

State Economic Areas

GENERAL

This report presents inventory statistics on 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 the 509 State economic areas and, for some of the characteristics, for the urban, rural-nonfarm, and rural-farm population of these areas. All 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.

Related materials.--In general, the statistics for State economic areas (SEA's) presented in this report represent a consolidation of the statistics for counties and their equivalents which appear in chapter C of the individual State parts of 1960 Census of Population, Volume I, Characteristics of the Population. Statistics for the individual States, geographic divisions, regions, and the United States may be found in chapter C of Parts 1 through 51 of Volume I. Many of the types of statistics which appear in this report are shown in chapter C for urban places, the rural population of counties, and the rural-farm population of counties with a rural-farm population of 400 or more. For a listing of the data available for these areas, see 1960 Census of Population, Availability of Published and Unpublished Data. The population of the SEA's according to the complete count

and by urban-rural residence appears in tables 38 and 39 of the report 1960 Census of Population, Volume I, Characteristics of the Population, Part A or Part 1. One of the Volume II Subject Reports being planned would provide statistics on the mobility of the population for SEA's. In addition to these published materials, summary data for the complete range of subject matter shown for States in chapter C of Volume I are available on magnetic computer tapes for SEA's. Information on the detailed content of these tapes and their costs can be obtained by an inquiry addressed to the Chief, Population Division, Bureau of the Census, Washington 25, D.C.

The components of change in the population of SEA's for the period 1950 to 1960 and net total migration for the period 1940 to 1950 are given in Current Population Reports, Series P-23, No. 7, "Components of Population Change, 1950 to 1960, for Counties, Standard Metropolitan Statistical Areas, and Economic Subregions," November 1962.

In the reports of the 1950 Census, the population of the SEA's was published in table 31 of chapter 1 of the 1950 Census of Population, Volume I, Number of Inhabitants, and in Volume II, Characteristics of the Population, Part 1. Mobility data for the SEA's appear in 1950 Census of Population, Volume IV, Special Reports, Part 4, chapter B, "Population Mobility--States and State Economic Areas."

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.

STATE ECONOMIC AREAS AND ECONOMIC SUBREGIONS

Definition of State economic areas.--SEA's are relatively homogeneous subdivisions of States. They consist of single counties or groups of counties which have similar economic and social characteristics. The boundaries of these areas have been drawn in such a way that each State is subdivided into relatively few parts, with each part having certain significant characteristics which distinguishes it from adjoining areas. The counties comprising the SEA's are shown in the appendix.

The State economic areas were originally delineated for the 1950 Censuses. The grouping of the 3,103 counties or county equivalents in 1950 into SEA's was the product of a special study sponsored by the Bureau of the Census in cooperation with the Bureau of

Agricultural Economics and several State and private agencies. The delineation procedure was devised by Dr. Donald J. Bogue, then of the Scripps Foundation for Research in Population Problems, on loan to the Bureau of the Census.¹

The 1960 set of SEA's represents a limited revision of the 1950 areas. This revision takes into account changes in the definitions of standard metropolitan statistical areas (SMSA's), but no attempt was made to reexamine the original principles or to apply them to more recent data relating to homogeneity. In addition, SEA's were delineated for Alaska and Hawaii for the first time. As a result of the revision, the number of areas was increased from 501 to 509. (In the publications of the 1950 Census of Population, combinations were made which reduced the number of areas to 453.)

The combination of counties into SEA's has been made for the entire country, and in this process the larger SMSA's (those in 1960 with a central city of 50,000 or more and a total population of 100,000 or more) have been recognized as metropolitan SEA's.² When a SMSA is located in two or more States or economic subregions, each State part and each part in an economic subregion becomes a separate metropolitan SEA. In New England this correspondence of State metropolitan SEA's and SMSA's does not exist because SEA's are composed of whole counties, whereas SMSA's are built up from towns. Here a county with more than half of its population in one or more SMSA's is classified as a metropolitan SEA if the county or a combination of counties containing the SMSA or SMSA's has 100,000 inhabitants or more. A few metropolitan SEA's in New England therefore contain all or part of two or more SMA's. Connecticut Area A, for example, contains the Stamford and Norwalk SMSA's and part of the Bridgeport SMSA, as well as nonmetropolitan territory. Metropolitan SEA's are identified by a capital letter (A, B, C, etc.), whereas nonmetropolitan areas are identified by numerals (1, 2, 3, etc.).

Uses of State economic areas.--In the establishment of SEA's, factors in addition to industrial and commercial activities were taken into account. Demographic, climatic, physiographic, and cultural factors, as well as factors pertaining more directly to the production and exchange of agricultural and nonagricultural goods, were considered. The net result then is a set of areas, intermediate in size between States, on the one hand, and counties, on the other, which are relatively homogeneous with respect to a large number of characteristics. Areas of this type are well adapted for use in a wide variety of studies in which State data are neither sufficiently refined nor homogeneous and in which the manipulation of county data presents real difficulty. Moreover, a standard set of areas, such as these, makes possible studies in widely different fields on a comparable area basis.

¹ For further discussion and materials on SEA's and their uses, see U.S. Bureau of the Census, State Economic Areas, U.S. Government Printing Office, Washington, D.C., 1951, and Donald J. Bogue and Calvin L. Beale, Economic Areas of the United States, the Free Press of Glencoe, Inc., New York, 1961.

² In 1950 those SMSA's with a total population of 100,000 or more in 1940 were recognized as metropolitan SEA's.

Economic subregions.--These areas represent combinations of SEA's. The 509 SEA's are consolidated into a set of 121 areas which cut across State lines but which are intended, like the SEA's themselves, to have the homogeneous character of the SEA's. No changes were made in the boundaries of the 119 subregions of 1950 in conterminous United States. Two new subregions were established for the 1960 Census, one in Alaska and one in Hawaii. The economic subregions are perhaps best adapted to those analyses of the geographic distribution of characteristics of the population within the country as a whole in which there is no need for the recognition of State boundaries and in which the greater refinement permitted by the larger number of areas is desirable.

No statistics are presented in this report for the economic subregions. Figures on the population of the economic subregions by urban-rural residence appear in table 38 of the report 1960 Census of Population, Volume I, Characteristics of the Population, Part A or Part 1. The SEA's comprising the economic subregions are also shown in this table. Virtually all the statistics shown in this report may be obtained for the economic subregions through the consolidation of the statistics for SEA's.

URBAN-RURAL RESIDENCE

In general, the urban population comprises all persons living in urbanized areas and in places of 2,500 inhabitants or more outside urbanized areas. More specifically, according to the definition adopted for use in the 1960 Census, the urban population comprises all persons living in (a) places of 2,500 inhabitants or more incorporated as cities, boroughs, villages, and towns (except towns in New England, New York, and Wisconsin); (b) the densely settled urban fringe, whether incorporated or unincorporated, of urbanized areas; (c) towns in New England and townships in New Jersey and Pennsylvania which contain no incorporated municipalities as subdivisions and have either 25,000 inhabitants or more or a population of 2,500 to 25,000 and a density of 1,500 persons or more per square mile; (d) counties in States other than the New England States, New Jersey, and Pennsylvania that have no incorporated municipalities within their boundaries and have a density of 1,500 persons or more per square mile; and (e) unincorporated places of 2,500 inhabitants or more.

FARM-NONFARM RESIDENCE

The rural population 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. In the 1960 Census, the farm population consists of persons living in rural territory on places of 10 or more acres from which sales of farm products amounted to \$50 or more in 1959 or on places of less than 10 acres from which sales of farm products amounted to \$250 or more in 1959. In this report, all persons living in group quarters are classified as nonfarm. Through an error in computer programming, the small number (29,873 for the United States) of farm residents in workers' camps (including quarters for migratory agricultural

workers) were erroneously classified as nonfarm. The correct State figures appear in chapter D of the State parts of Volume I, Characteristics of the Population.

COUNTIES

The primary divisions of the States are, in general, termed counties; but in Louisiana these divisions are known as parishes. Alaska was divided into 24 election districts, included here as the equivalents of counties. There were also a number of cities which are independent of any county organization and thus constitute primary divisions of their States, namely, Baltimore in Maryland, St. Louis in Missouri, and 32 cities in Virginia. The District of Columbia, which is not divided into counties, also is included here as the equivalent of a county, as are the three parts of Yellowstone National Park in Idaho, Montana, and Wyoming.

MEDIAN

The median is presented in connection with the data on age, years of school completed, and income. 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.

A plus (+) or minus (-) sign after the median indicates that the median is above or below that number. For example, a median of \$10,000+ for income indicates that the median fell in the interval "\$10,000 or more."

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" includes Negroes, American Indians, Japanese, Chinese, Filipinos, Koreans, Hawaiians, Asian Indians, Malaysians, Eskimos, Aleuts, etc. Persons of Mexican birth or ancestry who are not definitely of Indian or other nonwhite race are classified as white.

NATIVITY AND PARENTAGE

Native.--This category comprises persons born in the United States, the Commonwealth of Puerto Rico, or a possession of the United States; persons born in a foreign country or at sea who have at least one native American parent; and persons whose place of birth was not reported and whose census report contained no contradictory information, such as an entry of a language spoken prior to coming to the United States.

Foreign born.--This category includes all persons not classified as native.

Native of native parentage.--This category consists of native persons both of whose parents are also natives of the United States.

Native of foreign or mixed parentage.--This category includes native persons one or both of whose parents are foreign born.

Foreign stock.--This category includes foreign-born persons and native persons of foreign or mixed parentage.

STATE OF BIRTH OF THE NATIVE POPULATION

In this report, the native population is further classified into the following groups: Persons born in the State in which they were residing at the time of the census, persons born in a different State, persons born in an outlying area of the United States, persons born abroad or at sea of American parents, and persons whose State of birth was not reported. The 1960 instructions specified that place of birth was to be reported in terms of the mother's usual State of residence at the time of the birth rather than in terms of the location of the hospital if the birth occurred in a hospital.

COUNTRY OF ORIGIN OF THE FOREIGN STOCK

Persons of foreign stock are classified according to their country of origin--country of birth for the foreign born and parents' country of birth for the native of foreign or mixed parentage. Natives of foreign parentage whose parents were born in different countries are classified according to the country of birth of the father. Natives of mixed parentage are classified according to the country of birth of the foreign-born parent. The classification by country of origin is based on international boundaries as recognized by the United States Government on April 1, 1960, although there may have been some deviation from the rules where respondents were unaware of changes in boundaries or jurisdiction.

YEAR MOVED INTO PRESENT HOUSE

The data on year moved into present house refer to the most recent move the person made. Thus, a person who had moved back into the same house (or apartment) in which he had previously lived was asked to give the date at which he began the present occupancy. If a person had moved from one apartment to another in the same building, he was expected to give the year when he moved into the present apartment. The category "always lived here" consists of persons who reported that their residence on April 1, 1960, was the same as their residence at birth and who had never had any other place of residence.

RESIDENCE IN 1955

Residence on April 1, 1955, is the usual place of residence five years prior to enumeration. The category "same house as in 1960" includes all persons 5 years old and over who were reported as living in the same house on the date of enumeration in 1960 and five years prior to enumeration. Included in the group are persons who had never moved during the five years as well as those who had moved but by 1960 had returned to their 1955 residence. The category "different house in the U.S." includes persons who, on April 1, 1955,

lived in the United States in a different house from the one they occupied on April 1, 1960. This category was subdivided into three groups according to their 1955 residence, viz., "different house, same county," "different county, same State," and "different State." The category "abroad" includes those with residence in a foreign country or an outlying area of the United States in 1955. (In the coding of this item, persons who lived in Alaska or Hawaii in 1955 but in other States in 1960 were classified as living in a different State in 1955.) Persons 5 years old and over who had indicated they had moved into their present residence after April 1, 1955, but, for whom sufficiently complete and consistent information regarding residence on April 1, 1955, was not collected, are included in the group "moved, place of residence in 1955 not reported."

SCHOOL ENROLLMENT

School enrollment is shown for persons 5 to 34 years old. Persons were included as enrolled in school if they were reported as attending or enrolled in a "regular" school or college at any time between February 1, 1960, and the time of enumeration. 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. In general, a "public" school is defined as any school which is controlled and supported primarily by a local, State, or Federal agency. All other schools are "private" schools.

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.

MARITAL STATUS

This classification refers to the marital status of the person at the time of enumeration. Persons classified as "married" comprise, therefore, both those who have been married only once and those who remarried after having been widowed or divorced. Persons reported as separated (either legally separated or otherwise absent from the spouse because of marital discord) are classified as a subcategory of married persons. The enumerators were instructed to report persons in common-law marriages as married and persons whose only marriage had been annulled as single. Persons "ever married" are those in the categories married (including separated), widowed, and divorced.

Married women with "husband present" are women whose husband was enumerated as a member of the same household even though he may have been temporarily absent on business or vacation, visiting, in a hospital, etc., at the time of enumeration.

HOUSEHOLD, GROUP QUARTERS, AND RELATIONSHIP TO HEAD OF HOUSEHOLD

A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants. The average population per household is obtained by dividing the population in households by the number of households.

All persons who are not members of households are regarded as living in group quarters. Group quarters are living arrangements for institutional inmates or for other groups containing five or more persons unrelated to the person in charge. Most of the persons in group quarters live in rooming houses, college dormitories, military barracks, or institutions. Inmates of institutions are persons for whom care or custody is provided in such places as homes for delinquent or dependent children; homes and schools for the mentally or physically handicapped; places providing specialized medical care for persons with mental disorders, tuberculosis, or other chronic disease; nursing and domiciliary homes for the aged and dependents; prisons; and jails.

For persons in households, several categories of relationship to head of household are recognized in this report:

1. The head of the household is the member reported as the head by the household respondent. However, if a married woman living with her husband is reported as the head, her husband is classified as the head for the purpose of census tabulations.

2. The wife of a head of a household is a woman married to and living with a household head. This category includes women in common-law marriages as well as women in formal marriages.

3. An other relative of the head is a person related to the head of the household by blood, marriage, or adoption, but not included specifically in another category.

4. A nonrelative of the head is any member of the household who is not related to the household head. This category includes lodgers (roomers and partners, relatives of such persons, and foster children) and resident employees (maids, hired farm hands, etc.).

MARRIED COUPLE, FAMILY, CHILD, AND UNRELATED INDIVIDUAL

A married couple is defined as a husband and his wife enumerated as members of the same household. A married couple with own household is one in which the husband is a household head.

A family consists of two or more persons in the same household who are related to each other by blood, marriage, or adoption; all persons living in one household who are related to each other are regarded as one family. A "husband-wife" family is a family in which the head and his wife are enumerated as members of the same household.

An own child of a household head or of a family head is defined here as a single (never married) son, daughter, stepchild, or adopted child of the head in question.

An unrelated individual is (1) a member of a household who is living entirely alone or with one or more persons all of whom are not related to him, or (2) a person living in group quarters who is not an inmate of an institution.

CHILDREN EVER BORN

The number of children ever born includes children born to the woman before her present marriage, children no longer living, and children away from home, as well as children borne by the woman who were still living in the home. Although the question on children ever born was asked only of women reported as having been married, the data are not limited to legitimate births.

EMPLOYMENT STATUS

The data on employment status relate to the calendar week prior to the date on which the respondents filled their Household Questionnaires or were interviewed by enumerators. This week is not the same for all respondents because not all persons were enumerated during the same week.

Employed persons comprise all civilians 14 years old and over who were either (a) "at work"--those who did any work for pay or profit, or worked without pay for 15 hours or more on a family farm or in a family business; or (b) were "with a job but not at work"--those who did not work and were not looking for work but had a job or business from which they were temporarily absent because of bad weather, industrial dispute, vacation, illness, or other personal reasons.

Persons are classified as unemployed if they were 14 years old and over and not "at work" but looking for work. A person is considered as looking for work not only if he actually tried to find work but also if

he had made such efforts recently (i.e., within the past 60 days) and was awaiting the results of these efforts. Persons waiting to be called back to a job from which they had been laid off or furloughed are also counted as unemployed.

The "civilian labor force" includes all persons classified as employed or unemployed, as described above. The "labor force" also includes members of the Armed Forces (persons on active duty with the United States Army, Air Force, Navy, Marine Corps, or Coast Guard).

Persons "not in the labor force" comprised all those 14 years old and over who are not classified as members of the labor force, including persons doing only incidental unpaid family work (less than 15 hours during the week).

OCCUPATION AND INDUSTRY

The data on occupation and industry in this report are for employed persons and refer to the job held during the week for which employment status was reported. For persons employed at two or more jobs, the data refer to the job at which the person worked the greatest number of hours. The occupation and industry statistics presented here are based on the detailed systems developed for the 1960 Census; see 1960 Census of Population, Classified Index of Occupations and Industries, U.S. Government Printing Office, Washington, D.C., 1960.

PLACE OF WORK

Place of work refers to the geographic location in which civilians at work during the reference week and Armed Forces personnel (except those on leave, sick, etc.) carried out their occupational or job activities. These locations were defined for the purposes of this report by county boundaries or those of county equivalents. Therefore, place of work is classified simply as to whether it was in the same county (or equivalent area) as the worker's county of residence or in a different county.

Persons working at more than one job were asked to report on the job at which they worked the greatest number of hours during the census week. Salesmen, deliverymen, and others who work in several places each week were requested to name the place in which they began work each day, if they reported to a central headquarters. In cases in which daily work was not begun at a central place each day, the person was asked to report the county in which he had worked the greatest number of hours during the previous week.

MEANS OF TRANSPORTATION TO WORK

Means of transportation to work refers to the principal mode of travel or type of conveyance used in traveling to and from work by civilians at work during the reference week and Armed Forces personnel (except those on leave, sick, etc.). For the purposes of this report, the categories "railroad" and "subway or elevated" were combined and "taxicab" was included in "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 25, D.C.

ELECTRONIC PROCESSING

Several steps were required to process the data. First, the enumerator recorded the information by marking appropriate circles on the FOSDIC schedules. These schedules were later microfilmed and the information was 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 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.

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 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 produces 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 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.

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 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.

According to preliminary estimates, 25.07 percent of the total population in the United States as a whole and 24.95 percent of the total housing units were designated for the sample.

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 the following 44 groups of persons in each of the smallest areas for which sample data are published.³

³ 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_i is the count of persons in the complete count for the area in the same one of the 44 groups.

| Group | Sex, color, and age | Relationship and tenure |
|---|---------------------|-----------------------------------|
| Male white: | | |
| 1 | under 5 | |
| 2 | 5 to 13 | |
| 3 | 14 to 24 | Head of owner household |
| 4 | 14 to 24 | Head of renter household |
| 5 | 14 to 24 | Not head of household |
| 6-8 | 25 to 44 | Same groups as age group 14 to 24 |
| 9-11 | 45 and over | Same groups as age group 14 to 24 |
| 12-22 Male nonwhite: Same groups as Male white | | |
| 23-33 Female white: Same groups as Male white | | |
| 34-44 Female nonwhite: Same groups as Male white | | |

For each of the 44 groups, the ratio of the complete count to the sample count of the population in the group was determined. Each specific sample person in the group was assigned an integral weight so that the sum of the weights would equal the complete count for the group. For example, if the ratio for a group was 4.2, one-fifth of the persons (selected at random) within the group were assigned a weight of 5, and the remaining four-fifths a weight of 4. The use of such a combination of integral weights rather than a single fractional weight was adopted to avoid the complications involved in rounding in the final tables. In order to increase the reliability, where there were fewer than 50 persons in the complete count in a group, or where the resulting weight was over 16, groups were combined in a specific order to satisfy both of these two conditions.

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 will be 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. A more complete discussion of the technical aspects of these ratio estimates will be presented in another report.

The ratio estimation procedure was generally applied to the smallest complete geographic area for which data were to be published. The area may be a city, tract within a city, county, SMSA, urbanized area, or the rural part of a county. The rural-nonfarm and rural-farm portions of a county, however, do not represent complete areas; therefore, data for rural-nonfarm and rural-farm population as presented in this report in tables 5 and 6 do not reflect the full effect of the reduction in sampling variability which is achieved by the ratio 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 A and B. Somewhat more precise estimates of sampling error may be obtained by using the factors shown in table C in conjunction with table B for percentages and table D for absolute numbers.⁴ These tables 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 two out of three 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 A.--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 A shows rough standard errors of estimated numbers up to 50,000. For estimated numbers larger than 50,000 the relative errors are somewhat smaller than for 50,000. In determining the figures for this table, some aspects of the sample design, the estimation process, and the population of the area over which the data have been compiled are ignored. Table B shows rough standard errors of data in the form of percentages. Linear interpolation in tables A and B will provide approximate results that are satisfactory for most purposes. The standard errors estimated from tables A and B are not directly applicable to differences between two sample estimates. These tables are to be applied differently in the three following situations:

1. For a difference between the sample figure and one based on a complete count (e.g., arising from comparisons between 1960 statistics and complete-count statistics for 1950 or 1940), the standard error is identical with the standard error of the 1960 estimate alone.

⁴ These estimates of sampling variability are based on partial information on variances being calculated from a sample of 1960 Census results. Further estimates are being calculated and will be made available at a later date.

Table B.--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 | 500,000 | 5,000,000 |
| 2 or 98..... | 1.3 | 0.9 | 0.5 | 0.3 | 0.1 | 0.1 | 0.0 | 0.0 |
| 5 or 95..... | 2.0 | 1.4 | 0.9 | 0.4 | 0.2 | 0.1 | 0.0 | 0.0 |
| 10 or 90..... | 2.8 | 2.0 | 1.2 | 0.6 | 0.3 | 0.2 | 0.0 | 0.0 |
| 25 or 75..... | 3.8 | 2.7 | 1.5 | 0.7 | 0.4 | 0.2 | 0.1 | 0.0 |
| 50..... | 4.4 | 3.1 | 1.6 | 0.8 | 0.5 | 0.3 | 0.1 | 0.0 |

2. For a difference between two sample figures (that is, one from 1960 and the other from 1950, or both from the same census year), the standard error is approximately the square root of the sum of the squares of the standard error of each estimate considered separately. This formula will represent the actual standard error quite accurately for the difference between estimates of the same characteristics in two different areas, or for the difference between separate and uncorrelated characteristics in the same area. If, however, there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error. The approximate standard error for the 1960 sample figure is derived directly from table A or B. The standard error of a 20-percent 1950 sample figure may be obtained from the relevant 1950 Census report, or an approximate value may be obtained by multiplying by 1.2 the appropriate value in table A or B.

3. For a difference between two sample estimates, one of which represents a subclass of the other, table A or B (whichever is appropriate) can be used directly, with the difference considered as the sample estimate.

The sampling variability of the medians presented in certain tables (median years of school completed and median income) depends on the size of the base and on the distribution on which the median is based. An approximate method for measuring the reliability of an estimated median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the true median lies within the interval. As the first step in estimating the upper and lower limits of the interval (that is, the confidence limits) about the median, compute one-half the number reporting (designated $\frac{N}{2}$) on the characteristic on which the median is based. By the methods outlined in other parts of this section, compute the standard error of $\frac{N}{2}$. Subtract this standard error from $\frac{N}{2}$. Cumulate the frequencies (in the table on which the median is based) up to the interval containing the difference between $\frac{N}{2}$ and its standard error, and by linear interpolation obtain a value corresponding to this number. In a corresponding manner, add the standard error to $\frac{N}{2}$, cumulate the frequencies in the table, and obtain a value corresponding to the sum of $\frac{N}{2}$ and its standard error. The chances are

about 2 out of 3 that the median would lie between these two values. The range for 19 chances out of 20 and for 99 in 100 can be computed in a similar manner by multiplying the standard error by the appropriate factors before subtracting from and adding to one-half the number reporting the characteristic. Interpolation to obtain the values corresponding to these numbers gives the confidence limits for the median.

The sampling variability of a mean, such as a number of children ever born per 1,000 women or population per household, presented in tables 1 and 3, depends on the variability of the distribution on which the mean is based, the size of the sample, the sample design (for example, the use of households as the sampling unit), and the use of ratio estimates. Formulas for computing the variability of a mean in simple random sampling can be found in textbooks on statistics. Although the estimated distribution on which a given mean is based may not be published in the detailed tables which follow, an approximation to the variability of the mean may be obtained by using a comparable distribution for a larger area or for a similar population group. A rough estimate of the sampling variability of means in this report may then be obtained by multiplying the figure thus derived by the factor corresponding to it in table C.

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

| Characteristic | Factor |
|--|--------|
| Age, by sex (by farm, nonfarm)..... | 1.8 |
| Color or race (by farm, nonfarm)..... | 1.8 |
| Nativity and parentage..... | 1.4 |
| State of birth..... | 1.2 |
| Country of origin..... | 1.4 |
| Residence in 1955..... | 1.6 |
| Year moved into present house..... | 1.6 |
| School enrollment: | |
| By age..... | 0.8 |
| By level and type of school..... | 0.8 |
| Years of school completed..... | 1.0 |
| Household relationship..... | 0.8 |
| Married couples..... | 1.0 |
| Families and unrelated individuals..... | 1.0 |
| Children ever born, by age of woman..... | 1.0 |
| Employment status, by sex..... | 1.0 |
| Labor force status, by age and sex..... | 1.0 |
| Occupation of employed, by sex..... | 1.0 |
| Industry of employed..... | 1.0 |
| Place of work..... | 1.0 |
| Means of transportation to work..... | 1.0 |
| Income in 1959: | |
| Families and unrelated individuals..... | 1.0 |
| Persons, by sex..... | 1.0 |

For most characteristics, the use of the household as a sampling unit increases slightly the standard error above what would be expected for a simple random sample of persons taken with the same sampling fraction. In particular, sample items which tend to have the same value for all members of a household (e.g., race, year moved into this house, and residence in 1955) will have a somewhat higher variance than if a sample of persons had been used. However, for many characteristics, the standard error is reduced below what would be expected for a simple random sample of persons because of geographic stratification in the selection of the sample and the use of ratio estimation.

Table C provides a factor by which the standard errors shown in table D should be multiplied to adjust for the combined effect of the sample design, the estimation procedure, and the population of the area over which the estimate is calculated. Table D shows standard errors for estimated numbers of persons depending on the population of the State economic area and the magnitude of the estimate.

To estimate a somewhat more precise standard error for a given characteristic, locate in table C the factor applying to the characteristic. Multiply

the standard error given for the size of estimate and the population of the area as shown in table D by this factor from table C. 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 B by the factor from table C. For most estimates, linear interpolation in tables B and D will provide reasonably accurate results.

Illustration: Let us assume that, for a State economic area with a total population of 1,000,000, table 1 shows that there are an estimated 50,000 males under 5 years old. Table C shows that for characteristics on age the appropriate standard error in table D should be multiplied by a factor of 1.8. Table D shows that the standard error for an estimate of 50,000 in areas with 1,000,000 inhabitants is about 340. The factor of 1.8 times 340, or 612, means that the chances are approximately 2 out of 3 that the results of a complete census would not differ by more than 612 from this estimated 50,000. It also follows that there is only about 1 chance in 100 that a complete census result would differ by as much as 1,530, that is, by about 2½ times the number estimated from tables C and D.

Table D.--STANDARD ERROR OF ESTIMATED NUMBER
(For multiplying factors, see table C and text; range of 2 chances out of 3)

| Estimated number | Population of area ¹ | | | | | | | |
|------------------|---------------------------------|--------|--------|---------|---------|-----------|-----------|------------|
| | 1,000 | 10,000 | 25,000 | 100,000 | 250,000 | 1,000,000 | 5,000,000 | 15,000,000 |
| 50..... | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| 100..... | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| 250..... | 25 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| 500..... | 25 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| 1,000..... | 0 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 2,500..... | ... | 70 | 70 | 80 | 80 | 80 | 80 | 80 |
| 5,000..... | ... | 80 | 100 | 110 | 110 | 110 | 110 | 110 |
| 10,000..... | ... | 0 | 120 | 150 | 150 | 150 | 160 | 160 |
| 15,000..... | ... | ... | 120 | 180 | 190 | 190 | 190 | 190 |
| 25,000..... | ... | ... | 0 | 210 | 230 | 240 | 250 | 250 |
| 50,000..... | ... | ... | ... | 250 | 310 | 340 | 350 | 350 |
| 75,000..... | ... | ... | ... | 210 | 360 | 410 | 420 | 430 |
| 100,000..... | ... | ... | ... | 0 | 380 | 470 | 490 | 490 |
| 250,000..... | ... | ... | ... | ... | 0 | 670 | 760 | 770 |
| 500,000..... | ... | ... | ... | ... | ... | 780 | 1,000 | 1,100 |
| 1,000,000..... | ... | ... | ... | ... | ... | 0 | 1,400 | 1,500 |
| 2,500,000..... | ... | ... | ... | ... | ... | ... | 1,700 | 2,300 |
| 5,000,000..... | ... | ... | ... | ... | ... | ... | 0 | 2,800 |
| 10,000,000..... | ... | ... | ... | ... | ... | ... | ... | 2,800 |
| 15,000,000..... | ... | ... | ... | ... | ... | ... | ... | 0 |

¹ An area is the smallest complete geographic area to which the estimate under consideration pertains. Thus, the area may be the State, city, county, standard metropolitan statistical area, urbanized area, or the urban or rural portion of the State or county. The rural-farm or rural-nonfarm population of the State or county, the nonwhite population, etc., do not represent complete areas.