

English Pamphlet Series No. 57  
Institute of Population Problems  
October 10, 1963

AN ANALYSIS OF THE DECLINE  
OF BIRTH RATE IN JAPAN

by

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## FOREWORD

This paper is originally the report of my demographic workshop of 1962 - 1963 Training Program in Demography at Princeton University which have been performed under the supervision of Professor Ansley J. Coale, Director of the Office of Population Research, Princeton University. I am very pleased to have an opportunity to publish as one of the English Series of Population Studies of the Institute of Population Problems, Welfare Ministry Tokyo.

October 10, 1963

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## INTRODUCTION

The first modern census of Japan was taken in 1920. It was on about the same date that the birth rate began to decline. The crude birth rate was 36.2 per thousand in 1920, 32.4 per thousand in 1930, 29.4 per thousand in 1940, 28.1 per thousand in 1950 and 17.2 per thousand in 1960. The speed of decline of the birth rate was especially rapid in Japan compared with the other West-European countries. That is, the time interval during which the crude birth rate declined from the level of 30 per thousand to the level of 20 per thousand was seventy eight years in France, thirty seven years in Sweden and twenty seven years in England.<sup>1</sup> It was about twenty years in Japan.

The purpose of this paper is to analyse the decline of the birth rate in Japan rather from the demographic viewpoint than from the sociological viewpoint. Although the main concern is in the analysis of the relationship between the birth rate and the marital status, some exposition on the statistical data and some explanation of the demographic transition of Japan will be presented in Chapter I and Chapter II.

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1 Mackenroth, F. Bevölkerungslehre, 1953, S. 151

## CHAPTER I

### THE FUNDAMENTAL MATERIAL OF THE POPULATION -CENSUS DATA, VITAL REGISTRATION AND SOME ESTIMATES-

#### 1. Census data.

The census result is the most important fundamental data of the population. In Japan the first census was taken on October 1, 1920. Since that time, the statistics on the static situation of the Japan's population has been completely prepared.

After the first census taking nine regular population censuses and four special censuses have been conducted. Names and dates are as follows.

Name of Census	Census Date
Population Census of 1920	October 1, 1920
Population Census of 1925	October 1, 1925
Population Census of 1930	October 1, 1930
Population Census of 1935	October 1, 1935
Population Census of 1940	October 1, 1940
Population Census of 1944	February 22, 1944
Population Census of 1945	November 1, 1945
Population Census of 1946	April 26, 1946
Extraordinary Population Census of 1947	October 1, 1947
Population Census of 1948	August 1, 1948
Population Census of 1950	October 1, 1950

Name of Census	Census Date
Population Census of 1955	October 1, 1955
Population Census of 1960	October 1, 1960

The coverage and accuracy of these censuses have been almost complete, because of the powerfully centralized system of administration and the high cultural standard of the people. That the "Index of Preference" calculated by the Myers' method is very low as it is shown in Table 1 is one of the evidences.

TABLE 1

INDEX OF PREFERENCE BY THE MYER' METHOD

<u>Japan (female)</u>	<u>U.S.A.</u>
1.6 (1920)	20.8 (1880)
1.0 (1930)	15.6 (1890)
0.8 (1940)	9.4 (1900)
1.0 (1950)	11.2 (1910)
1.5 (1955)	9.0 (1920)
2.1 (1960)	8.6 (1930)

Source: Japan: Censuses, U.S.A.: Wolfenden, H.H., Population Statistics and Their Compilation, p. 49.



According to the classification by the United Nations, the census result of Japan is classified into the "Highly Accurate Group."<sup>2</sup>

2. The data from the vital registration.

The original system of the vital registration in Japan was started in 1872. In this year the Family Register was formed for the first time on a nation-wide scale. At first only births and deaths were registered, since 1880 marriage and divorce were added in the items of registration and then in 1886 still births were added.

In 1899 the system of vital registration changed from the decentralized system to the centralized system. This change of the system contributed to make the vital statistics much more complete. By reason of this circumstance, the modern system of the vital registration in Japan is ordinarily regarded to be established in 1899. And the consistent series of vital statistics are published on the period since 1900.

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2 The United Nations classified the census results of countries into five categories according to Whipple's Index as follows, I. Highly accurate data (Whipple's Index; less than 105); II Fairly accurate data (105-109.9); III. Approximate data (110-124.9); IV. Rough data (125-174.9); V. Very rough data (175 and more). U.N., Demographic Yearbook, 1960, pp. 17-19.

According to the current rules of the vital registration, a notification of birth must be given within fourteen days; that of death within seven days; and that of still birth within seven days. On the other hand, there is no rule which provides the time limit of the notification of marriage and divorce.

The report of birth and death has been performed pretty well. That is, the percentage of delayed notifications to regular notifications has been fairly low and declining as shown in Table 2.

TABLE 2

PERCENTAGE OF DELAYED NOTIFICATIONS TO REGULAR NOTIFICATIONS

Year	Birth	Death
1904 - 1913	4.01	0.60
1914 - 1923	3.96	0.62
1924 - 1933	3.33	0.67
1934 - 1943	3.17	0.63
1948 - 1952	0.95	0.52
1953	1.03	0.55
1954	0.92	0.53
1955	0.94	0.44
1956	0.94	0.39
1957	1.02	0.43
1958	1.00	0.42

Source: Population Encyclopedia, 1957, p.167; Division of Health and Welfare statistics, Welfare Minister's Secretariat, Vital Statistics, 1958.

That the rules of vital registration have no provision about the time limit of marriage notification is the cause of disturbing the completeness of marriage statistics. The distribution of registered marriages by the period between the date of wedding and that of registration is indicated in Table 3.

TABLE 3

DISTRIBUTION OF MARRIAGES BY THE PERIOD BETWEEN  
THE DATES OF WEDDING AND REGISTRATION

	1950	1955	1958
Total	100.0	100.0	100.0
Less than one year	73.5	80.8	84.0
1 - 2 year	17.6	12.3	10.3
2 - 3 year	3.6	2.6	2.1
3 - 5 year	1.9	1.6	1.2
5 -10 year	1.7	1.4	1.3
More than 10 year	1.6	1.3	1.2
Unknown	0.1	0.1	0

Source; Division of Health and Welfare Statistics, Welfare Minister's Secretariat, Vital Statistics 1958, Vol. 1, pp.265.

In addition, the vital registration deals with only the marriage de jure, it does not include the marriage de facto which has not been registered. On the other hand, there are

considerable number of persons who are married in the de facto sense but are not married in the de jure sense. The definition of "married" in the census taking, to the contrary to that of the vital registration, includes all persons who have a spouse, husband or wife, no matter whether they have notified or not. The estimated proportion of persons in the unregistered marriage among married persons in 1920 is shown in Table 4.

TABLE 4  
PROPORTION OF THE UNREGISTERED MARRIAGE AMONG ALL MARRIAGES  
-AN ESTIMATION FOR 1920-

Age	Male	Female
10 - 14	100.0	96.1
15 - 19	68.5	57.1
20 - 24	44.4	30.4
25 - 29	27.2	18.2
30 - 34	18.5	17.1
35 - 39	15.4	13.9
40 - 44	14.4	12.7
45 - 49	13.6	11.8
50 - 54	12.8	9.5
55 - 59	13.1	8.6
60 - 64	12.7	5.7
65 - 69	12.8	4.3
70 +	19.9	0.8
Total	17.6	17.0

Source; Okazaki, A., Positive Research on Population in Japan, 1950, p.421.

### 3. Population before census-taking.

There are several population data for the period before census-taking.

#### (a) The "domicile population".

The "domicile population" has been enumerated in conformity with the Family Registration Law. The first enumeration of the domicile population was conducted on March 8, 1872 (January 28, 1872 according to the calender of that time). From 1873 to 1897 the tabulation of the domicile population was made by adjusting births, deaths and acquisition and loss of domiciles annually to the basic figure of 1872. Therefore, there seems to be two kinds of errors in the domicile population. One are errors in actual enumerations, the other are errors in adjusting births, deaths and acquisition and loss of domiciles.

#### (b) The "current population".

The domicile population is the de jure population concerning the domicile; the current population is the de facto population. The current population was calculated on the basis of the domicile population by adjusting the regional migrations which could be known from the temporary residence register. These current populations include at least the same kind of errors as the domicile population because they were calculated on the basis of the domicile population. In addition they have errors about migration data.

(c) The estimated population since 1872 by Census Bureau.

The Bureau of Census estimated and published Japan's Population since 1872 (published in 1930) in order to get series of population data continuous to the census population. This estimation was made by using the actually enumerated population in 1872, the census population in 1920 and the vital statistics.

(d) The new estimation of the pre-census population.

Formerly I estimated the population by sex and age for the period 1870 - 1920.<sup>3</sup> The fundamental idea of this estimation is shown in the following.

(1) The basic population on which the estimation is made is the first census population by sex and age in October 1, 1920.

(2) The death rates were abnormally high in 1918 and 1920 because influenza prevailed in those years. These high rates should be considered as special cases, so I made an estimation from 1920 to 1918 directly by using "vital statistics".

(3) Starting from the population in January 1, 1918, every five years populations were estimated by the method of reverse survival ratios.

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3 Okazaki Y., "Population Estimates by Sex and Age from 1870's to 1920", Research Series, No.145 of Institute of Population Problems, Ministry of Health and Welfare, February 1, 1962.

(4) The survival ratios which were used in this estimation were calculated according to the method which Dr. Matsuura adopted in his work "Reformation of Japanese Pre-Census Life-Tables" (Kyushu Journal of Medical Science, September 1958).

In the following analysis I exclusively used my estimated population for the pre-census period. The reason why I prefer to my estimated population is that as it is shown in the next chapter, the trends of the crude birth and death rates calculated on my estimated population reveal a much more plausible pattern than the vital rates calculated on the other population.

## CHAPTER II

### THE DEMOGRAPHIC TRANSITION IN JAPAN ESPECIALLY ON THE TREND OF FERTILITY-

According to the official data of vital statistics, the crude birth rate was 25.3 per thousand in 1875, since then it gradually rised and reached at 31.7 per thousand in 1900, 33.9 per thousand in 1910 and 36.2 per thousand in 1920. Since 1920 the birth rate began to decline. On the other hand, the crude death rate maintained the level of about 20 per thousand from 1875 to 1920. After that it declined.

Suppose that these official vital rates are reliable, the demographic transition in Japan, the rising trend of the birth rate, seems to be a unique pattern, different from that of the West-European countries. Because the typical pattern in the demographic transition in the West-European countries is that the birth rate remained almost unchanged during the early period of modernization. But by the prevailing opinion at present, the rising trend of the official birth rate during the early period of modernization in Japan is simply the effect of improvement of the vital registration. The trend of the birth



rate is supposed to be declining. 4, 5

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4 Frumkin, G., "Japan's Demographic Expansion in the Light of Statistical Analysis, "Sociological Review, Vol. xxx, No. 1, Jan., 1938.

Morita, Y., "An Analysis of Japan's Population Increase during the Meiji Era. "Analysis of Population Increase, 1944, p.430

Taeuber, I., "Japan's Demographic Transition Re-Examined," Population Studies, Vol. xiv, No. 1. July 1960, p.33.

Honda, T., "Re-Examination of Japan's Vital Rates before and after the Meiji Reformation, "Annual Report of Institute of Population Problems. Ministry of Health and Welfare, No. 6, 1961.

5 Recently the traditional model of the demographic transition is under revision as the result of a number of studies. According to those studies there is a considerable variability in the actual course of the demographic transition. And the rise in fertility in Japan during the early stages of industrialization is regarded as one example from the similar pattern. Cf. Current Sociology, "The Sociology of Human Fertility, A trend report and bibliography, 1963, pp. 53 - 54.

As mentioned above, I estimated the population by sex and age for the period 1870-1920 by using the first census population in 1920 and the estimated life tables for the pre-census period. The result of this estimation made it possible to calculate the birth rate and death rate during the same period.

The estimated vital rates are shown in Table 5.

TABLE 5

THE BIRTH RATE AND DEATH RATE  
DURING THE PRE-CENSUS PERIOD  
(By Okazaki's Estimation)

Period	Birth Rate	Death Rate	Rate of Increase
1870-1875	36.3	31.3	5.0
1875-1880	36.4	31.3	5.1
1880-1885	33.9	28.3	5.6
1885-1890	33.7	28.1	5.6
1890-1895	34.3	27.3	7.0
1895-1900	36.3	27.0	9.3
1900-1905	35.2	24.2	11.0
1905-1910	37.0	25.3	11.8
1910-1915	35.6	22.1	13.5
1915-1920	33.2	22.3	10.9

The Chart 1 shows the comparison of the birth rate and death rate of my estimation, of Professor Morita's and of Mr. Honda's. In Chart 2 the comparison of the demographic transitions of Japan and England and Wales is illustrated. We can find a remarkable similarity between them, except the following two points. One point is that the transition started in 1750 in England and Wales, it started in 1870 in Japan, the other point is that Japan spent only one hundred years for completion of the demographic transition while England and Wales spent two hundreds years.

Chart 1. VITAL RATES OF MEIJI ERA

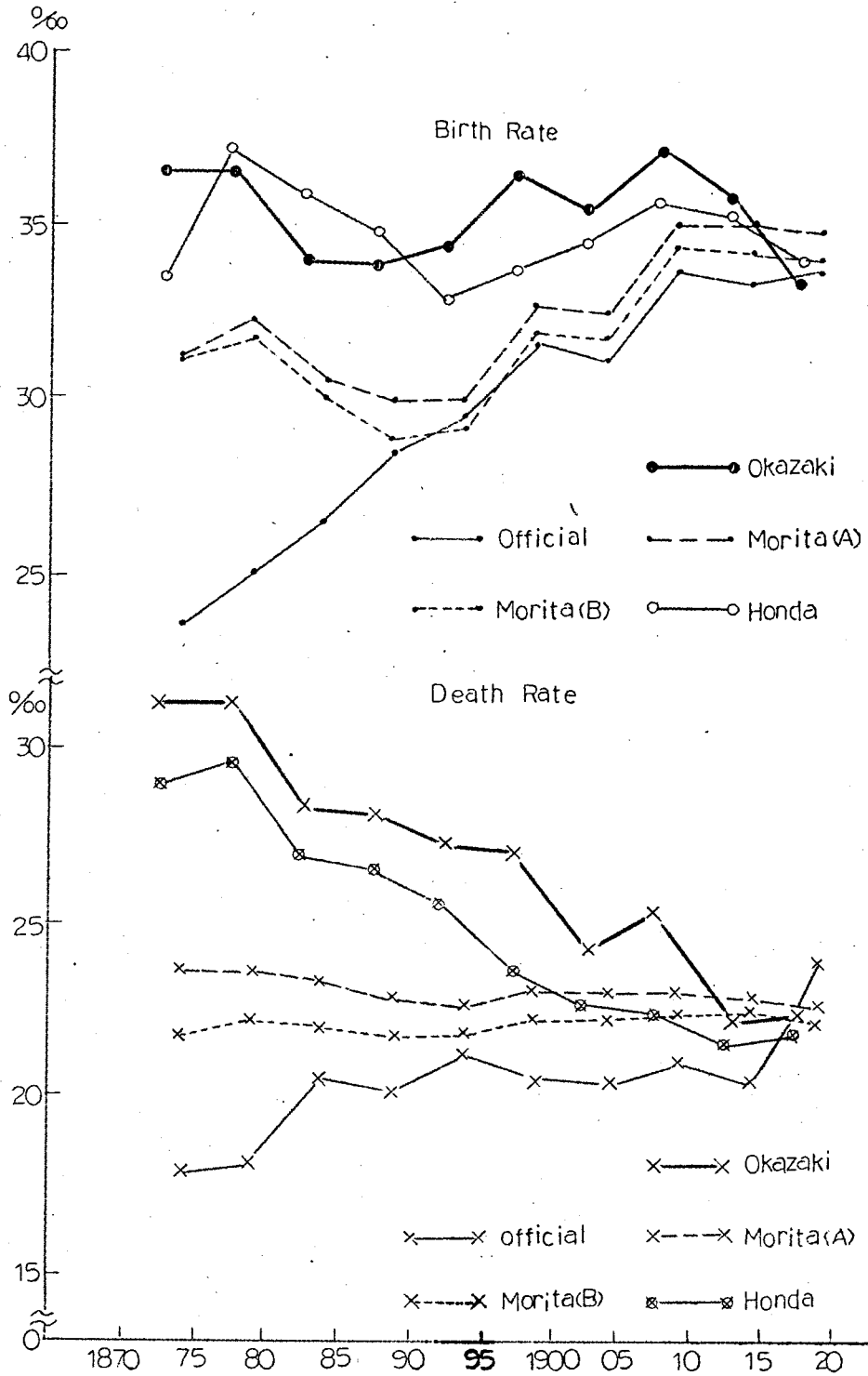
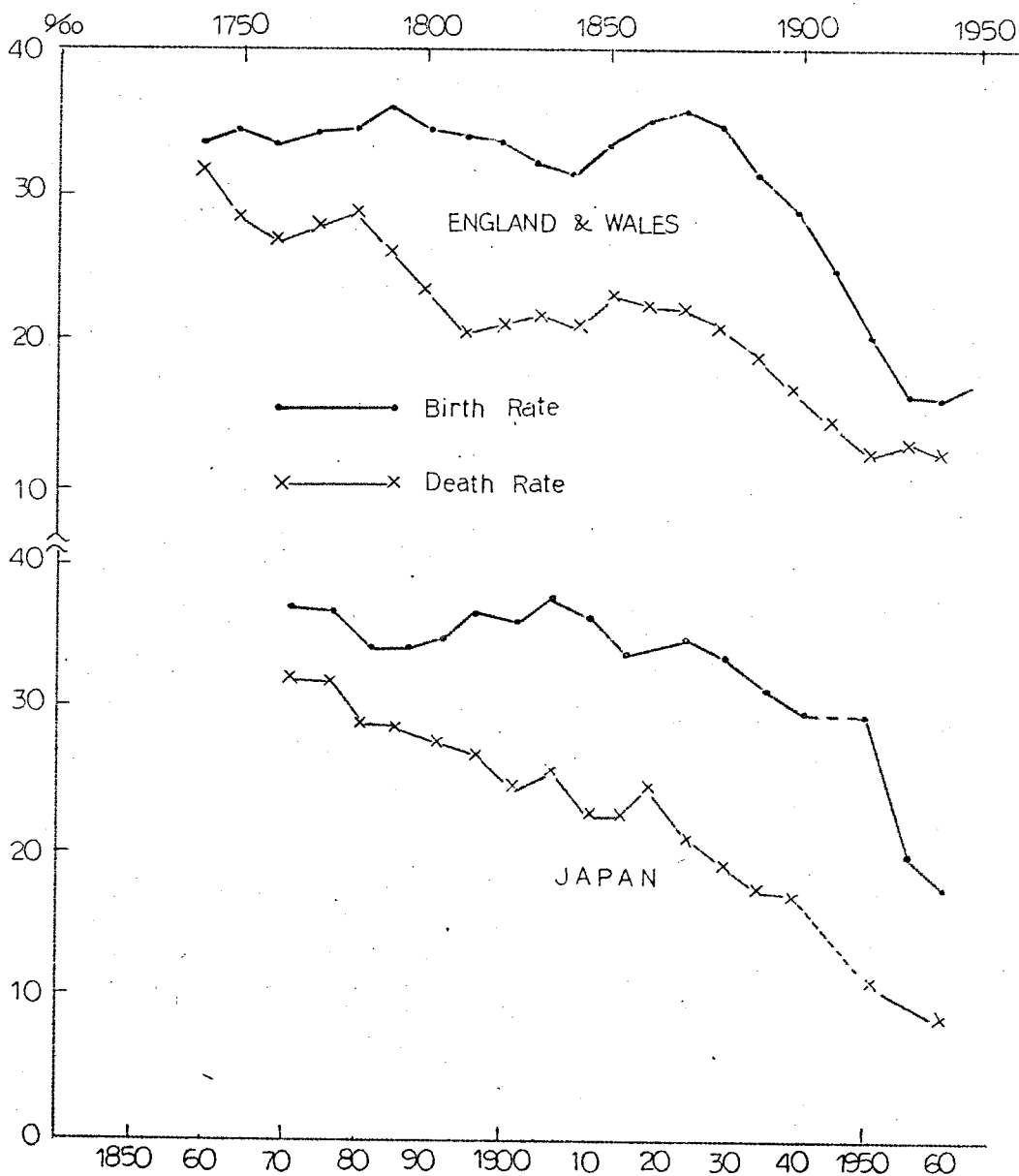


Chart 2. DEMOGRAPHIC TRANSITION OF ENGLAND-WALES AND JAPAN



## CHAPTER III

### THE DEMOGRAPHIC ANALYSIS OF THE TREND OF BIRTH RATE

This chapter is divided into two parts. In the first part the trend of the various indices of fertility will be surveyed. In the second part the trend of the birth rate will be analysed from the aspects of the marriage rate and marital status.

#### 1. Three birth rates and three reproduction rates.

The most simple index of fertility is the crude birth rate. As is generally known this is a ratio of all births to the number of total population. Thus the crude birth rate is an index of fertility in terms of total population, regardless of its composition by sex and age.

A same kind of crude birth rate can be imagined and calculated in terms of total female population. This index might be named the female crude birth rate. If the sex ratio is constant the female crude birth rate will move in parallel with the crude birth rate. But in the case that the change of the sex ratio causes the difference of trends of those two crude rates, the female crude birth rate reflects the fertility trend better than the crude birth rate does.

TABLE 6

CRUDE BIRTH RATE, FEMALE CRUDE BIRTH RATE  
AND GENERAL FERTILITY RATIO

Year	Female			Year	Female		
	C.B.R.	C.B.R.	G.F.R.		C.B.R.	C.B.R.	G.F.R.
1875	35.5	74.6	157.8	1902	36.3	72.8	151.7
1876	37.6	77.1	163.6	1903	35.5	71.0	148.6
1877	36.8	75.3	160.5	1904	33.9	67.8	142.4
1878	36.0	73.6	157.4	1905	35.5	71.0	149.3
1879	35.8	73.1	156.9	1906	33.6	67.4	141.4
1880	32.1	65.5	140.7	1907	38.7	77.5	162.2
1881	34.0	69.2	148.3	1908	39.4	78.9	165.4
1882	33.2	67.5	144.1	1909	39.6	79.3	166.8
1883	35.9	73.0	155.6	1910	36.0	72.0	152.2
1884	34.7	70.4	150.1	1911	36.3	72.6	153.2
1885	31.8	64.3	136.9	1912	35.6	71.2	150.1
1886	32.4	65.5	138.5	1913	35.5	71.1	149.9
1887	32.6	65.9	137.8	1914	36.1	72.2	152.2
1888	35.8	72.4	150.7	1915	34.1	68.3	143.8
1889	36.7	74.1	153.8	1916	33.7	67.5	142.4
1890	34.3	69.2	143.1	1917	33.5	67.1	141.5
1891	32.3	65.2	134.4	1918	32.8	65.7	138.4
1892	35.7	72.0	147.8	1919	32.3	64.7	135.4
1893	34.6	69.7	142.8	1920	36.2	72.6	152.5
1894	35.3	70.9	144.8	1921	35.1	70.5	148.6
1895	35.0	70.3	143.3	1922	34.3	68.9	145.2
1896	35.6	71.5	146.2	1923	35.2	70.6	148.9
1897	36.8	73.9	151.4	1924	33.9	68.2	143.5
1898	37.4	75.0	154.2	1925	34.9	70.2	147.8
1899	37.5	75.3	155.5	1926	34.6	69.6	147.2
1900	34.9	69.8	144.6	1927	33.4	67.2	141.9
1901	36.5	73.2	151.9	1928	34.1	68.6	144.9

TABLE 6  
(continued)

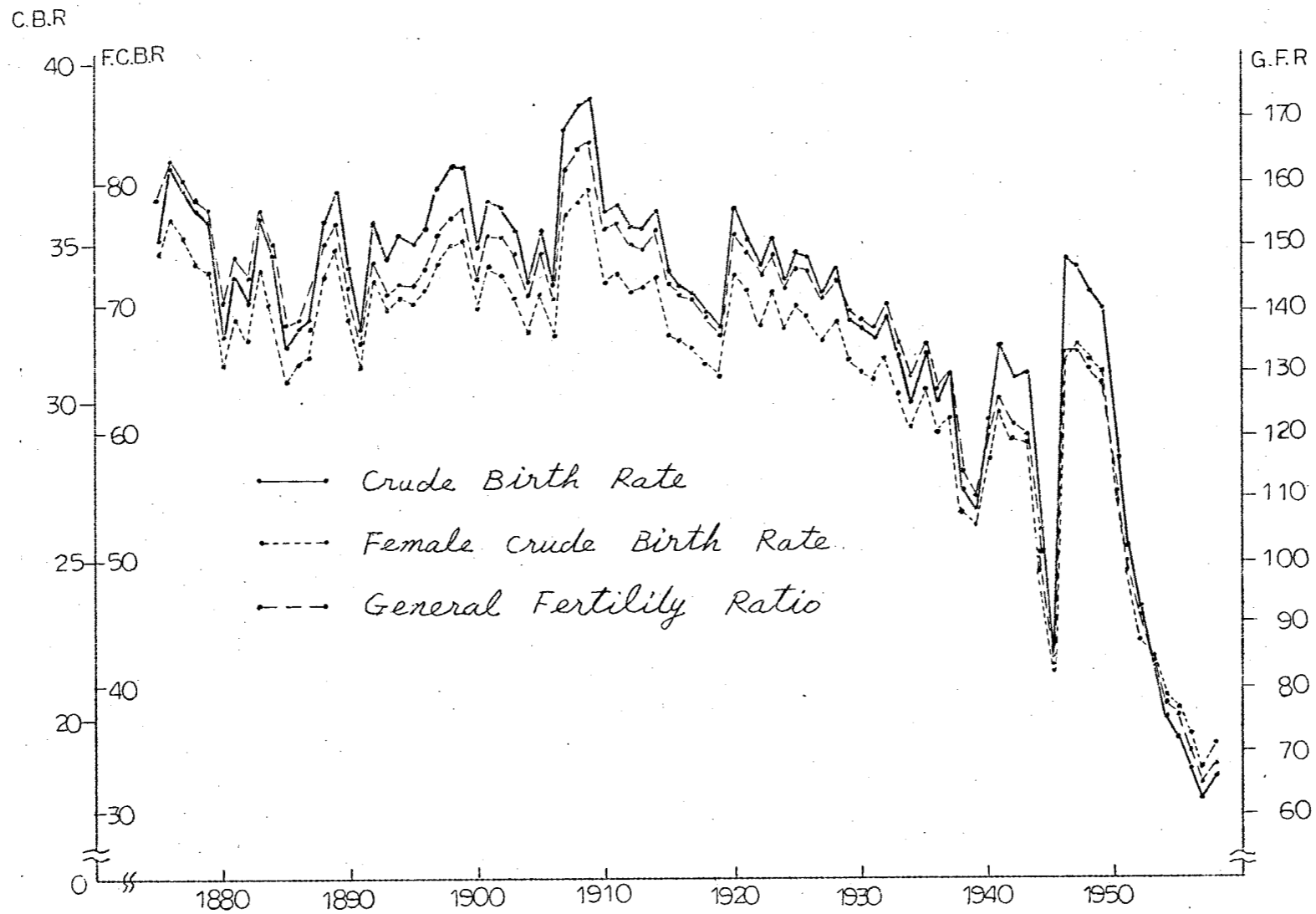
Year	Female			Year	Female		
	C.B.R.	C.B.R.	G.E.R.		C.B.R.	C.B.R.	G.E.R.
1929	32.7	65.8	138.9	1944	*25.8	*49.0	*100.3
1930	32.4	65.0	137.4	1945	*21.8	*41.2	* 83.3
1913	32.1	64.6	136.7	1946	*34.6	*66.2	*132.1
1932	32.9	66.0	140.1	1947	34.3	67.0	132.6
1933	31.5	63.2	134.5	1948	33.5	65.6	130.0
1934	29.9	60.1	128.2	1949	33.0	64.7	128.5
1935	31.6	63.5	134.7	1950	28.1	55.1	109.8
1936	30.0	60.0	127.2	1951	25.3	49.6	98.5
1937	30.9	61.4	129.9	1952	23.4	45.9	90.6
1938	27.2	53.7	113.1	1953	21.5	42.2	82.9
1939	26.6	52.6	110.0	1954	20.0	39.4	77.2
1940	29.4	57.9	120.4	1955	19.4	38.1	74.3
1941	31.8	61.6	126.8	1956	18.4	36.3	69.9
1942	30.9	59.5	121.7	1957	17.2	33.8	64.5
1943	30.9	59.1	119.9	1958	18.0	35.3	66.8

Source: For the period 1875-1919, the Okazaki's estimation; after 1920, the official vital statistics, census population and official estimated population.

Note: The figures for 1944, 1945, 1946 are a little unreliable because of some disturbances by the war.



Chart 3. CRUDE BIRTH RATE, FEMALE CRUDE BIRTH RATE AND  
GENERAL FERTILITY RATIO



Another index of fertility of the same kind as the crude birth rate and the female crude birth rate is the general fertility ratio of all births to the number of women of child-bearing age, 15 - 49 years. The general fertility ratio is a purer index of fertility than the female crude birth rate.

In Table 6 the figures of the crude birth rate, female crude birth rate and general fertility ratio are shown and they are illustrated in Chart 3. The number of births of every year was calculated by distributing the number of births in every five year group of my estimation to each year according to the proportion of the official data of births. The number of total population and childbearing age women was calculated by the linear interpolation of my estimated population.

From the investigation of the table and the chart we can conclude that;

(1) All three crude birth rates fluctuate but do not present any definite declining trend during the period 1875 - 1920. Since 1920 they all began to decline. The extent of decline is 46.5 per cent (36.2 per thousand in 1920 to 19.4 per thousand in 1955) for the crude birth rate, 47.5 per cent (72.6 per thousand in 1920 to 38.1 per thousand in 1955) for the female crude birth rate and 51.3 per cent (152.5 per thousand in 1920 to 74.3 per thousand in 1955) for the general

fertility ratio.

(2) As is evident from the following equations,

$$\frac{B}{P} = \frac{B}{P^f} \times \frac{P^f}{P}$$

$$\frac{B}{P} = \frac{B}{P_{15-49}} \times \frac{P_{15-49}}{P}$$

B : Number of births.

P : Number of total population.

P<sup>f</sup>: Number of female population.

P<sub>15-49</sub> : Number of women of child bearing age.

the factor which explains the gap between the change of the crude birth rate and that of the female crude birth rate is the change of the sex ratio, and the factor which explains the gap between the crude birth rate and that of the general fertility ratio is the change of the proportion of women of childbearing age.

(3) The female crude birth rate is nearer to the true index of fertility than the crude birth rate is, and the general fertility ratio is much nearer than the crude birth rate is. Thus the fertility of Japan declined during 1920 - 1955 at more than that extent which the crude birth rate indicates. The decline of the crude birth rate was mitigated by the rise of the proportion of the female population in the total population; and the rise of the proportion of the childbearing age women in

the total female population.

Various reproduction rates are the indices which represent the trend of fertility more explicitly, with less disturbance of sex-age composition, than the crude birth rates described above.

In Table 7 and Chart 4 the total fertility rate, gross reproduction rate and net reproduction rate during the period 1920 - 1955 are presented.

Total fertility rate and gross reproduction rate declined by the almost same proportion, 54 per cent, during this period. Because the gross reproduction rate is equal to the total fertility rate multiplied by the sex ratio of babies, and because there is little change in the sex ratio of babies, it is natural that the movements of the total fertility rate and the gross reproduction rate are parallel.

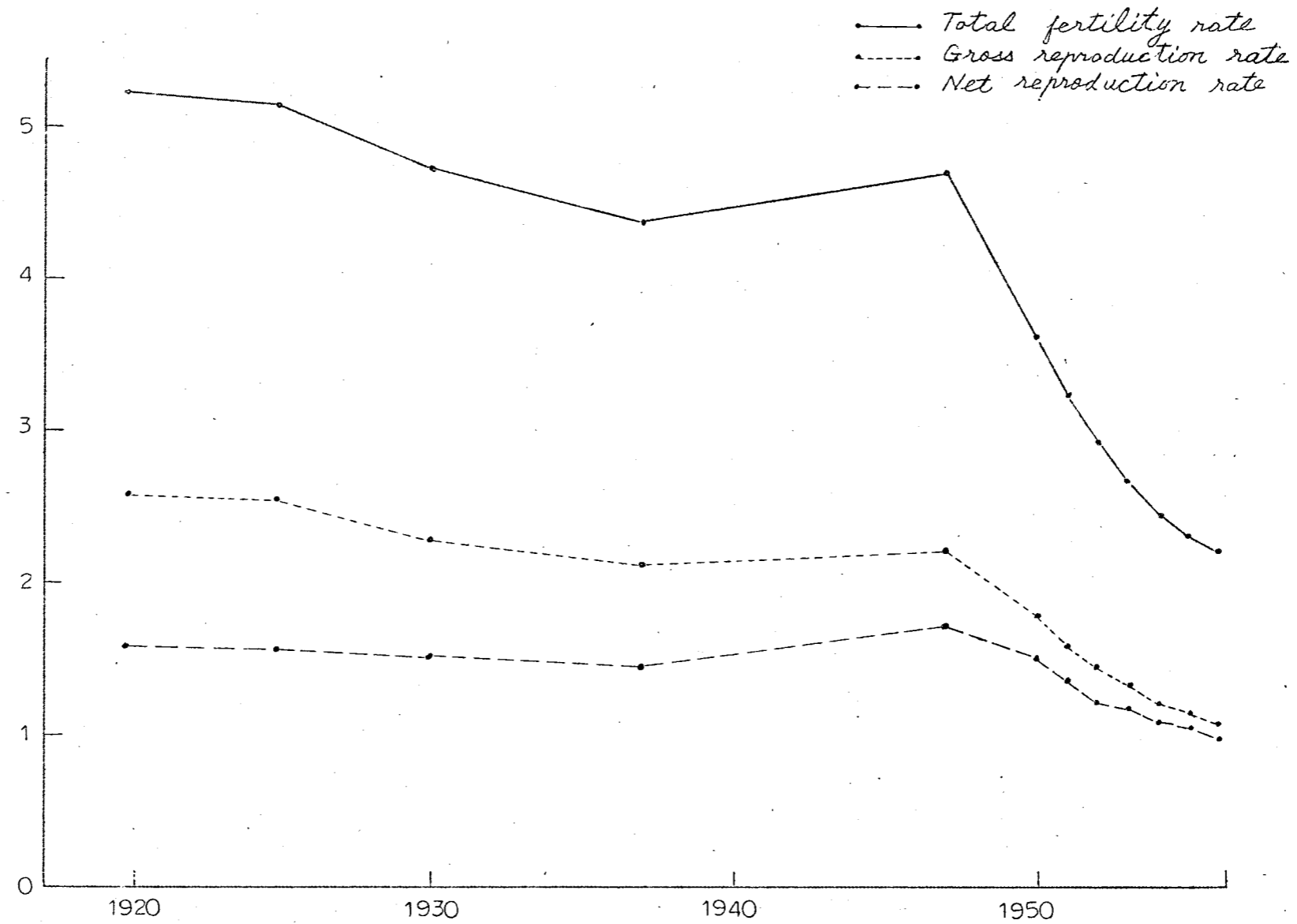
On the other hand, the extent of decline of the net reproduction rate is definitely smaller than that of the gross reproduction rate. That is, the net reproduction rate declined 34 per cent, while the gross reproduction rate declined 54 per cent. This difference is explained by the fact that the survivorship of the population in the childbearing age rised over this period. Thus, the undisguised effect of the fertility decline which is not disturbed by the effect of mortality decline is indicated by the decline of the gross reproduction rate.

TABLE 7

Year	T.F.R.	G.R.R.	N.R.R.
1920	5.23	2.56	1.59
1925	5.11	2.51	1.56
1930	4.71	2.30	1.52
1937	4.34	2.12	1.49
1947	4.52	2.20	1.71
1950	3.63	1.76	1.50
1951	3.24	1.58	1.38
1952	2.96	1.45	1.28
1953	2.68	1.31	1.17
1954	2.47	1.20	1.09
1955	2.36	1.15	1.05
1956	2.22	1.08	0.99
1959	2.03	0.99	0.92

Note: T.F.R. = Total fertility rate, G.R.R. = Gross reproduction rate, N.R.R. = Net reproduction rate.

Chart 4. TOTAL FERTILITY RATE, GROSS REPRODUCTION RATE, AND NET REPRODUCTION RATE



2. The analysis of the birth rate from the aspect of the marriage rate and marital status.

In Japan most of births are legitimate births. During the Meiji era the proportion of illegitimate births among the total births was about 9 per cent, but it declined steadily. It was 4 per cent in 1940, 2 per cent in 1953 and 1.4 per cent in 1958. Therefore it is significant to analyse the trend of birth rate from the view point of marriage rate, although there is some trouble originated in the delay of marriage notification.

In Table 8 and Chart 5 the trends of the birth rate and the marriage rate are shown. The feature which we can point out in these materials is that there is an almost perfect parallelism during the period 1900 - 1935 between the birth rate and the marriage rate; that after 1935, especially after 1950 the parallelism has been destroyed. That is, the correlation coefficient between the birth rate and the marriage rate is + 0.676 for the period 1900 - 1935 while it is + 0.257 for the whole period 1900 - 1958.

As mentioned above there were considerable number of illegitimate births during the Meiji era. If we take this factor into consideration and amend the data, the parallelism would be higher during 1900 - 1920.

Now if we concentrate our attention to the long-run trend

of the birth rate and the marriage rate, we can see that the birth rate declined about 50 per cent from 1920 to 1958, the marriage rate declined only 10 per cent during the same period. This fact seems to suggest that the decline of the birth rate is independent of the trend of the marriage rate. However, before we conclude we should examine the relationship between the birth rate and the proportions married.

TABLE 8

CRUDE BIRTH RATE AND MARRIAGE RATE

Year	Birth Rate	Marriage Rate	Year	Birth Rate	Marriage Rate
1900	34.9	7.9	1919	32.3	8.7
1901	36.5	8.6	1920	36.2	9.8
1902	35.5	8.2	1921	35.1	9.2
1903	35.5	8.2	1922	34.3	9.0
1904	33.9	8.7	1923	35.2	8.8
1905	35.5	7.6	1924	33.9	8.7
1906	33.6	7.6	1925	34.9	8.7
1907	38.7	9.2	1926	34.6	8.3
1908	39.4	9.7	1927	33.4	7.9
1909	39.6	9.1	1928	34.1	8.0
1910	36.0	9.0	1929	32.7	7.8
1911	36.3	8.7	1930	32.4	7.9
1912	35.6	8.5	1931	32.1	7.6
1913	35.5	8.4	1932	32.9	7.8
1914	36.1	8.7	1933	31.5	7.2
1915	34.1	8.5	1934	29.9	7.5
1916	33.7	8.1	1935	31.6	8.0
1917	33.5	8.3	1936	30.0	7.8
1918	32.8	9.2	1937	30.9	9.5



TABLE 8  
CRUDE BIRTH RATE AND MARRIAGE RATE  
(continued)

Year	Birth Rate	Marriage Rate	Year	Birth Rate	Marriage Rate
1938	27.2	7.6	1949	33.0	10.3
1939	26.6	7.8	1950	28.1	8.6
1940	29.4	9.3	1951	25.3	7.9
1941	31.8	11.0	1952	23.4	7.9
1942	30.9	9.4	1953	21.5	7.8
1943	30.9	10.2	1954	20.0	7.9
1944	---	---	1955	19.4	8.0
1945	---	---	1956	18.4	7.9
1946	---	---	1957	17.2	8.5
1947	34.3	12.0	1958	18.0	9.0
1948	33.5	11.9			

The proportion of women married at childbearing age, 15 - 49, declined steadily from 1920 to 1955 as it is shown in Table 9.

TABLE 9  
THE PROPORTION OF WOMEN MARRIED AT CHILDBEARING AGE

Year	Proportion married
1920	68.3 %
1925	68.0
1930	65.8
1935	64.1
1940	61.4
1950	58.6
1955	57.4

Source: Bureau of Statistics, Population of Japan, 1960, pp. 272-279.

Chart 5. TRENDS OF BIRTH RATE AND MARRIAGE RATE

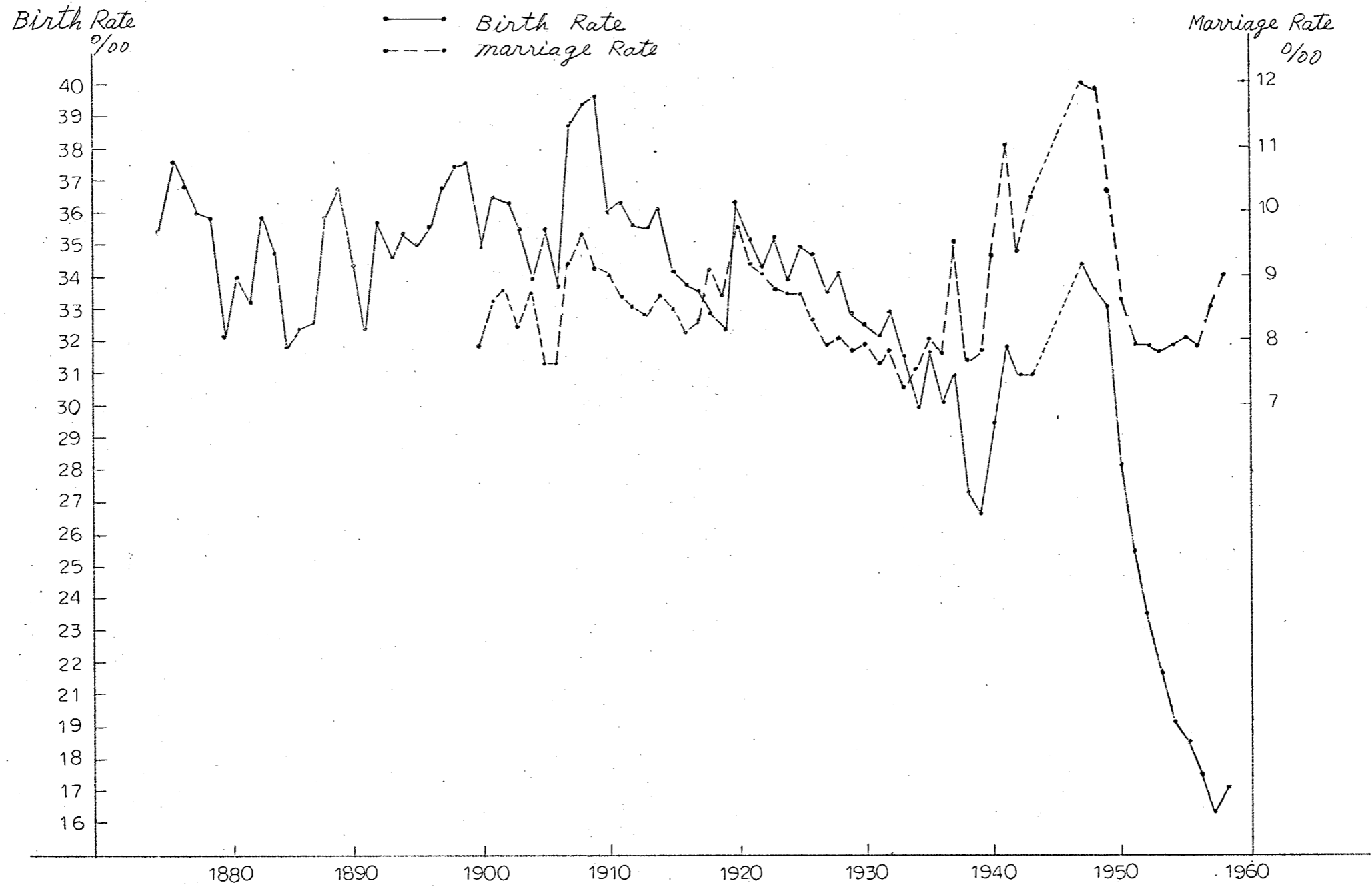
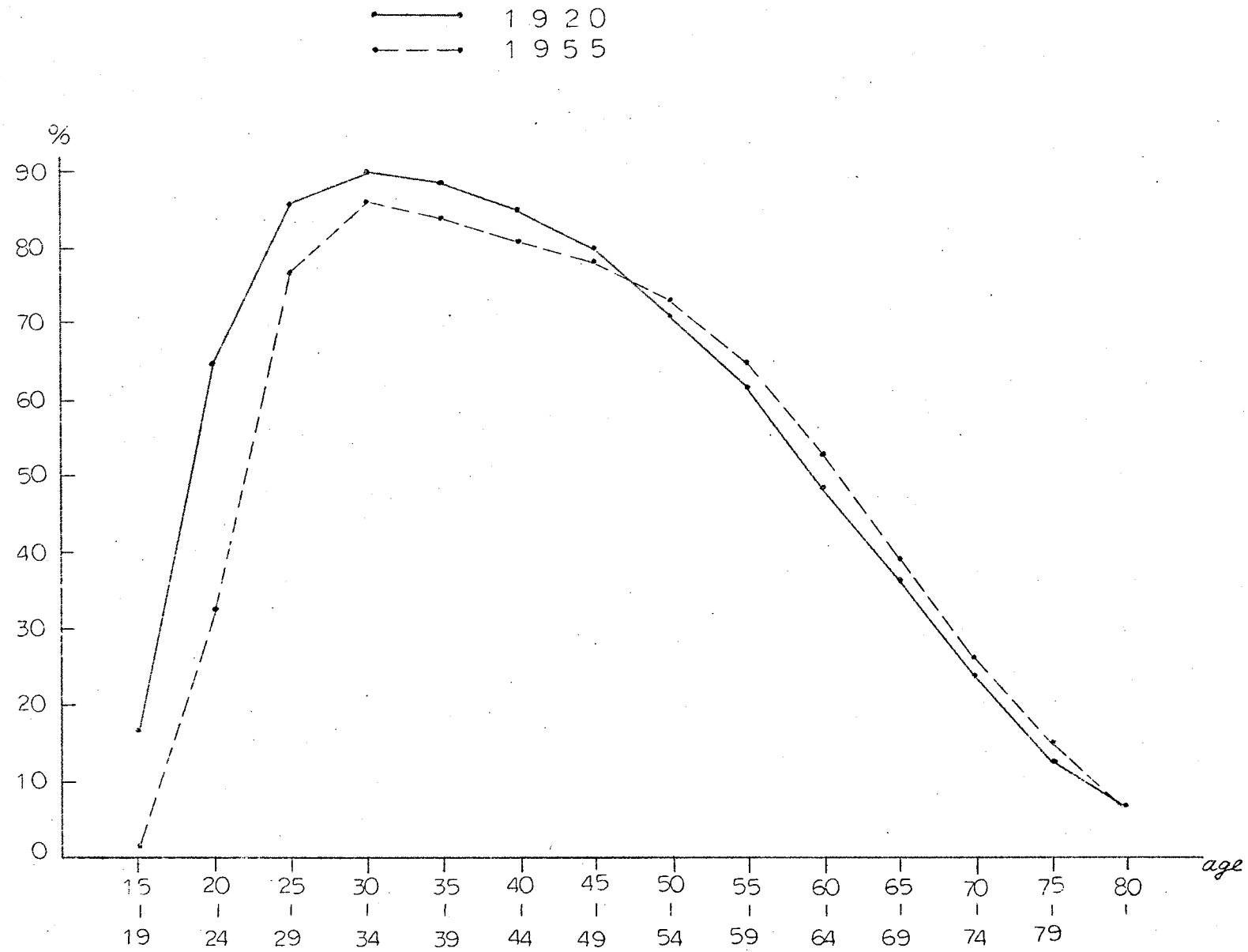


Chart 6. PROPORTION OF WOMEN MARRIED BY AGE GROUPS



The changes of the proportion of married women of each five-year age group are illustrated in Chart 6. The proportion of married women declined in every age group within the range of the childbearing ages. On the other hand, however, it rather rose in the higher age groups because of the relative improvement of old age female mortality.

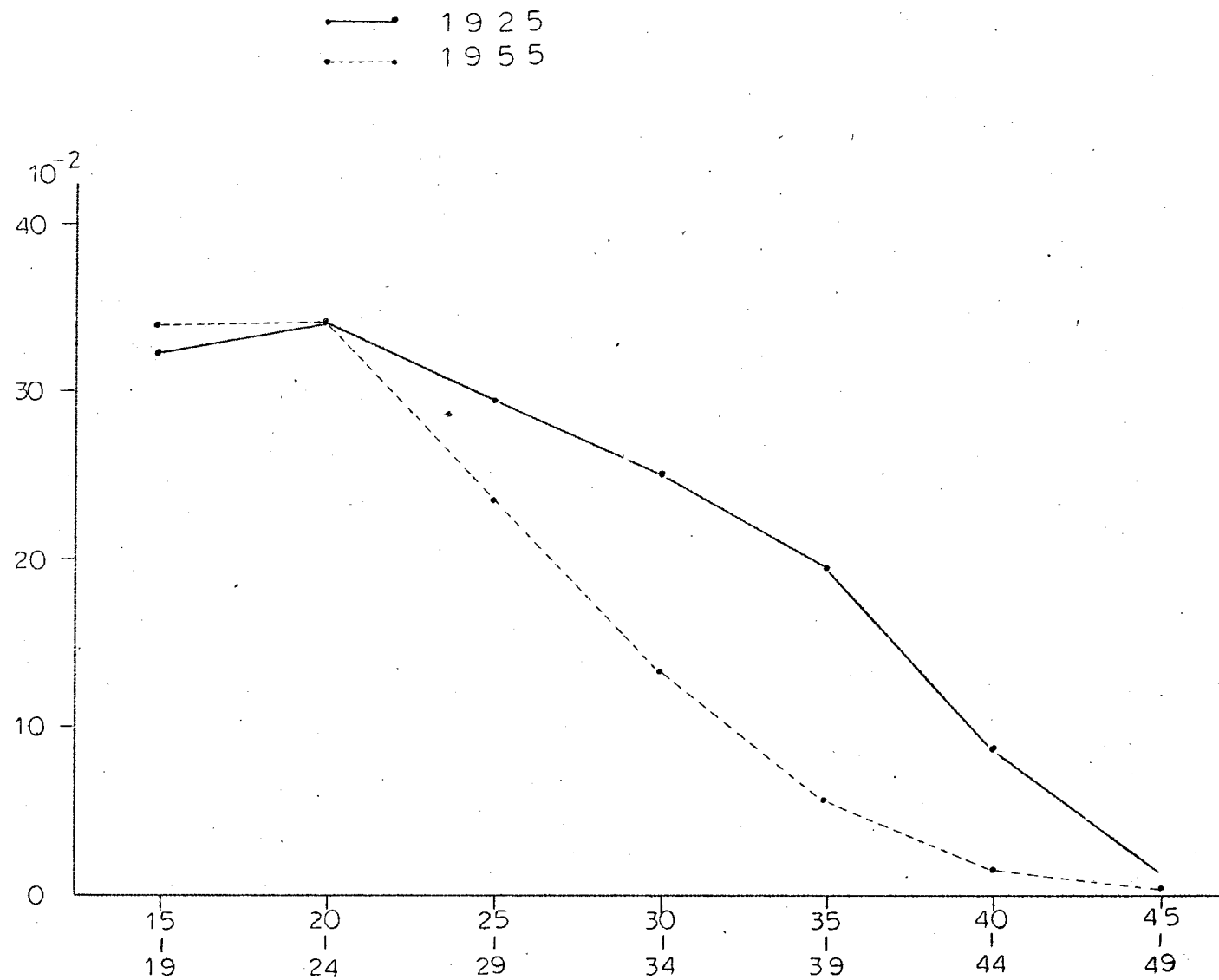
The rate of decline of proportions women married is higher as the age is lower. That is,

<u>Age group</u>	<u>Rate of decline</u>
15 - 19	89.8 %
20 - 24	49.8
25 - 29	11.2
30 - 34	4.8
35 - 39	5.6
40 - 44	5.0
45 - 49	1.1

Source: Chart 6.

On the other hand, the change of the age specific fertility of married women is as shown in Chart 7. It should be noted that because the data of age specific fertility are available only from 1925, the comparison in this chart is made not as for 1920 - 1955 but as for 1935 - 1955. The point which this chart

Chart 7 AGE SPECIFIC FERTILITY OF MARRIED WOMEN



reveals is that the fertility declined definitely in the upper childbearing ages while it remained almost unchanged in the lower childbearing ages.

The crude birth rate was 34.9 per thousand in 1925, it was 19.4 per thousand in 1955. Thus the crude birth rate declined 44 per cent in these thirty years. Three factors can be considered to contribute to the decline. The first one is the decline of the age specific fertility, the second one is the decline of the proportion of married women and the third one is the change of the age distribution of female population.

If we calculate the crude birth rate, using 1925 proportions married, 1925 age distribution of female population and 1955 age specific marital fertility, we have some assumed crude birth rate of 1925, that is, 24.6 per thousand. The difference between the actual birth rate and the assumed birth rate,  $34.9 - 24.6 = 10.3$  means the pure effect of the decline of marital fertility. Similarly we can calculate another assumed crude birth rate of 1925, using 1955 proportions married, 1925 age distribution of female population and 1925 age specific marital fertility. The result is 26.2 per thousand. The difference, 8.7 per thousand, between the actual and the assumed means the pure effect of the decline of proportions married. Finally the pure effect of the change of age distribution is

- 4.6 per thousand. Thus, the decline of marital fertility reduced the crude birth rate by 29 per cent, the decline of proportions married reduced it by 25 per cent and the change of age distribution raised by 13 per cent.

The result of the similar calculation made on the basis of 1955 data is that the decline of marital fertility reduced the birth rate by 58 per cent, the decline of proportions married reduced it by 46 per cent and the change of age distribution raised by 15 per cent. In this case the actual rate of decline of the crude birth rate is 80 per cent (  $(34.9 - 19.4) - 19.4$  ).

The following table is the summary of the preceding calculation.<sup>6</sup>

TABLE 10  
THE SUMMARY TABLE

1925		1955	
Actual Rate:	34.9	Actual Rate:	19.4
Assumed Rate:		Assumed Rate:	
1925 Proportions married		1955 Proportion married	
1925 Age distribution	24.6	1955 Age distribution	30.6
<u>1955</u> Marital fertility		<u>1925</u> Marital fertility	
<u>1955</u> Proportions married		<u>1925</u> Proportion married	
1925 Age distribution	26.2	1955 Age distribution	28.3
1925 Marital fertility		1955 Marital fertility	
1925 Proportion married		1955 Proportion married	
<u>1955</u> Age distribution	39.5	<u>1925</u> Age distribution	16.4
1925 Marital fertility		1955 Marital fertility	

One important conclusion derived from the preceding calculation is that the change of proportion married contributed to the decline of the birth rate to almost same degree as the change of marital fertility did.

6 The gap between the difference of the actual crude birth rates and the sum of the differences of the actual and assumed crude birth rates can be explained by the following.

F : Marital fertility.

M : Proportion married.

P : Age distribution.

$F \times M \times P$  : Crude birth rate at one date.

$(F + \Delta F) (M + \Delta M) (P + \Delta P)$  : Crude birth rate at the other date.

$$(1) \frac{(F + \Delta F)(M + \Delta M)(P + \Delta P) - F \times M \times P}{F \times M \times P} \quad \text{Actual rate of change of the crude birth rate.}$$

$$(2) \frac{(F + \Delta F) \times M \times P - F \times M \times P}{F \times M \times P}$$

$$(3) \frac{F \times (M + \Delta M) \times P - F \times M \times P}{F \times M \times P} \quad \text{Assumed rate of change of the crude birth rate.}$$

$$(4) \frac{F \times M \times (P + \Delta P) - F \times M \times P}{F \times M \times P}$$

$$(2) + (3) + (4) - (1)$$

$$= \frac{F \times \Delta M \times \Delta P + \Delta F \times M \Delta P + \Delta F \times \Delta M \times P}{F \times M \times P}$$

This makes the gap which is under consideration.



Finally I should indicate an interesting point.

The childbearing age female population can be divided into two groups. One is the group aged 15 - 24, the other is the group aged 25 - 49. We call the former Group A, the latter Group B.

The crude birth rates of Group A, that is the number of births by A group divided the number of women in A group, was 0.127 in 1925 and 0.059 in 1955. The rate of decline is 53.5 per cent. As for Group B, it was 0.160 in 1925 and 0.083 in 1955. The rate of decline is 48.1 per cent.

Although the rate of decline of birth rate is almost same in each group, the cause which contributed to the decline is quite different between two groups. That is, the proportion married in Group A was 38.1 per cent in 1925 and 17.0 per cent in 1955. The rate of decline is 55.4 per cent. On the other hand, the proportion married in Group B was 86.5 per cent in 1925 and 80.6 per cent in 1955. The rate of decline is only 6.8 per cent.

The marital fertility in Group A was 0.333 in 1925 and 0.346 in 1955. It rised 3.9 per cent. On the other hand, the marital fertility in Group B was 0.185 and 0.103 in 1955. In this case it declined by 44.3 per cent.

Thus, we conclude that the decline of birth rate was mainly

due to the decline of proportion married in the group aged 15 - 24, was mainly due to the decline of fertility in the group aged 25 - 49.

The following table is the summary table on the two groups.

TABLE 11  
THE SUMMARY TABLE

Year	1925	1955	Rate of decline
Birth rate:			%
Group A ;	0.127	0.059	53.5
Group B ;	0.160	0.083	48.1
Proportion married:			
Group A ;	0.381	0.170	55.4
Group B ;	0.865	0.806	6.8
Marital fertility:			
Group A ;	0.333	0.346	-3.9
Group B ;	0.185	0.103	44.3

