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|------------------|---------|--------|--------|
| LHAM MANOR . . . | 12 740 | 19 658 | 11 904 |
| NN YAN. . . | 3 839 | 1 824 | 425 |
| RYSBURG. . . | 23 742 | 15 911 | 1 315 |
| LMONT. . . | 148 658 | 35 579 | 22 443 |
| TSBURGH . . . | 56 321 | 99 607 | 33 847 |
| ANTVILLE . . . | 9 943 | 22 053 | 740 |
| CHESTER. . . | 38 582 | 15 911 | 9 79 |
| ERVIS . . . | 29 671 | 16 739 | 12 6 |
| LE . . . | 88 348 | 32 118 | 21 7 |
| EPSIE. . . | 256 743 | 38 327 | 25 |
| ER. . . | 7 465 | 2 675 | 4 |
| . . . | 54 872 | 42 732 | 3 |
| . . . | 12 389 | 9 783 | |
| . . . | 28 980 | 19 689 | |
| . . . | 21 641 | 12 543 | |
| . . . | 6 003 | 2 333 | |
| . . . | 94 169 | 67 879 | |
| . . . | 112 248 | 98 564 | |
| . . . | 82 392 | 45 098 | |
| . . . | 41 004 | 16 321 | |
| . . . | 3 649 | 98 | |
| . . . | 136 932 | 38 40 | |
| . . . | 22 385 | 15 1 | |
| . . . | 940 | 18 2 | |
| . . . | 608 | 2 | |
| . . . | 320 | 54 | |
| . . . | 082 | 35 | |
| . . . | 642 | 206 | |
| . . . | 842 | | |
| . . . | 321 | | |
| . . . | 644 | | |
| . . . | 900 | | |
| . . . | 32 | | |
| . . . | 3 | | |
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UNITED STATES CENSUS OF POPULATION 1960

Size of Place



Volume III
SELECTED AREA REPORTS

Series PC(3) Final Reports

- 1A State Economic Areas
- 1B Size of Place
- *1C Americans Overseas
- 1D Standard Metropolitan Statistical Areas

* Report in preparation.

BUREAU OF THE CENSUS

U.S. CENSUS OF POPULATION: 1960

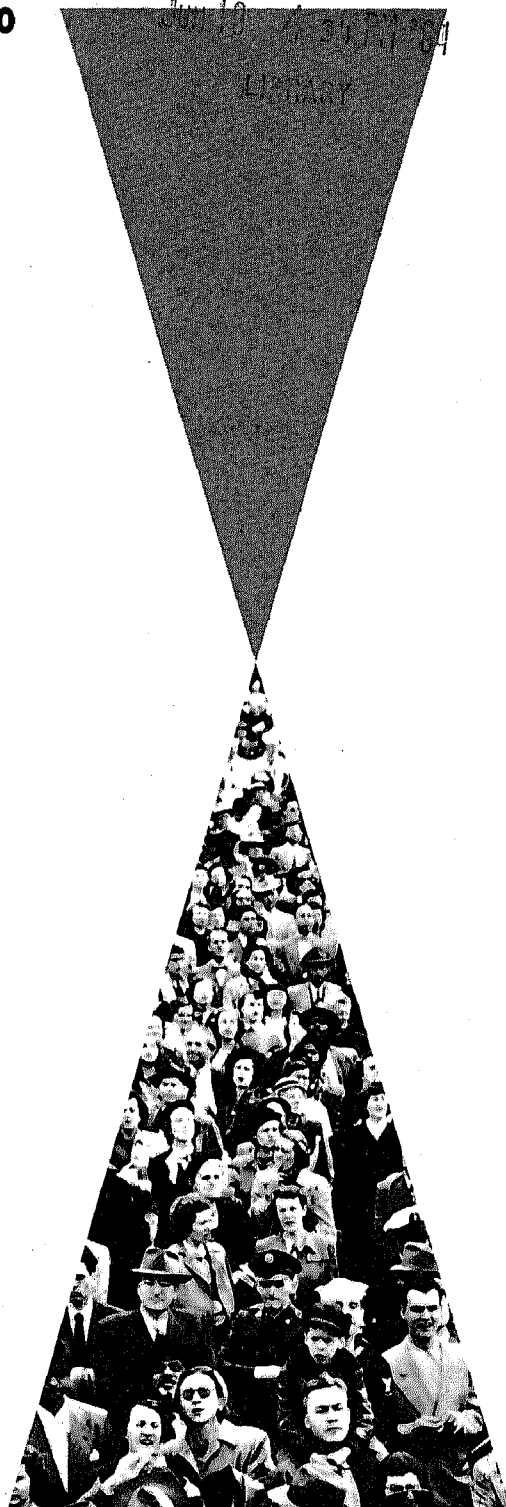
Final Report PC(3)-1B

SELECTED AREA REPORTS

Size of Place

SOCIAL AND ECONOMIC DATA
BY SIZE OF URBANIZED AREA
AND SIZE OF URBAN PLACE

Prepared under the supervision of
HOWARD G. BRUNSMAN, Chief
Population Division



U.S. DEPARTMENT OF COMMERCE

Luther H. Hodges, Secretary

BUREAU OF THE CENSUS

Richard M. Scammon, Director (From May 4, 1961)

Robert W. Burgess, Director (To March 3, 1961)



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PREFACE

This report presents statistics from the 1960 Census of Population on selected demographic, social, and economic characteristics of the inhabitants of the United States classified by the size of the place in which they live. 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 III, Selected Area Reports, and is designated as PC(3)-1B. A list of the Volume III Selected Area 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 Service Division, Everett H. Burke, 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.

Howard G. Brunsman, Division Chief, Henry D. Sheldon, Chief, Demographic Statistics Branch, Population Division, and Charles P. Brinkman 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 Leah S. Anderson performed the technical editorial work. The procedures for compiling the final tables were devised by Catherine M. Neafsey and G. Maxine Perry of the Demographic Operations Division. The sampling materials were prepared by Robert H. Hanson and Robert H. Finch, Jr., 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.

April 1964.

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 57C: 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 57D: 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.

Volume III (Series PC(3) reports). Selected Area Reports. Three of the reports in this volume present selected characteristics of the population (1) for State economic areas, (2) for standard metropolitan statistical areas, and (3) according to the size of place where the individual resided. A fourth report provides data on the social and economic characteristics of Americans overseas. A list of reports is given on the inside of the front cover.

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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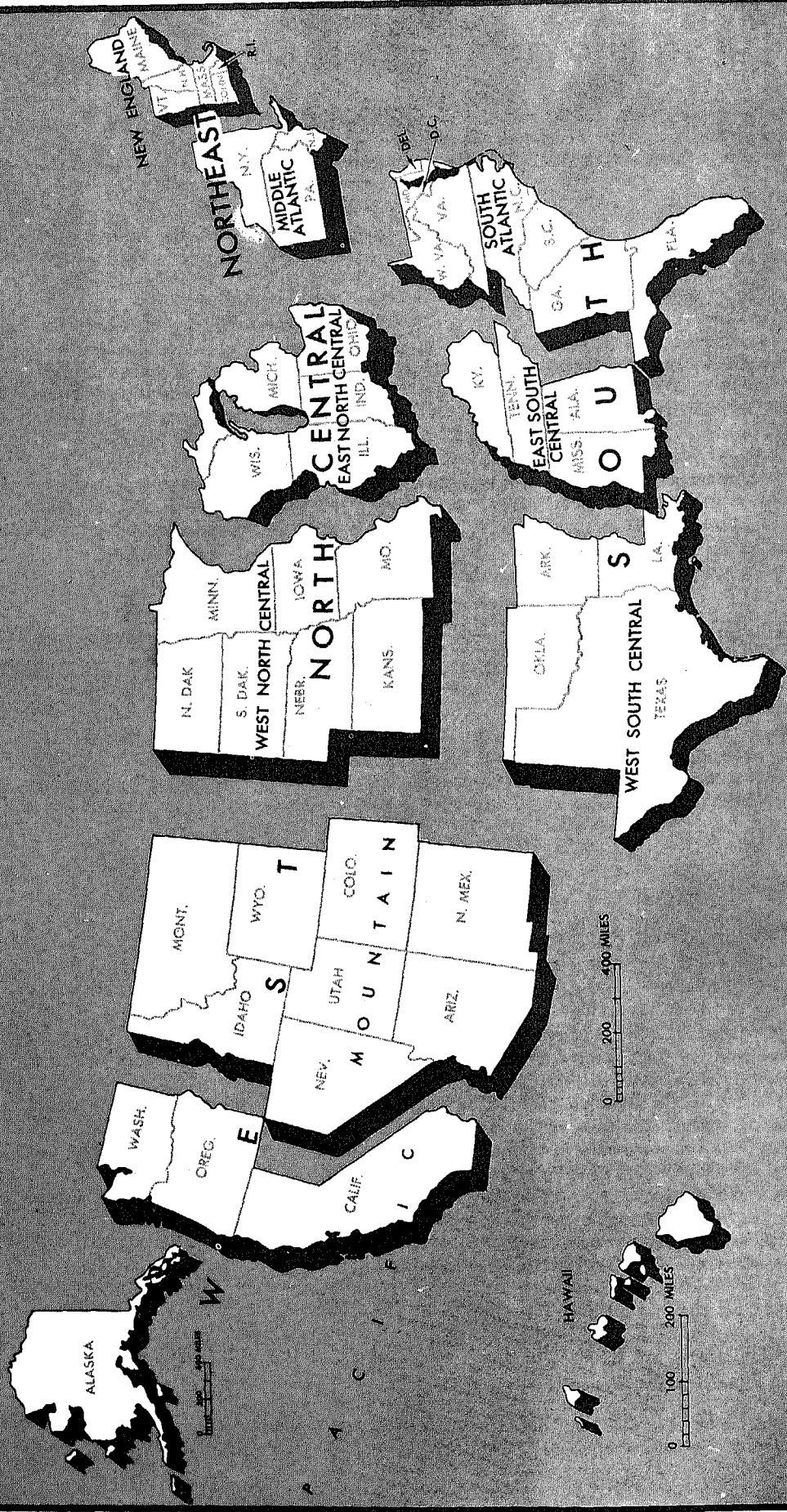
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REGIONS AND GEOGRAPHIC DIVISIONS OF THE UNITED STATES



BUREAU OF THE CENSUS

DEPARTMENT OF COMMERCE

Size of Place

GENERAL

This report presents statistics on selected demographic, social, and economic characteristics of persons enumerated in the Eighteenth Decennial Census of Population, taken as of April 1, 1960. The statistics are presented for four size categories of urbanized areas, subdivided by residence in central cities and in the fringe, and, for the population residing outside urbanized areas, by size of place cross-classified by metropolitan-nonmetropolitan residence, for the United States and the four regions. Somewhat abridged data on the characteristics of the nonwhite population are also shown for the United States and the South.

All the statistics in this report are based on a 25-percent sample of the population, although those on age, sex, color, relationship to head of household, and marital status were collected on a complete-count basis. The demographic and social characteristics shown in this report for the total population are age by sex and color, nativity and parentage, State of birth of the native population, country of origin of the foreign born, year moved into present house, residence in 1955, school enrollment, years of school completed, marital status, married couples and families, and number of children ever born. Economic characteristics presented are employment status, age and marital status of the labor force, occupation and industry, place of work and means of transportation to work, and family and personal income.

RELATED REPORTS

1960 Census.--The statistics in this report represent a retabulation of the data presented in chapter C of the individual State parts of 1960 Census of Population, Volume I, Characteristics of the Population. Statistics from the complete count on the population of the States by size of place appear in tables 2 to 4, 13 to 16, and 18 and 19 of chapters A and B of the individual State parts of Volume I, Characteristics of the Population.

Social and economic characteristics of the population of the States from the 25-percent sample count by size of place appear in tables 70 and 71 of chapter C. Statistics for the United States are presented in tables 7 and 8, 17 to 19, 42, 44, 46, 49 and 50, and 100 of the corresponding chapters of the United States Summary. A few of these tables also show data for the regions and geographic divisions. Characteristics of the inhabitants of standard metropolitan statistical areas by size of SMSA and residence in the central cities and outside the central cities appear in the Final Report PC(3)-1D, Standard

Metropolitan Statistical Areas. Additional information on characteristics classified by size of place appears in a number of Series PC(2) reports.

1950 Census.--The 1950 Census report Volume IV, Part 5, chapter A, Characteristics by Size of Place, presented the first comprehensive set of statistics by size of place. This report, based on the 3 1/3-percent sample, presented information on social and economic characteristics of the population by size of place for the United States and, in a somewhat abridged form, for the four regions. Several other Volume IV reports such as Education and Employment and Personal Characteristics presented additional information by size of place in connection with the principal subject of the report. The size of place classification in these reports, however, differed in some respects from that shown in the size of place report.

1940 Census.--Some of the special reports of the 1940 Census, such as Women by Number of Children Under 5 Years of Age and Educational Attainment of Children by Rental Value of Home, contained data by size of place for particular characteristics.

AVAILABILITY OF UNPUBLISHED DATA

The statistics which are shown in tables 2, 3, 4, and 5 are also available on magnetic tape for the nine geographic divisions. These data can be made available on a reimbursable basis. Inquiries concerning this material should be transmitted to the Bureau as soon as possible because the tape files are not maintained indefinitely. 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.

The information on the nonwhite population for the United States and the South which is presented in tables 6 and 7 was not tabulated for the other regions. However, the information is on magnetic tape and it can be made available for the three remaining regions and for the nine geographic divisions on the same basis as that for the total population. Country of origin of the foreign born, year moved into present house, age and marital status of the labor force, and means of transportation to work were not available for the nonwhite population on the magnetic tapes used in the preparation of this report. Consequently, no statistics on these characteristics are shown for the nonwhite population nor can be made available from these tapes.

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.

SIZE OF PLACE

Definitions

The census definition of a place as a concentration of population, which may be independent of legal limits, implies the possibility that a place or city may be defined in terms of the entire area of continuous concentrated settlement rather than the area defined by corporate limits. Under this definition a place or physical city includes not only the principal incorporated area or areas but also adjacent suburban and satellite areas. This definition is reflected in the urbanized areas established in connection with cities of 50,000 or more or with "twin cities" having a combined population in excess of 50,000.

For cities below this size, urbanized areas have not yet been established, and this fact introduces a degree of discontinuity. The change of unit is made apparent in the tables by the basic dichotomy of urbanized areas and other urban areas. Each urbanized area is recognized as a unit and classified by size on the basis of its total population. It follows then that a number of urban places adjacent to large cities are included in the fringe of urbanized areas and do not appear in the size classes in which they would fall on the basis of their own population. Thus, for example, the Chicago-Northwestern Indiana Urbanized Area includes in its fringe such places as Evanston and Oak Park.

To isolate the suburbs and satellite areas, an urbanized area is divided into its central city or cities and urban fringe as indicated in the formal definitions below. This distinction between central city and urban fringe is recognized in each size class of urbanized areas. In the tables, the fringe data

are presented for incorporated places (cities, boroughs, villages, etc.) of 2,500 inhabitants or more and for the remainder of the fringe, that is, urban counties, towns, and townships, unincorporated places of 10,000 or more, other unincorporated territory, and incorporated places under 2,500.

Outside the urbanized areas, the classification of the urban population by size is simply in terms of the size of the urban place. The classification of the rural population is by farm-nonfarm residence.

Uses and Limitations of Data

There is interest in the similarities and differences of people living in population agglomerations of different sizes. Moreover, statistics on this subject show how a particular demographic, social, or economic characteristic varies with size of place. Furthermore, one may examine whether the relationships between various characteristics, such as age and personal income or sex and educational attainment, are fairly constant within each broad range of population size. An attempt has also been made to shed some light on the differences between residents of the suburbs and residents of the central urban area. A tabulation based on a classification of places according to main function (manufacturing cities, mining towns, trade centers, college towns, etc.) would also undoubtedly have produced some interesting comparisons. Such a classification, however, would have resulted in an additional major project.

In the transition from urbanized areas to urban places outside such areas, there is a discontinuity arising from the restriction of urbanized areas to those with a city of 50,000 or more (or "twin cities" having a combined population in excess of 50,000). There is an overlap in size of incorporated city in the stratification between central cities and incorporated places of 2,500 or more in the fringe. All cities in urbanized areas which qualified as central cities of SMSA's (see section on SMSA's below) were also central cities of urbanized areas. In general, the larger cities are central cities, but the rules of nomenclature permitted some cities with 25,000 inhabitants or more to qualify as a central city. Consequently, a city such as Texas City, Texas (1960 population 32,065), qualified as a central city. On the other hand, the rule requiring a second and third city to have one-third or more of the number of inhabitants of the largest city in the SMSA meant that Yonkers, New York (1960 population 190,634), did not qualify. In addition, a few urbanized areas were established for "twin cities" having a combined population of 50,000. The smallest city qualifying under this criterion--San Benito, Texas--had only 16,422 inhabitants in 1960.

The choice of units to be used in the classification by size of place is somewhat arbitrary. In other reports of this census, there are classifications that use all individual places (that is, incorporated places, unincorporated places, and urban counties, towns, and townships) as units. This system does

represent an inconsistent treatment of incorporated and unincorporated suburbs within urban fringes. The latter places were identified only to a limited extent in the 1960 Census. To be classified as an unincorporated place inside an urbanized area, such places had to have a minimum population of 10,000 and there had to be an expression of local interest in their recognition. Even if all suburban communities regardless of incorporation status had been identified, however, a case might still be made for a unit that represented physical agglomerations in their entirety.

It was not feasible in the present report to extend the continuum of places into rural territory using size classes that appear in other reports. The categories "rural nonfarm" and "rural farm" have sometimes been used as if they represented part of the continuum beginning with urban size classes. Actually farm-nonfarm residence represents a different dimension from size of place. The traditional relationship is modified here by a classification of rural area by farm-nonfarm residence with a further indication as to whether the area is in an SMSA.

It has been suggested that size classes of places outside SMSA's might be further subdivided in terms of distance from the nearest SMSA. This approach might well be a very meaningful one for analytical purposes, but resources limited the number of ways in which the influence of size of place could be examined.

Comparability of Data

Although statistics on the total population by size of place are available for each census beginning with the first census in 1790, no comprehensive report presenting the characteristics of the population by size of place was published until the 1950 Census. The classification of size of place in this report, however, differs from the one employed in the 1950 report. In the present report, the size-of-place classification is cross-classified in accordance with metropolitan-nonmetropolitan residence, and, unlike 1950, separate figures are not shown for places of 1,000 to 2,500 and incorporated places under 1,000 in territory outside urbanized areas. Another difference in the 1950 and 1960 reports is that the 1950 report presented more extensive use of cross-classification by age.

The classification in the other 1950 reports referred to in the section "Related reports" represented a compromise between the classification used in the 1950 report on size of place and one that ordered incorporated and unincorporated places in terms of their own size. Their own size was used, but the urban units were stratified into those inside and those outside urbanized areas. Furthermore, the rural-nonfarm and rural-farm populations were not stratified by size of place.

URBANIZED AREAS

Definition.--The major objective of the Bureau of the Census in delineating urbanized areas was to provide a better separation of urban and rural population

in the vicinity of the larger cities. In addition to serving this purpose, individual urbanized areas have proved to be useful statistical areas as well. They correspond to what are called "conurbations" in some other countries. An urbanized area contains at least one city of 50,000 inhabitants or more in 1960,¹ as well as the surrounding closely settled incorporated places and unincorporated areas that meet the criteria listed below. An urbanized area may be thought of as divided into the central city, or cities, and the remainder of the area, or the urban fringe. All persons residing in an urbanized area are included in the urban population.

It appeared desirable to delineate the urbanized areas in terms of the 1960 Census results rather than on the basis of information available prior to the census as was done in 1950. For this purpose, a peripheral zone was recognized around each 1950 urbanized area and around cities that were presumably approaching a population of 50,000 in 1960. Within the unincorporated parts of this zone small enumeration districts (ED's) were established, usually including no more than one square mile of land area and no more than 75 housing units.²

Arrangements were made to include within the urbanized area those enumeration districts meeting specified criteria of population density as well as adjacent incorporated places. Since the urbanized area outside incorporated places was defined in terms of ED's, the boundaries of the urbanized area for the most part follow such features as roads, streets, railroads, streams, and other clearly defined lines which may be easily identified by census enumerators in the field and often do not conform to the boundaries of political units.

In addition to its central city or cities, an urbanized area contains the following types of contiguous areas, which together constitute its urban fringe:

1. Incorporated places with 2,500 inhabitants or more.
2. Incorporated places with less than 2,500 inhabitants, provided each has a closely settled area of 100 housing units or more.
3. Towns in the New England States, townships in New Jersey and Pennsylvania, and counties elsewhere which are classified as urban.
4. Enumeration districts in unincorporated territory with a population density of 1,000 inhabitants or more per square mile. (The areas of large nonresidential tracts devoted to such urban land uses as railroad yards, factories, and cemeteries were excluded in computing the population density of an ED.)
5. Other ED's provided that they served one of the following purposes:
 - a. To eliminate enclaves.
 - b. To close indentations in the urbanized areas of one mile or less across the open end.

¹ A few urbanized areas contain no single city with a population of 50,000 but have "twin" central cities with a combined population of at least 50,000.

² An enumeration district (ED) is a small area assigned to one enumerator to be canvassed and reported separately. The average ED contains approximately 200 housing units.

"other means." The enumerator was instructed that "principal means" referred to the means of transportation covering the greatest distance, if more than one means was used in daily travel, or to the means of transportation used most frequently, if different means were used on different days. He was further instructed that "railroad" was defined to include commuter and other regular trains operated by railroads, whereas "subway or elevated" was meant to refer to a rapid transit system operating on its own right-of-way. "Bus or streetcar" was defined as referring to vehicles operating within or between cities on public streets or highways.

INCOME IN 1959

Information on income for the calendar year 1959 was requested from all persons 14 years old and over in the sample. "Total income" is the sum of amounts reported separately for wage or salary income, self-employment income, and other income. Wage or salary income is defined as the total money earnings received for work performed as an employee. It represents the amount received before deductions for personal income

taxes, Social Security, bond purchases, union dues, etc. Self-employment income is defined as net money income (gross receipts minus operating expenses) from a business, farm, or professional enterprise in which the person was engaged on his own account. Other income includes money income received from such sources as net rents, interest, dividends, Social Security benefits, pensions, veterans' payments, unemployment insurance, and public assistance or other governmental payments, and periodic receipts from insurance policies or annuities. Not included as income are money received from the sale of property (unless the recipient was engaged in the business of selling such property), the value of income "in kind," withdrawals of bank deposits, money borrowed, tax refunds, and gifts and lump-sum inheritances or insurance payments.

In the statistics on family income, the combined incomes of all members of each family are treated as a single amount. Although the time period covered by the income statistics is the calendar year 1959, the composition of families refers to the time of enumeration. For most of the families, however, the income reported was received by persons who were members of the family throughout 1959.

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 by size of place 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. For a comparison of the 100-percent and the 3 1/3-percent counts in 1950, see page 13 of the 1950 report on Characteristics by Size of Place.

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.

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 an interview. Each enumerator was given a random key letter to start his assignment, and the order of canvassing was indicated in advance, although

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 chapters C and D of Volume I, 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 "Evaluation and Research Program Series" will deal with the methods, results, and interpretation of a group of evaluation and research studies of the 1960 Censuses of Population and Housing. A report entitled The Post-Enumeration Survey: 1950, Technical Paper No. 4, presents evaluative material on the 1950 Census.

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.⁶ (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 B and C. Somewhat more precise estimates of sampling error may be obtained by using the factors shown in table D in conjunction with table C for percentages and table B for absolute numbers. These tables⁷ 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 es-

⁶ 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_i is the count of sample persons with the characteristic for the area in one (i) of the 44 groups, Y_i is the count of all sample persons for the area in the same one of the 44 groups, and Y is the count of persons in the complete count for the area in the same one of the 44 groups.

⁷ These estimates of sampling variability are based on partial information on variances calculated from a sample of the 1960 Census results. Further estimates are being calculated and will be made available at a later date.

timate 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 B.--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 C.--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 B shows rough standard error 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 C shows rough standard errors of data in the form of percentages. Linear interpolation in tables B and C 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.

Table D provides a factor by which the standard errors shown in table B or C 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 D the factor applying to the characteristic. Where data are shown as cross-classifications of two characteristics, locate each characteristic in table D. 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 D. Where a characteristic is cross-classified in broad groups (or used in broad groups), the factor to be used in table D should be closer to the larger one. Multiply the standard error given for the size of the estimate as shown in table B by this factor from table D. 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 C by the factor from table D.

Illustration: Table 7 shows that in the urban fringe of urbanized areas of 1 to 3 million population in the South, there are 42,087 nonwhites who are living outside incorporated places of 2,500 or more and who were born in their State of residence. Table D shows that, for data on color by place of birth, the appropriate standard error in table B should be multiplied by a factor of 1.4. Table B shows that the standard error for an estimate of 42,087 is about 318.

The factor of 1.4 times 318 is 445, which means that the chances are approximately 2 out of 3 that the results of a complete census would not differ by more than 445 from this estimated 42,087. It also follows that there is only about 1 chance in 100 that a complete census result would differ by as much as 1,112, that is, by about $2\frac{1}{2}$ times the number estimated from tables B and D.

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

| Characteristic | Factor |
|------------------------------------|--------|
| Nativity and parentage..... | 1.4 |
| Color or race..... | 1.8 |
| Place of birth..... | 1.2 |
| Color, by place of birth..... | 1.4 |
| Country of origin..... | 1.4 |
| Residence in 1955..... | 1.6 |
| Year moved into present house..... | 1.6 |
| Household relationship..... | 0.8 |
| School enrollment..... | 0.8 |
| All other characteristics..... | 1.0 |