

# U.S. CENSUS OF POPULATION: 1960

Final Report PC(2)-1E

## SUBJECT REPORTS

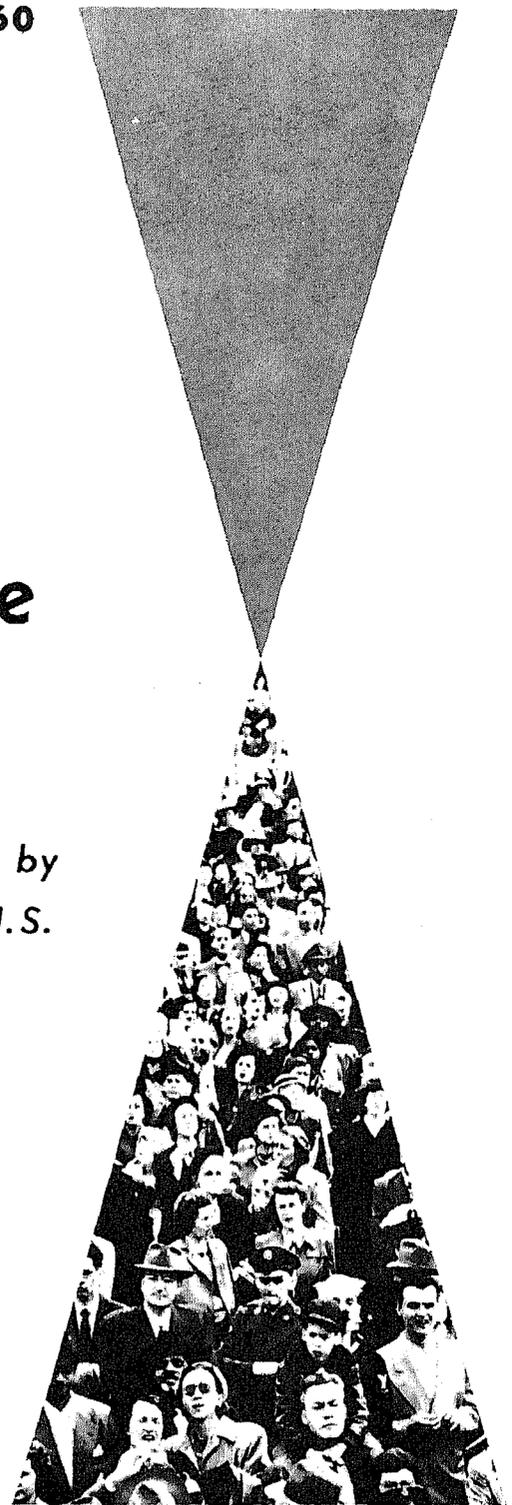
# *Mother Tongue of the Foreign Born*

*Selected Characteristics of Foreign Born by  
Language Spoken Before Coming to U.S.*

*Prepared under the supervision of  
HOWARD G. BRUNSMAN, Chief  
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## PREFACE

This report presents statistics from the 1960 Census of Population on the mother tongue of the foreign-born population, by country of birth, age, and years of school completed. Legal provision for this census, which was conducted as of April 1, 1960, was made in the Act of Congress of August 31, 1954 (amended August 1957), which codified Title 13 U.S. Code.

The major portion of the information compiled from the 1960 Census of Population appears in Volume I, Characteristics of the Population, which contains data for the United States, States and counties and their urban and rural parts, cities, minor civil divisions, etc. The present report is part of Volume II, Subject Reports, and is designated as PC(2)-1E. A list of the Volume II Subject Reports appears on the inside of the front cover. A summary description of all the final reports of the 1960 Population Census appears on page IV.

## ACKNOWLEDGMENTS

A large number of persons participated in the various activities of the 1960 Census of Population. Primary responsibilities were exercised by many of the persons listed on the preceding page. Within the Population, Demographic Operations, Field, Geography, and Statistical Methods Divisions, most of the staff members worked on the program. Important contributions were also made by the staffs of the Administrative and Publications Services Division, Cecil B. Matthews, Chief; Budget and Finance Division, William E. Stiver, Chief; Data Processing Systems Division, Robert F. Drury, Chief; Jeffersonville Census Operations Office, Robert D. Krook, Chief; Personnel Division, James P. Taff, Chief; and Statistical Research Division, William N. Hurwitz, Chief.

Tobia Bressler, Chief, Ethnic Origins Statistics Branch, Population Division, assisted by Laura L. Heriot and Denis Johnston, had the major responsibility for planning this report and developing its content. John C. Beresford provided liaison with the operations staff, Elizabeth A. Larmon assisted in the preparation of the introductory text, and Mildred M. Russell and Louise Douglas performed the technical editorial work. The procedures for compiling the data were devised by Richard A. Hornseth, Francis A. Gray and Randolph R. Ruffin of the Data Processing Systems Division. The sampling materials were prepared by Robert Hanson and Warren J. Mitofsky of the Statistical Methods Division.

The census program was designed in consultation with a number of advisory committees and many individuals in order to maximize the usefulness of the data. Among the groups organized for this purpose were the Technical Advisory Committee for the 1960 Population Census, the Council of Population and Housing Census Users, and the Federal Agency Population and Housing Census Council (sponsored by the U.S. Bureau of the Budget). The persons who served with these groups represented a wide range of interest in the census program; their affiliations included universities, private industry, research organizations, labor groups, Federal agencies, State and local governments, and professional associations.

February 1966.

# FINAL REPORTS OF THE 1960 CENSUS OF POPULATION

The final reports of the 1960 Population Census are arranged in three volumes and a joint Population-Housing series of census tract reports. The 1960 Population Census publication program also includes preliminary, advance, and supplementary reports, certain evaluation, procedural, and administrative reports, and graphic summaries. After publication, copies of all reports are available for examination or purchase at any U.S. Department of Commerce Field Office.

Certain types of unpublished statistics are available for the cost of preparing a copy of the data. Also, under certain conditions, special tabulations of the 1960 Census data can be prepared on a reimbursable basis. In addition, there are available for purchase magnetic tapes and punchcards containing 1960 Census information on the characteristics of a one-in-a-thousand and a one-in-ten-thousand sample of the population of the United States. Confidentiality of the information, as required by law, has been maintained by the omission of certain identification items. Further information about any of these materials can be obtained by writing to the Chief, Population Division, Bureau of the Census, Washington, D.C., 20233.

Volume I. Characteristics of the Population. This volume consists of separate reports for the United States, each of the 50 States, the District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa, and Canal Zone. For each of these 57 areas, the data were first issued in four separate paper-bound "chapters," designated as PC(1)-A, B, C, and D. (For Guam, Virgin Islands, American Samoa, and Canal Zone, the material normally contained in chapters B, C, and D are included in chapter B.) For library and general reference use, the paper-bound reports have been assembled and reissued in buckram-bound books identified as Parts A and 1 to 57 of Volume I.

Series PC(1)-1A to 57A: Chapter A. Number of Inhabitants. These reports contain final population counts for States and counties and their urban and rural parts, and for standard metropolitan statistical areas, urbanized areas, all incorporated places, unincorporated places of 1,000 inhabitants or more, and minor civil divisions.

Series PC(1)-1B to 57B: Chapter B. General Population Characteristics. These reports present statistics on sex, age, marital status, color or race, and relationship to head of household for States and counties and their urban and rural parts, and for standard metropolitan statistical areas, urbanized areas, places of 1,000 inhabitants or more, and minor civil divisions.

Series PC(1)-1C to 53C: Chapter C. General Social and Economic Characteristics. These reports cover the subjects of nativity and parentage, State of birth, country of origin of the foreign stock, mother tongue, place of residence in 1955, year moved into present house, school enrollment by level and type, years of school completed, families and their composition, fertility, veteran status, employment status, weeks worked in 1959, year last worked, occupation group, industry group, class of worker, place of work, means of transportation to work, and income of persons and families. Each subject is shown for some or all of the following areas: States and counties and their urban, rural-nonfarm, and rural-farm parts, standard metropolitan statistical areas, urbanized areas, and urban places.

Series PC(1)-1D to 53D: Chapter D. Detailed Characteristics. These reports present most of the subjects covered in chapter C, above, cross-classified by age, color, and other characteristics. There is also included additional information on families, as well as data on single years of age, detailed occupation, and detailed industry. Each subject is shown for some or all of the following areas: States and their urban, rural-nonfarm, and rural-farm parts; and large counties, cities, and standard metropolitan statistical areas.

Volume I, Part A: Number of Inhabitants. This is a compendium of the 57 chapter A reports, i.e., PC(1)-1A to 57A.

Volume I, Parts 1 to 57: Characteristics of the Population. The 57 parts relate respectively to the United States, each of the 50 States, District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa, and Canal Zone. Each part contains the data previously published in the four chapters A, B, C, and D, and is in the form of a separate, buckram-bound book. Parts 54, 55, 56, and 57--for Guam, Virgin Islands, American Samoa, and Canal Zone, respectively--are bound in a single book.

Volume II (Series PC(2) reports). Subject Reports. Each report in this volume concentrates on a particular subject. Detailed information and cross-relationships are generally provided on a national and regional level; in a few reports data for States or standard metropolitan statistical areas are also shown. Among the characteristics covered are ethnic origin and race, fertility, families, migration, education, employment, unemployment, occupation, industry, and income. There is also a report on the geographic distribution and characteristics of inmates of institutions. A list of reports is given on the inside of the front cover.

Volume III (Series PC(3) reports). Selected Area Reports. Four of the reports in this volume present selected characteristics of the population for State economic areas, for standard metropolitan statistical areas, and according to the size and type of place where the individual resided. A fifth report provides data on the social and economic characteristics of Americans overseas.

Series PHC(1). Census Tract Reports. These reports present information on both population and housing subjects. There is one report for each of 180 tracted areas in the United States and Puerto Rico. The population subjects include age, race, marital status, country of origin of the foreign stock, relationship to head of household, school enrollment, years of school completed, place of residence in 1955, employment status, occupation group, industry group, place of work, means of transportation to work, and income of families, as well as certain characteristics of the nonwhite population in selected tracts. The housing subjects include tenure, color of head of household, vacancy status, condition and plumbing facilities, number of rooms, number of bathrooms, number of housing units in structure, year structure built, basement, heating equipment, number of persons in unit, persons per room, year household head moved into unit, automobiles available, value of property, and gross and contract rent, as well as certain characteristics of housing units with nonwhite household head for selected tracts. In addition, for selected tracts these reports contain data on certain population and housing subjects for persons of Puerto Rican birth or parentage and for white persons with Spanish surname. (This series is the same as the tract reports listed in the publication program for the 1960 Census of Housing.)

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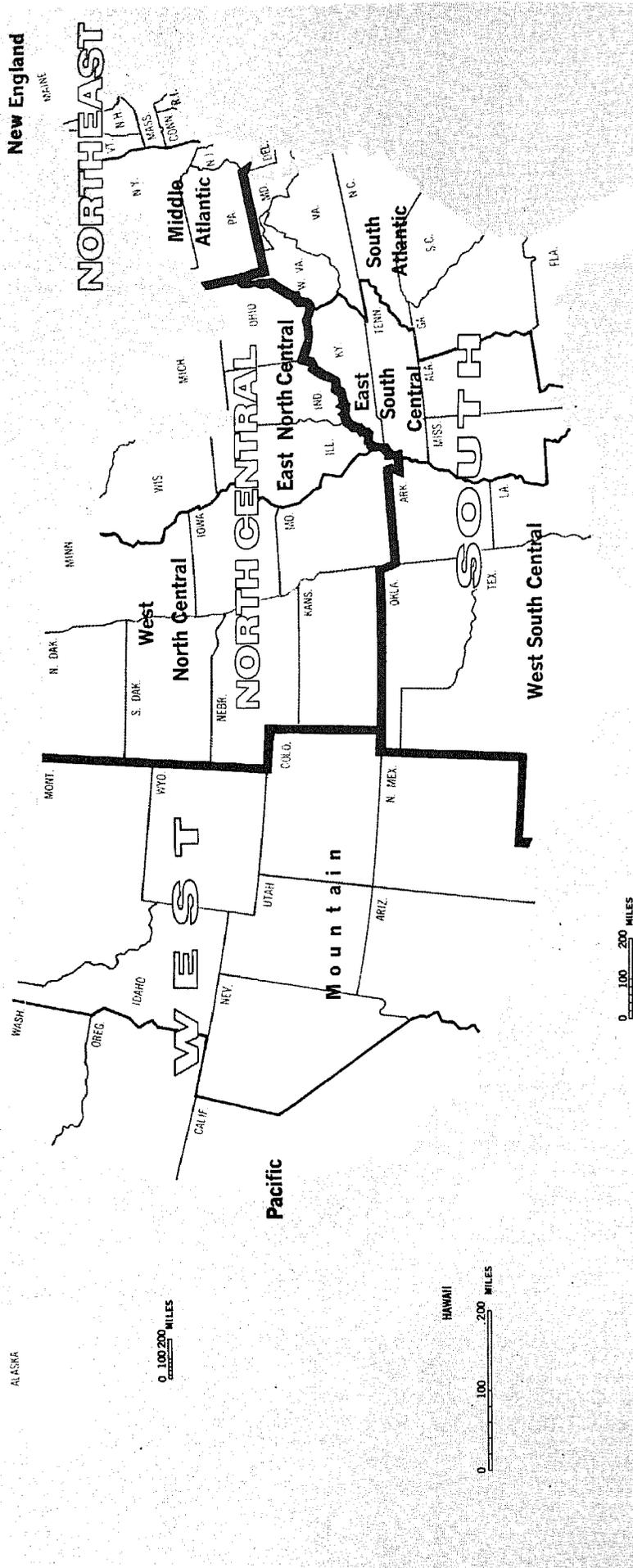
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# REGIONS AND GEOGRAPHIC DIVISIONS OF THE UNITED STATES



U.S. DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS

# Mother Tongue of the Foreign Born

## GENERAL

This report, based on the 1960 Census of Population, presents 25-percent sample data on the mother tongue of the foreign-born population. Statistics on mother tongue are shown by age, sex, color, years of school completed, and country of birth for the United States and regions. A distribution of the mother tongue of the foreign-born population is shown for States and for standard metropolitan statistical areas of 250,000 or more with 25,000 or more foreign-born persons.

### RELATED MATERIALS

1960 Census reports.--Statistics on mother tongue of the foreign born are shown for the United States, regions, divisions, and States in 1960 Census of Population, Volume I, Characteristics of the Population, Part 1, United States Summary. In the State parts of Volume I, statistics are presented for States and their urban and rural parts and for selected standard metropolitan statistical areas, urbanized areas, urban places of 10,000 or more, and counties.

The report PC(2)-1B, Persons of Spanish Surname, presents statistics on the mother tongue of foreign-born white persons of Spanish surname by country of birth and sex for five Southwestern States, by urban and rural residence.

1940 Census reports.--Data on mother tongue for 1940 are published in the report Nativity and Parentage of the White Population, Mother Tongue. This report presents statistics based on a 5-percent sample

of the population enumerated in 1940. The 1940 report presents data on mother tongue for the white population of the United States cross-classified by age, sex, nativity, parentage, and country of origin. The data on mother tongue by nativity and parentage are shown for the urban and rural parts of the United States, regions, divisions, and States, and for cities of 500,000 or more. Tables presenting statistics on mother tongue classified by age are shown for the United States by urban and rural residence and for regions. Data on mother tongue by country of origin are shown for similar areas.

### AVAILABILITY OF UNPUBLISHED DATA

Data for 1960 shown in this report for regions are also available for States and four cities (Chicago, Los Angeles, New York, and Philadelphia). Photocopies of these tabulations may be obtained at cost.

Data for 1960 on the mother tongue of the foreign-born population similar to table 41 of the State reports in 1960 Census of Population, Volume I, Characteristics of the Population, are available on magnetic tape for urban places of 2,500 to 10,000, the balance of each urbanized area, and the rural-nonfarm parts of counties. These data are available at cost.

Requests for unpublished data, giving a specific description of the figures desired, may be made in writing to the Chief, Population Division, Bureau of the Census, Washington, D.C. 20233.

## DEFINITIONS AND EXPLANATIONS

Some of the definitions used in 1960 differ from those used in 1950. These changes were made after consultation with users of census data in order to improve the statistics, even though it was recognized that comparability would be affected. The definitions and explanations should be interpreted in the context of the 1960 Censuses, in which data were collected by a combination of self-enumeration, direct interview, and observation by the enumerator.

The definitions below are consistent with the instructions given to the enumerator. As in all surveys, there were some failures to execute the instructions

exactly. Through the forms distributed to households, the respondents were given explanations of some of the questions more uniformly than would have been given in direct interviews. Nevertheless, it was not feasible to give the full instructions to the respondents, and some erroneous replies have undoubtedly gone undetected.

More complete discussions of the definitions of population items are given in 1960 Census of Population, Volume I, Characteristics of the Population, Part 1, United States Summary, and in each of the State parts.

## MOTHER TONGUE OF THE FOREIGN BORN

## Definitions

The data on mother tongue shown in this report were derived from answers to the following question on the Household Questionnaire:

**P9. If this person was born outside the U.S.—  
What language was spoken in his home before he came to the United States?**

In the 1960 Census, mother tongue is defined as the principal language spoken in the person's home before he came to the United States. If a person reported more than one language, he was assigned the code for the one which in the 1940 Census was most frequently reported by immigrants from his native country.

The categories of mother tongue shown in this report are arranged in geographic order, which in general parallels that of the usual classification by country of origin.

Data on mother tongue, cross-classified by age and education, are presented for the most common European languages, as well as Chinese, Japanese, and Arabic. Because of interest in the number of persons reporting the rarer languages, this report includes a table presenting a detailed inventory of languages reported. Although data on mother tongue do not necessarily reflect a person's current language skill, such data may provide some rough measure of latent language resources.

## Quality of the Data

For the United States approximately 7 percent of the foreign-born population did not report mother tongue. Failure to report a language may have resulted from a number of causes. For example, in some situations, the respondent and the enumerator may have thought the mother tongue was obvious from the country of birth. Furthermore, since the mother-tongue question was asked only of foreign-born persons, it was asked relatively rarely in some areas and may have been overlooked by the enumerator. It is apparent that in areas where there are large concentrations of foreign-born persons, nonresponse rates are substantially lower than in areas where there are relatively few such persons.

The statistics on mother tongue in this report differ from those published in Volume I because of a different procedure used for the tabulation of non-responses for mother tongue. In Volume I, all non-responses were shown as a separate category. In this report, allocations of mother tongue were made for some nonresponses on the basis of the country of birth of the individual. The basic procedure involved the use of data from the 1940 and 1930 censuses which showed that in 12 countries, over 90 percent of the foreign-born population had reported the same mother tongue. For 1960, nonresponses on mother tongue for persons born in these 12 countries were allocated to the major language of the country. This procedure accounted for the allocation of almost half of all the

nonresponses, leaving 3.9 percent of the foreign-born population in the category "mother tongue not reported." (See table A and appendix table A-1.)

Table A.--ALLOCATIONS FOR NONRESPONSE, BY MOTHER TONGUE: 1960

Mother tongue	Total after allocation	Allocations	
		Number	Percent of total
Total foreign born.....	9,738,155	330,894	3.4
English.....	1,979,949	126,947	6.4
Norwegian.....	152,687	11,913	7.8
Swedish.....	225,607	14,010	6.2
Danish.....	85,421	5,802	6.8
Dutch.....	130,482	6,869	5.3
Spanish.....	815,009	48,044	5.9
German.....	1,332,399	53,632	4.0
Greek.....	180,781	7,750	4.3
Italian.....	1,277,585	51,444	4.0
Portuguese.....	91,592	4,483	4.9
Other.....	3,088,667	...	...
Not reported.....	377,976	...	...

In 1940, no attempt was made to allocate mother tongue for those persons not reporting; in preceding censuses, persons not reporting mother tongue were allocated to a specific mother tongue if the persons originated in a country from which immigrants had reported, in the main, a single mother tongue.

## Comparability

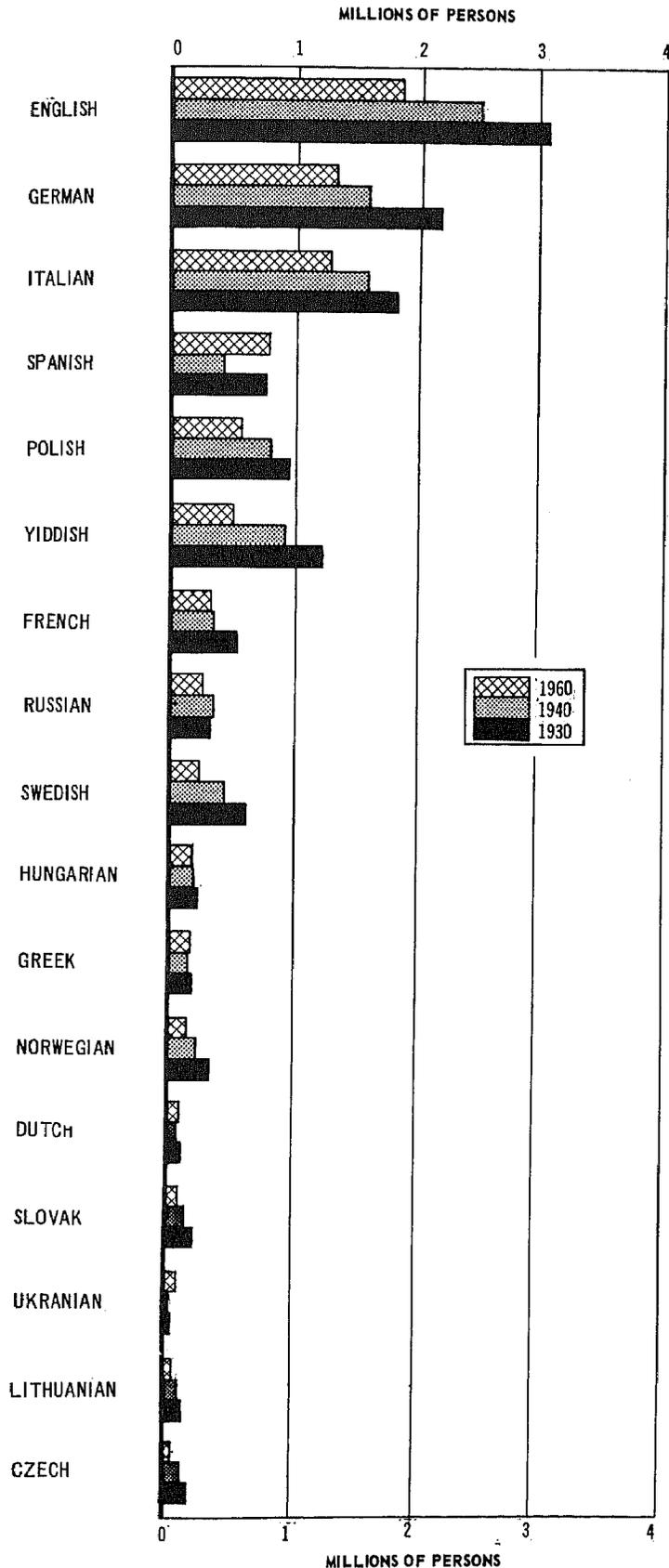
A question on mother tongue was asked in the Censuses of 1910, 1920, 1930, and 1940. The comparability of these data is limited to some extent by changes in the wording of the question, in the categories of the population to which the question was addressed, and in the detail that was published. In 1940, the question asked for the language spoken in earliest childhood, with a caution to enumerators that when obtaining this information from foreign-born persons, they should record the language spoken in the home before the person came to the United States. In 1960, if both English and another mother tongue were reported, preference was always given to the non-English language. This procedure may reduce somewhat the proportion of the foreign-born population classified as having English as their mother tongue.

In the 1910 and 1920 Censuses, statistics on mother tongue were published for the foreign white stock; in 1930, they were published for the foreign-born white population; and in 1940 they were published for the native white of native parentage as well as the foreign white stock. For this report they are shown for the foreign-born population of all races combined and, for historical comparability, for the foreign-born white population also. (See figure 1.)

## COUNTRY OF BIRTH

Foreign-born persons were asked to report their country of birth according to international boundaries as recognized by the United States on April 1, 1960. Similarly, in the editing and coding of data on country of birth of the foreign born, the list of countries

Figure 1.— PRINCIPAL MOTHER TONGUES OF THE FOREIGN BORN WHITE POPULATION, CONTERMINOUS UNITED STATES: 1960, 1940, AND 1930



used was composed of those officially recognized by the United States at the time of the census. In these operations, replies to the question on mother tongue were used for the determination of the national origin of the foreign born, especially of those persons born in certain Eastern European areas which have experienced many changes in national sovereignty.

#### MEDIAN

The median is presented in connection with the data on age and years of school completed. It is the value which divides the distribution into two equal parts, one-half the cases falling below this value and one-half the cases exceeding this value.

#### UNITED STATES AND CONTERMINOUS UNITED STATES

For 1960, the term "United States" when used without qualifications refers to the 50 States and the District of Columbia. To preserve historical comparability, some 1960 totals are shown for the 48 States and the District of Columbia, excluding Alaska and Hawaii. This area is designated "conterminous United States."

#### STANDARD METROPOLITAN STATISTICAL AREA

Except in New England, a standard metropolitan statistical area (SMSA) is a county or group of contiguous counties which contains at least one city of

Table B.—PERCENT OF THE FOREIGN BORN OF EACH MOTHER TONGUE LIVING IN SELECTED STANDARD METROPOLITAN STATISTICAL AREAS: 1960

(Standard metropolitan statistical areas of 250,000 or more with 25,000 or more foreign-born persons)

Mother tongue	Total	In selected standard metropolitan statistical areas	
		Number	Percent
Total.....	9,738,155	6,955,323	71.4
English.....	1,979,949	1,425,446	72.0
Norwegian.....	152,687	86,210	56.5
Swedish.....	225,607	135,359	60.0
Danish.....	85,421	44,721	52.4
Dutch.....	130,482	70,946	54.4
French.....	330,220	188,175	57.0
German.....	1,332,399	911,722	68.4
Polish.....	581,936	447,033	76.8
Czech.....	91,711	62,496	68.1
Slovak.....	125,000	84,107	67.3
Hungarian (Magyar).....	213,118	161,866	76.0
Serbo-Croatian.....	88,094	66,649	75.7
Slovenian.....	32,108	21,730	67.7
Russian.....	276,834	229,423	82.9
Ukrainian.....	106,974	86,676	81.0
Lithuanian.....	99,043	71,528	72.2
Finnish.....	53,168	23,582	44.4
Rumanian.....	38,019	31,747	83.5
Yiddish.....	503,605	468,815	93.1
Greek.....	180,781	129,573	71.7
Italian.....	1,277,585	1,010,046	79.1
Spanish.....	815,009	530,775	65.1
Portuguese.....	91,592	47,406	51.8
Japanese.....	95,027	64,137	67.5
Chinese.....	89,609	75,295	84.0
Arabic.....	49,908	31,870	63.9
All other.....	314,293	225,342	71.8
Not reported.....	377,976	222,648	58.9

50,000 inhabitants or more, or "twin cities" with a combined population of at least 50,000. In addition to the county, or counties, containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England, SMSA's consist of towns and cities, rather than counties. Data in this report are shown for SMSA's of 250,000 or more with 25,000 or more foreign-born persons. (See table B.)

#### AGE

The age classification is based on the age of the person in completed years as of April 1, 1960, as determined from the reply to a question on month and year of birth.

#### COLOR

The term "color" refers to the division of population into two groups, white and nonwhite. The color group designated as "nonwhite" consists of such races as the Negro, American Indian, Japanese, Chinese, Filipino, Korean, Asian Indian, and Malayan races. Persons of Mexican birth or ancestry who are not definitely of Indian or other nonwhite race are classified as white.

#### YEARS OF SCHOOL COMPLETED

The data on years of school completed were derived from the answers to the two questions: (a) "What is the highest grade (or year) of regular school he has ever attended?" and (b) "Did he finish this grade (or year)?" Enumerators were instructed to obtain the approximate equivalent grade in the American

school system for persons whose highest grade of attendance was in a foreign school system, whose highest level of attendance was in an ungraded school, whose highest level of schooling was measured by "readers," or whose training by a tutor was regarded as qualifying under the "regular" school definition. Persons were to answer "No" to the second question if they were attending school, had completed only part of a grade before they dropped out, or failed to pass the last grade attended.

The number in each category of highest grade of school completed represents the combination of (a) persons who reported that they had attended the indicated grade and finished it, and (b) those who had attended the next higher grade but had not finished it.

The questions on educational attainment applied only to progress in "regular" schools. Regular schooling is that which may advance a person toward an elementary school certificate or high school diploma, or a college, university, or professional degree. Schooling that was not obtained in a regular school and schooling from a tutor or through correspondence courses were counted only if the credits obtained were regarded as transferable to a school in the regular school system. Schooling which is generally regarded as not regular includes that which is given in nursery schools, in specialized vocational, trade, or business schools; in on-the-job training; and through correspondence courses.

Elementary school, as defined here, includes grades 1 to 8, and high school includes grades 9 to 12. College includes junior or community colleges, regular 4-year colleges, and graduate or professional schools. The category "less than 5 years" includes persons reporting "none" for years of school completed.

## COLLECTION AND PROCESSING OF DATA

### COLLECTION OF DATA

Several enumeration forms were used to collect the information for the 1960 Census of Population. A few days before the census date, the Post Office Department delivered an Advance Census Report (ACR) to households on postal delivery routes. This form contained questions which were to be answered for every person and every housing unit. Household members were requested to fill the ACR and have it ready for the enumerator. The census enumerator recorded this information on a form specially designed for electronic data processing by FOSDIC (Film Optical Sensing Device for Input to Computer). The information was either transcribed from the ACR to the complete-count FOSDIC schedule or entered on this schedule during direct interview.

In the densely populated areas, the enumerator left a Household Questionnaire to be completed by each household (or person) in the sample and mailed to the local census office. The population and housing information was transcribed from the Household Questionnaire to a sample FOSDIC schedule. When the Household Questionnaire was not returned or was returned

without having been completed, the enumerator collected the missing information by personal visit or by telephone and entered it directly on the sample FOSDIC schedule. In the remaining areas, when the enumerator picked up the ACR, he obtained all the information by direct interview and recorded it directly on the sample FOSDIC schedule.

Soon after the enumerator started work, his schedules were examined in a formal field review. This operation was designed to assure at an early stage of the work that the enumerator was performing his duties properly and had corrected any errors he had made.

More detailed descriptions of the 1960 Census procedures in the collection and processing of the data are given in reports entitled United States Censuses of Population and Housing, 1960: Principal Data Collection Forms and Procedures, 1961; and Processing the Data, 1962, U.S. Government Printing Office, Washington, D.C., 20402.

### MANUAL EDITING AND CODING

After the FOSDIC forms had been checked for completeness in the field, they were sent to a central processing office for manual editing and coding and

for microfilming. Except where some special problems arose, there was no manual coding of the FOSDIC forms for complete-count data. On the sample forms, the manual operation was limited to those items where coding required the reading of written entries and therefore could not be done effectively by machine. The coding clerks converted the written entries to codes by marking the appropriate circles on the FOSDIC schedules and at the same time were able to correct obviously wrong entries and sometimes supply missing information.

ELECTRONIC PROCESSING

After the enumerators and coders recorded the information by marking the appropriate circles, the schedules were microfilmed. The information on the microfilm was then read by FOSDIC, which converted the markings to signals on magnetic tape. The tape, in turn, was processed in an electronic computer, which was used extensively to edit and tabulate the data and to produce the publication tables.

EDITING

For a majority of items, nonresponses and inconsistencies were eliminated by using the computer to assign entries and correct inconsistencies. In general, few assignments or corrections were required, although the amount varied by subject and by enumerator.

The assignment of an acceptable entry by machine was based on related information reported for the person or on information reported for a similar person in the immediate neighborhood. For example, in the assignment of age in the complete-count tabulations, the computer stored reported ages of persons by sex, color or race, household relationship, and marital status; each stored age was retained in the computer only until a succeeding person having the same characteristics and having age reported was processed through the computer; this stored age was assigned to the next person whose age was unknown and who otherwise had the same characteristics. This procedure insured that the distribution of ages assigned by the computer for persons of a given set of characteristics would correspond closely to the reported age distribution of such persons as obtained in the current census.

The extent of the allocations for nonresponse or for inconsistency is shown for the United States and for States, places of 10,000 inhabitants or more, and other areas in appendix tables in chapters B, C, and D of 1960 Census of Population, Volume I, Characteristics of the Population.

SAMPLE DESIGN AND SAMPLING VARIABILITY

SAMPLE DESIGN

For persons in housing units at the time of the 1960 Census, the sampling unit was the housing unit and all its occupants; for persons in group quarters, it was the person. On the first visit to an address, the enumerator assigned a sample key letter (A, B, C, or D) to each housing unit sequentially in the order in which he first visited the units, whether or not he completed

Specific tolerances were established for the number of computer allocations acceptable for a given area. If the number was beyond tolerance, the data were rejected and the original schedules were re-examined to determine the source of the error. Correction and reprocessing were undertaken as necessary and feasible.

ACCURACY OF THE DATA

Human and mechanical errors occur in any mass statistical operation such as a decennial census. Such errors include failure to obtain required information from respondents, obtaining inconsistent information, recording information in the wrong place or incorrectly, or otherwise producing inconsistencies between entries on interrelated items on the field documents. Sampling biases occur because some of the enumerators fail to follow the sampling instructions. Clerical coding and editing errors occur, as well as errors in the electronic processing operation.

Careful efforts are made in every census to keep the errors in each step at an acceptably low level. Review of the enumerator's work, verification of manual coding and editing, checking of tabulated figures, and ratio estimation of sample data to control totals from the complete count reduce the effects of the errors in the census data.

Very minor differences between tables in this report or between corresponding data in this report and chapter C of the Volume I report, Characteristics of the Population, result from imperfections in the electronic equipment. No attempt has been made to reconcile these minor discrepancies.

Some innovations in the 1960 Censuses reduced errors in processing and others produced a more consistent quality of editing. The elimination of the card-punching operation removed one important source of error. The extensive use of electronic equipment insured a more uniform and more flexible edit than could have been accomplished manually or by less intricate mechanical equipment. It is believed that the use of electronic equipment in the 1960 Censuses has improved the quality of the editing compared with that of earlier censuses but, at the same time, it has introduced an element of difference in the statistics.

A group of reports designated Series ER 60 deals with the methods, results, and interpretation of a group of evaluation and research studies of the 1960 Census of Population and Housing. A report entitled The Post-Enumeration Survey: 1950, Technical Paper No. 4, presents evaluative material on the 1950 Census.

an interview. Each enumerator was given a random key letter to start his assignment, and the order of canvassing was indicated in advance, although these instructions allowed some latitude in the order of visiting addresses. Each housing unit which was assigned the key letter "A" was designated as a sample unit and all persons enumerated in the unit were included in the sample. In every group quarters, the sample consisted of every fourth person in the order listed.

Although the sampling procedure did not automatically insure an exact 25-percent sample of persons or housing units in each locality, the sample design was unbiased if carried through according to instructions; and, generally, for large areas the deviation from 25 percent was found to be quite small. Biases may have arisen, however, when the enumerator failed to follow his listing and sampling instructions exactly.

RATIO ESTIMATION

The statistics based on the sample of the 1960 Census returns are estimates that have been developed through the use of a ratio estimation procedure. This procedure was carried out for each of 44 groups of persons in each of the smallest areas for which sample data are published.<sup>1</sup> (For a more complete discussion of the ratio estimation procedure, see 1960 Census of Population, Volume I, Characteristics of the Population, Part 1, United States Summary.)

These ratio estimates reduce the component of sampling error arising from the variation in the size of household and achieve some of the gains of stratification in the selection of the sample, with the strata being the groups for which separate ratio estimates are computed. The net effect is a reduction in the sampling error and bias of most statistics below what would be obtained by weighting the results of the 25-percent sample by a uniform factor of four. The reduction in sampling error is trivial for some items and substantial for others. A by-product of this estimation procedure, in general, is that estimates for this sample are consistent with the complete count with respect to the total population and for the subdivisions used as groups in the estimation procedure.

SAMPLING VARIABILITY

The figures from the 25-percent sample tabulations are subject to sampling variability, which can be estimated roughly from the standard errors shown in tables C and D. Somewhat more precise estimates of sampling error may be obtained by using the factors shown in table E in conjunction with table D for percentages and table C for absolute numbers. These tables<sup>2</sup> do not reflect the effect of response variance, processing variance, or bias arising in the collection, processing, and estimation steps. Estimates of the magnitude of some of these factors in the total

error are being evaluated and will be published at a later date. The chances are about 2 out of 3 that the difference due to sampling variability between an estimate and the figure that would have been obtained from a complete count of the population is less than the standard error. The chances are about 19 out of 20 that the difference is less than twice the standard error and about 99 out of 100 that it is less than 2½ times the standard error. The amount by which the estimated standard error must be multiplied to obtain other odds deemed more appropriate can be found in most statistical text books.

Table C.--ROUGH APPROXIMATION TO STANDARD ERROR OF ESTIMATED NUMBER

(Range of 2 chances out of 3)

Estimated number	Standard error	Estimated number	Standard error
50.....	15	5,000.....	110
100.....	20	10,000.....	160
250.....	30	15,000.....	190
500.....	40	25,000.....	250
1,000.....	50	50,000.....	350
2,500.....	80		

Table D.--ROUGH APPROXIMATION TO STANDARD ERROR OF ESTIMATED PERCENTAGE

(Range of 2 chances out of 3)

Estimated percentage	Base of percentage					
	500	1,000	2,500	10,000	25,000	100,000
2 or 98.....	1.3	0.9	0.5	0.3	0.1	0.1
5 or 95.....	2.0	1.4	0.9	0.4	0.2	0.1
10 or 90.....	2.8	2.0	1.2	0.6	0.3	0.2
25 or 75.....	3.8	2.7	1.5	0.7	0.4	0.2
50.....	4.4	3.1	1.6	0.8	0.5	0.3

Table C shows rough approximations to standard errors of estimated numbers up to 50,000. The relative sampling errors of larger estimated numbers are somewhat smaller than for 50,000. For estimated numbers above 50,000, however, the nonsampling errors, e.g., response errors and processing errors, may have an increasingly important effect on the total error. Table D shows rough standard errors of data in the form of percentages. Linear interpolation in tables C and D will provide approximate results that are satisfactory for most purposes.

For a discussion of the sampling variability of medians and means and of the method for obtaining standard errors of differences between two estimates, see 1960 Census of Population, Volume I, Characteristics of the Population, Part 1, United States Summary. For a discussion of the sampling variability of characteristics from the 1940 Census, see 1940 Census, Nativity and Parentage of the White Population, Mother Tongue.

Table E provides a factor by which the standard errors shown in table C or D should be multiplied to adjust for the combined effect of the sample design and the estimation procedure. To estimate a somewhat more precise standard error for a given characteristic, locate in table E the factor applying to the

<sup>1</sup> Estimates of characteristics from the sample for a given area are produced using the formula:

$$x' = \sum_{i=1}^{44} \frac{x_i}{Y_i} y_i$$

where x' is the estimate of the characteristic for the area obtained through the use of the ratio estimation procedure, x<sub>i</sub> is the count of sample persons with the characteristic for the area in one (i) of the 44 groups, y<sub>i</sub> is the count of all sample persons for the area in the same one of the 44 groups, and Y<sub>i</sub> is the count of persons in the complete count for the area in the same one of the 44 groups.

<sup>2</sup> These estimates of sampling variability are based on partial information on variances calculated from a sample of the 1960 Census results.

characteristic. Where data are shown as cross-classifications of two characteristics, locate each characteristic in table E. The factor to be used for any cross-classification will usually lie between the values of the factors. When a given characteristic is cross-classified in extensive detail (e.g., by single years of age), the factor to be used is the smaller one shown in table E. Where a characteristic is cross-classified in broad groups (or used in broad groups), the factor to be used in table E should be closer to the larger one. Multiply the standard error given for the size of the estimate as shown in table C by this factor from table E. The result of this multiplication is the approximate standard error. Similarly, to obtain a somewhat more precise estimate of the standard error of a percentage, multiply the standard error as shown in table D by the factor from table E.

Illustration: Table 2 shows there were an estimated 34,556 foreign born with Chinese "mother tongue" in California in 1960. Table E shows that, for data

on mother tongue, the appropriate standard error in table C should be multiplied by a factor of 1.4. Linear interpolation in table C shows a rough approximation to the standard error for an estimate of 34,556 is 288. The factor of 1.4 times the standard error is 403. This means the chances are 2 out of 3 that the results of a complete count of all people in California would not differ by more than 403 from an estimate in this sample. Furthermore, the chances are about 99 in 100 that the difference is less than 1,008, which is 2½ times the standard error determined from tables C and E.

Table E.--FACTOR TO BE APPLIED TO STANDARD ERRORS

Characteristics	Factor
Foreign born, country of birth, mother tongue.....	1.4
All other characteristics.....	1.0