

Appendix A.—GENERAL INFORMATION CONCERNING THE DATA

| | |
|---|-------|
| PRESENTATION OF THE DATA . . . | App-1 |
| Derived figures (percents, medians, etc.) | App-1 |
| Symbols | App-1 |
| Boundaries | App-1 |
| DATA COLLECTION PROCEDURES | App-1 |
| PROCESSING PROCEDURES | App-2 |

PRESENTATION OF THE DATA

Derived figures (percents, medians, etc.).—Percents, medians, and means, as well as certain rates and ratios are shown in Volume II reports. For all types of derived figures in this series of reports, the figure is not presented (but indicated by three dots "...") if the base is smaller than the minimum number prescribed for the sample on which the figure is based. The minimum bases for 1970 are 100 (persons, families, or households) for the 20-percent sample, 132 for the 15-percent, and 400 for the 5-percent.

The reader should exercise caution in the use and interpretation of data for very small subgroups of the population; these data are especially subject to the effects of sampling variability, misreporting, and processing errors.

Percents that round to less than 0.1 are not shown but indicated as zero (i.e., "—"). The median, which is a type of average, is the middle value in a distribution; i.e., the median divides the distribution into two equal parts—one-half of the cases fall below the median and one-half of the cases exceed the median. When the median falls in the lower terminal category of an open-end distribution, the method of presentation is to show the initial value of the next category followed by a minus sign; thus, for example, if the median falls in the category "Less than

\$250," it is shown as "\$250—." When the median falls in the upper terminal category of an open-end distribution, the method of presentation is to show the initial value of the terminal category followed by a plus sign; thus, for example, if the median falls in the category "\$10,000 and over," it is shown as "\$10,000+." The mean is the arithmetic average derived by adding the values in a particular distribution and dividing by the number of units in the distribution.

Symbols.—A dash "—" signifies zero. Three dots "..." mean not applicable, or that the base for the derived figure is too small for it to be shown. The symbol "NA" means not available.

Boundaries.—The data shown for 1970 relate to boundaries as they existed on January 1, 1970. Information on boundary changes between 1960 and 1970 for certain types of areas is given in the Volume I report for each State.

DATA COLLECTION PROCEDURES

The 1970 census was conducted primarily through self-enumeration. In 1960, self-enumeration was first introduced on a nationwide scale as a substitute for the traditional census direct interview.

A census questionnaire was delivered by postal carriers to every household several days before Census Day, April 1, 1970. This questionnaire contained certain explanatory information and was accompanied by an instruction sheet; in areas with comparatively large proportions of Spanish-speaking persons, a Spanish version of the instruction sheet was also enclosed. Facsimiles of the questionnaires and instructions to respondents are included in the Volume I reports.

In the larger metropolitan areas and some adjacent counties, altogether containing about three-fifths of the population of the United States, the householder was requested to fill out and mail back the form on Census Day. Approximately 87 percent of the householders returned their forms by mail. The mailed-back forms were reviewed by the census enumerator (or, in some localities, a census clerk) and if the form was determined to be incomplete or inconsistent, a followup was made. The bulk of these followups were made by telephone, the rest by personal visit. For the households which did not mail back their forms, a followup was also made, in almost all cases by personal visit and in the remainder by telephone.

For the remaining two-fifths of the population, the householder was requested to fill out the form and give it to the enumerator when he called; approximately 80 percent did so. Incomplete and unfilled forms were completed by interview during the enumerator's visit.

Three types of questionnaires were used throughout the country; 80 percent of the households answered a form containing a limited number of population and housing questions, and the remainder, split into 15-percent and 5-percent samples, answered forms which contained these questions as well as a number of additional questions. Some of the additional questions were the same on the 15-percent and 5-percent versions; others were different. A random procedure was used to determine which of the three forms any particular household answered.

In the metropolitan and adjacent areas, the designated type was sent to each household. In the remaining

areas, the questionnaire with a limited number of questions was distributed to all households, and the enumerators asked the additional questions in those households designated for the 15-percent and 5-percent samples.

PROCESSING PROCEDURES

The 1970 census questionnaires were specially designed to be processed by FOSDIC (Film Optical Sensing Device for Input to Computer). For most items on the questionnaire, the information supplied by the respondent or obtained by the enumerator was indicated by marking the answers in pre-designated positions that would be "read" by FOSDIC from a microfilm

copy of the questionnaire onto computer magnetic tape with no intervening manual processing. Among the items covered in this report, however, a number required reviewing written entries to determine the proper code. Consequently, the processing involved a manual coding and editing operation in which clerks determined the appropriate codes and marked the specified positions on the questionnaire; for example, the clerks applied a 2-digit numerical code for the State-of-birth entry. These marks as well as those made by the respondent and enumerator were read by FOSDIC onto magnetic tape.

The tape containing the information from the questionnaires was proc-

essed on the Census Bureau's computers through a number of editing and tabulation steps (see Appendix C, "Accuracy of the Data"). Figures shown in this series of reports may differ from comparable figures in Volume I because of differences in processing.

One of the end results of the tabulation operation was a computer tape from which the tables in this report were prepared on a cathode-ray-tube phototypesetting machine at the Government Printing Office. Another end result was the summary tapes which are available for purchase, as described in Appendix D, "Publication and Computer Summary Tape Program."

Appendix B.—DEFINITIONS AND EXPLANATIONS OF SUBJECT CHARACTERISTICS

| | |
|-----------------------------------|--------------|
| GENERAL | App-3 |
| SOCIAL CHARACTERISTICS ... | App-3 |
| Age | App-3 |
| Race | App-3 |
| Spanish origin | App-3 |
| Years of school completed | App-3 |
| ECONOMIC CHARACTERISTICS | App-3 |
| Employment status | App-3 |
| Income in 1969 | App-4 |

GENERAL

As stated in Appendix A the 1970 census was conducted primarily through self-enumeration. The principal determinant for the responses was, therefore, the questionnaire and its accompanying instruction sheet. Furthermore, census takers were instructed, in their telephone and personal-visit interviews, to read the questions directly from the questionnaire. The definitions and explanations given below for each subject are largely drawn from various technical and procedural materials used in the collection of the data. This material helped the enumerative personnel to understand more fully the intent of each question and thus to resolve problem or unusual cases in a manner consistent with this intent. Also included is certain explanatory information to assist the user in the proper utilization of the statistics. Some terms that are briefly defined in this report are more fully explained in the Volume I reports. Volume I also contains facsimiles of the questionnaires and instructions to respondents. More complete definitions of the terms relating to the central subject of this report are presented in the Introduction.

SOCIAL CHARACTERISTICS

Age.—The age classification is based on the age of the person in completed years as of April 1, 1970, and was determined from the reply to questions on age and on month and year of birth.

Race.—Information on race was obtained primarily through self-enumeration, and the data represent essentially self-classification by people according to the race with which they identify themselves. For persons of mixed parentage who were in doubt as to their classification, the race of the person's father was to be used.

The category "white" includes persons who indicated their race as white, as well as persons who did not classify themselves in one of the specific race categories on the questionnaire but entered Mexican, Puerto Rican, or a response suggesting Indo-European stock.

The category "Negro" includes persons who indicated their race as Negro or black, as well as persons who did not classify themselves in one of the specific race categories on the questionnaire but had such entries as Jamaican, Trinidadian, West Indian, Haitian, and Ethiopian. The term "Negro and other races" includes persons of all races other than white.

Spanish origin.—The term "Spanish origin" relates to statistics based on the 5-percent sample. A person is classified as being of Spanish origin if his or her reply to the question on origin or descent was any of the following: Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish.

Years of school completed.—The information on years of school completed

was based on responses to two questions. The first called for the highest grade attended, regardless of "skipped" or "repeated" grades. Persons whose highest grade of attendance was in a foreign school system, or in an ungraded school whose highest level of schooling was measured by "readers," or whose training was received through a tutor were instructed to report the approximate equivalent grade in the regular United States school system. The second question on educational attainment asked whether or not the highest grade attended had been finished.

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 had finished it, (b) those who had attended the next higher grade but had not finished it, and (c) those still attending the next higher grade. Persons who have not completed the first year of elementary school are classified as having no years of school completed.

ECONOMIC CHARACTERISTICS

Employment status.—According to current definition, the labor force and the various employment status categories relate to the population 16 years old and over. However, in this series of reports, data are sometimes shown for persons 14 and 15 years old as well.

Reference week.—Data on employment status refer to the calendar week prior to the date on which respondents completed their questionnaires or were interviewed by enumerators. Since the week of enumeration was not the same for all persons, the reference week for employment data is not entirely uniform.

Employed.—Employed persons comprise all civilians 16 years old and over who were either (a) "at work"—those who did any work at all as paid employees or in their own business or profession, or on their own farm, or who worked 15 hours or more as unpaid workers on a family farm or in a family business; or (b) were "with a job but not at work"—those who did not work during the reference week but had jobs or businesses from which they were temporarily absent due to illness, bad weather, industrial dispute, vacation, or other personal reasons. Excluded from the employed are persons whose only activity consisted of work around the house or volunteer work for religious, charitable, and similar organizations.

Unemployed.—Persons are classified as unemployed if they were civilians 16 years old and over and: (a) were neither "at work" nor "with a job, but not at work" during the reference week, (b) were looking for work during the past 4 weeks, and (c) were available to accept a job.

Also included as unemployed are persons who did not work at all during the reference week and were waiting to be called back to a job from which they had been laid off.

Experienced unemployed.—Unemployed persons who have worked at any time in the past are classified as the "experienced unemployed."

Civilian labor force.—The civilian labor force consists of persons classified as employed or unemployed in accordance with the criteria described above.

Experienced civilian labor force.—The "experienced civilian labor force"

comprises the employed and the experienced unemployed.

Labor force.—The labor force includes all persons classified in the civilian labor force plus members of the Armed Forces (persons on active duty with the United States Army, Air Force, Navy, Marine Corps, or Coast Guard).

Not in labor force.—All persons 16 years old and over who are not classified as members of the labor force are defined as "not in labor force." This category consists mainly of students, housewives, retired workers, seasonal workers enumerated in an "off" season who were not looking for work, inmates of institutions, disabled persons, and persons doing only incidental unpaid family work (less than 15 hours during the reference week).

Income in 1969.—Information on money income received in the calendar year 1969 was requested from all persons 14 years old and over. "Total income" is the algebraic sum of amounts received as wage or salary income, self-employment income, and income other than earnings. 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. Self-employment income may be subdivided into farm

and nonfarm self-employment income. Earnings is the algebraic sum of wage or salary income and self-employment income. Income other than earnings includes money income received from such sources as interest, dividends, net rental income, 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.

Family income is computed by summing the income of all family members 14 years old and over, whereas the income of unrelated individuals or persons 14 years old and over includes only their own income.

The income data presented in census reports are not directly comparable with estimates of aggregate personal income or per capita personal income prepared by the Bureau of Economic Analysis (BEA), formerly the Office of Business Economics, nor with the distribution of families and individuals by personal income brackets previously published by that agency. For a detailed explanation of the difference between the Census and BEA income definitions and coverage, see U.S. Bureau of the Census, **Current Population Reports, Series P-60, No. 75, "Income in 1969 of Families and Persons in the United States"** or the 1970 Census of Population Volume 1 reports.

Appendix C.—ACCURACY OF THE DATA

| | |
|------------------------------------|-------|
| SOURCES OF ERROR | App-5 |
| EDITING OF UNACCEPTABLE DATA | App-5 |
| ALLOCATION TABLES | App-5 |
| SAMPLE DESIGN | App-6 |
| RATIO ESTIMATION | App-6 |
| SAMPLING VARIABILITY | App-8 |

SOURCES OF ERROR

Human and mechanical errors occur in any mass statistical operation such as a decennial census. Errors during the data collection phase can include failure to obtain required information from respondents, obtaining incorrect or inconsistent information, and recording information in the wrong place or incorrectly. Errors can also occur during the field review of the enumerator's work, the clerical handling of the questionnaires, and the various stages of the electronic processing of the material. Careful efforts are made in every census to keep the errors in each step at an acceptably low level. Quality control and check measures are utilized throughout the census operation. As was done for the 1950 and 1960 censuses, evaluative material on many aspects of the 1970 census will be published as soon as the appropriate data are accumulated and analyzed.

EDITING OF UNACCEPTABLE DATA

The objective of the processing operation is to produce a set of statistics that describes the population as accurately and clearly as possible. To meet this objective, certain unacceptable entries were edited.

In the field, questionnaires were reviewed for completeness by a census

clerk or enumerator, and a followup was made for missing information. The major review occurred in the central processing office, where the editing and coding operation provided an opportunity to correct obvious errors in the respondents' entries for those items which required manual processing.

For a few of the items, the respondents' entries were reviewed for reasonableness or consistency on the basis of other information on the questionnaire. As a rule, however, editing was performed by hand only when it could not be done effectively by machine.

Because of the limitations of computer capacity and other resources, a number of complicated editing steps were not introduced when the effect on the final data was considered to be small. Thus, there may be a small number of cases having unlikely combinations of characteristics.

As one of the first steps in mechanical editing, the configuration of marks on the questionnaire was scanned electronically to determine whether it contained information for a person or merely spurious marks. If the questionnaire contained entries for at least two of the basic characteristics (relationship, sex, race, age, marital status), or for at least two relevant sample characteristics, the inference was made that the marks represented a person. Names were not used as a criterion of the presence of a person because the electronic scanning was unable to distinguish between a name and any other entry in the name space.

If any characteristics for a person were missing, they were, in most cases, supplied by allocation. Allocations, or assignments of acceptable codes in place of unacceptable entries, were needed most often where an entry for a given item was lacking or where the

information reported for a person on that item was inconsistent with other information for the person. As in earlier censuses, the general procedure for changing unacceptable entries was to assign an entry that was consistent with entries for other persons with similar characteristics. Thus, a person who was reported as a 20-year-old son of the household head, but for whom marital status was not reported, was assigned the same marital status as that of the last son processed in the same age group. The assignment of acceptable codes in place of blanks or unacceptable entries, it is believed, enhances the usefulness of the data.

The editing process also includes another type of correction; namely, the assignment of a full set of characteristics for a person. When there was indication that a housing unit was occupied but the questionnaire contained no information for any person, a previously processed household was selected as a substitute and the full set of characteristics for each substitute person was duplicated.

Specific tolerances were established for the number of computer allocations and substitutions that would be permitted. If the number of corrections was beyond tolerance, the questionnaires in which the errors occurred were clerically reviewed. If it was found that the errors resulted from damaged questionnaires, from improper microfilming, from faulty reading by FOSDIC of undamaged questionnaires, or from other types of machine failure, the questionnaires were reprocessed.

ALLOCATION TABLES

Some of the Volume II reports contain tables presenting allocation rates for the principal subject of the report and

showing the extent of allocation of that characteristic cross-classified by other selected characteristics. When such tables are included, they follow the numbered tables and are discussed in the introduction of the report. Additional allocation tables presented in Volume I, Part 1, **Characteristics of the Population, United States Summary** (tables C-1 to C-4) include rates for most of the subjects covered in the census. The information shown in these tables includes (1) the percent of the total population enumerated in the sample, (2) the allocation rate for each subject, and (3) the distributions for each subject before allocation. For a given subject the distribution before allocation may be compared with the corresponding statistics shown in the detailed tables to measure the net effect of allocation. Further explanation of the allocation tables is included in Appendix C of the Volume I reports.

SAMPLE DESIGN

For persons living in housing units at the time of the 1970 census, the housing unit, including all its occupants, was the sampling unit; for persons in group quarters identified in advance of the census, the sampling unit was the person. In nonmail areas, the enumerator canvassed his assigned area and listed all housing units in an address register sequentially in the order in which he first visited the units whether or not he completed the interview. Every fifth line of the address register was designated as a sample line, and the housing units listed on these lines were included in the sample. Each enumerator was given a random line on which he was to start listing and the order of canvassing was indicated in advance,

although the instructions allowed some latitude in the order of visiting addresses. In mail areas, the list of housing units was prepared prior to Census Day either by employing commercial mailing lists corrected through the cooperation of the post office or by listing the units in a process similar to that used in nonmail areas. As in other areas, every fifth housing unit of these lists was designated to be in the sample. In group quarters, all persons were listed and every fifth person was selected for the sample.

This 20-percent sample was subdivided into a 15-percent and a 5-percent sample by designating every fourth 20-percent sample unit as a member of the 5-percent sample. The remaining sample units became the 15-percent sample. Two types of sample questionnaires were used, one for the 5-percent and one for the 15-percent sample units. Some questions were included on both the 5-percent and 15-percent sample forms and therefore appear for a sample of 20 percent of the units in the census.

Other items appeared on either the 15-percent or the 5-percent questionnaires. An item collected on a 20-percent basis may have been tabulated on a 15- or 5-percent basis. The sample rate for tabulation is shown in the headnote of the table if the entire table is based on the same sample. For tables having figures based on different samples, the sample rates are explained under the heading "Sample size" in the introduction.

Although the sampling procedure did not automatically insure an exact 20-percent sample of persons or housing units in each locality, the sample design was unbiased if carried through according to instructions; generally for larger areas the deviation from 20 percent was found to be quite small.

Biases may have arisen, however, when the enumerator failed to follow his listing and sampling instructions exactly. Quality control procedures were used throughout the census process, however, and where there was clear evidence that the sampling procedures were not properly followed, some enumerators' assignments were returned to the field for resampling. For the United States as a whole 19.4 percent of the population and 19.6 percent of the housing units were enumerated in the sample. The bases for these percentages included several classes of the population for which no attempt at sampling was made. These were the relatively small numbers of persons and housing units (in most States, less than one percent) added to the enumeration from the post-census post office check, the various supplemental forms, and the special check of vacant units. (If these classes are excluded from the bases, the respective proportions become 19.6 and 19.7 percent.) The ratio estimation procedure described below adjusts the sample data to reflect these classes of population and housing units.

RATIO ESTIMATION

The statistics based on 1970 census sample data are estimates made through the use of ratio estimation procedures, which were applied separately for population and for housing data for each of the 5-, 15-, and 20-percent samples. The first step in carrying through the ratio estimates was to establish the areas within which separate ratios were to be prepared. These are referred to as "weighting areas." For the 15- and 20-percent samples, the weighting areas contained a minimum population size of 2,500. The weighting areas used for the

5-percent ratio estimate were larger areas, having a minimum population size of 25,000 and comprising combinations of the weighting areas used for the 15- and 20-percent samples. Weighting areas were established by a mechanical operation on the computer and were defined to conform, as nearly as possible, to areas for which tabulations are produced. Where these areas do not agree (primarily for smaller areas), there may be some differences between complete counts and sample estimates.

The ratio estimation process for population operated in three stages. The first stage employed 19 household-type groups (the first of which was empty by definition). The second stage used two groups, head of household and not head of household, and the third stage used 24 age-sex-race groups.

Group

STAGE I

Male head with own children under 18

- 1 1-person household
- 2 2-person household
- 3 3-person household

- 6 6-or-more-person household

Male head without own children under 18

- 7-12 1-person to 6-or-more-person households

Female head

- 13-18 1-person to 6-or-more-person households

- 19 *Group quarters persons*

STAGE II

- 20 *Head of household*

- 21 *Not head of household (including persons in group quarters)*

STAGE III

Male Negro

- 22 Age under 5 years
- 23 5-13
- 24 14-24
- 25 25-44
- 26 45-64
- 27 65 and older

Male, not Negro

- 28-33 Same age groups as for Male Negro

Female Negro

- 34-39 Same age groups as for Male Negro

Female, not Negro

- 40-45 Same age groups as for Male Negro

At each stage, for each of the groups, the ratio of the complete count to the weighted sample count of the population in the group was computed and applied to the weight of each sample person in the group. This operation was performed for each of the 19 groups in the first stage, then for the two groups in the second stage and finally for the 24 groups in the third stage. As a rule, the weighted sample counts within each of the 24 groups in the third stage should agree with the complete counts for the weighting areas. Close, although not exact, consistency can be expected for the two groups in the second stage and the 19 groups in the first stage.

There are some exceptions to this general rule, however. As indicated above, there may be differences between the complete counts and sample estimates when the tabulation area is not made up of whole weighting areas.

Furthermore, in order to increase the reliability, a separate ratio was not computed in a group whenever certain criteria pertaining to the complete count of persons and the magnitude of the weight were not met. For example, for the 20-percent sample the complete count of persons in a group had to exceed 85 persons and the ratio of the complete count to the unweighted sample count could not exceed 20. Where these criteria were not met, groups were combined in a specific order until the conditions were met. Where this occurred, consistency between the weighted sample and the complete counts would apply as indicated above for the combined group but not necessarily for each of the groups in the combination.

Each sample person was assigned an integral weight to avoid the complications involved in rounding in the final tables. If, for example, the final weight for a 20-percent group was 5.2, one-fifth of the persons in the group (selected at random) were assigned a weight of 6 and the remaining four-fifths a weight of 5.

The estimates realize some of the gains in sampling efficiency that would have resulted had the population been stratified into the groups before sampling. The net effect is a reduction in both the sampling error and possible bias of most statistics below what would be obtained by weighting the results of the sample by a uniform factor (e.g., by weighting the 20-percent sample results by a uniform factor of 5). The reduction in sampling error will be trivial for some items and substantial for others. A byproduct of this estimation procedure is that estimates for this sample are, in general, consistent with the complete count for the population groups used in the estimation procedure. A more com-

plete discussion of the technical aspects of these ratio estimates will be presented in a separate report.

SAMPLING VARIABILITY

The estimates from the 20-, 15-, and 5-percent sample tabulations are subject to sampling variability. The standard errors of these estimates can be approximated by using the data in tables A through C. The chances are about 2 out of 3 that the difference (due to sampling variability) between the sample 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 textbooks. The sampling errors may be obtained by using the factors shown in table C in conjunction with table A for absolute numbers and in conjunction with table B for percentages. These tables reflect the effect of simple response variance, but not of bias arising in the collection, processing, and estimation steps nor of the correlated errors enumerators introduce; estimates of the magnitude of some of these factors in the total error are being evaluated and will be published at a later date.

Table A shows approximate standard errors of estimated numbers for most statistics based on the 20-percent sample. 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 standard errors of most percentages based on the 20-percent sample. Linear interpolation in tables A and B will provide approximate results that are satisfactory for most purposes. Table C provides a factor by which the standard errors shown in tables A or B should be multiplied to adjust for the combined effect of the sample size (i.e., whether a 20-percent, 15-percent, or 5-percent sample), the sample design, and the estimation procedure.

To estimate the standard error for a given characteristic based on the 15- or 5-percent sample, or for a more precise estimate for the 20-percent sample, locate in table C the factor applying to the characteristic and sample size used to tabulate the data and multiply this factor by the standard error found in table A or B. If the estimate is not identified in table C, use the factor shown for "all other." Where data are shown as cross-classifications of two characteristics, locate and use the larger factor. Similarly, if an item, although collected on one sample basis, has been tabulated for a smaller sample, use the factor appropriate for the smaller sample.

The standard errors estimated from these tables are not directly applicable to differences between two sample estimates. In order to estimate the standard error of a difference, the tables are to be used somewhat 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 1970 sample statistics and complete-count statistics for 1960 or 1950), the standard error is identical with the standard error of the 1970 estimate alone.

2. For a difference between two sample figures (that is, one from 1970 and the other from 1960, or both from the same census year), the standard error is approximately the square root of the sum of the squares of the standard errors 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 1970 sample figure is derived directly from tables A through C. The standard error of a 25-percent 1960 sample figure may be obtained from the relevant 1960 census report or an approximate value may be obtained by multiplying the appropriate value in table A or B by 0.9.

3. For a difference between two sample estimates, one of which represents a subclass of the other, the tables can be used directly with the difference considered as the sample estimate.

The sampling variability of the medians presented in certain tables (median age, 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 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 on which the median is based (designated $\frac{N}{2}$). From table A, following the method outlined in other parts of this section, compute the standard error of an estimated number equal to $\frac{N}{2}$. Subtract this standard error from $\frac{N}{2}$. Cumulate the frequencies (in the table on which the median is based) until the total first exceeds 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 in the table on which the median is based 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 the number of children ever born per 1,000 women or mean income, presented in certain reports, 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.

An approximation to the variability of the mean may be obtained as follows: compute the standard deviation of the distribution on which the mean is based; divide this figure by the square root of one-fifth of the total units in the distribution; multiply this quotient by the factor from table C appropriate to the statistic and the actual sample rate on which the mean is based. If the distribution is not published in the detailed tables, calculate the standard deviation from a comparable distribution for a larger area or for a similar population group; divide by the square root of one-fifth of the units on which the mean of interest is based; multiply the quotient by the factor from table C.

APPENDIX C—Continued

TABLE A. Approximate Standard Error of Estimated Number Based on 20-Percent Sample

(Range of 2 chances out of 3; for factors to be applied see table C and text)

| Estimated number ¹ | Number of persons, families, or households in area ² | | | | | | | | |
|-------------------------------|---|--------|--------|---------|---------|-----------|-----------|-----------|------------|
| | 1,000 | 10,000 | 25,000 | 100,000 | 250,000 | 1,000,000 | 3,000,000 | 5,000,000 | 20,000,000 |
| 50 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| 100 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| 250 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| 500 | 30 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| 1,000 | ... | 60 | 60 | 65 | 65 | 65 | 65 | 65 | 65 |
| 2,500 | ... | 90 | 95 | 100 | 100 | 100 | 100 | 100 | 100 |
| 5,000 | ... | 100 | 130 | 140 | 140 | 140 | 140 | 140 | 140 |
| 10,000 | ... | ... | 150 | 190 | 200 | 200 | 200 | 200 | 200 |
| 15,000 | ... | ... | 150 | 230 | 240 | 240 | 240 | 240 | 240 |
| 25,000 | ... | ... | ... | 270 | 300 | 310 | 310 | 320 | 320 |
| 50,000 | ... | ... | ... | 320 | 400 | 440 | 440 | 440 | 450 |
| 75,000 | ... | ... | ... | 270 | 450 | 520 | 540 | 540 | 540 |
| 100,000 | ... | ... | ... | ... | 490 | 600 | 620 | 630 | 630 |

¹For estimated numbers larger than 100,000, the relative errors are somewhat smaller than for 100,000.

²An area is the smallest complete geographic unit 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 in the State or county, the Negro population, etc., do not represent complete areas. Total persons, families, or households for an area, if not available in this report, may be found in Volume 1, *Characteristics of the Population*.

TABLE B. Approximate Standard Error of Estimated Percentage Based on 20-Percent Sample

(Range of 2 chances out of 3; for factors to be applied see table C and text)

| Estimated percentage | Base of percentage | | | | | | |
|----------------------|--------------------|-------|-------|--------|--------|---------|---------|
| | 500 | 1,000 | 2,500 | 10,000 | 25,000 | 100,000 | 250,000 |
| 2 or 98 | 1.3 | 0.9 | 0.6 | 0.3 | 0.2 | 0.1 | 0.1 |
| 5 or 95 | 2.0 | 1.4 | 0.9 | 0.4 | 0.3 | 0.1 | 0.1 |
| 10 or 90 | 2.7 | 1.9 | 1.2 | 0.6 | 0.4 | 0.2 | 0.1 |
| 25 or 75 | 3.9 | 2.7 | 1.7 | 0.9 | 0.5 | 0.3 | 0.2 |
| 50 | 4.5 | 3.2 | 2.0 | 1.0 | 0.6 | 0.3 | 0.2 |

APPENDIX C—Continued

TABLE C. Factor to be Applied to Standard Error

(For cross-classifications of two or more items, use the factor for the item having the largest factor for the given sample rate)

| SUBJECT | Factor if sample rate is— | | |
|---|---------------------------|------------|-----------|
| | 20 percent | 15 percent | 5 percent |
| Race | 1.1 | 1.4 | 2.5 |
| Age | 0.8 | 1.0 | 1.8 |
| Household relationship | 0.5 | 0.6 | 1.1 |
| Families and subfamilies ¹ | 0.6 | 0.7 | 1.3 |
| Unrelated individuals | 1.3 | 1.5 | 2.8 |
| Type of group quarters | 0.6 | 0.7 | 1.2 |
| Marital status | 0.6 | 0.7 | 1.4 |
| Marital history | — | — | 2.0 |
| State of birth | 1.3 | 1.6 | 2.9 |
| Country of origin | | | |
| Foreign born | — | 1.6 | 2.9 |
| Foreign stock | — | 1.6 | — |
| Spanish origin ² | — | — | 2.9 |
| Spanish heritage ² | — | 1.6 | — |
| Nativity and parentage | — | 1.7 | 3.1 |
| Mother tongue | — | 1.8 | — |
| Citizenship | — | — | 3.3 |
| Year of immigration | — | — | 3.3 |
| Year moved in to present house | — | 1.9 | — |
| Residence in 1965 | — | 2.0 | 3.7 |
| Rural farm and nonfarm residence | 1.7 | 2.0 | 3.7 |
| School enrollment | — | 1.0 | 1.8 |
| Years of school completed | 1.0 | 1.2 | 2.3 |
| Vocational training | — | — | 1.7 |
| Veteran status | — | 0.9 | — |
| Disability | — | — | 2.4 |
| Labor force status or participation | 0.8 | 0.9 | 1.6 |
| Unemployed | 1.1 | 1.3 | 2.4 |
| Hours worked | 0.8 | 0.9 | 1.6 |
| Weeks worked in 1969 | 0.8 | 0.9 | 1.6 |
| Year last worked | 0.8 | 0.9 | 1.6 |
| Activity 5 years ago | 0.8 | 0.9 | 1.6 |
| Place of work | — | 1.3 | — |
| Means of transportation to work | — | 1.3 | — |
| Occupation | 1.1 | 1.3 | 2.3 |
| Industry | 1.1 | 1.3 | 2.3 |
| Class of worker | 1.1 | 1.3 | 2.3 |
| Income in 1969 | | | |
| Persons | 1.0 | 1.2 | 2.2 |
| Families ¹ | 1.0 | 1.2 | 2.3 |
| Poverty status in 1969 | | | |
| Persons | 1.8 | 2.2 | 4.0 |
| Families ¹ | 1.1 | 1.2 | 2.3 |
| All other | 1.0 | 1.2 | 2.2 |

¹When determining the standard error of a number that relates to families or households rather than to persons, use the number of families or households in the area rather than the population of the area for selecting the appropriate column in table A.

²Tabulations of characteristics for persons of Spanish heritage (Puerto Rican birth or parentage, Spanish language or Spanish surname) are based on the 15-percent sample, and the appropriate factor is found in the 15-percent column for the subject or for Spanish heritage, whichever is the larger. Tabulations of characteristics for persons of Spanish origin are based on the 5-percent sample, and the appropriate factor is found in the 5-percent column for the subject or for Spanish origin whichever is the larger.

Appendix D.—PUBLICATION AND COMPUTER SUMMARY TAPE PROGRAM

The results of the 1970 Census of Population and Housing are being issued in the form of printed reports, microfiche copies of the printed reports, computer summary tapes, computer printouts, and microfilm. Listed below are short descriptions of the final report series and computer tapes, as currently planned. More detailed information on this program can be obtained by writing to the Publications Distribution Section, Social and Economic Statistics Administration, Washington, D.C. 20233.

Population Census Reports

Volume I. CHARACTERISTICS OF THE POPULATION

This volume will consist of 58 "parts"—number 1 for the United States, numbers 2 through 52 for the 50 States and the District of Columbia in alphabetical order, and numbers 53 through 58 for Puerto Rico, Guam, Virgin Islands, American Samoa, Canal Zone, and Trust Territory of the Pacific Islands, respectively. Each part, which will be a separate clothbound book, will contain four chapters designated as A, B, C, and D. Each chapter (for each of the 58 areas) will first be issued as an individual paperbound report in four series designated as PC(1)-A, B, C, and D, respectively. The 58 PC(1)-A reports have been specially assembled and issued in a clothbound book, designated as Part A.

■ Series PC(1)-A. NUMBER OF INHABITANTS

Final official population counts are presented for States, counties by urban and rural residence, standard metropolitan statistical areas (SMSA's), urbanized areas, county subdivisions, all incorporated places, and unincorporated places of 1,000 inhabitants or more.

■ Series PC(1)-B. GENERAL POPULATION CHARACTERISTICS

Statistics on age, sex, race, marital status, and relationship to head of household are presented for States, counties by urban and rural residence, SMSA's, urbanized areas, county subdivisions, and places of 1,000 inhabitants or more.

■ Series PC(1)-C. GENERAL SOCIAL AND ECONOMIC CHARACTERISTICS

Statistics are presented on nativity and parentage, State or country of birth, Spanish origin, mother tongue, residence 5 years ago, year moved into present house, school enrollment (public or private), years of school completed, vocational training, number of children ever born, family composition, disability, veteran status, employment status, place of work, means of transportation to work, occupation group, industry group, class of worker, and income (by type) in 1969 of families and individuals. Each subject is shown for some or all of the following areas: States, counties (by urban, rural-nonfarm, and rural-farm residence), SMSA's, urbanized areas, and places of 2,500 inhabitants or more.

■ Series PC(1)-D. DETAILED CHARACTERISTICS

These reports cover most of the subjects shown in Series PC(1)-C, above, presenting the data in considerable detail and cross-classified by age, race, and other characteristics. Each subject is shown for some or all of the following areas: States (by urban, rural-nonfarm, and rural-farm residence), SMSA's, and large cities.

Volume II. SUBJECT REPORTS

Each report in this volume, also designated as Series PC(2), will concentrate on a particular subject. Detailed information and cross-relationships will generally be provided on a national and regional level; in some reports, data for States or SMSA's will also be shown. Among the characteristics to be covered are national origin and race, fertility, families, marital status, migration, education, unemployment, occupation, industry, and income.

Housing Census Reports

Volume I. HOUSING CHARACTERISTICS FOR STATES, CITIES, AND COUNTIES

This volume consists of 58 "parts"—number 1 for the United States, numbers 2 through 52 for the 50 States and the District of Columbia in alphabetical order, and numbers 53 through 58 for Puerto Rico, Guam, Virgin Islands, American Samoa, Canal Zone, and Trust Territory of the Pacific Islands, respectively. Each part, which is a separate clothbound book, contains two chapters designated as A and B. Each chapter (for each of the 58 areas) is issued as an individual paperbound report in two series designated as HC(1)-A and B, respectively.

■ Series HC(1)-A. GENERAL HOUSING CHARACTERISTICS

Statistics on tenure, kitchen facilities, plumbing facilities, number of rooms, persons per room, units in structure, mobile home, telephone, value, contract rent, and vacancy status are presented for some or all of the following areas: States (by urban and rural residence), SMSA's urbanized areas, places of 1,000 inhabitants or more, and counties.

■ Series HC(1)-B. DETAILED HOUSING CHARACTERISTICS

Statistics are presented on a more detailed basis for the subjects included in the Series

HC(1)-A reports, as well as on such additional subjects as year moved into unit, year structure built, basement, heating equipment, fuels, air conditioning, water and sewage, appliances, gross rent, and ownership of second home. Each subject is shown for some or all of the following areas: States (by urban, rural-nonfarm, and rural-farm residence), SMSA's, urbanized areas, places of 2,500 inhabitants or more, and counties (by rural and rural-farm residence).

Volume II. METROPOLITAN HOUSING CHARACTERISTICS

These reports, also designated as Series HC(2), cover most of the 1970 census housing subjects in considerable detail and cross-classification. There is one report for each SMSA, presenting data for the SMSA and its central cities and places of 50,000 inhabitants or more, as well as a national summary report.

Volume III. BLOCK STATISTICS

One report, under the designation Series HC(3), is issued for each urbanized area showing data for individual blocks on selected housing and population subjects. The series also includes reports for the communities outside urbanized areas which have contracted with the Census Bureau to provide block statistics from the 1970 census.

Volume IV. COMPONENTS OF INVENTORY CHANGE

This volume will contain data on the disposition of the 1960 inventory and the source of the 1970 inventory, such as new construction, conversions, mergers, demolitions, and other additions and losses. Cross-tabulations of 1970 and 1960 characteristics for units that have not changed and characteristics of the present and previous residence of recent movers will also be provided. Statistics will be shown for 15 selected SMSA's and for the United States and regions.

Volume V. RESIDENTIAL FINANCE

This volume will present data regarding the financing of privately owned nonfarm residential properties. Statistics will be shown on amount of outstanding mortgage debt, manner of acquisition of property, homeowner expenses, and other owner, property, and mortgage characteristics for the United States and regions.

**Volume VI.
ESTIMATES OF "SUBSTANDARD"
HOUSING**

This volume will present counts of "substandard" housing units for counties and cities, based on the number of units lacking plumbing facilities combined with estimates of units with all plumbing facilities but in "dilapidated" condition.

**Volume VII.
SUBJECT REPORTS**

Each report in this volume will concentrate on a particular subject. Detailed information and cross-classifications will generally be provided on a national and regional level; in some reports, data for States or SMSA's may also be shown. Among the subjects to be covered are housing characteristics by household composition, housing of minority groups and senior citizens, and households in mobile homes.

Joint Population-Housing Reports

**Series PHC(1).
CENSUS TRACT REPORTS**

This series contains one report for each SMSA, showing data for most of the population and housing subjects included in the 1970 census.

**Series PHC(2).
GENERAL DEMOGRAPHIC TRENDS FOR
METROPOLITAN AREAS, 1960 TO 1970**

This series consists of one report for each State and the District of Columbia, as well as a national summary report, presenting statistics for the State and for SMSA's and their central cities and constituent counties. Comparative 1960 and 1970 data are shown on population counts by age and race and on such housing subjects as tenure, plumbing facilities, value, and contract rent.

**Series PHC(3).
EMPLOYMENT PROFILES OF SELECTED
LOW-INCOME AREAS**

This series consists of 76 reports, each presenting statistics on the social and economic characteristics of the residents of a particular low-income area. The data relate to low-income neighborhoods in 51 cities and seven rural poverty areas. Each report provides statistics on employment and unemployment, education, vocational training, availability for work, job history, and income, as well as on value or rent and number of rooms in the housing unit.

Additional Reports

**Series PHC(E).
EVALUATION REPORTS**

This open series will present the results of the extensive evaluation program conducted as an integral part of the 1970 census program, and relating to such matters as completeness of enumeration and quality of the data on characteristics.

**Series PHC(R).
PROCEDURAL REPORTS**

This open series presents information on various administrative and methodological aspects of the 1970 census, and will include a comprehensive procedural history of the 1970 census. The first report issued focuses on the forms and procedures used in the data collection phase of the census.

Computer Summary Tapes

The major portion of the results of the 1970 census are produced in a set of six tabulation counts. To help meet the needs of census users, these counts are designed to provide data with much greater subject and geographic detail than it is feasible or desirable to publish in printed reports. The data so tabulated are generally available—subject to suppression of certain detail where necessary to protect confidentiality—on magnetic computer tape, printouts, and microfilm, at the cost of preparing the copy.

First Count—source of the PC(1)-A reports; contains about 400 cells of data on the subjects covered in the PC(1)-B and HC(1)-A reports and tabulated for each of the approximately 250,000 enumeration districts in the United States.

Second Count—source of the PC(1)-B, HC(1)-A, and part of the PHC(1) reports; contains about 3,500 cells of data covering the subjects in these reports and tabulated for the approximately 35,000 tracts and 35,000 county subdivisions in the United States.

Third Count—source of the HC(3) reports; contains about 250 cells of data on the subjects covered in the PC(1)-B and HC(1)-A reports and tabulated for approximately 1,500,000 blocks in the United States.

Fourth Count—source of the PC(1)-C, HC(1)-B, and part of the PHC(1) reports; contains about 13,000 cells of data covering the subjects in these reports and tabulated for the approximately 35,000 tracts and 35,000 county subdivisions in the United States; also contains about 30,000 cells of data for each county.

Fifth Count—contains approximately 800 cells of population and housing data for 5-digit ZIP code areas in SMSA's and 3-digit ZIP code areas outside SMSA's; the ZIP code data are available only on tape.

Sixth Count—source of the PC(1)-D and HC(2) reports; contains about 260,000 cells of data covering the subjects in these reports and tabulated for States, SMSA's, and large cities.

The tapes are generally organized on a State basis. To use the First Count and Third Count tapes, it is necessary to purchase the appropriate enumeration district and block maps.

The term "cells" used herein to indicate the scope of subject content of the several counts refers to each figure or statistic in the tabulation for a specific geographic area. For example, in the Third Count, there are six cells for a cross-classification of race by sex: three categories of race (white, Negro, other race) by two categories of sex (male, female).

In addition to the above-mentioned summary tapes, the Census Bureau makes available for purchase certain sample tape files containing population and housing characteristics as shown on individual census records. These files contain no names or addresses, and the geographic identification is sufficiently broad to protect confidentiality. There are six files, each containing a 1-percent national sample of persons and housing units. Three of the files are drawn from the population covered by the census 15-percent sample and three from the population in the census 5-percent sample. Each of these three files provides a different type of geographic information: One identifies individual large SMSA's and, for the rest of the country, groups of counties; the second identifies individual States and, where they are sufficiently large, provides urban-rural and metropolitan-nonmetropolitan detail; and the third identifies State groups and size of place, with each individual record showing selected characteristics of the person's neighborhood.

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
Washington, D.C. 20402
OFFICIAL BUSINESS
FIRST CLASS MAIL

POSTAGE AND
FEES PAID
U.S. GOVERNMENT
PRINTING OFFICE
375

