995	68,027	71,283	67,950

II. FERTILITY TABLES

The tables on pages 135-38 give (1) the years lived by 1,000 live-born females in each quinquennial age group from 15 to 50 years according to the life tables; (2) the births (or confinements) per 1,000 women for each quinquennial age group from 15 to 50 years; (3) the births (or confinements) per 1,000 women for each quinquennial age group from 15 to 50 years adjusted to the age composition derived from the life table.

(1) The years lived by 1,000 live-born females in each age group are derived from the number of female survivors of the life table by assuming that the years lived by 1,000 women of 15 to 16 years would be equal to the average of the women surviving 15 and those surviving 16 years, etc. The number of female survivors has been taken from the life tables given on pages 130-33 with the exception of those for Denmark 1926, Finland 1921-25, France 1920-21, 1922-25, Germany 1925, Sweden 1921-22. Since so far no official life tables have been calculated for those recent periods, we have computed abbreviated life tables ourselves by using the method of Becker-Zeuner, as simplified by Rahts, with the modification for the first year of age suggested by the author in *Vierteljahrsberichte des Statistischen Amtes der Stadt Schæneberg 1911*, II, pp. 49-50.

(2) The fertility rates have been taken from the table on pages 37-39, or computed on the basis of data taken from the sources quoted in Appendix C.

(3) The adjustment of the fertility rates to the age composition derived from the life table has been effected by multiplying (1) by (2).

FERTILITY TABLES, 1816-1926

DENMARK.

YEARS OF AGE	1885-94	1895-1900	1901-05	1906-10	1911-15	1916-20	1921-25	1926
<i>Years Lived by 1,000 Live-born Females</i>								
15-20	3,736.16	3,970.54	4,154.92	4,245.89	4,324.91	4,324.63	4,461.09	4,482
20-25	3,632.78	3,882.07	4,070.88	4,167.99	4,252.01	4,225.36	4,399.63	4,426
25-30	3,523.78	3,784.96	3,977.33	4,078.09	4,169.40	4,104.95	4,330.15	4,359
30-35	3,403.84	3,676.57	3,873.72	3,979.79	4,076.73	3,975.83	4,254.58	4,288
35-40	3,275.76	3,558.63	3,760.28	3,873.39	3,973.30	3,849.78	4,168.10	4,202
40-45	3,134.48	3,433.20	3,635.11	3,755.41	3,857.41	3,723.46	4,066.20	4,100
45-50	2,990.16	3,293.86	3,496.72	3,621.60	3,726.88	3,588.40	3,939.96	3,979
Total	23,696.96	25,599.83	26,968.96	27,722.16	28,380.64	27,792.41	29,619.71	29,836

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<i>Confinements per 1,000 Women</i>								
15-20	15.5	17.3	20.1	24.5	23.9	22.1	24.0	23.6
20-25	132.6	140.3	143.1	148.4	137.6	128.6	122.0	114.9
25-30	233.7	224.1	225.3	208.2	187.8	173.5	160.8	145.1
30-35	224.8	209.0	198.1	182.6	161.4	148.1	131.5	122.6
35-40	183.4	170.0	150.0	135.5	119.6	106.5	93.3	79.6
40-45	90.0	78.9	66.9	60.8	54.2	47.8	41.0	35.9
45-50	9.2	8.2	7.3	5.9	5.5	4.6	4.1	3.3

<i>Confinements per 1,000 Women in Stationary Population</i>								
15-20]	57.90	68.70	83.60	103.99	103.37	95.57	107.07	106
20-25	481.89	544.78	582.56	618.36	585.08	543.38	536.75	508
25-30	823.57	848.22	895.99	849.10	783.01	712.21	696.29	632
30-35	765.10	768.18	767.59	726.71	657.98	588.82	559.48	526
35-40	600.70	604.92	564.05	524.89	475.21	410.00	388.88	335
40-45	282.22	270.90	243.05	228.53	209.07	177.98	166.71	147
45-50	27.41	27.03	25.63	21.28	20.50	16.51	16.15	13
Total	3,038.79	3,132.73	3,162.47	3,072.86	2,834.22	2,544.47	2,471.34	2,267

FERTILITY TABLES, 1816-1926

YEARS OF AGE	ENGLAND	FINLAND				FRANCE				
	1921	1881-90	1901-10	1911-20	1921-25	1898-1903	1908-13	1920-21	1922-25	
<i>Years Lived by 1,000 Live-born Females</i>										
15-20 . . .	4,326.53	3,450.27	3,696.02	3,827.32	4,125	3,814.97	4,035.67	4,139	4,289	
20-25 . . .	4,262.93	3,348.74	3,582.57	3,692.89	4,007	3,700.89	3,930.73	4,036	4,187	
25-30 . . .	4,189.84	3,236.81	3,464.22	3,551.07	3,885	3,569.86	3,810.38	3,915	4,070	
30-35 . . .	4,109.16	3,116.87	3,339.77	3,411.80	3,770	3,436.48	3,685.55	3,793	3,955	
35-40 . . .	4,018.41	2,985.64	3,211.94	3,271.73	3,656	3,299.30	3,557.43	3,671	3,842	
40-45 . . .	3,913.96	2,847.15	3,075.70	3,132.39	3,535	3,157.03	3,419.83	3,544	3,720	
45-50 . . .	3,786.92	2,706.29	2,940.73	2,984.00	3,403	3,003.16	3,267.06	3,403	3,575	
Total . . .	28,607.75	21,691.77	23,310.95	23,871.20	26,381	23,981.69	25,706.65	26,501	27,638	
136	<i>Live-born per 1,000 Women</i>	<i>Confinements per 1,000 Women</i>				<i>Live- and still-born per 1,000 Women</i>				
	15-20 . . .	15.3	19.0	16.2	14.6	14.5	27.8	28.4	24.6	25.3
	20-25 . . .	108.0	153.7	138.5	116.7	115.8	141.2	139.3	137.5	133.4
	25-30 . . .	156.1	234.1	211.9	167.7	161.1	169.9	150.1	166.1	146.1
	30-35 . . .	137.5	239.6	216.0	165.6	138.9	128.6	109.1	118.3	103.5
	35-40 . . .	96.9	202.5	184.9	142.3	119.9	86.8	70.8	72.5	60.2
	40-45 . . .	22.0	121.2	106.0	86.0	68.8	35.7	27.2	27.8	22.9
45-50 . . .	2.3	19.2	16.0	13.1	10.7	5.7	2.7	2.7	2.3	
	<i>Live-born per 1,000 Women in Stationary Population</i>	<i>Confinements per 1,000 Women in Stationary Population</i>				<i>Live- and still-born per 1,000 Women in Stationary Population</i>				
	15-20 . . .	66.44	65.69	59.97	55.78	60	106.27	114.74	102	109
	20-25 . . .	460.23	514.57	496.32	430.95	464	522.46	547.69	555	559
	25-30 . . .	653.99	757.97	734.15	595.40	626	606.44	571.79	650	595
	30-35 . . .	565.13	746.71	721.52	565.00	524	441.86	402.02	449	409
	35-40 . . .	389.47	604.69	593.69	465.63	438	286.33	251.90	266	231
	40-45 . . .	86.03	345.19	325.99	269.43	243	112.68	93.02	99	85
45-50 . . .	8.61	52.0	46.94	39.13	36	17.15	8.85	9	8	
Total . . .	2,229.90	3,086.82	2,978.58	2,421.32	2,391	2,093.19	1,990.01	2,130	1,996	

FERTILITY TABLES, 1816-1926

YEARS OF AGE	GERMANY				SWEDEN		
	1881-90	1891-1900	1901-10	1925	1816-40	1841-50	1851-60
	<i>Years Lived by 1,000 Live-born Females</i>						
15-20	3,230.09	3,445.48	3,713.01	4,305	3,553.20	3,661.88	3,533.97
20-25	3,146.51	3,368.41	3,637.00	4,241	3,451.95	3,568.51	3,438.84
25-30	3,039.51	3,272.35	3,543.12	4,163	3,329.60	3,462.48	3,331.08
30-35	2,913.74	3,161.75	3,439.10	4,078	3,188.10	3,342.01	3,206.93
35-40	2,774.90	3,038.69	3,324.85	3,987	3,031.65	3,199.42	3,062.06
40-45	2,629.64	2,905.81	3,200.40	3,884	2,858.60	3,035.77	2,899.96
45-50	2,483.30	2,765.45	3,065.75	3,760	2,666.00	2,858.88	2,726.82
Total	20,217.69	21,957.94	23,923.23	28,418	22,079.10	23,128.95	22,199.66
	<i>Live- and still-born per 1,000 Women</i>				<i>Confinements per 1,000 Women</i>		
15-20	20.0	21.7	24.3	22.8	13.2	8.0	7.8
20-25	188.8	192.2	183.9	131.0	120.8	97.8	97.7
25-30	295.6	289.9	272.4	146.0	223.3	206.5	202.3
30-35	253.8	243.4	207.3	102.2	240.6	237.1	235.3
35-40	194.0	175.1	144.2	58.5	195.3	198.5	203.3
40-45	85.5	73.3	61.6	21.1	107.1	108.9	116.0
45-50	10.9	8.6	6.7	1.8	19.1	17.7	18.5
	<i>Live- and still-born per 1,000 Women in Stationary Population</i>				<i>Confinements per 1,000 Women in Stationary Population</i>		
15-20	64.63	74.87	90.30	98	46.79	29.42	27.54
20-25	593.92	647.36	668.82	555	417.05	348.82	335.88
25-30	898.55	948.68	965.14	608	743.69	715.16	673.90
30-35	739.59	769.47	712.93	417	767.01	792.49	754.61
35-40	538.38	532.08	479.57	233	592.11	635.03	622.68
40-45	224.66	212.93	197.12	82	306.13	330.66	336.44
45-50	27.04	23.86	20.53	7	50.96	50.49	50.34
Total	3,086.77	3,209.25	3,134.41	2,000	2,923.74	2,902.07	2,801.39

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FERTILITY TABLES, 1816-1926

SWEDEN (continued)

YEARS OF AGE	1861-70	1871-80	1881-90	1891-1900	1901-10	1911-15	1916-20	1921-22
<i>Years Lived by 1,000 Live-born Females</i>								
15-20	3,594.60	3,706.67	3,848.74	3,999.67	4,204.70	4,346.85	4,321.08	4,480
20-25	3,507.35	3,615.96	3,755.34	3,895.72	4,096.81	4,242.25	4,182.92	4,393
25-30	3,407.65	3,507.37	3,649.32	3,780.52	3,979.46	4,128.36	4,029.99	4,296
30-35	3,297.05	3,387.17	3,535.06	3,662.68	3,861.01	4,016.54	3,880.25	4,197
35-40	3,171.00	3,259.18	3,413.26	3,539.48	3,739.23	3,899.18	3,740.61	4,092
40-45	3,026.15	3,120.15	3,281.05	3,407.96	3,610.92	3,772.13	3,606.43	3,978
45-50	2,871.35	2,977.27	3,143.49	3,271.62	3,474.96	3,636.52	3,469.38	3,850
Total	22,875.15	23,573.77	24,626.26	25,557.65	26,967.09	28,041.83	27,230.66	29,286
<i>Confinements per 1,000 Women</i>								
15-20	8.8	9.6	10.5	13.7	18.0	19.5	16.9	19.3
20-25	101.7	106.4	106.3	113.8	121.8	113.3	105.5	105.7
25-30	201.9	208.5	199.9	194.2	189.9	163.3	148.7	142.7
30-35	229.3	233.3	221.9	205.5	188.4	158.3	140.0	129.4
35-40	200.9	203.9	192.8	175.7	154.4	130.4	111.0	102.3
40-45	118.3	119.4	110.9	98.7	83.4	69.2	58.7	52.6
45-50	18.8	18.6	16.7	13.3	10.5	8.1	7.3	6.7
<i>Confinements per 1,000 Women in Stationary Population</i>								
15-20	31.46	35.44	40.45	54.56	75.18	84.68	73.22	87
20-25	356.55	384.86	399.08	442.09	497.96	480.76	441.10	464
25-30	688.06	731.50	729.49	733.75	755.63	674.06	599.14	613
30-35	756.19	790.07	784.23	752.65	727.78	635.82	543.30	544
35-40	637.08	664.59	658.15	622.46	577.93	508.35	415.22	418
40-45	357.91	372.56	363.90	337.56	302.17	261.18	211.83	209
45-50	53.98	55.26	52.53	44.04	36.69	29.51	25.39	26
Total	2,881.23	3,034.28	3,027.83	2,987.11	2,973.34	2,674.36	2,309.20	2,361

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