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DEPARTMENT OF COMMERCE

JESSE H. JONES, SECRETARY

BUREAU OF THE CENSUS

J. C. GALT, DIRECTOR (Appointed May 22, 1941)

WILLIAM LANE AUSTIN, DIRECTOR (Retired January 31, 1941)

PHILIP M. HAUSER, ASSISTANT DIRECTOR



5TH CENSUS

THE UNITED STATES

1940



# POPULATION

## DIFFERENTIAL FERTILITY 1940 AND 1910

Standardized Fertility Rates and  
Reproduction Rates

UNITED STATES DEPARTMENT OF COMMERCE

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SIXTEENTH CENSUS OF THE UNITED STATES : 1940

POPULATION

DIFFERENTIAL FERTILITY

1940 AND 1910

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Standardized Fertility Rates and  
Reproduction Rates

A Supplement to the Report Designated "Fertility for  
States and Large Cities"

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Prepared under the supervision of

Dr. LEON E. TRUESDELL

Chief, Population Division

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## SIXTEENTH CENSUS OF THE UNITED STATES: 1940

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  - IV Characteristics by Age—Marital Status, Relationship, Education, and Citizenship, by States.

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- Volume
- I Data for Small Areas, by States.  
Supplement: Block Statistics for Cities.
  - II General Characteristics of Housing, by States.
  - III Characteristics by Monthly Rent or Value, by States.
  - IV Mortgages on Owner-Occupied Nonfarm Homes, by States.

### SPECIAL REPORTS

[Individual reports, grouped according to subject. Reports denoted by an asterisk (\*) are based on sample statistics]

- Statistics for Census Tracts (Including Housing Data):
  - A report for each of 60 tracted cities and suburbs.
- Unincorporated Communities.
- Institutional Population, 14 Years Old and Over.
- \*Families (Including Housing Data):
  - General Characteristics.
  - Tenure and Rent.
  - Income and Rent.
  - Characteristics of Rural-Farm Families.
  - Types of Families.
  - Size of Family and Age of Head.
  - Employment Status.
  - Family Wage or Salary Income in 1939.
- \*Differential Fertility, 1940 and 1910:
  - Fertility for States and Large Cities.
  - Standardized Fertility Rates and Reproduction Rates.
- State of Birth of the Native Population.
- Internal Migration, 1935 to 1940:
  - Color and Sex of Migrants.

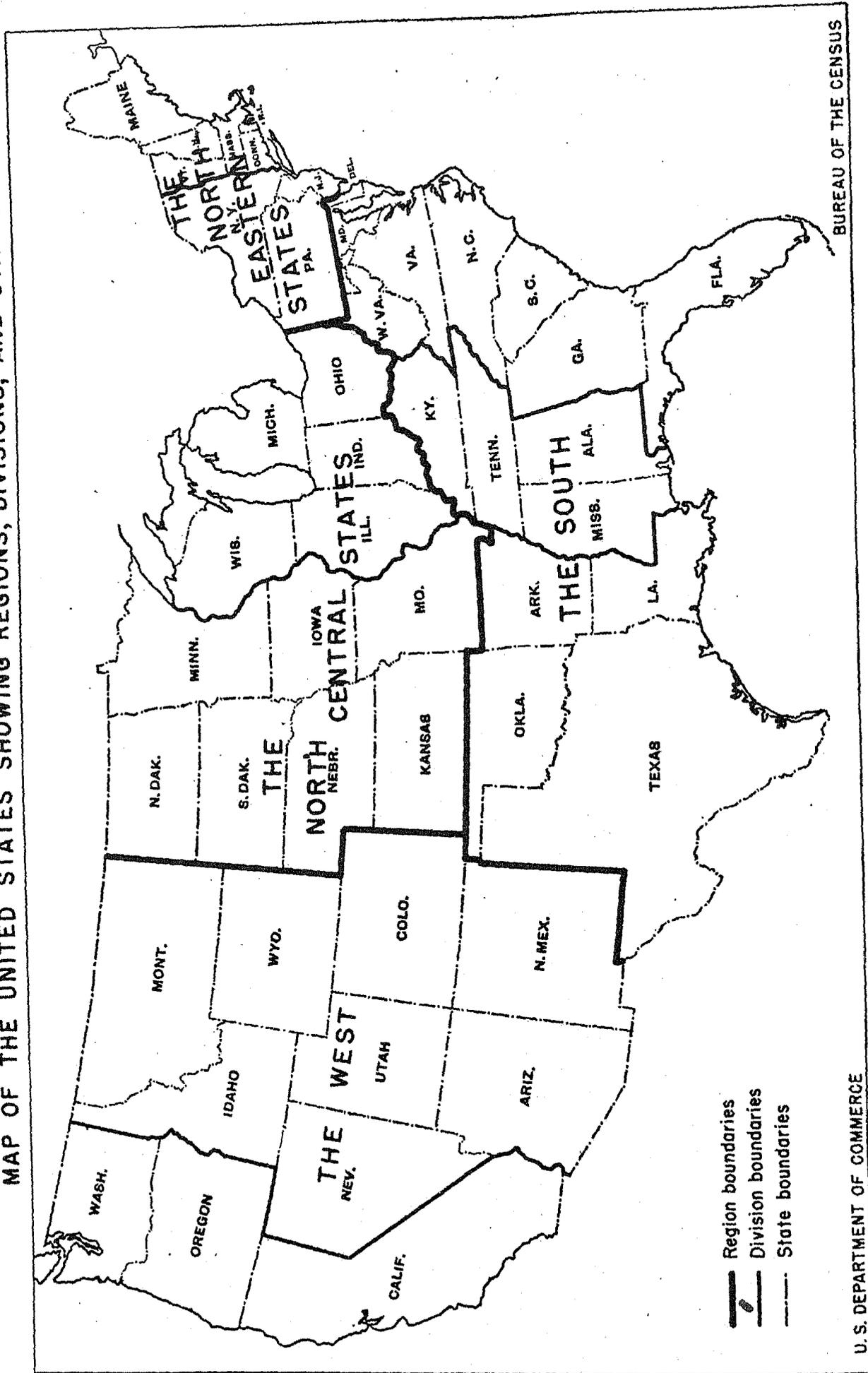
- Characteristics of the Nonwhite Population by Race.
- \*Nativity and Parentage of the White Population:
  - General Characteristics.
  - Country of Origin of the Foreign Stock.
  - Mother Tongue.
- \*The Labor Force (Sample Statistics):
  - Employment and Personal Characteristics.
  - Characteristics of Persons Not in the Labor Force.
  - Employment and Family Characteristics of Women.
  - Wage or Salary Income in 1939.
  - Education, Occupation, and Household Relationship of Males 18 to 44 Years Old.
  - Industrial Characteristics.
  - Occupational Characteristics.
  - Usual Occupation.
- Comparative Occupation Statistics for the United States, 1870 to 1940.
- Estimates of Labor Force, Employment, and Unemployment in the United States, 1940 and 1930.

## FOREWORD

This report presents standardized fertility rates, reproduction rates, and other fertility rates derived from data contained in the report entitled "Differential Fertility, 1940 and 1910—Fertility for States and Large Cities," to which this report constitutes a supplement. Both reports are based on the tabulation of samples of the census returns for 1940 and 1910 and present statistics on the fertility of women for regions, States, cities of 250,000 inhabitants or more, and metropolitan districts of 1,000,000 inhabitants or more. Statistics for 1910 are presented in both reports in order to show changes in fertility which have occurred in the course of a generation. The transcription, coding, and punching of the samples of the population returns for 1910 were performed by New York City Work Projects Administration Project No. O.P. 65-2-97-48 (Census Records and Research Project), sponsored by the Bureau of the Census.

This report was prepared under the supervision of Dr. Leon E. Truesdell, Chief, Population Division, and Howard G. Brunzman, Assistant Chief, by Dr. Henry S. Shryock, Jr., Wilson H. Grabill, and Dr. Paul C. Glick. The sampling procedures were under the direction of Dr. W. Edwards Deming, Mathematical Adviser.

MAP OF THE UNITED STATES SHOWING REGIONS, DIVISIONS, AND STATES



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## INTRODUCTION

### GENERAL

This report presents fertility rates for women 15 to 74 years old, for the United States, based on returns of the Sixteenth and Thirteenth Decennial Censuses of Population, taken as of April 1, 1940, and April 15, 1910, respectively.<sup>1</sup> Most of the fertility rates were computed from the detailed statistics on fertility presented in the report entitled "Differential Fertility, 1940 and 1910—Fertility for States and Large Cities".<sup>2</sup> Standardized numbers of children ever born and of children under 5 years old per 1,000 women are presented, by age, color, and marital status of woman. These rates are standardized for various combinations of age, color, and marital status of woman, and urban-rural residence. Other fertility rates were derived by the use of appropriate life tables, from the numbers of women of childbearing ages and of their children under 5 years old and 5 to 9 years old; these are gross and net reproduction rates, intrinsic rates of natural increase, mean length of generation, intrinsic birth and death rates, and age-specific birth rates. The rates indicate some of the more important patterns and trends in fertility. Statistics are given for the United States by regions and States, urban and rural; for cities of 250,000 inhabitants or more; and for metropolitan districts of cities of 1,000,000 inhabitants or more.

The fertility statistics in this report were computed from data based on tabulations of samples of women 15 or more years old enumerated in the 1940 and 1910 censuses. These samples are identified as Sample C and Sample W, respectively. Characteristics of the woman and of her household were obtained from entries on the Population schedules, where the individual members of a household were enumerated on consecutive lines. (See section on "Nature of the sample data," below.)

Related reports on fertility.—This is one of a series of reports entitled "Differential Fertility, 1940 and 1910," based on sample tabulations of the 1940 and 1910 fertility data. The report on "Fertility for States and Large Cities," to which this report is a supplement, presents data on women by number of children ever born, number of children under 5 years old, number of children 5 to 9 years old, age at marriage, and duration of marriage, cross-classified by age, color, and marital status of the woman, for the same areas as those for which data are presented in this supplement. Additional reports on fertility are planned which will include statistics on fertility in relation to social, economic, and other characteristics of whites and Negroes, including country of birth for the foreign-born whites, for the United States, by regions, urban and rural.

Related reports on population.—A report entitled "The Labor Force (Sample Statistics)—Employment and Family Characteristics of Women" contains sample data on the labor force status of women by age, color, and marital status, cross-classified with number of children under 5 years old and 5 to 9 years old. Figures are shown for the United States by regions, urban and rural, and for the metropolitan districts of 100,000 inhabitants or more.

A series of reports entitled "Families" contains sample data on families by number of children under 10 years old, under 18 years old, and under 21 years old. The report in that series which contains the most statistics relating to fertility is entitled "Types of Families" and presents figures on families by marital status, age, color, and sex of head, and number of children under 18 years old, cross-classified by age

<sup>1</sup> The 1940 Population Census schedule and the instructions to enumerators are reproduced in Part 1 of Volume IV of the Sixteenth Decennial Census Reports on Population. The 1910 Population Census schedule is reproduced in Volume I of the Thirteenth Decennial Census Reports on Population.

<sup>2</sup> The present report incorporates corrections for several minor errors in the report entitled "Differential Fertility, 1940 and 1910—Fertility for States and Large Cities."

of wife for families with married male heads, number of children under 10 years old, size of family, education of head, monthly rental of home, and other characteristics.

Valuable source material on fertility for areas smaller than those presented in this report are contained in Volumes II and IV of the Sixteenth Census Reports on Population, entitled "Characteristics of the Population" and "Characteristics by Age—Marital Status, Relationship, Education, and Citizenship," respectively, and in the series of Population and Housing Reports entitled "Statistics for Census Tracts." From data on individuals classified by age and sex in those reports, ratios of children to women of childbearing age, and reproduction rates computed by the so-called "indirect method," can be derived. The measures of fertility which may be computed from those source materials, however, are not as precise as those shown in the present series of reports on differential fertility.

Arrangement of tables.—Fertility statistics are given for the United States and regions in tables 1 to 9, for States in tables 10 and 11, and for large cities and metropolitan districts in tables 12 and 13. Within these three groups, tables derived from data on number of children ever born precede those derived from data on number of children under 5 years old and 5 to 9 years old.

Availability of unpublished data.—The tables in this report present all of the reliable standardized fertility rates and reproduction rates computed on the basis of data shown in the report "Differential Fertility, 1940 and 1910—Fertility for States and Large Cities." Coefficients of variation (see section on "Coefficients of Variation") were worked out for the fertility statistics shown in tables 1 to 8 and 10 to 13 of the present report. With the exception of the selected values exhibited in text table IV, the exact values of the coefficients are not shown in this report, but those based on data from Sample C can be made available upon request, for the cost of transcription. Requests for these data, addressed to the Director of the Census, Washington 25, D. C., will receive a prompt reply, including an estimate of the cost of preparing the figures.

### DEFINITIONS OF TERMS AND EXPLANATIONS

Children ever born.—In the classification of women by number of children ever born, all children ever born alive to a woman during her lifetime were counted, including children by any former marriage. Although this question was not asked of women reported as single, there is evidence that most of the single mothers with illegitimate children living in the household reported themselves as married, widowed, or divorced. Hence, the statistics are not limited strictly to legitimate fertility. In the determination of total children ever born to women in all marital status groups combined, therefore, it has been assumed that women reported as single had borne no children.<sup>3</sup> Without this assumption, fertility rates could have been computed only for women who were or had been married.

<sup>3</sup> If illegitimate births which are registered may be attributed to single women, it appears that few of the women having illegitimate children in the household were reported as single in the 1940 Census. Moreover, the number of single women with illegitimate children in the household was a negligible proportion of the total number of single women.

In the period 1935 to 1939, there were 161,047 illegitimate births registered for white women and 210,663 illegitimate births registered for nonwhite women in the United States, exclusive of those States which did not require a statement on the birth certificate concerning legitimacy (namely, Massachusetts, New York, and California for all years, 1935 to 1939, and Texas for 1938 and 1939). The figures on number of illegitimate births are subject to considerable understatement as there is a tendency to report such births as legitimate. In contrast, only 15,400 native white single women and 16,040 Negro single women were reported as mothers of illegitimate children under 5 years old in the 1940 Census (Sample C) for the entire United States.

The 15,400 native white single women with illegitimate children under 5 years old comprised only 0.1 percent of the 10,049,300 native white single women 15 to 49 years old represented in Sample C; the 16,040 Negro single women with illegitimate children under 5 years old comprised only 1.5 percent of the 1,056,620 Negro single women 15 to 49 years old represented in Sample C.

## DIFFERENTIAL FERTILITY, 1940 AND 1910

In 1940, women ever married (that is, married, widowed, or divorced) but not reporting on number of children ever born comprised 9.4 percent of all women 15 to 74 years old and 12.7 percent of all women ever married. The corresponding proportions in 1910 were 5.3 and 7.6 percent, respectively. The proportion of women ever married who made no report on number of children ever born was highest for the youngest women (21.8 percent for those 15 to 19 years old in 1940 and 23.0 percent for the corresponding group in 1910). The proportion was progressively smaller up to about 45 years old but tended to be progressively larger thereafter in both 1940 and 1910. However, it should be added that the age groups with the largest proportions not reporting on number of children were the ones in which there is the greatest possibility that the woman had never borne a child. These groups included relatively large numbers of women who were working at the time of the enumeration and for whom information was given by a person who was not sufficiently well acquainted with the woman to report for her on number of children ever born. The proportion of women not reporting also varied with other factors such as color and residence. These women who were or had been married but did not report on number of children ever born were excluded from the computation of fertility rates.

In computing rates for this report three alternative assumptions were considered regarding the fertility of women ever married who made no report on number of children ever born:

- (1) That their fertility was the same as that of single ("childless") women;
- (2) That their fertility was the same as that of the combination of single ("childless") women plus women ever married who did report on children;
- (3) That their fertility was the same as that of women ever married who did report on children.

The second assumption was selected. The influence of this decision upon the rates shown for all women regardless of marital status may be seen from an examination of the figures presented in table I.

Table I.—NUMBER OF CHILDREN EVER BORN PER 1,000 WOMEN 15 TO 74 YEARS OLD, BY AGE OF WOMAN, FOR THE UNITED STATES: 1940 AND 1910

(Statistics for 1940 based on Sample C; statistics for 1910 based on Sample W. See text for statements of the three assumptions)

AGE OF WOMAN	1940			1910		
	Assumption 1	Assumption 2	Assumption 3	Assumption 1	Assumption 2	Assumption 3
Total, 15 to 74 years..	1,528	1,796	1,865	2,334	2,465	2,527
15 to 49 years.....	1,262	1,382	1,447	1,848	1,941	1,998
15 to 19 years.....	60	61	76	67	69	88
20 to 24 years.....	463	505	549	629	681	725
25 to 29 years.....	1,014	1,129	1,187	1,510	1,601	1,634
30 to 34 years.....	1,907	1,678	1,711	2,320	2,446	2,472
35 to 39 years.....	1,930	2,155	2,187	3,128	3,286	3,310
40 to 44 years.....	2,242	2,501	2,552	3,715	3,904	3,927
45 to 49 years.....	2,464	2,758	2,790	4,079	4,295	4,317
50 to 74 years.....	2,741	3,094	3,134	4,426	4,770	4,800
50 to 54 years.....	2,576	2,891	2,925	4,272	4,529	4,554
55 to 64 years.....	2,725	3,066	3,104	4,495	4,830	4,858
65 to 74 years.....	2,951	3,368	3,417	4,508	4,990	5,027

Because the second assumption was chosen the published rates may be slightly too high or too low, depending on the age group in question. In general, the possibility that a published rate for women without regard to marital status is too low is greatest for the youngest women and least for the oldest women. If the first assumption had been followed, however, the resulting rates for women of each age group would have undoubtedly been too low. On the other hand, if the third assumption had been followed, the resulting rates for women of each age group probably would have been too high.

Children under 5 years old.—In the classification of women by number of children under 5 years old, only those children presumably born to the woman and living with her at the time of the census were counted. The number of such children was obtained by an inspection of the entries on the successive

lines of the Population schedule. Stepchildren, adopted children, grandchildren, and other related children in the family not born to this woman, as well as wards and other unrelated children in the household, were excluded, so far as such children could be identified. It is possible that the children of the woman could be identified less easily for nonwhites than for whites, because nonwhite families are more likely to have a complex composition, and because of the generally less adequate census returns for them. It is also possible that the children of women in the older ages could be identified less easily than those of younger women.

For 1940, children living with mothers who were reported as single were included in the count, but for 1910 they were excluded. It seems certain, however, that most of the single women living with their illegitimate children reported themselves as married, widowed, or divorced.\*

One of the most important factors to be considered in analyzing fertility data based on number of children under 5 years old is the underenumeration of such children (and particularly of infants under 1 year old) in both the census of 1940 and that of 1910. (See Appendix A.) The underenumeration of young children is not peculiar to the United States Census. It has been noted, for example, in the census returns of England and Wales and of some of the countries of continental Europe. Fertility rates adjusted for underenumeration of children under 5 years old are presented in tables 6 to 9, 11, and 13 of this report.

Another type of adjustment made in many of the tables was that for children who were not living in the same household as their mothers and who were therefore excluded from the count. The number of children thus excluded from the count, however, is only about five percent of the total number of children under 5 years old (see Appendix B). The fertility rates presented in tables 7 to 9, 11, and 13 of this report have been adjusted to include estimates of children not living with their mothers. Rates in table 6 were not adjusted for children not living with their mothers, because this table includes a classification of women by marital status and separate estimates were not obtainable for women so classified.

Data on number of children under 5 years old indicate "current" fertility in contrast with the "lifetime" fertility indicated by number of children ever born, since all of the children under 5 were born during the five years preceding the census date, that is, from April 1, 1935, to March 31, 1940, and from April 15, 1905, to April 14, 1910. Rates based on number of children under 5 years old are not, of course, equivalent to birth rates, since the children have lived for about 2.5 years on the average. With an allowance for mortality during this period, however, these rates can be converted into age-specific birth rates, as indicated by the figures in table 8.

Children 5 to 9 years old.—The reproduction rates shown in table 7 for the period 1930 to 1935 are based on data for women classified by number of children 5 to 9 years old at the time of the 1940 census. The number of these children was determined by an inspection of entries on the Population schedule in the same manner as the number of children under 5 years old. Children 5 to 9 years old in 1940 were born during the period from April 1, 1930, to March 31, 1935. Figures were not tabulated for women by number of children 5 to 9 years old in 1910.

The enumeration of children 5 to 9 years old in the Population Census was assumed to be complete. (See discussion of this subject in the section on "Gross and net reproduction rates." The remarks in the section on "Children under 5 years old" concerning the effects of mortality, however, apply here also.)

The rates shown for the period 1930 to 1935, in combination with those for the period 1935 to 1940, furnish information on the fertility of women during the entire intercensal period 1930 to 1940. The rates must be interpreted with caution if used for the study of fertility trends during the depression and subsequent recovery period, because rates for the two five-year periods cannot show the U-shaped trend of fertility during

\* Figures on the number of single women with children in 1940 are presented in footnote 3, on page 1.

the decade. The trend of fertility during this period of changing economic conditions can best be determined from such figures as annual birth statistics (see table II) or the statistics showing the number of children by single years of age in 1940 which appear in Volume IV of the Population reports.

**Standardized rates.**—In several tables fertility rates are presented standardized for age, color, and marital status of woman and urban-rural residence. In these tables, the standard is the distribution of all women in the United States with respect to a given characteristic. A standardized rate shows what the fertility rate for a group of women would be if these women had the same distribution as the standard with respect to the given characteristic. A standardized rate is computed by taking the fertility rates for women (in a particular area) classified by a given characteristic and by multiplying each of these rates by the proportion of women (in the United States) in the corresponding category of this characteristic; the sum of these products is the standardized rate.

It follows that, for all women in the United States as a whole, an unstandardized rate is always the same as the corresponding standardized rate. For a group such as the rural-farm nonwhite women in the South, however, the unstandardized and standardized fertility rates may be very different. Since the rural-farm nonwhite women 15 to 49 years old in the South are more heavily concentrated in the younger age groups than all women 15 to 49 years old in the United States as a whole, and since the number of children ever born per 1,000 women is lower for women in the younger age groups than in the older age groups, the unstandardized number of children ever born per 1,000 rural-farm nonwhite women in the South in 1940, namely, 2,190, was considerably lower than the corresponding rate standardized for age, namely, 2,574. On the other hand, in the West the unstandardized number of children ever born per 1,000 urban white women 15 to 49 years old in 1940 was 1,098, whereas the corresponding rate standardized for age was somewhat lower, namely, 1,038. This difference arises from the fact that there is a tendency toward concentration of these women in the older ages. The same line of reasoning may be easily extended in interpreting the rates that have been standardized for two or more characteristics.

The main value of standardized rates is that these rates for different groups may be compared with confidence that the observed differences are not attributable to or obscured by variations among the groups in the distribution of women with respect to the characteristic for which the rates have been standardized. For instance, a comparison of the unstandardized and standardized rates quoted above indicates that there were important differences between the age distributions of the rural-farm nonwhite women in the South and the urban white women in the West; and that the difference between the fertility rates of the two groups tended to be obscured by this fact when the unstandardized rates were compared. The standardized rates, therefore, may be interpreted as refined measures of the fertility of women, which fertility may be properly gauged only when the effect of variation in disturbing characteristics is minimized.

**Gross and net reproduction rates.**—The gross and net reproduction rates presented in tables 7, 10, and 12 were computed from data on number of women of childbearing ages and their children under 5 years old and 5 to 9 years old.\*

Both "unadjusted" and "adjusted" reproduction rates are shown in the tables. The "unadjusted" rates contain no allowance for the underenumeration of children under 5 years old in the census or for the extent to which those children under 5 years old and 5 to 9 years old enumerated in the census are not represented in Sample C and Sample W. The "adjusted" rates contain an allowance for these factors. (See Appendix A for a discussion of underenumeration and Appendix B for a discussion of the extent to which young children are not represented in the samples.) As already stated, the children 5 to 9 years old of both white and nonwhite women were assumed to have been completely enumerated. This assumption appears to be acceptable for the whites, but it may not be strictly true for the nonwhites. Because of this assumption the gross and net reproduction rates shown in the detailed tables for the period 1930

to 1935 are probably too low for the nonwhites, but should be satisfactory for the whites and, because of the low proportion of nonwhites in most cases, for "all classes" as well.

In the computation of the reproduction rates, an allowance was made for deaths among both the women and their children between the time the children were born and the date of the census. This allowance was made by means of mortality rates computed from life tables (see Appendix C). The reproduction rates, therefore, reflect the approximate fertility and mortality conditions prevailing in the periods April 1, 1935, to March 31, 1940; April 1, 1930, to March 31, 1935; and April 15, 1905, to April 14, 1910.

The gross reproduction rate represents the number of daughters a cohort of 1,000 female infants beginning life together would have during the course of their lives, if the cohort were subject to the birth rates at each age level which prevailed at the time specified, and if none of the cohort was to die before the end of the childbearing period, or about age 50. The net reproduction rate represents the number of daughters a cohort of 1,000 female infants beginning life together would have during the course of their lives if the cohort were subject to both the birth and death rates at each age level which prevailed at the time specified. Both gross and net reproduction rates are based on the assumption that the cohort will not be augmented or diminished by migration to or from outside the area.

For replacement in the next generation, each cohort of 1,000 female infants should, during their lifetime, give birth to 1,000 daughters. If more than 1,000 daughters were born, the next generation would be larger, and if fewer than 1,000 daughters were born, the next generation would be smaller. Since the gross reproduction rate implies that all of the cohort of 1,000 female infants survive to the end of the childbearing period, this rate measures the maximum reproduction possible from the given birth rates at each age level. The net reproduction rate, on the other hand, measures the expected reproduction, with an allowance for the fact that not all women live to the end of the child-bearing period. A comparison of the gross reproduction rate with the net reproduction rate will indicate the expected loss in reproduction as a result of deaths among the cohort before the end of the child-bearing period.

The gross and the net reproduction rates may be interpreted as measures of the extent to which the women in a population would replace themselves in the long run, and by implication, the reproduction rates also measure the potential growth or decline in the total population. That is, the reproduction rates measure the extent to which the potential stable population, not the existing population, will be replacing itself in the course of a generation. A stable population is one which maintains a constant percentage distribution of persons with respect to age over a period of time, although the total number of persons may increase or decrease at a uniform rate through all age levels with the passage of time. It may require 50 to 100 years, or longer, for a particular population to attain a stable age distribution as a consequence of the long continuance of the given birth and death rates in the absence of emigration or immigration.

The reproduction rates do not necessarily measure the extent of current population replacement per generation, as this type of replacement depends on many factors, such as the proportion of women currently in the most fertile ages, the proportion of old people in the current population, etc. On the basis of the birth and death rates during the period 1935 to 1940 and of the changing age structure which such rates would produce, the population of the United States would continue to grow for some years to come, despite the net reproduction rate of less than 1,000 (978). If the 1935 to 1940 birth and death rates were to continue, however, each age group would eventually contain successively smaller numbers of women as generation succeeded generation, and the time would come when the population would have relatively fewer women in the reproductive ages than during the period 1935 to 1940, and relatively more who had passed the reproductive ages, so that the number of deaths would eventually exceed the number of births, even though the birth and death rates at each age level should not change.

\* See Appendix D for a detailed description of the method of computation.

## DIFFERENTIAL FERTILITY, 1940 AND 1910

In all forecasts of future population changes, consideration must be given to trends in birth and death rates. Mortality has declined with the advances made in medical science; birth rates have, in general, been declining for many decades; both in the United States and in various countries of Europe.

The figures in table II, based on birth registrations (which are available annually) indicate that the trend in the gross reproduction rate has been upward during recent years. Most of the improvement is attributable to increases in the first-child birth rate among young women, in association with increases in the marriage rate.

Table II.—GROSS REPRODUCTION RATES BASED ON REGISTERED BIRTHS, 1930 TO 1942, AND BASED ON CHILDREN UNDER 5 AND 5 TO 9 YEARS OLD, 1940, BY COLOR, FOR THE UNITED STATES

(Statistics based on registered births are adjusted for underregistration. Statistics for registered births by color for 1930 to 1934 have also been adjusted to include as white the Mexicans who were classified with the nonwhite in the reports on birth statistics published for those years. Statistics based on children are from Sample C, adjusted for underenumeration of children under 5 years old and for those children not represented in Sample C because they were not living with the mother)

YEAR	All classes	White	Nonwhite
BASED ON REGISTERED BIRTHS			
1942.....	1,299	1,270	1,510
1941.....	1,176	1,139	1,461
1940.....	1,119	1,082	1,405
1939.....	1,084	1,049	1,359
1938.....	1,109	1,075	1,367
1937.....	1,081	1,046	1,346
1936.....	1,067	1,037	1,305
1935.....	1,067	1,054	1,357
1934.....	1,105	1,070	1,355
1933.....	1,072	1,040	1,311
1932 <sup>1</sup> .....	1,136	1,105	1,387
1931 <sup>2</sup> .....	1,174	1,139	1,435
1930 <sup>2</sup> .....	1,235	1,211	1,409
1935 to 1940.....	1,067	1,054	1,347
1930 to 1935 <sup>2</sup> .....	1,137	1,105	1,376
BASED ON CHILDREN			
1935 to 1940..... (Birth period of children under 5 years old in 1940)	1,101	1,065	1,415
1930 to 1935..... (Birth period of children 5 to 9 years old in 1940)	1,106	1,080	1,556

<sup>1</sup>Exclusive of Texas in 1932, since the State was not in the Birth Registration Area of 1932.

<sup>2</sup>Exclusive of Texas and South Dakota in 1931 and 1930, since these States were not in the Birth Registration Area of 1931 or of 1930.

Reproduction rates computed from birth statistics may differ from corresponding rates computed from ratios of children to women (see table II). The differences arise from a number of disturbing factors in the two sets of data. The underregistration of births has a counterpart in the failure of some families to report to the enumerator the presence of young children in the household. Both birth statistics and population census statistics are affected by occasional misstatements of age. The population in an area may be augmented or diminished by migration to or from another area; hence, the population living in an area at a census date does not necessarily represent the survivors from the population actually in the area in the years to which the birth data refer. Still other sources of error could be cited. It is difficult to evaluate the effect of all these disturbing factors in such a way as to make the rates, computed from two different types of data, agree exactly. In spite of these difficulties, reproduction rates, computed from ratios of children to women are generally in close agreement with the corresponding rate computed from birth statistics, particularly for the white population.

**Age-specific birth rates.**—An age-specific birth rate may be defined as the number of live births occurring in the course of a year to a group of 1,000 women of a particular age interval. Age-specific birth rates are useful both for the study of variations in fertility of women in association with age and as the basis for the computation of certain demographic statistics, such as the mean length of a generation and the intrinsic rate of natural increase.

The age-specific birth rates presented in table 8 were computed from data on the number of women of childbearing age and their children under 5 years old.\* The data were adjusted to allow for those children not enumerated in the census and for the extent to which children enumerated in the census are not represented in Sample C and Sample W. If this adjustment had not been made, the birth rates would have been too low. (See Appendix A for a discussion of underenumeration and Appendix B for a discussion of the extent to which young children are not represented in the sample.)

In the computation of the birth rates from data on number of women of childbearing age and their children under 5 years old, an allowance was made for deaths among both the women and their children between the time the children were born and the date of the census. This allowance was made by means of mortality rates computed from life tables (see Appendix C). The allowance for deaths converted ratios of children to women into birth rates for women during the five-year period preceding the census date. By means of mathematical interpolation, the five-year birth rates were converted into average annual age-specific birth rates for women living during the period in which the children were born.

An indication of the reliability of the estimated age-specific birth rates may be obtained from a comparison of the estimated birth rates with corresponding birth rates computed from data on number of registered births. Such a comparison may be made from the birth rates presented for the United States in table III. In comparing the rates, the remarks in the section on "Gross and net reproduction rates," concerning the sources of possible bias in both the birth statistics and the census data, should be borne in mind, especially in studying the rates for the nonwhites.

Table III.—AVERAGE ANNUAL NUMBER OF BIRTHS PER 1,000 WOMEN 15 TO 49 YEARS OLD, BY AGE AND COLOR OF WOMAN, BASED ON REGISTERED BIRTHS, AND BASED ON CHILDREN UNDER 5 YEARS OLD, FOR THE UNITED STATES: 1935 TO 1940

(Rates based on registered births are adjusted for underregistration. Rates based on children under 5 were derived from data of Sample C, adjusted for underenumeration of children and for those children not represented in the sample because they were not living with the mother)

AGE OF WOMAN	ALL CLASSES		WHITE		NONWHITE	
	Based on registered births	Based on children under 5	Based on registered births	Based on children under 5	Based on registered births	Based on children under 5
Total, 15 to 49 years....	69	70	66	67	69	90
15 to 19 years...	62	50	44	46	118	90
20 to 24 years...	150	126	126	122	158	159
25 to 29 years...	119	122	119	121	113	122
30 to 34 years...	80	85	80	83	80	94
35 to 39 years...	47	49	46	47	54	64
40 to 44 years...	17	19	17	18	20	32
45 to 49 years...	2	5	2	2	3	8

**Mean length of a generation.**—The mean length of a generation may be defined as the average age of mothers at time of birth of a daughter, or as the average spacing between two successive generations of women.\* Figures on the mean length of a generation are presented in table 9 and pertain to the eventual stable population that would result if the birth and death rates of the specified period should continue unchanged at each age level and if no emigration or immigration should occur.

The statistics in table 9 show that the mean length of a generation for the United States, based on conditions in the period 1935 to 1940, would be 27.6 years. This figure represents a decline from that based on conditions in the period 1905 to 1910, namely 28.7 years. This decline may be accounted for by the disproportionately rapid drop in the fertility of the women in the older age groups.

**Intrinsic rate of natural increase.**—The intrinsic rate of natural increase may be defined as the potential rate of growth of the population per annum, or as the annual rate of

\*See Appendix E for a more detailed description of the method of computation.

<sup>7</sup>This measure is based on the age-specific birth rates presented in table 8 and on the life tables presented in Appendix C. For the method of computation, see Dublin, Louis I., and Lotka, A. J., "On the True Rate of Natural Increase," *Journal of the American Statistical Association*, Vol. XX, 1925, pp. 305-359.

natural increase in the eventual stable population that would result if the birth and death rates of the specified period should continue unchanged at each age level and if no emigration or immigration should occur.\*

**Intrinsic birth rate.**—The intrinsic birth rate may be defined as the annual number of female births per 1,000 of the total female population in the eventual stable population that would result if the birth and death rates of the specified period should continue unchanged at each age level, and if no emigration or immigration should occur.\*

The intrinsic birth rate may be regarded as a refinement of the crude birth rate for the potential stable population. The crude birth rate represents the number of births of both sexes during the year per 1,000 of the total population. Since slightly more male births than female births occur, and since the male population contains a smaller proportion of old people than the female population, it follows that the intrinsic birth rate, being based on females, is slightly smaller than the crude birth rate.

**Intrinsic death rate.**—The intrinsic death rate may be defined as the annual number of female deaths per 1,000 of the total female population in the eventual stable population that would result if the birth and death rates of the specified period should continue unchanged at each age level, and if no emigration or immigration should occur.\*

The intrinsic death rate may be regarded as a refinement of the crude death rate for the potential stable population. The crude death rate represents the number of deaths of both sexes during the year per 1,000 of the total population. Since the mortality of males is slightly higher than that of females at each age level, it follows that the intrinsic death rate, being based on females, is slightly smaller than the crude death rate.

**Urban and rural areas.**—Urban population, as defined by the Bureau of the Census in 1940, is in general the population residing in cities and other incorporated places having 2,500 inhabitants or more. The remainder of the population is classified as rural, and is subdivided into the rural-farm population, which comprises all rural residents living on farms, and the rural-nonfarm population, which comprises the remaining rural population. (For further details for each State, see Volume I of the 1940 Population reports.)

In the reports of the 1910 Census not only incorporated places of 2,500 or more but also all New England towns (townships) of this size were classified as urban, but in the compilation of the 1910 fertility data shown here, the 1940 rules of classification as urban or rural were followed.

**Metropolitan districts.**—A metropolitan district has been set up for use in the 1940 Census of Population in connection with each city of 50,000 or more, two or more such cities sometimes being in one district. The general plan is to include, in addition to the central city or cities, all adjacent and contiguous minor civil divisions or incorporated places having a population of 150 or more per square mile. A metropolitan district is thus not a political unit but rather an area including all the thickly settled territory in and around a city or group of cities. It tends to be a more or less integrated area with common economic, social, and often, administrative interests.

**Age.**—The age classification is based on the age of the person at his last birthday before the date of the census, that is, the age of the person in completed years. In the 1940 tabulations, when the age of a person was not reported, it was estimated on the basis of other information on the Population schedule, such as marital status, school attendance, employment status, age of other members of the family, etc. The 1910 data in this report do not include the small number of persons whose age was not reported. No data on fertility were tabulated from either census for women under 15 years old or over 74 years old.

**Color.**—The color classification used in this report is limited to white and nonwhite. The nonwhite population includes

Negroes and other nonwhite races such as Indians, Chinese, and Japanese. Persons of Mexican birth or ancestry who were not definitely Indian or of other nonwhite races were returned as white in 1940 and in 1910. The great majority of the nonwhite population consists of Negroes, except in the Pacific States, where there are many Chinese and Japanese, and in Oklahoma and certain Mountain States, where many of the nonwhite population are Indians.

Because of the small number of women, particularly of nonwhite women, in some areas, statistics for whites and nonwhites in tables 10 to 13 are shown only for selected States, urban and rural, and for selected cities and metropolitan districts. Data are shown for areas in which there were, in 1940, at least 25,000 women 15 to 49 years old of the specific color. If 1940 (or 1935 to 1940) statistics are shown for a given color group of women in an area, 1910 (or 1905 to 1910) statistics are also shown for that color group, except in Michigan for which 1910 nonwhite statistics are not available. (See also the section on "Coefficients of Variation.")

**Marital status.**—The statistics on the marital status of women shown in this report refer to the marital status at the time the census was taken. Women classified as "ever married" include those who were widowed or divorced, as well as those who were married, at the time of the census.

In table 6, statistics are shown for women classified as "married once, husband present" and as "other ever married." The former category includes only those married women living with their husbands at the time of the census and reporting that they had been married only once; the latter category includes the remainder of all women ever married. Statistics for women in the category "other ever married" were not presented in the report on "Differential Fertility, 1940 and 1910—Fertility for States and Large Cities," because data for these women were not tabulated separately. The number of "other ever married" women was derived by deducting the number of single women and the number of women married once, husband present, from the total number of women; and the number of their children under 5 years old was obtained by deducting from the total number of children under 5 years old those children belonging to women married once, husband present. The ratios of children to "other ever married" women thus include the few children reported as belonging to single women, and are therefore slightly too high, particularly for nonwhite women in the South.

**Nature of the sample data.**—The fertility statistics shown in this report are based on tabulations of samples of women 15 years old and over enumerated in the 1940 and 1910 censuses, identified as Sample C and Sample W, respectively. Sample C was designed so that in certain portions of the area shown, a 2 1/2-percent sample was used (multiplied by a uniform factor of 40) and elsewhere a 5-percent sample was used (multiplied by a uniform factor of 20). Sample W was designed so that in the North and the South an 8-percent sample was used (multiplied by a uniform factor of 12.5) and in the West a somewhat larger sample.

A discussion of the differences observed between the results of the various sample tabulations and the complete counts is given in the report entitled "Differential Fertility, 1940 and 1910—Fertility for States and Large Cities." It may be stated here, however, that although exact agreement would not be expected between these tabulations and the corresponding tabulations that might have been made of complete counts, the sample data nevertheless indicate the relationship among the various characteristics involved.

**Coefficients of variation.**—An indication of the possible percent difference between a published rate based on sample data and the corresponding rate that would have been obtained from a complete count is given by the coefficient of variation. The percent difference between a published rate and the rate for a complete count would be less than the coefficient of variation in about 68 percent of all cases, less than twice the coefficient of variation in about 95 percent of all cases, and less than three times the coefficient of variation in about 99.7 percent of all cases. For instance, in 95 out of 100 cases, a published rate of 900 having a coefficient of variation of less than 2.5 percent would differ from the rate that would have been obtained from a complete count by less than

\* This measure is based on the age-specific birth rates presented in table 8 and on the life tables presented in Appendix C. For the method of computation, see Dublin, Louis I., and Lotka, A. J., "On the True Rate of Natural Increase," *Journal of the American Statistical Association*, Vol. XX, 1925, pp. 305-359.

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5.0 percent (twice the coefficient of variation) of 900, or by less than 45.

In tables 1 to 8 and 10 to 13, an asterisk (\*) is attached to those rates based on Sample C which have coefficients of variation of 2.5 to 4.9 percent. In all of these tables, except table 8, rates are shown only if the coefficient is less than 5.0 percent. In table 8, rates with coefficients of 5.0 percent or more are shown with a double asterisk (\*\*); they have been retained in this table so that the patterns of the birth rates might be preserved. Coefficients of variation have not been computed for the rates presented in table 9.

If a rate based on Sample C is shown with an asterisk, a double asterisk, or is not shown at all, the corresponding rate

based on Sample W also is shown with an asterisk, a double asterisk, or is not shown at all. This procedure was followed in order to save labor. The coefficient of variation of a rate based on Sample C is ordinarily slightly higher than the coefficient of the corresponding rate based on Sample W, because the sampling proportions were smaller for Sample C. Hence, if a rate based on Sample C has a low coefficient of variation, the corresponding rate based on Sample W will generally have a low coefficient also. To demonstrate the similarity in magnitude of the corresponding coefficients of variation for rates based on the two samples, the values of the coefficients of variation for selected rates are presented in table IV.

Table IV.—COEFFICIENT OF VARIATION FOR SELECTED FERTILITY RATES, BY COLOR, FOR REGIONS: 1940 AND 1910

(Coefficient of variation represents standard error of a rate as percentage of the specified rate. Statistics for 1940 based on Sample C; statistics for 1910 based on Sample W)

REGION AND TYPE OF RATE	1940			1910			REGION AND TYPE OF RATE	1940			1910		
	All classes	White	Nonwhite	All classes	White	Nonwhite		All classes	White	Nonwhite	All classes	White	Nonwhite
CHILDREN EVER BORN PER 1,000 WOMEN 15 TO 49 YEARS OLD, UNSTANDARDIZED							NET REPRODUCTION RATE, UNADJUSTED <sup>1</sup>						
The Northeastern States.....	0.3	0.3	1.5	0.2	0.2	1.5	The Northeastern States.....	0.4	0.4	2.3	0.3	0.3	2.3
The North Central States.....	0.2	0.3	1.3	0.2	0.2	1.3	The North Central States.....	0.4	0.4	2.1	0.2	0.2	2.0
The South.....	0.2	0.3	0.5	0.2	0.2	0.5	The South.....	0.3	0.4	0.7	0.2	0.2	0.4
The West.....	0.4	0.4	2.2	0.3	0.3	1.7	The West.....	0.5	0.8	2.9	0.4	0.4	2.2
CHILDREN UNDER 5 YEARS OLD PER 1,000 WOMEN 15 TO 49 YEARS OLD, UNSTANDARDIZED							AVERAGE ANNUAL NUMBER OF BIRTHS PER 1,000 WOMEN 15 TO 49 YEARS OLD						
The Northeastern States.....	0.4	0.4	2.3	0.3	0.3	2.3	The Northeastern States.....	0.4	0.4	2.1	0.2	0.2	1.9
The North Central States.....	0.4	0.4	2.1	0.2	0.2	2.0	The North Central States.....	0.3	0.3	2.0	0.2	0.2	1.6
The South.....	0.3	0.4	0.7	0.2	0.2	0.4	The South.....	0.3	0.3	0.7	0.2	0.2	0.3
The West.....	0.6	0.6	3.0	0.4	0.4	2.2	The West.....	0.5	0.5	2.7	0.3	0.3	1.8

<sup>1</sup>For the periods 1935 to 1940 and 1905 to 1910.